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Block Scheduling: A Comparison Of Block Scheduling And Traditional Scheduling And Its Relationship To Student Achievement, Student Satisfaction And Teacher Methodology In A Junior-Senior High School In New Jersey

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BLOCK SCHEDULING:

**A COMPARISON OF BLOCK SCHEDULING AND TRADITIONAL
SCHEDULING AND ITS RELATIONSHIP TO STUDENT ACHIEVEMENT,
STUDENT SATISFACTION AND TEACHER METHODOLOGY IN A JUNIOR-
SENIOR HIGH SCHOOL IN NEW JERSEY.**

**BY
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**Submitted in partial fulfillment of the
requirements for the Degree of Doctor in Education
Seton Hall University**

1999

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DEDICATION

To my mother and father, Mary and Pat, I thank them for always being there for me and encouraging my educational pursuits throughout my life. To my daughters, Ida-Marie, Dina and Samantha, I thank them for their continual encouragement and for giving me the inspiration to excel. And, to my wife and best friend, Barbara, I thank her for supporting my goals, listening when I needed to confide in her, and believing that I could succeed.

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Chapter 1

INTRODUCTION

Introduction

Criticism of the American educational system as outlined in such reports as Nation at Risk (National Commission on Excellence in Education, 1993) is further delineated by Fullan (1991) who states that there is a need for public school improvement.

The U.S. Department of Education released America 2000: An Education Strategy. Secretary of Education, Lamar Alexander, reported that all of this country's educational trends were flat. "Our country is idling its engines, not knowing . . . nor being able to do enough to make America all that it should be" U.S. Department of Education, 1991.

Prisoners of Time states that time is the missing element in the great national debate about learning. It asserts that our schools are hampered by the dynamics of the clock as well as the calendar. The school clock thus, "Governs how families organize their lives, how administrators oversee their schools, and how teachers work their way through the curriculum." Most importantly, the clock controls how material is presented to students and the opportunity they have to comprehend and master it" (National Commission on Time and Learning, 1994).

Evidence presently exists that the current organization of the American Educational System scheduling was not conducive to the best teaching and learning environment. This lack of success is evidenced by high dropout rates, low critical

thinking and writing, spelling and math. This was indicated in such reports as A Nation at Risk (National Commission on Excellence in Education, 1983) Making the Grade, (Tock, 1983), and High School: A Report on Secondary Education (Carnegie Foundation, 1983). The test scores and achievement scores, as stated in these reports, are far below other industrialized nations. In addition, the reports indicate that thinking and writing skills were at low levels. Moreover, SAT scores and achievement test scores declined. In fact, thirteen percent of all 17-year-olds were found to be functionally illiterate, especially for the minority youth.

A desire for improving public schools is greatly recognized and as a result two types of reform movements have evolved: intensification and restructuring (Fullen, 1991). There is much focus on intensification reforms in the area of curriculum. Albert Shanker (1990) stated that the attempt to improve achievement was made by "enacting a regimen of central regulations." Elmore (1991) states that restructuring focuses on either teaching and learning in schools, the conditions under which teachers work, and the governance and incentive structures under which schools presently operate. One way of restructuring would be to change the traditional school time schedule that divides the teachers and students into various groups for a limited time period. Schools could schedule two three-hour classes a day for 60 days or even a four-hour class for 30 days. In the United States, however, it is unusual to see any change from the traditional schedule. Students usually attend six or seven 45-minute classes each day and teachers teach five or six periods a day.

A change in time schedule to longer classes and fewer classes per day allows changes in teaching and learning and the conditions under which teachers work in the high school. The change to fewer and longer classes is one argument that can be supported. For example, Dewey (1938) believed that time had to be spent determining the needs and interests of students and then meaningful teaching and learning experiences could be based on that knowledge. Positive relationships between teachers and students are another condition for good teaching and learning. Aspy (1977) stated that students are not going to learn what they do not enjoy. Homans' theory (1974) about group relationships indicates that increased contact would lead to greater interactions, resulting in more positive collaboration and sentiments. These studies in conjunction with similar studies, indicate that the traditional schedule results in the following conditions in larger daily student class sizes, ineffective and inefficient use of teacher time, difficulty for teachers to learn and plan lessons that would meet the needs and interest of students, poor student and teacher relationships, inadequate opportunity for teachers to use a variety of teaching activities and methods, inadequate student interest and concentration, and inadequate learning outcomes.

Altering the daily structure of the high school student can affect many aspects of learning. Time impacts appropriate instruction, resource allocations, and the goals of the school. Time must remain flexible because of the possibilities it affords and limitations it sets (Lohr and McGrevin, 1990).

Although evidence of poor performance of traditional scheduling exists and other types of scheduling are associated with superior outcomes, few schools have moved towards a change in their time schedules. The pace of changing the traditional high school schedule has been very low. This is in spite of evidence that the benefits of intensified scheduling would have on teaching, learning and social interaction.

Carroll (1990) stresses that the structure of the American high school schedule is governed by six or seven period schedules--the traditional Carnegie system. Such organization and management presents students with the task of coping daily with six or seven different teachers, sets of class rules, and homework assignments. In addition, high school students must deal with personal problems, as well as job-related problems. Traditional schedules also pose problems for teachers who must provide instruction for up to 150 students per day in 45- to 55-minute time frames, and as many as five different class preparations (Edwards, 1993). Credit for each course is calculated in Carnegie units, a system that has been around for 70 years and uses a direct correlation between learning and time spent in class.

The Carnegie unit is basically a bonus awarded for the fulfillment of a designated number of hours of instruction (Powell, 1976). The origins of the Carnegie unit can be traced to the industrial standardization reforms of the early twentieth century. In other words, the amount of time is directly related to the amount of production. Consequently, a "factory-like" system of education was born from the aspect that learning was a form of production of a product in a given time constraint (Kruse and Kruse, 1995).

Sizer (1992) agrees that traditional scheduling in American schools creates large daily student loads for teachers. The more classes a teacher instructs per day, the greater the student load. Sizer is of the opinion that alternative scheduling could alleviate this situation. Intensive scheduling, for example, could reduce the daily load of students per teacher to 20-35 instead of the traditional 125-200 without increasing funding (Carroll, 1989; Canady and Hotschkiss, 1984).

The daily structure plays a vital role in the educational process. The impact of scheduling may allow a wide range of opportunities or it may delineate the boundaries of a school's program (Hart, 1994). According to the N.W. Regional Educational Lab (1990), the schedule is the time management tool that enables the implementation of a school's educational program and goals. The student's daily routine should be a product of the community's curricular philosophy (Carroll, 1987; 1990). It is created to satisfy the educational needs of the school or some philosophical perspective of the curriculum (Dempsey and Traverso, 1983). The process of the scheduling is, therefore, related to the educational philosophy of a school (Dempsey and Traverso, 1983).

There are some major criticisms of traditional structure. Some of them include:

1. The traditional daily structure of a high school student puts an individual in contact with up to eight instructors per day, creating a removed relationship between teacher and student (Canady and Rettig, 1995b; Carroll, 1990; Sizer, 1992).

2. The student teacher ratio may surpass 150-200 students per week (Canady and Rettig, 1995b; Carroll, 1990; Sizer, 1992).
3. Class changes may create discipline problems (Canady and Rettig, 1992).
4. Traditional schedules are limiting because there is no flexibility for instructional possibilities (Canady and Rettig, 1992; Dempsey and Traverso, 1983; Marshak, 1997; Sizer, 1992).
5. The traditional structure is not user-friendly; teachers could have as many as six preparations.

If the problem of scheduling were scientifically studied, Sizer (1992), maintains that the primary concern could be "How can adolescents be assisted in learning more efficiently?" Most likely, the solution would be a simplified schedule with a minimum number of subjects of study. In addition, it would be recommended that teachers have fewer than eighty students per day. The simple schedule would result in a longer class period yet lower student-to-teacher ratio. Both intensive schedule with its one class a day and macro-block scheduling with its two or three classes a day conform to these recommendations. After studying traditionally scheduled high schools, it can be concluded that although information is plentiful, learning how to apply this knowledge is stressful. Traditional schedules neither allow the time for one-on-one coaching, nor consider the process essential to understanding (Sizer, 1992).

Carroll (1990) and Canady and Rettig (1995b) view block scheduling as the best method to restructure and improve the high school curriculum. In their book

Block Scheduling: A Catalyst for Change in High Schools (1995a), Robert Canady and Michael Rettig refer to block scheduling as the "window of opportunity" through which teacher methodology and student success will grow and improve.

One of the results of the intensified scheduling would be to accomplish and attain many goals. Some of them would include the reduction in the number of failures, reduce dropout rates, reduce the stress for faculty and students, improve daily attendance, improve standardized test scores, improve grade point average, produce active, rather than passive, learners, improve student morale, produce a higher order of thinking skills, produce greater teacher-student relationships and reduce memorizing with learning skills.

Problem Statement

One of the arguments against block scheduling is that there is a decrease in actual hours of seat time of classroom instruction. By increasing the number of courses a student can take per year within the existing school day, class time per course may be reduced. Proponents of block scheduling agree that lecture time in block scheduling is less than it would be with a traditional schedule. A study indicating that instructional activities in a traditional setting averaged only 28 minutes (54.2 %) of each 55-minute class period (Canady and Rettig 1993).

Although time spent learning is an important factor in educational reform, little research has been conducted in this area. Advocates of block scheduling purport impressive advantages: achievement gains, improved student-teacher relationships, and such improved student outcomes as decreasing dropout rates, absenteeism, and

disciplinary referrals. While there is some support for such claims, there is a limited amount of research about block scheduling (Bateson, 1990; Canady and Rettig, 1995a, 1995b; Carroll, 1994a, 1994b; Guskee and Kifer, 1995; Sharman, 1990; Whitla, Bempechat, Perrone, and Carroll, 1992).

In order to fulfill student potential and increase student motivation, educators need to reexamine the method in which students are taught. Educators must redesign the structure of American education to maximize the school day as well as maximize the individualization of instruction.

While most educators believe that students should be instructed at a correct level of difficulty, and while this is reflected in many schools by their mission statement, very little time and research must be made to the restructuring of American education with regard to student satisfaction, student achievement and the improving of instructional methodology on the part of American educators.

This study analyzed three main parts. The first part examined student achievement. Students not only received better grades, but they also received more courses available to them which lead to greater amounts of knowledge (Smith, 1995).

The second point analyzed was student satisfaction. Student satisfaction also affects attendance. It was discovered that when block scheduling was implemented, student attendance increased (Butcher, 1996). If students are satisfied in their learning process, then there would be less discipline problems and lower dropout rates which would only increase the students' level of satisfaction (Canady and Rettig, 1995a).

Teacher methodology was the third area that was examined. It was determined that a change in schedule was a condition that translated into a change in teaching as well as in learning. (Carroll, 1994a) Block scheduling forced educators to alter their methods of teaching. Effective and innovative teaching methods were instituted into the teaching format which led to greater student success (Canady and Rettig, 1995a).

Need for the Study

Julia Anderson (1994), former deputy director of the National Education Commission on Time and Learning, believes that in order for education reform to meet the needs and goals of the changing population, schools must vary the use of learning time and "refine and even redefine--their role" (National Education Commission on Time and Learning, 1994).

The issues of time and learning are paramount and change will not occur unless these vital issues are dealt with. Time, as educational researchers agree, is the critical element for increasing student achievement. There has been a great amount of research on time and learning and it consistently reveals that the total instructional time in a specific curriculum area is positively related to student achievement.

Time has been considered to be so important in education that Public Law 102-62 caused the establishment of the National Education Commission on Time and Learning in 1991 to examine the relationship between time and learning. The Commission concluded that high schools are poorly designed and do not allow students the time required for in depth reflection. "Very few of us do serious,

imaginative, or intellectual work in 50 minute snippets, with the subject changed that previous hour and the following hour" (National Education Commission on Time and Learning, 1994).

Levin (1984) noted that the proportion of instructional time in which a student is involved in academic tasks is positively associated with learning. It must be noted though that time, as an educational variable, has not been researched enough. The former deputy director of National Education Commission on Time and Learning, Julia Anderson (1994), stated: "By varying the ways in which time is used for learning, schools have the capacity to refine - and even redefine - their role, shaping themselves to meet the goals of the education reform movement and of the needs of a changing population." This report calls for a lengthening of the now standard 180-day school year. The commission's investigation, which was 24 months of investigation, detected five dimensions of time that face American schools today. In addition to recommendations that the curriculum be expanded to match requirements of students in other industrialized nations, the report urged educators to use time in "new and better" ways. The report states that State and local boards work with schools to redesign education so that time becomes a factor supporting learning, not a boundary marking its limits. The conviction that learning goals should be fixed and time a flexible resource opens up profound opportunities for change. New uses of time should ensure that schools rely much less on the 51-minute period, after which teachers and students drop everything to rush off to the next class. Block scheduling—the use of two or more periods for extended exploration of complex

topics or for science laboratories—should become more common (National Commission on Time and Learning, 1994).

According to Prisoners of Time (1994) the school year needs to be lengthened.

Some of their suggestions were:

1. The fixed clock and calendar is a fundamental design flaw that must be changed.
2. Academic time has been stolen to make room for a host of non-academic activities.
3. Today's school schedule must be modified to respond to the great changes that have reshaped American life outside school.
4. Educators do not have the time they need to do their job properly.
5. Mastering world-class standards will require more time for almost all students.

According to the United States Department of Education, (see table 1) indicates that French students attend school 174 days a year, German students attend school 210 days a year, Japanese students attend school 220 days a year while students in Korea and Taiwan attend school 222 days a year. The United States Department of Education, (Walt, 1995) compiled a chart depicting the number of days and hours that students in the junior/ senior high school setting attend school. As the numbers indicate, students in the United States have the second fewest school days per year. Although the average hours spent in school per day is higher than most other nations, reports call for an increase in order to match foreign standards.

Table 1

Average Number of School Days Per Year - Worldwide

| | Average Days Per Year | Average Hours Per Day | Average Hours Per Year |
|---------------|-----------------------|-----------------------|------------------------|
| England | 192 | 6.0 | 960 |
| France | 174 | 6.2 | 1,073 |
| Germany | 210 | 4.6 | 966 |
| Japan | 220 | 4.0 | 875 |
| Korea | 222 | 4.4 | 977 |
| Taiwan | 222 | 5.3 | 1,177 |
| United States | 178 | 5.6 | 1,003 |

Source: Walt, K. (1995) State discusses length of school year. The Houston Chronicle pp. A 1m A 12013.

Another study completed by Odden of the Education Commission of the States, Toch (1983), calculated that it would cost the Nation over \$20 billion a year if the school day were extended to 8 hours.

Block scheduling is an alternative that schools are opting for to reorganize time much more efficiently. The basic premise of block scheduling is to create a longer period of time for each class. Many proponents of this type of scheduling believe that if students and teachers worked with fewer classes and fewer people each day, they could focus more on time and energy, thus improving instruction, increasing learning and student achievement. Kadel (1994) suggests two approaches to block scheduling:

1. Holding fewer classes per day that meet every other day for the full year; or
2. Scheduling fewer classes per term or more terms per year.

These classes can be taught in longer periods, such as ninety minutes for two or four hours a day. In addition, these classes may meet for different lengths during the school year such as forty-five, sixty, or ninety days. The benefits of this block scheduling could be more individualized instruction, a greater amount of flexibility in time for the students to learn and even a greater opportunity for more professional teacher involvement while instructional programming would include more flexibility in teaching techniques and more time for teacher preparation.

The use of block scheduling which provided teachers and students with longer "blocks" of instructional time and fewer daily classes became more popular during the 1990's. The premise behind block scheduling is that the longer learning periods allow for more in-depth study of the subject matter. In 1994, Cawelti reported that 10% of high schools already employed block scheduling, and 12% had partial implementation of block scheduling. However, by 1996, it was predicted that 38% of high schools in America would be instituting some form of block scheduling. Unfortunately, curriculum reform is often based upon trends rather than sound judgment.

For this reason, research is needed to determine the validity of the benefits of block scheduling as reported by its proponents (increased student achievement, improved student satisfaction, and improved instructional methodology). A comparative analysis between the benefits of block scheduling and traditional

scheduling needs to be conducted. This study was designed to provide school communities with valid information about the impact of block scheduling of high school student achievement, student satisfaction, and teacher methodology.

Purpose of the Study

The purpose of this study was to compare block scheduling and traditional scheduling and its relationship to, student achievement, student satisfaction and teacher methodology in a junior/senior high school in New Jersey.

Eight major research questions form the focus of this study:

1. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to the quantity and quality of courses taken?
2. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to grades in regular courses and grades in advanced placement courses?
3. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to honor roll?
4. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to a decrease in the number of failures per course?

5. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student attendance?
6. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student dropout rates?
7. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student disciplinary referrals?
8. Is there a difference between the mean scores of teacher observation in a traditional program and the mean scores of teacher observation in a block scheduling program with respect to instructional methodology utilized?

Hypotheses

The null hypotheses developed for the study were based upon the stated purpose of the study and the eight questions presented for research and analysis which support the purpose of this study.

Hypothesis #1. There is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student achievement (Research Questions #1, 2, 3, 4).

Hypothesis #2. There is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student satisfaction (Research Questions #5, 6, 7).

Hypothesis #3. There is no significant difference that exists between teachers operating in a traditional program and teachers operating under a block scheduling program with respect to teacher methodology (Research Question #8).

The basis of the dissertation was an in-depth analysis of 720 junior/senior high school students. A comparative analysis was conducted to determine if significant difference, if any, existed in student achievement, student satisfaction and teacher methodology with respect to this junior/senior high school operating under a traditional schedule and consequently under a block scheduling format. The school selected is the junior/senior high school located in Palisades Park, New Jersey. All of the students examined in this study were enrolled in this junior/senior high school.

The school was selected because it represented a highly diverse multi-cultural population and had adopted a block scheduling format for implementation in 1998 thus allowing collection of base line data for comparison purposes.

Limitations of the Study

Since only one junior/senior high school is analyzed in this study, caution is required in the comparison. To foster the assuredness that the inter-school discrepancies or similarities are the product of scheduling changes and no other agents, the analysis compares the school to themselves during the earlier, traditional school year schedule. With this in consideration, the second mode of in-school comparison should illustrate changes that are due to the new schedule.

This particular study sought the effects of "block scheduling" (four 80-minute periods per day) on various behaviors in certain students. Included on this list of behaviors is GPA, Honor Roll, attendance, discipline reports, dropouts and failures.

One benefit of this study is that it enables the research to isolate certain effects of the block scheduling upon the individual school. In addition, a small sized study augments reliability and validity of inference by avoiding statistical restrictions. Data can be handled with a degree of flexibility; students can be grouped and regrouped according to gender, GPA, etc. The data collection allows explanation of relationships of student outcomes to the block scheduling.

In order to generalize any findings of this study to other settings, research was needed to account for the size, location, and nature of the school. Because there are many kinds of schools with different characteristics, the conclusions of this study were restricted to the sample under investigation. The research results were carefully interpreted to not go beyond the relationship assumed to exist between the type of class scheduling and report differences in subjects.

The study was further restricted by the following limitations. The study was limited to one junior/senior high school in the state of New Jersey, therefore, the findings may not be applicable to other junior/senior high schools. Another limitation was that this study was conducted in a two-year pre- and post-design. Another limitation was that the teacher methodology data is limited to the subjective interpretations of the interns assigned to the observation design of this study.

Significance of the Study

During the 1990's there has been an increasing number of high schools employing a variety of block scheduling plans, providing teachers and students with longer "blocks" of instructional time and fewer daily classes. The intent has been to permit teachers and students the time to become immersed in subject matter. Cawelti (1994) reported that 11% of high schools already employed block scheduling, 12% had partial implementation, and in 1996 38% of high schools throughout the nation had implemented some form of block scheduling. As in other instances of educational innovation, the decision to implement a significant curricular change has often been based on trends and expert opinion rather than on evidence.

Comprehensive research in this area was significant. The significance of this study was to compare the factors of student achievement, student satisfaction and teacher methodology in a junior/senior high school prior to data under a traditional period schedule against similar factors after implementation of block scheduling.

The study holds significance for students who better achieve their goals as a student. The achievement was greatly significant by the various amount of studies that were explored in this study.

The study provided a means through which school districts can examine and improve its present method of teaching and to eliminate many of the problems that presently exist.

The study holds significance for the level that students are more satisfied with their educational experience and thus enhancing the way that they learned.

Finally, the study holds significance for the teacher methodology used and to the new focus of attention that was given by these educators to learn new more effective methods when educating the youth of today.

Definition of Terms

Block Scheduling. For the purpose of this study, the practice of extending the length of class periods and reducing the number of consecutive classes during an academic day. The number of days required to receive full credit is also reduced.

Carnegie Unit. For the purpose of this study, the traditional scheduling, 45-55 minute classes in a 6, 7, or 8 period day.

Copernican Plan. For the purpose of this study, the Copernican Plan is defined as a system of block scheduling which was originated by Joseph Carroll. The Copernican Plan is any restructured schedules with blocks of time longer than the traditional schedule of 45-50 minute periods. A student could take two classes each day for 180 minutes. The courses are completed in 30 days at which time the schedule changes.

Four by four schedule. For the purpose of this study, a block schedule in which students typically attend four classes per day and receive full credit in one semester.

Sign Test. For the purpose of this study, the appellation, sign test, is derived from the fact that it implements a plus or minus sign rather than a quantitative measure as its data. It is especially helpful for research in which quantitative measurement is impossible or impracticable. The sign test is appropriate in the case of two related samples where the experimenter desires to note that two conditions are different. The sole assumption underlying this test is that the variable under consideration has a

continuous distribution. The sign test does not make any suppositions regarding the form of the distribution of differences, nor does it assume that all subjects are taken from the same population. The different pairs may be different populations with respect to age, sex, intelligence, etc.; the only standard is that within each pair the experimenter has attained matching in reference to the relevant extraneous variables (Siegel, 1956).

Student Satisfaction. For the purpose of this study, student attendance, dropout rates, and disciplinary referrals that may be used as indicators of student behavioral patterns in relationship to school.

Student Achievement. For the purpose of this study, quantity and quality of courses, grades, honor roll and AP grades.

Traditional Schedule. For the purpose of this study, the placement of students in consecutive periods of seven (7) daily classes over the course of an academic year.

Teacher Methodology. For the purpose of this study, teachers interviewed by observation instrument that was developed by Copernican Associates (see Appendix A).

Organization of the Study

The initial chapter of the study introduces the issue of block scheduling and how it compared to the traditional type of scheduling that has been used for decades. The chapter examined evidence on the current attitudes that students had, on the amount of student satisfaction that existed, and the teacher methodology used in education. The chapter compared and contrasted the traditional positions with those same topics implemented under block scheduling.

The first chapter finally presented the statement of the problem, the need for the study, the purpose of the study, the hypotheses, the limitations of the study, the significance of the study and the definition of terms.

The second chapter presented an extensive literature review. This chapter explored research dealing with the amount of student satisfaction under the traditional way of learning and the amount of satisfaction that students gained under block scheduling. This chapter also examined student achievement under the traditional setting versus the student achievement under block scheduling. Finally, teacher methodology was examined and compared under these two types of learning. The literature review included information in a comparative manner throughout.

The third chapter established the methods and procedures through which data was collected and compiled. This chapter also explored the design of the study, the institution and subjects that were used in this study.

The fourth chapter presented the findings and identifies significant relationships and the variables.

The fifth chapter detailed the conclusions, implications, and recommendations of the study. Topics for further research were suggested as well as recommendations for practitioners in the field.

The study concludes with a detailed list of references and appendices supporting the conclusion of the major research question.

Chapter II

REVIEW OF LITERATURE

Introduction

The review of the literature was divided into four main sections. The first section described the nature of block scheduling. It indicated, through various studies, why block scheduling evolved and also described the various types of block scheduling that exist.

The second segment of review of literature dealt with student satisfaction as it relates to block scheduling. It explored such sub-topics as student attendance, student discipline, and student drop out rate.

The third area of review of literature examined student achievement and compared various findings of student achievement under the traditional program of studies versus the program of studies under the block scheduling proposal.

The fourth section in review of literature described teacher methodology with respect to block scheduling.

Block Scheduling

"A Nation at Risk" was a report that was published in 1983 by the National Commission on Excellence in Education. While criticizing the quality of education in the United States, the report sparked the onslaught of numerous other reports, which recommended, in particular, that schools examine the issue of scheduling. Canady and Rettig (1993), Carroll (1990) and the National Commission on Time and

Learning (1994), for example, encourage the use of block scheduling. Two advantages of block scheduling stated are: better use of time, and better educational climate.

Canady and Rettig (1995a) and Carroll (1989) describe the different types of block scheduling. Two models emerge as the basic structure of block scheduling.

The first configuration is presented in Table 2.

Table 2

Basic Structure of Block Scheduling

| PERIOD | Semester 1 | Semester 3 |
|--------|------------|------------|
| 1 2 | Course 1 | Course 5 |
| 3 4 | Course 2 | Course 6 |
| 5 6 | Course 3 | Course 7 |
| 7 8 | Course 4 | Course 8 |

This 4 x 4 block scheduling permits students to take four courses in the first semester and four courses in the second semester. Each teacher will be scheduled to teach three classes per semester. The length of each course is 90 minutes.

A major benefit of the 4 x 4 block scheduling is that it is a cost effective program which is a plus to any school system. According to Czaja and McGee (1995) block scheduling is advantageous for several reasons. In the first place, students can graduate in less than four years. In addition, teachers will teach three classes, rather

than the traditional five classes. Block scheduling will also be cost effective because less textbooks will need to be purchased because less students will need to use the same textbook at the same time.

Anderson, in 1993, reported on Champlin Park High School's change to a block schedule. He interviewed both students and staff. Students credited greater success to the extended period schedule. Staff reported that the schedule provided the time they needed to do instructional activities previously unavailable to them.

With this block schedule, teachers would teach only one class, thereby acquainting themselves better with students. Attendance taking would remain the teacher's responsibility, and afternoons could be used for extra help. In addition, Anderson found that, in smaller systems, teachers could work at neighboring schools during a four-week period. Also, the master schedule would be simple to build.

Ryan (1991) identifies the advantages for teachers of teaching 20 students per day in place of the traditional average of 125. He sees a very positive effect on the student-teacher relationship. Once a particular teacher's rules and expectations were established, students would be free to concentrate on their sole course. No time would be wasted on switching class locations. The four-block schedule, being used with frequency across the nation, greatly decreases fragmented instruction as reported by Canady and Rettig (1995). In "The Power of Innovative Scheduling", Canady and Rettig assert that the most critical time division issue facing schools is the fact that some students need more time to learn than others. Alternative schedules can greatly improve the quality of time students spend in school.

The second basic configuration described by Canady and Rettig (1995a) and Carroll (1990) is the Trimester Plan. Unlike the 4 x 4 block scheduling, the student is enrolled in only two classes per semester, as depicted in Table 3. Each class will be scheduled for 120-150 minutes each, thus allowing students to study a subject in depth.

Table 3

Variation Structure of Block Scheduling

| Trimester 1 | Trimester 2 | Trimester 3 |
|-------------|-------------|-------------|
| Course 1 | Course 3 | Course 5 |
| | Lunch | |
| Course 2 | Course 4 | Course 6 |

These models are not rigid in design. Variations of both have been successfully implemented. One such variation is the A/B block schedule whereby teachers will meet with their students on alternate days. Each student will take six to eight courses per year. Each class period lasts approximately 90 minutes. This variation may include one day of all odd numbered periods for 90 minutes each and on the next day, even numbered classes will meet for the same length of time. This scheduling would be in effect for the whole year. Table 4 presents an alternate day block schedule of six classes.

Table 4

Alternate Day Block Schedule - 6 Days

| Days | Monday Day 1 A | Tuesday Day 2 B | Wednesday Day 1 A | Thursday Day 1 A | Friday Day 2 B | Monday Day 1 A |
|---------|-------------------|--------------------|----------------------|---------------------|-------------------|-------------------|
| Block 1 | 1 | 2 | 1 | 2 | 1 | 2 |
| | 1 | 2 | 1 | 2 | 1 | 2 |
| Block 2 | 3 | 4 | 3 | 4 | 3 | 4 |
| | 3 | 4 | 3 | 4 | 3 | 4 |
| Block 3 | 5 | 6 | 5 | 6 | 5 | 6 |
| | 5 | 6 | 5 | 6 | 5 | 6 |

The format of the daily schedule is a key determinant of the ways in which a school's resources can foster the learning program (Lohr and McGrevin, 1990). In the majority of high schools across the country, students sit in classes for approximately 50 minutes--then pass to the next class and subject. Not only must students change locations, but also shift gears mentally as they change subjects. Although this rapidly changing schedule has been in practice for a long time, educators today are unsure whether it is the most productive way. As innovations in the classroom rise--such as cooperative learning, hands-on activities, long-term projects and interdisciplinary lessons--instructors are realizing that the traditional structure is limiting, Willis (1993).

As educators try to improve the quality of public school education, many aspects of a school's structure and function are under the microscope. All across the country, educators are examining the allocation of time during a regular school day,

seeking to discover if there is a way to organize more effective instruction. Kruse and Kruse (1995) offer that it would be most logical to begin educational reform by addressing the reality of how human beings learn, and, in turn, allowing this knowledge to direct decisions about how to alter the structure of the school day. Block scheduling in schools allows the greatest flexibility, in their opinion.

In Breaking Ranks: Changing an American Institution (National Association of Secondary School Principals, 1996), Commission in Partnership with the Carnegie Foundation for the Advancement of Teaching studies the restructuring of the American High School. Breaking Ranks discusses a concept developed primarily by high school principals. The narration is forceful because it offers the insider's viewpoint rather than being a criticism from the outside. As greater flexibility is sought, various suggestions are revealed in the area of time and organization.

Specifically it states:

1. Every high school teacher participating in the program on a full time basis will be responsible for contact time with no more than 90 students devote during a given term so that the teacher can devote more attention to individual needs.
2. High schools will develop flexible scheduling that permits more varied use of time in order to meet core curriculum requirements.
3. The Carnegie unit will be redefined or replaced so that high schools no longer measure learning by seat time.

4. The high school will reorganize the traditional departmental structure to meet the needs of a more integrated curriculum.

5. The academic program will extend beyond the high school campus to take advantage of outside learning opportunities.

Buckman, King and Ryan (1995), describe two Orlando, Florida high schools working toward providing success for their students by using restructuring plans.

Block scheduling improved attendance and increased grade point averages. A poll of teachers and students expressed school climate improvements in the areas of safety, success, involvement, commitment, interpersonal competence and satisfaction. The "Colonial High School" showed dramatic improvements in attendance, fewer suspensions, fewer disciplinary infractions and high grades in the first year of use. To confirm these effects of block scheduling, a survey based on effective School Battery (Goodlad, 1994) was given and revealed positive attitudes from staff and students on the learning environment.

One Arkansas high school is described by Wilson (1995). Here, the 4 x 4 block schedule is reportedly meeting students' and teachers' needs. Wilson charges the school with high success in instructional effectiveness. Satisfaction among students and staff is high. Wilson says that students and teachers view the new time structure favorably, yielding increased student achievement and satisfaction.

The preponderance of the literature which analyzes the use of time in high schools concentrates either on the logistics of scheduling or on variations of the traditional school day. There is some discussion of alternatives to the seven period

day. If block scheduling brings the opportunity for improved teaching and enhanced learning, clearly the educational community needs to consider the evidence.

Student Achievement

Proponents of block scheduling contend that this method of scheduling is particularly beneficial to the high-risk and low-achieving student (Canady and Rettig, 1993, 1995a; Carroll, 1990; Willis, 1993). Central Park in New York City is one school which is successfully implementing block scheduling as a means to benefitting disadvantaged students. The school uses a simplified schedule each day which includes consecutive, two-hour periods and two shorter periods, including lunch. The success of the scheduling is apparent in its low drop-out rate of 5 % compared with a citywide drop-out rate of 40 %. In addition, 90 % of its graduates attend college (Scherer, 1994).

Walters (1996) found that block scheduling is effective in curbing class cutting and discipline referrals, while increasing the number of students making honor roll from 5% to 8%, as well as significantly increasing scores on New York State Regents exams in January, 1996. He noted that the success of the program is due, in part, to an in-service course preparing teachers for block scheduling.

In a similar study, Butcher (1996) observed that his school reflected a decrease in failure rate, an increase in attendance rate and an increase in the number of students who received "A's". According to Carroll (1989), nearly 1,000 schools throughout the United States have adopted block scheduling, and educators involved in this schedule believe that it improved students' grades. Other studies also support the

positive effects of block scheduling. According to Walters (1996) there was a decrease in disciplinary problems, an increase in the Regents Examination scores and an increase in the number of students on the honor roll.

Furman and McKenna (1995) depicts the success of an upstate New York high school at restructuring its schedule according to a modified Copernican Plan. The Dover Renew 2000 block schedule splits the school year into trimesters; each term has two 120-minute periods and a shorter "interest" block. Furman and McKenna (1995), believes this tactic "dejuvenilizes" the high school and permits more focused learning time. The Dover 2000 was a pilot project. It is not a 4 x 4 block schedule, but yet another option that highlights longer class periods which lead to higher student success rates (Furman and McKenna, 1995).

Munroe (1989) conducted a study of block scheduling versus traditional scheduling at Amphitheater High School in Arizona. The comparison revealed that there was a greater improvement in the GPA's of students in the experimental group over the those adhering to the traditional scheduling.

Other advantages of block scheduling include: students get better grades, more students pass classes, and students avail themselves of additional course opportunities (Carroll, 1994a; Munroe, 1989; Scherer, 1994; Smith, 1995). Orange County High School, Virginia, as reported by Edwards (1995a), indicates that students completed more courses and improved grades. The percentage of "A" grades earned increased from 21% to 32%. In addition, more students were taking and passing advanced placement exams. As early as the end of the first year of instituting

block scheduling, students set a school record by earning 3's or higher on 85% of their advanced placement exams. In fact, 58 of the exams were marked 4 or higher. The following year the number of students taking advanced placement exams increased from 30 to 50, and 63% of the scores were measured at 3 or higher.

In his article, Schoenstein (1994) attempted to answer questions frequently asked by educators across the country regarding block scheduling. Schoenstein referred to Wasson High School in Colorado Springs, Colorado, where students had experienced block scheduling for 6 years. Schoenstein found that whereas teachers under the traditional scheduling are responsible for 150 students or more, under the 4 x 4 semester scheduling teachers are only responsible for 75-90 students. In addition, a student who is absent for a day will need to make up less work for fewer classes. Taking into account that less content might be covered under block scheduling, students learn concepts in more depth. He found that the school climate had changed significantly for the better. In particular, Schoenstein reported positive results in honor roll percentages, failure rates, daily attendance, and average class size, and the four-year college attendance rate had changed significantly for the better.

Glasser (1992), in The Quality School, says that what has emerged from the restructuring movement is a focus on changing the school structure. Goodlad (1994), in A Place Called School, asserts we must not only change the school structure but also change the methods in which time is used. Increased options and the ability to precipitate positive change according to these authors needs to be available. Lifelong learning is to be the final goal for students (Glasser, 1992; Goodlad, 1994). Block

scheduling is one reform that is suggested by educators as a step to solving education deficits.

According to Averett (1994); Canady and Rettig (1995b); Carroll (1990); Cawelti (1994); Marshak (1997); block schedules have been developed and introduced to accomplish some or all of the following goals.

1. Reduce the number of classes students must attend and prepare for each day and or term.
2. Allow students variable amounts of time for learning without lowering standards and without punishing those who need more or less time to learn.
3. Increase opportunities for some students to be accelerated or remediated.
4. Reduce the number of students teachers must prepare for an interact with each day and or term.
5. Reduce the number of courses for which teachers must prepare for each day and or term.
6. Reduce the fragmentation inherent in single period schedules, especially in classes that require extensive practice or laboratory work.
7. Provide teachers with blocks of teaching time that allows and encourages the use of active teaching strategies and greater student involvement.
8. Provide opportunities for interdisciplinary teaching.
9. Save time.
10. Provide additional opportunities for teachers to work with students.
11. Help teachers develop closer relationships with their students.

12. Reduce the number of class changes.

Reid (1995) reported his findings on the effects of block scheduling on the curriculum and students' achievement in English courses. He found that 90 % of the teachers prefer the 90-minute periods, and that most students believed they had improved their writing skills. Like Schoenstein, Reid reported that block and modified schedules resulted in reduced stress. Also, block scheduling enabled an acceleration of students' learning. Reid concluded that teachers and students supported the continuation of block scheduling since it proved advantageous for curriculum and instruction. Within four years, 192 out of 300 high schools in North Carolina adopted the new block schedule. At least one 4 x 4 schedule, according to Reid, exists in each state.

Similarly, Edwards (1995b) reported that after a full year with the 4 x 4 schedule, 94% of the teachers, and 93% of the students were in favor of block scheduling. Ninth graders and advanced placement students seemed to benefit the most from such scheduling. Edwards concluded that semester-length courses enable capable and motivated students to improve their grades. In addition, the 4 x 4 schedule allows four year high schools to offer up to a year of post-secondary study beyond the full high school program.

One Missouri high school, after investigating its alternatives, adopted the eight-block flexible scheduling model. In place of a 45-60 minute class period, the high school instilled a 94-minute period that meets every other day. This change was met by enthusiasm by staff and students according to Huff (1995). The 94-minute

period enabled teachers to develop key concepts while using diverse learning activities.

Fallon (1994) stated that the literature on block scheduling validated these relationships through the use of intensive education in summer schools and colleges. Fallon reported on Harvard research headed by Whitla (1992) who completed a study comparing a traditional scheduling program at Masconomet Regional High School in Massachusetts named Tradpro and a pilot program using block scheduling called Renpro in the same school. Whereas the Tradpro program included classes running 46 minutes, the Renpro classes were scheduled for longer hours. Students in the experimental block scheduling group were more satisfied with the teachers and the program. Parents reported higher student motivation, increased academic achievement, and better rapport with teachers. The experimental group also showed a higher GPA than the traditionally scheduled group.

Guskee and Kifer (1995) analyzed a block schedule restructuring program at Governor Thomas Johnson High School in Frederick, Maryland. After reviewing data collected one and one-half years into the program, it was concluded that there was little change in standardized test scores. However, a large number of students in the block scheduling program showed improvement in their scores, especially in mathematics and citizenship. Students taking advanced placement classes increased sharply as did the scores on the AP tests. Moreover, African American students' scores on the Maryland Functional Tests and on Advanced Placement Tests had improved. Data indicated, however, that there was no change in daily attendance or

drop-out rates. Teachers and students on the whole preferred block scheduling to traditional scheduling. Guskee and Kifer suggested that staff development, i.e. in-service training, is needed for successful implementation of block scheduling.

Parents expressed their concerns that block scheduling might not allow all material within a curriculum to be covered. However, since students were taking an additional course each year, the total curriculum coverage would be more.

Not all research regarding student achievement with respect to block scheduling is positive. In British Columbia, Canada, Bateson (1990), studied science achievement by administering a matrix style test to all tenth grade students. Out of the 30,116 students tested, 64% took science 10 in a traditional full year schedule, 28.3% took science 10 in a semester schedule, and 68% did not take science. The scores of the students in the traditional schedule were significantly higher than those in a semester format in 6 out of 6 areas. The most noticeable difference favored the traditional structure in the area labeled "rational and critical thinking".

Bateson's (1990) results were supported by findings by Marshall, Taylor, Bateson, and Bridgen (1990). Similar results were included in math when reporting data from the 1995 British Columbia Mathematics and Science Assessment. Of 29,183 students that took the grade 10 science test, 64% were in a full year schedule, 28% were in a semester schedule, and 8% were enrolled in a quarter plan. Results were in proportion with earlier findings; traditional students scored better than semester students, who scored better than the quarter plan students. Of the 24,250 students that took the tenth grade math test, 67% were in a traditional full year

schedule. These 67% scored higher than the 26% that represented the semester format group as well as the 7% who made up the quarter plan.

Studies incorporating data released by the British Columbia Ministry of Education by Gordon Gore (1995), concur with the studies of Bateson (1990), and Raphael, Wahlstrom, and McLean (1986a). They proved that during the 1994 - 1995 high school year that grades and Provincial Examination Scores were higher for students in full year courses in comparison to semester and quarter plan students.

An earlier Canadian study showed no discrepancies in mathematics achievement. This was a 3-year longitudinal study applied to ninth and tenth grade general level mathematics students. No noticeable differences in achievement were detected between full year schedule and semester schedule students (Stennett and Rachar, 1973).

In one study, Kramer (1997b, 1997c), compared standardized end of year course exams of students in a 4 x 4 semester block schedule to students in a traditional schedule setting. This was a study of North Carolina high schools that used the Averett (1994), study as a reference. The study was conducted in five subject areas including: Algebra I, Geometry, English I, U.S. History, and Economic and Legal Political Systems. The number of schools reporting results ranged from 21 with over 2,000 students tested annually for Algebra I to 27 with over 5,500 students tested annually for English I. The deviation in final test scores ranged from -0.4% to +1.5% compared to a standard deviation of 16.6% or more on each test. In comparison the state-wide average test score during that period decreased more than -

0.4% in all subject areas. Similarly to Averett (1994), Kramer (1997b), found that the data indicate a change to semester block schedules in North Carolina had either no effect or a minimally positive effect on achievement in these five subject areas. It should be noted that the time allocation per course was less under the semester block scheduling system in some of the schools.

Czaja and McGee (1995) conclude that students involved in block scheduling demonstrate less retention of material taught than those students in traditional scheduling. In other words, one 90-minute class is less effective than two 45-minute classes.

Bateson (1990) conducted a study on science courses taken by 30,000 sophomores in British Columbia, Canada whereby it was concluded that students in traditional programs outperformed those using block scheduling science classes. A similar finding was made by Raphael, Wahlstrom, and McLean (1986a) in reference to the effects of block scheduling in mathematics classes.

Other studies agree that block scheduling causes more problems than it solves (Ranck and Thompson, 1996). This research purports that discipline problems will not be reduced because students would be together in class for longer periods of time. In particular, Ranck and Thompson reported that SAT scores dropped in other schools which implemented block scheduling.

Panitz (1996) reported on a school in Barnstable, Massachusetts, which adopted block scheduling for one year after the enactment of the Educational Reform Act in 1993. This act requires increased class time and time spent on learning. It is

Panitz's belief that block scheduling is implemented for economic reasons, since teachers will be teaching six classes a day rather than five. However, research indicates that teachers cannot cover the same amount of material in half a year because students need time to absorb and retain material. He, too, found a decrease in SAT scores taken in January and believed it was due to the fact that teachers cannot maintain student interest for 90 minutes.

A study by Christy (1993) indicated lower student achievement. This study was a descriptive ex post facto survey research study which compared performances in biochemistry of college students with those from intensive and traditional organic chemistry backgrounds. Christy's findings found there was a higher achievement in application of the traditional group; however, differences in retention of knowledge was insignificant between the two groups. Application was measured by performance in a traditionally scheduled biochemistry class, for which organic chemistry is considered a prerequisite.

Student Satisfaction

The effect of block scheduling upon student satisfaction was analyzed by studying its affect on student attendance, discipline, and drop-out rate. This researcher works under the premise that if student attendance increases, student discipline problems diminish and the drop-out rate decreases, such positive indications are interpreted as representing a high degree of student satisfaction (Canady and Rettig, 1995a; Carroll, 1994a).

Upon reviewing the literature concerning the impact of block scheduling on attendance, it was learned that student attendance improved when block scheduling was employed (Butcher, 1996). Schoenstein (1995a) collected data which supports this premise. Embriano and Ryan (1995) discovered that not only did block scheduling assist low achievers academically, but also found an increase in the attendance rate. Carroll (1990), after studying seven schools that switched to block scheduling, found that the attendance rate increased in four of the seven schools, with one school demonstrating no change and two schools showing a decrease in student attendance. The results of Carroll's study are depicted in Table 5.

Table 5

Comparison of Attendance/Drop-out Rate of Schools Using Block Schedule

| School District | Attendance Rate | Drop-out Rate |
|---|-------------------|-------------------|
| L. V. Rogers Secondary School, Nelson, British Columbia | Increased 6% | Decreased 2.5% |
| Chelsea High School Chelsea, Massachusetts | Increased 6% | Decreased 4.8% |
| Mt. Everett Regional High School Sheffield, Massachusetts | Unchanged | Decreased 2% |
| West Carteret High School Morehead City, North Carolina | Increased 6% | Decreased 4.7% |
| Longmont High School Longmont, Colorado | Decreased 2.2% | Increased 2.6% |
| Rocky Mountain High School Ft. Collins, Colorado | Increased 1% | Decreased 2.3% |
| Green River High School Green River, Wyoming | Decreased 9% | Decreased 5% |

Block scheduling at Wasson High School in Colorado Springs, Colorado, according to Schoenstein (1995b) resulted in lower stress levels for students and

teachers. Additionally, the average attendance rate improved, as well as the percentage of students on the honor roll, the ACT verbal score and the number of students enrolled in college.

Schoenstein (1995b) concluded that stress among teachers and students was greatly reduced when block scheduling was adopted by the school. Both attendance and enrollment rate also increased.

The second area analyzed with respect to student satisfaction was student discipline. Proponents of block scheduling hold that block scheduling results in less discipline problems because students are less often in hallways, usually have longer breaks between classes and have a less stressful schedule.

In several studies of schools which implemented block scheduling, teachers noted a growth in responsible behavior and found students less disruptive (Carroll, 1994b). Canady and Rettig (1995a) suggested that less disciplinary problems would be expected because students spend less time going to and from their classes under the block schedule program.

Carroll (1990) evaluated six schools that have utilized block scheduling with respect to the drop-out rate, the third area analyzed in the category of student satisfaction. In L.V. Rogers Secondary School in Nelson, British Columbia the drop-out rate decreased from 27% in 1990 - 1991 to 10% in 1991 - 1992. In Chelsea High School in Chelsea, Massachusetts drop-out rates declined from 13.3% to 8.5% in the first year. In Mt. Everett Regional High School, Sheffield, Massachusetts drop-out rates were not a major problem. When block scheduling was introduced, the drop-

out rate declined from 3% to 2%. In West Carteret High School in Morehead City, North Carolina, the drop-out rate fell from 11.3% to 5.6% over a 3-year period. In Longmont High School, Longmont, Colorado, the traditional drop-out rates had been traditionally very low. In 1990 - 1991 the drop-out rate was only 1.6%. In 1991 - 1992, the drop-out rate was also 1.6%. In 1991 - 1992 the drop-out rate was 2.6%. This is still a low rate. The size of this increase could be attributed to the small numbers involved in this study. In Rocky Mountain High School, Fort Collins, Colorado the drop-out rate declined from 4% in 1991 - 1992 to 2.3% in 1992 - 1993. In Green River High School, Green Rivers, Wyoming the drop-out rate declined from 6% in the 1990-1991 to 5% in the 1991 - 1992 school year. These declines in drop-out rate indicate that under block scheduling there is a consistency when implementing this new type of program. Something important has been occurring in these schools when these positive concepts frequently occur.

According to Shore (1995), block scheduling improves school climate. A more personalized environment is created when the number of student-teacher contacts is reduced. This study supports the findings of Sizer's study (1992) which stated that a personalized school environment is the main factor which led to a decreased drop-out rate. In addition, Sizer reported the lowest expulsion and suspension rate in the district involved in the study, as well as an improvement in the morale of both teachers and administrators.

School climate improvements dealing with student and teacher behavior patterns including attendance, communication, discipline, goal focus, innovation

(including integration and building school-community partnerships), and an overall less stressful environment more conducive to learning have been reported in Orange County, Florida, (Buckman, King, and Ryan, 1995); Ligoneer Valley, Pennsylvania, (Salvaterra and Adams, 1995); Laramie, Wyoming, (Gerking, 1995); Wasson, Colorado, (Schoenstein, 1995a, 1995b); Dutchess County, New York, (Furman and McKenna, 1995); Hope, Arkansas, (Wilson, 1995); Memphis, Missouri, (Huff, 1995); King County, Gig Harbor and Duvall Washington, (Marshak, 1997) and in various locations in Virginia and North Carolina (Canady and Fugliani, 1989; Canady and Rettig, 1995a, 1995b, 1996; Edwards, 1993, 1995a, 1995b).

Teacher Methodology

Block scheduling proponents seem to infer that a change in schedule is a condition which will translate into a change in teaching and learning (Canady and Rettig, 1995b; Carroll, 1994b). Canady and Rettig (1995b), for example, seem convinced that the block schedule is so radically different from other education reform proposals that it will prove to be a powerful catalyst for change.

Wilson, (1995) defined the 4 X 4 block scheduling system as a workable alternative at Hope High School in Arkansas. She indicated that the teachers had positive results. She also indicated that the teachers divided the longer classes into segments to address the average students' attention span and to allow students to become more participative in their own learning. The teachers were encouraged to allow the students to move around the room during the 90-minute classes. Wilson also stated that the average student ratio had decreased.

In Newmann's analysis (1991) of more recent studies of teacher methodology that traditional scheduling is not conducive to student achievement (462). High schools should prepare students for the world of work. Adults are generally not expected to work within the rigid 50-minute time constraints we place on students with traditional scheduling. Therefore, we should offer alternative scheduling to students which would allow them to perform as adults solving complicated problems which parallel authentic work environments.

While observing behavioral changes in teachers, Hart found significant discrepancies (using T-tests upon data gathered) in the ways teachers utilized different teaching methods, assessed student work; utilized various resources, and encourage the use of higher level thinking skills. Hart shows that the study produced an overwhelming body of evidence showing a change in teaching techniques used. Furthermore, he expresses that the restructuring of teaching time compelled teachers to find new ways to be successful. The block schedule also altered the mind set of teachers and refocused thinking on ways to encourage student achievement by engaging them actively in the learning process (Hart, 1994). Hart's study was in accordance with another conducted by Hatboro-Horsham's principal (Hottenstein and Maletesta, 1993).

There have been many findings in accordance with Kevin Hart's conclusion that teacher behavior changes in a block scheduling environment. For example, increased time for writing assignments was reported by Language Arts teachers (Hall, 1993; Hartwig, 1993; Reid, 1995). Science teachers reportedly experienced more

uninterrupted time for experiments, and consequently, more lab procedures (Day, 1995). Teachers of mathematics found that in a block schedule, students spent either equal or fewer hours in individual math courses, however, they tend to take a greater number of math courses during their high school careers (Kramer, 1996). Block scheduling also allows for more technology utilization in the classroom (Marshak, 1997). All in all, block scheduling concentrates on in-depth instruction and stresses active student engagement (Cushman, 1995).

In 1994 the National Education Commission on Time and Learning recommended that "time become a factor supporting learning, not a boundary marking its limits". The Commission stated that block scheduling and other flexible scheduling of time should be utilized to promote such activities as in-depth exploration of complex topics, science laboratories, team teaching and to make greater use of instructional resources in the community. The constraints of the traditional 45-50 minute classes can be an obstacle to secondary teachers when it comes to cooperative learning, hands-on activities, laboratory experiments, long-term group or individual projects, and interdisciplinary lessons (Willis, 1993). Block scheduling which allows for longer class periods, eliminates the time obstacle. With longer class periods, students can "delve more deeply into their subjects before the bell rings" (Willis, 1993).

Are educators ready to move away from teacher-directed, lecture based classrooms to a student-centered, collaborative environment? This is the question posed by Salvaterra and Adams (1995). These two analyzed two schools that have

already adopted a block schedule. Extended class time reportedly allowed teachers to delve deeply into concepts. One teacher said that the intensive time schedule created a work load that he had not experienced since his first year on the job. So far, results point to increased student achievement, stronger critical thinking and encouraged collaborative learning.

With longer class times, teachers can take advantage of instructional strategies to directly involve students in more active learning. Classroom simulations are discussed by Jones (1987). Classroom simulations can provide students with a variety of opportunities. For example, students are enjoying social, emotional and intellectual development. Jones depicts simulations as a teaching method where a model has been created to be played out by participants to provide them with lifelike problem solving experiences.

Cooperative learning has been a "buzz word" in education in recent years. Cooperative learning in the classroom involves an environment where student work in pairs or small groups, discuss ideas together, check on each others comprehension and draw conclusions with other groups in the classroom. Slavin (1983) feels that cooperative learning is especially powerful for the block schedule.

Gardner (1993) has indicated that even "A" students typically do not show more than a basic understanding of the materials and concepts with which they have been working. He claims that current traditional schedules have created a narrow view of human learning. He calls for a shift from recall and recognition to thinking and learning. Gardner has pointed out that high school students need to gain a deeper

understanding of the concept and be able to apply their knowledge to real-life situations. Traditionally, teachers have not had the time to teach and then to use techniques such as simulation. The six and seven period school day has strongly fostered teacher-centered, teacher-dominated classroom instruction. Block scheduling provides teachers with the opportunity to use more interactive strategies with their students.

Two comprehensive studies performed in North Carolina by the North Carolina Department of Public Instruction of the 4 x 4 semester plan were conducted in 1994 and 1996. The goal of these studies was to determine the implementation status, and to identify strengths and weaknesses associated with the 4 x 4 block scheduling systems.

The 1994 study applies to the end of the 1993-1994 school year. This study was begun in response to the perceived rapid rate of growth and popularity of the 4 x 4 block scheduling plan in North Carolina. The initial step was to survey principals to determine the prevalence of the 4 x 4 plan as well as other new ideas for the restructuring of school time. Schools in either their first or second year of use were then selected for participation in follow up surveys of school administrators, guidance counselors, teachers and students. Two schools participated in case studies which included Focus groups of teachers and students and interviews with administrators and guidance counselors. Also, academic performance on chosen end of course tests was collected and analyzed. Highlights of the Averett (1994), study includes the following:

1. In 1992 - 1993, three high schools, about 1% of all North Carolina public high schools were using a full block schedule. In 1993 - 1994, slightly less than 10% of schools were block scheduled. In 1994 - 1995 about 38% were reported to be changing to a block schedule and for the 1995 - 1996 school year, it was reported that 60% of high schools in North Carolina would be implementing a block schedule.

2. Plans to implement block scheduling appeared to be site-based management decisions. Over 90% of teachers reported that the change in scheduling was started by the principal (42%), a school-based committee of teachers (36%), or a school-based committee that included parents (12%). Over two-thirds of the teachers said that they were part of the decision-making at the beginning of the process.

3. Under block scheduling, teachers would normally teach three courses per semester and six courses per year rather than the five or six at a time in a traditional schedule. Survey results showed the average number of courses taught dropped from 4.5 to 2.7 under block scheduling. The average number of preparations decreased from 3.2 to 2.3 and the average number of students taught per day decreased from 116.1 to 63.5. During the entire year, a teacher would teach about 130 students which remained unchanged.

4. Average class size dropped from 29.8 to 24.5. Average class size changes according to the size of school, and staff, and by subject area. This reduction

in class size, however, was caused by staff changes rather than block scheduling itself.

5. The amount of planning time for teachers increased from one 50-55 minute period to one 90-minute period per day. In the end, there was an approximate increase of about 100 minutes per year. Many schools took advantage of this time for staff development activities.

6. The instructional time, or direct teacher contact hours, was decreased under some 4 x 4 block scheduling plans. In 180 days of a traditional 55-minute period schedule, 165 clock hours were available for teachers to use. In 90 days of a 90-minute block, 135 hours were available. In a traditional schedule utilizing a 45-minute period, the instructional time was the same. In this scenario, a net increase of quality time occurred due to the fact that less time was set aside for taking attendance and setting into dismissing a class.

7. The proportion of time in which students enrolled in state-required core academic courses defined as language arts, mathematics, social studies, and science was reduced from 54% to 41%. This was defined as 13 of a potential 24 courses in a traditional 6 period day versus a 13 of a potential 32 courses in a block schedule. The total number of available courses however increased.

8. The amount of time in free electives increased from 42% in a 6 period day to 56% in a block schedule.

9. The number of potential homework assignments was reduced in a block schedule.

10. Over 75% of the teachers surveyed found that block scheduling would have a positive effect on student grades, problem solving ability, higher level thinking, performance on tests, and in-depth knowledge of subject matter.

11. Most teachers and administrators believed the strongest points about block scheduling were; students could take more courses/electives and have fewer classes to prepare for at a time, teachers had more planning time, used class time more effectively, and had fewer preparation periods. Students also felt that the most important advantages of block scheduling were the opportunity to take more courses, prepare for fewer courses at a time and to complete a course in one semester.

12. According to teachers and administrators, the biggest problems occurred in the accommodation of transfer students and the difficulty of students recovering from absences.

13. Over 40% of teachers worried that they had to present too much material too quickly or found it difficult to teach all the standard courses of study in the allotted time. Over 85% believed that they could provide more quality instruction and were at ease with their instructional practices in the lengthened class periods.

14. Almost 50% of students surveyed believed their block scheduled classes were more interesting and less than 15% believed that the classes were less interesting. However, when asked about the worst aspects of block

scheduling, 17% of students reported that the classes were boring and 32% reported that the classes were too long.

15. Teachers and administrators suggested that staff development and planning are vital to successful implementation of block scheduling. Pacing guides need to be developed and instructional practices need to be improved in order to keep block scheduled courses from becoming diluted.

16. Although there may be some problems in implementation about 80% of students and 85% of teachers preferred block scheduling and would not want to return to a traditional schedule. For teachers, the block schedule offered a more professional environment, with more planning time, fewer students at a time and fewer preparations. Students liked the opportunity to take more courses, to have less homework and fewer classes to prepare for, and to complete a course in a shorter time span.

17. Time is precious to teachers in block scheduling. Teachers felt that they had less time and fewer days to accomplish their tasks. The use of the instructional day for things like pep rallies, assemblies, etc. became an issue in the day to day management of school.

18. The first survey results showed that across all schools block scheduling had minimal effect on end of course tests. Average scores across schools and students were about the same as before block scheduling. Within schools some subject area test scores were up while others were down. There was no evidence of a pattern that related to school or type of subject.

The goal of the 1996 North Carolina study was to compare 1995 End-of-Course (EOC) Test standard scores between high schools that were using a 4 x 4 semester block schedule and those using a more traditional year long schedule. Ten tests were involved in this study. They were English I, Algebra I, Geometry, U.S. History, Economics, Legal Political Systems, Biology, Chemistry, Physics and Physical Science. Mean scores were compared utilizing Analysis of Covariance with the school being the unity of analysis. Adjustment in scores were made for differences in parent education level (proxy for socio-economic status), homework time and starting point.

Findings of the North Carolina Department of Public Instruction (1996) study included:

1. Students in block scheduled schools had EOC test scores at least equal to students in non-blocked schools. Without adjustments of any kind, the results were equivalent. Slightly higher scores were reported for students in blocked schools for most subjects.
2. After adjusting for starting point, parental education, and homework time, block scheduled schools showed significantly higher 1995 scores than non-blocked schools in almost all major subjects. The conclusion implied that block scheduling had the most impact on courses that served all students. Courses most likely to attract higher level college bound students were not affected by schedule.
3. Most block scheduled schools had a lower parent education level (SES).

4. Students completed less homework in most block scheduled schools.
5. Length of time in a block schedule was not co-related to higher EOC scores.
6. A study needs to be conducted utilizing future EOC Test results.

The states of Mississippi and Tennessee have also had reports issued concerning block scheduling. Mississippi Department of Education (1996), found the following about sixty-four block scheduled schools in fifty school districts that implemented one of the various types of block scheduling (4 x 4, A/B, Modified Version) during the 1995 -1996 school year.

1. An increase in the integration of subject matter.
2. An increase in the use of community resources and involvement of volunteers.
3. Decreased discipline referrals, tardiness, and improved attendance.
4. Difficulty in maintaining a pool of qualified substitute teachers with the ability to fill in meaningfully for teachers during absences.
5. Difficulty between teachers in coordinating homework assignments and assessment situations.
6. Difficulty in students staying on-task for 90 minutes.
7. Concerns about retention of learning.
8. 87% of teachers and administrators reported that modular/block scheduling had been an effective educational practice for their school.

9. 88% of teachers and administrators showed the desire to continue with modular block scheduling.

Proponents of block scheduling believe that it creates conditions that promote teaching and learning (Canady and Rettig, 1993, 1995a; Carroll, 1990; Cushman, 1995; Edwards, 1993; Willis, 1993). Extended period schedules facilitate in-depth learning, allow for more effective instructional strategies (i.e. simulations, group project work, debates, outdoor study, lab work) that are conducive to longer time blocks, and varied assessment strategies. Block scheduling creates a condition to allow team teaching and interdisciplinary teaching strategies which are otherwise difficult to achieve in traditional scheduling. Implementation of approaches like outcome-based education is also made easier.

Those involved in The Coalition of Essential Schools support the notion that teachers and students benefit from schedules which lessen student load for teachers while providing the time and atmosphere which encourages advanced projects and field trips (Cushman, 1989; Sizer, 1992). Those encouraging school reform suggest that the alternative to cutting down the curriculum is to create flexible scheduling which enhances the school program.

Proponents of block scheduling counter the arguments that teachers will be forced to alter their teaching methods and that students will be bored in longer class periods. Willis (1993) says that students will only be bored if teachers merely lecture, but this "timetable kills the lecture method." Students agree that the "block schedule has forced the teachers to become more creative in the classroom" (Willis, 1993).

Instructional change did occur, according to several studies, with the implementation of block scheduling. It was found that teachers used double the amount of teaching strategies with block scheduling in an alternative-type school, a school within a school for high risk students (Munroe, 1989). It was also apparent that a greater amount of educational activities was available with more flexible time scheduling (Cawelti, 1994). Smith (1995) found that by increasing the length of each class in Tennessee's high schools, encouraged teachers to move away from the traditional lecture format to an interactive approach which was more meaningful to students. Some innovative instructional activities included team teaching and field trips. Two areas that were especially benefitted by block scheduling were laboratory and vocational education classes since they permitted more time for setting up, as well as completing and discussing projects (Smith, 1995).

Much of the literature on block scheduling supports the belief that the longer class periods are more conducive to the types of teaching strategies discussed above. In particular, Tennessee's high schools found that hands-on teaching strategies and student-centered instruction were enhanced with the implementation of block scheduling (Smith).

The suggestion of limiting the traditional, often ineffective, and out-dated teacher lecture format was also advanced by Canady and Rettig (1995a). Schools throughout the United States have implemented block scheduling as a means of promoting more varied instructional methods. Simply, longer periods are more conducive to in-depth class discussions. Students learn concepts in greater depth,

working towards mastery of the topic. In addition, the longer periods allow teachers the flexibility to experiment with a variety of teaching strategies. It also provides enough time for teachers to use other resources besides textbooks. Gerstle and French (1993) found that students are more likely to improve their academic ability with they are allowed to use all of the realms of intelligence (Canady and Fugliani, 1989).

Francka and Lindsey (1995) also affirm the theory that block scheduling is more beneficial to teachers and students than traditional scheduling. They found that the traditional teacher lecture should be limited to 20 minutes to permit alternative learning activities and cooperative work. In fact, 85% of teachers and 84% of students surveyed preferred block scheduling because it offers more credits while providing more time in class, for in-depth discussions and individualized instruction. Yet, the time seemed to go faster. In addition, there was a reduction in homework and stress.

According to Buckman, King, and Ryan (1995), across the United States schools are experimenting with longer class periods through a variety of flexible schedules. Such schedules permit teachers to use cooperative learning. More time per class period resulted in an increase in students' learning activities and a greater opportunity for students to use more sophisticated thinking skills.

Huff (1995) believes that teachers should be encouraged to use creative teaching approaches since lecturing appears to be the least effective method of instruction. Flexible scheduling allows teachers enough time to follow through on key concepts. There is a greater variety of learning activities and students have wider

course selections. Huff's data strongly supports block scheduling. In fact, such scheduling is so successful that double the amount of instruction is achieved with block scheduling over traditional scheduling.

Murdock (1995) also presented evidence that block scheduling is more effective than traditional scheduling. It was reported that block scheduling allows students to get more involved in their work and lessons often become more relevant to their lives. Students become more involved in the learning process, working independently. Greater student involvement would naturally result in increased learning.

O'Neil (1995) found that block scheduling resulted in an improved school environment. The study focused on 133 out of 290 high schools in Virginia which had changed to block scheduling. He discovered that longer class periods allowed students to improve since teachers had sufficient time to compensate for the different learning styles of students.

Although some teachers find block scheduling a disadvantage, Day (1995), a science teacher, demonstrated the benefits of implementing block scheduling in her biology and chemistry classes. After five years of block scheduling, Day reported that students were better able to focus on a particular topic since there were fewer interruptions per class during experimental and laboratory procedures.

McKenna, Smith, and Furman (1994) presented evidence that block scheduling results in more student involvement. Rather than passively listening to lectures, students interact, thus retaining more key concepts. They did note, however,

that students should enroll in sequential classes without interruption, such as those in mathematics and foreign language.

Alam and Seick (1994) reviewed an alternative program called the Intensive Care Program (ICP) which demonstrates how teachers modify their methods of instruction to adapt to flexible scheduling. Block scheduling was reported as a positive change.

Munroe (1989) utilized questionnaires completed by parents, students, and teachers comparing the effects of block scheduling versus traditional scheduling. Twice as many teaching methods were employed by those involved in block scheduling than in traditionally scheduled classes.

Raker (1994) studied an English as a Second Language (ESL) program which was made up of 3-hour instructional blocks per day. Three methods of teaching were used: thematic, student-centered and team teaching. The school climate was improved through a better rapport between students and teachers. Students had a greater opportunity to get to know each other. In addition, the longer blocks of time accommodated different learning styles, promoted more learning skills and allowed for more time to practice techniques.

Summary

The review of literature indicates a strong relationship between implementation of block scheduling and improvement in the areas of student achievement, student satisfaction and teacher methodology. It is evident that the longer class periods that result from block scheduling have a positive effect on all

three of these areas. There are indications that block scheduling could present some problems in its beginning process, such as teacher resistance to longer time periods, as well as student adjustments to the length of the class periods.

Not only has the literature indicated that block scheduling improves student satisfaction, but also gives strong indications that student achievement increased. Grade point averages tend to rise with the implementation of block scheduling as well as scores on standardized tests. Since students have more time to study a concept in depth or to complete projects and laboratory work in one period, students involved in block scheduling demonstrated a greater knowledge and retention of key ideas and used higher thinking skills than those students in traditional programs. Students were also able to have a greater selection of courses as a result of block scheduling.

Some researchers though indicated that block scheduling offered little or no change. Opponents to block scheduling point out that there was little change in standardized test scores (Guskee and Kifer, 1995). It was further pointed out in this study, that there was no change in daily attendance or drop-out rates.

Block scheduling seems to create a better school climate whereby students are more likely to stay in school. The relationship between students and teachers becomes more rewarding because it is more personalized and peer relationships improve. Some studies also indicated that there were less expulsions and suspensions. It stands to reason that because there are fewer breaks between classes, discipline improved in schools that have implemented block scheduling.

Perhaps the greatest impact of block scheduling is in the area of teacher methodology. Research indicates that there is a definite movement away from the traditional lecture approach which causes students to remain passive learners. With longer class periods, teachers are able to experiment with different teaching approaches which caters to the various learning styles of students. Such positive changes as cooperative learning, team teaching, outreach programs, field trips and independent study allow students to become active learners. Students become an integral part of the learning process.

It is apparent that block scheduling excels over the restrictive traditional scheduling. Student satisfaction, student achievement and teacher methodology all improve with such flexible scheduling.

Chapter III

METHODOLOGY AND PROCEDURE

Introduction

The purpose of this study is to examine traditional scheduling as it compares to block scheduling. A traditional schedule is one in which students typically participate in six to eight classes each day. Classes meet at the same time each day throughout the week. Major courses commonly meet five times a week for the entire school year. A block schedule is one in which the school day is divided into four periods. The school year is divided into two semesters of four classes each. The comparison of the scheduling is done with respect to student achievement, student satisfaction and teacher methodology. The population for this study is comprised of a junior/senior high school utilizing a traditional schedule and compared data from the same junior/senior high school utilizing a block scheduling format, in the aforementioned areas above. Student achievement and satisfaction are measured because it is at the center of the school reform movement. Educational policy makers will be able to use this information in order to make effective change at the junior/senior high school level. Teacher methodology is studied in recognition of that fact the schedule restructuring alone will not account for favorable results. Changes made by teachers in lesson delivery had a significant impact on student achievement.

The purpose of this chapter is to describe the instrumentation and procedures for data collection to be used to test the hypotheses, examine the design of the study, describe the subjects to be studied and answer the research questions posed by the study. The procedures section of the chapter describes the development of the questionnaire, the sample studied, and the sampling technique. The chapter also describes the data analysis plan.

Instrumentation

The teacher instructional analysis observation form utilized was developed by Dr. Joseph Carroll, author of the Copernican Plan, and was designed to evaluate teacher methodology under traditional scheduling and teacher methodology under block scheduling.

This survey was designed to examine several dimensions of instructional techniques used by teachers in the Palisades Park Junior/Senior High School. The teacher observation instrument is divided into two sections. The first section measures the amount of time teachers utilize in different instructional strategies. The dimensions of teacher strategies measured are lecture, audio-visual, teacher to student work, student groups, labs, seat work and down time. The second section analyzes student involvement utilizing a one to five Likert scale, with 4-5 indicating low student involvement, 3 indicating medium student involvement and 1-2 indicating high student involvement in the lessons. The areas to be examined grew out of the attention given to the teaching methods used prior to block scheduling and after the implementation of block scheduling.

Design of Study

The study examines the differences in student and teacher behaviors observed before and after the adoption of a new schedule. The subjects were all students enrolled in the Palisades Park Junior/Senior High School grades 7-12 for the school year 1997-1998. Data from this school year was used for base-line data utilizing the traditional schedule. Data for the school year 1998 - 1999 was utilized for comparative purposes of the effects of block scheduling on all students enrolled in the Palisades Park Junior/Senior High School grades 7-12, for the first semester.

Two methodologies were incorporated to compare data from pre to post block scheduling format. The two methodologies were as follows:

1. **Quantitative Methodology:** Student achievement and student satisfaction was analyzed utilizing quantitative methods. Data was compared for student achievement including student grades, honor roll, and number of courses taken in academic areas. Student satisfaction was evaluated comparing student attendance, the number of discipline referrals and the number of student suspensions. The results will be reported and compared for the one level in grades 7 and 8 and the second level in grades 9-12.
2. **Qualitative Methodology:** Teacher methodology was analyzed using, the teacher operation instruments developed by Copernican Associates (Carroll, 1994).

Copernican Associates developed an observation form that measures two different aspects of instruction. The first is the approximate number of minutes of

different uses of instruction time. The second is the level of student engagement. Instructional time is divided into seven different sections. They include lecture, audio-visual, teacher to student instruction, group work, laboratories, seat work and down time. (See Appendix C). The second section, level of student engagement, is divided into high to low, using the Lickert scale with a range from 1-5. One and 2 are considered on the high side, 3 is in the middle, and 4-5 are considered low engagement.

The Sign test was utilized to examine and calculate student achievement, student satisfaction and teacher methodology in traditional scheduling versus block scheduling. The Sign test determined whether the discrepancies in the sample means qualifies as a common or a rare outcome (Witte and Witte, 1997).

Procedure for Data Collection

Data for pre and post analysis for student achievement was provided to this researcher by the Mac School Statistical package. Student achievement, i.e., student quantity and quality of courses, student grades, and honor roll were provided in a summary data sheet for the 1997 - 1998 school year and first semester of the 1998 - 1999 school year. The Mac School Statistical package was also utilized to compare the summary data for student satisfaction, i.e., student attendance, number of discipline referrals, student dropout rate and the number of student suspensions for the 1997 school year and the first semester of the 1998 - 1999 school year.

The procedure for completing the qualitative research for teacher observation and teacher methodology was gathered utilizing interns visiting every classroom

operating in a traditional schedule and was repeated during the observation process in every classroom after the implementation of block scheduling. The two observers were independently hired for these observations by the Palisades Park Board of Education. These two observers are retired administrators who have completed this before in other school systems.

Observations were made by two individual observers. These observers went into each classroom and recorded the use of instructional time and student engagement activities. In this evaluation observers compared data concerning student performance during the 1997 - 1998 school year, the last year under a traditional 40 minute schedule, with comparable data concerning student performance in the 1998 - 1999 school year, the first semester that the junior-senior high school was organized under a block schedule. These observations were conducted by the same individuals to indicate consistency.

Determination of Sample

The subjects were all students and teachers who were in the Palisades Park Junior/Senior High School for the 1997 - 1998 school year and the 1998 - 1999 school year.

Before examining the school system, one must have knowledge of the culture of the community. Tucked in the southeast corner of Bergen County, Palisades Park covers an area of 1.3 square miles. It is located approximately two miles southeast of the George Washington Bridge which connects New Jersey and New York. The borough is bounded on the east by the Borough of Fort Lee, on the south by the

Borough of Ridgefield, on the west by Overpeck Creek, and on the north by the Boroughs of Leonia and Fort Lee.

In 1970, Palisades Park had a population of 13,037; in 1980 a population of 13,732; and in 1990 the approximate population is 14,532. Palisades Park, in addition to the increase in population is also experiencing a shift in the ethnic makeup of the Borough increasing the number of Asians and Hispanics in the citizenry and in the schools. Therefore, there has been an increase of 800 citizens during the last ten years. This is an increase of 5.8%. As for the school population, there has been a decrease of 194 students over the last ten years. This is a decrease of 29.1%.

Many of the shops on Broad Avenue are now owned and operated by Asians who cater to an Asian and American trade. In the fall of 1991, The Bergen Record, a local newspaper, serving northeastern New Jersey, did a three part series reporting how the Asian population has impacted on the southeastern section of Bergen County. This demographic data clearly indicates that the Palisades Park community is experiencing a major transition.

The mission of the Palisades Park school district is to insure that all the students achieve to their full potential and become global citizens, who are able to academically, socially and morally meet the challenges of an ever-changing society by providing the resources necessary for a state of the art technology program, establishment of a comprehensive literary program and incorporation of improved methodology to insure mastery of core knowledge and skills.

Data Analysis Plan

The purpose of this section is to present a description of the method that was used to analyze the data collected in this study.

Descriptive Statistics

The Sign test was employed to analyze student achievement (grades). For the duration of this study, the term Sign test is taken from the fact that it uses a positive or negative sign rather than a quantitative measure as its data. It is particularly beneficial for research in which quantitative measurement is impossible. The Sign test is applicable in the instance of two related samples where the conductor of the experiment wants to show that the two conditions are different. The only assumption accompanying this test is that the variable under scrutiny has a continuous distribution. The Sign test does not make any suppositions about the form of the distribution of differences, nor does it take for granted that every subject is taken from the same population. The different pairs may be different populations in the areas of age, sex, intelligence, etc.; the only constant is that within each pair the experimenter has achieved a match in regards to the relevant extraneous variables (Siegel, 1956).

Analysis of Hypotheses

Hypothesis #1. No significant differences exist between students enrolled in traditional scheduling verses students enrolled in block scheduling with respect to student achievement. A sign test of significant difference was used to analyze hypothesis 1. Data collected on students in a traditional schedule and data collected on students in a block scheduling were compared for significant differences with

respect to student achievement. Student achievement is comprised of student attendance, quantity and quality of courses, student grades, honor roll and AP grades.

A Sign test is the preferred statistical technique when comparing the means.

Hypothesis #2. No significant differences exist between students enrolled in traditional scheduling verses students enrolled in block scheduling with respect to student satisfaction. A sign test of significant difference was used to analyze hypothesis 2. Data collected on students in a traditional schedule and data collected on students in a block schedule were compared for significant differences with respect to student satisfaction. Student satisfaction is comprised of the following sub-factors: student attendance, student discipline, number of student suspensions, and student dropout rate. A sign test was the preferred statistical technique used when comparing the means.

Hypothesis #3. Comparative analysis was conducted utilizing the Copernican Associates (Carroll, 1990) instruments. This determined the changes in instructional methodology between teachers working in a traditional schedule and teachers working in a block schedule. For the instructional methodology the use of the Sign test was utilized for hypothesis 3.

Summary

A description of the survey instruments and their component parts have been presented in this chapter. Additionally, the design of the study, the procedure for data collection used in gathering data on the survey instruments have been fully described. The determination of sample, data analysis plan as well as the instrumentation was

fully reviewed. The chapter concludes with a detailed analysis of how the data will be treated in relation to the stated hypotheses and research questions.

Chapter IV

ANALYSIS OF THE DATA

Introduction

The purpose of this chapter is to present the results of the statistical analysis conducted on the data collected in the study. Data for pre- and post-analysis for student satisfaction, student achievement and teacher methodology was formulated comparing traditional scheduling to block scheduling. The three null hypotheses developed were: Hypothesis #1. There is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student achievement; Hypothesis #2. There is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student satisfaction; Hypothesis #3. There is no significant difference that exists between teachers operating in a traditional program and teachers operating under a block scheduling program with respect to teacher methodology.

The population of this study was comprised of all students and teachers in Palisades Park Junior/Senior High School during the 1997 - 1998 school year and during the 1998 - 1999 school year. Data collected for student satisfaction compared student attendance, the number of discipline, referrals and the number of student suspensions. Data comparing student achievement included student grades, honor

roll, and the number of courses taken in academic areas. The teacher methodology using the teacher operation instrument developed by Copernican Associates, compared the different methods teachers used in their daily teaching.

Student Achievement

The null hypothesis of student achievement that there is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student achievement was rejected. Actual 1997-1998 data on grades compared to estimated 1998-1999 data based upon from the first semester of 1998-1999, indicates that Palisades Park Junior-Senior High School students mastered about 25% to 30% more of their school's curriculum during the first year under a Copernican Schedule.

The data in table 6 are based upon the following two assumptions:

1. **Grade Point Averages:** Higher grades represent a higher level of mastery of course content than lower grades. While there is general agreement with this assumption, how much mastery does each grade indicate? It is common practice to use grade point averages to evaluate academic performance. Typically a four point scale is used: "A" = 4 points; "B" = 3 points; "C" = 2 points; "D" = 1 point; and an "F" receives no points. While the four point scale is widely used and draws a sharp difference between grades, these weightings are not related to mastery of course objectives. For example, a student who receives an "A" (4 points) probably hasn't mastered 100% more of course objectives than a student who received a "C" (2 points).

What weightings should be used? The following weightings are much more closely related to academic master (American Educational Research Association, 1982) than is the traditional four point scale. Thus, for the purpose of this study, an "A" = 95%; "B" = 85%; "C" = 75%; "D" = 65%; and "F" = 50%. In table 7, a grade point average is calculated for 1997-1998 school year and also, for the first semester of the 1998-1999 school year, using the above weightings and based upon all the grades earned by all of the students in all of their courses.

Table 6 indicates the grades given by all the teachers in 1997 - 1998 and in 1998 - 1999. The differences in the baseline grade point averages in 1997 - 1998 compared with those of the first semester of the 1989 - 1999 is a measure of the change in levels of academic mastery by the students based upon the teachers evaluation of how well their students are performing in their classes.

2. **Successful Completion of Courses:** The other measure of mastery used in this grade analysis is based upon the average number of courses students complete with a passing grade in a year. Under a block schedule, students can complete four courses per semester or eight courses per year as compared to about six courses per year under a traditional schedule. Thus, it is reasonable to expect students to complete more courses under a block schedule. It should be noted that no credits are awarded for "F" grades, so any reduction in failure rates increases the number of successfully completed courses. It is reasonable to believe that a student has mastered more of the school's curriculum if he or she completed, satisfactorily, a larger number of courses in a year and earns more course credits.

Table 6

Grade Analyses - Compares actual 1997 - 1998 with estimated 1998 - 1999

| Summary of Attachment III Estimated Changes in Academic Mastery | | | |
|--|-------------------------------|------------------------|-------------------------------|
| | Credits Earned Per Student | Grade Point Average | Change in Academic Mastery |
| Grades 7-12 | 26.5% | 4.6% | 31.1% |
| Junior High Grades 7-8 | 12.3% | 4.1% | 16.4% |
| Senior High Grades 9-12 | 35.5% | 4.6% | 40.1% |

Table 6 compared the grades earned during a complete year under a traditional schedule with the grades earned in the first semester under a block schedule. It was necessary to estimate the grades that would be earned in the second semester of the 1998-1999 school year to make a reasonable comparison. With some exceptions, the adjustments assumed that about half of the students would enroll in the same number of courses each semester under a block schedule so first semester data was doubled to get a full year estimate. However, for example, no students from grades 7 or 8 enrolled in world languages during the first semester of 1998 - 1999 which limits these comparisons.

Table 7

Comparison of the Changes in Academic Mastery 1997 - 1998 Grades Versus Estimated 1998 - 1999 Grades: By Subject

| Grades 7-12 Totals By Subject | | | |
|--------------------------------------|-------------------------------|----------------------------------|---------------------|
| | Mastery Course Credits | Mastery Grade Pt. Average | Total Change |
| Grades 7 - 12 Totals | 26.5% | 4.6% | 31.1% |
| English Courses | 16.0% | 3.3% | 19.3% |
| English as a Second Language | 33.5% | 8.9% | 42.4% |
| Mathematics Courses | 28.4% | 5.7% | 34.1% |
| Social Studies Courses | 8.2% | 2.1% | 10.3% |
| Science Courses | 11.0% | 7.4% | 18.4% |
| World Languages | 29.7% | 2.9% | 32.6% |
| Arts | 94.5% | 2.0% | 96.5% |
| Business/Tech Ed. | 61.8% | 5.9% | 57.7% |
| Physical Education | 0.0% | 3.7% | 3.7% |

The changes among the nine subject areas ranged from 0.0% in Physical Education to 94% in Arts. English, Mathematics, Social Studies, World Languages, and Science are the five subjects most associated with college entrance. The estimated changes in mastery in these five subject areas in the 1998 - 1999, as compared to the 1997 - 1998 school year ranged from 8.2% in Social Studies to 29.7% in World Languages with a median of 11% in Science. Elective courses in Business Education, Technical Education, and Art education had major increases in total mastery, 62% to 94% respectively. It should be noted that these courses had relatively small enrollments under the traditional schedule. With two more electives per student, a relatively small

increase in enrollments in these courses will result in large percentage increases. (See Table 7)

Conversely, although students are able to enroll in one third more courses under a 4 x 4 schedule (8 courses as compared to 6) the number of enrollments in required subjects makes it unlikely that students will take more than the required numbers of courses under a block schedule.

Students responded more favorable to their school experience in the first semester under a block schedule than they did in the Spring of 1998 under a traditional schedule.

Table 8

Junior/Senior High School - All Grades - All Credits - Grades 7 through 12

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|-------------------------------|---------|-------------------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 1,125 | 24.4 | 2,117 | 37.9 | 55.3 | 95 | 106875 | 201115 | |
| B | 1,359 | 29.5 | 1,708 | 30.6 | 3.7 | 85 | 115515 | 145180 | |
| C | 1,189 | 25.8 | 1,036 | 18.5 | -28.1 | 75 | 89175 | 77700 | |
| D | 613 | 13.3 | 373 | 6.7 | -49.8 | 65 | 39845 | 24245 | |
| F | 324 | 7.0 | 352 | 6.3 | -10.3 | 50 | 16200 | 17600 | |
| Total | 4,610 | 100 | 5,586 | 100 | | | 367610 | 465840 | |
| Credits Attempted | 6.4 | Credits | 8.0 | Credits | | | | | |
| Credits Earned | | | | | | | 79.74 | 83.39 | |
| (A+B+C+D) Enroll-Adm | 4286 722 | | 5234 697 | | | | | | |
| Credits/Student | 5.94 | Credits | 7.51 | Credits | | | | | |
| Est. Change in Credits Per Student | | | 26.5% | | | Est. Change: Academic Mastery | | 4.6% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 31.1% | |

Table 8 compared all grades earned in all credits in grades 7 through 12. It illustrates the impact of a 4 x 4 block schedule. For example, the number of "A"s earned increased from 24.2 % to 37.9 %. There was also an increase in "B"s earned under the block schedule. Numbers went from 29.5% in 1997 - 1998 to 30.6% in 1998 - 1999. Similarly, "C" grades fell from 25.8% under a traditional schedule to 18.5% under the 4 x 4 block schedule. "D" grades also showed a positive flux, decreasing from 13.3% to 6.7%. Finally, "F" grades fell from 7.0% under a traditional schedule to 6.3% under a block schedule. The overall estimated total change in grading patterns and increases in

credits completed successfully was 31.1%, indicating the positive effects of the block schedule.

A sign test was utilized for all student grades, subject by subject. The analysis of student achievement, grades by subject utilizing the sign test in addition to percentages, is reported on the following pages, subject by subject.

Table 8a

All Grades - All Credits - Grades 7 through 12 - English

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 95 | 13.0 | 158 | 19.3 | 49.0 | 95 | 9025 | 15010 | |
| B | 237 | 32.3 | 300 | 36.7 | 13.4 | 85 | 20145 | 25500 | |
| C | 209 | 28.5 | 212 | 25.9 | -9.1 | 75 | 15675 | 15900 | |
| D | 129 | 17.6 | 80 | 9.8 | -44.4 | 65 | 8385 | 5200 | |
| F | 63 | 8.6 | 68 | 8.3 | -3.3 | 50 | 3150 | 3400 | |
| Total | 733 | 100 | 818 | 100 | | | 56380 | 65010 | |
| Credits Attempted | 1.0 | Credits | 1.2 | Credits | | | | | |
| Credits Earned | | | | | | | 76.92 | 79.47 | |
| (A+B+C+D) Enroll-Adm | 670 722 | | 750 697 | | | | | | |
| Credits/Student | 0.93 | Credits | 1.08 | Credits | | | | | |
| Est. Change in Credits Per Student | | | 16.0% | | Est. Change: Academic Mastery | | | 3.3% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 19.3% | | |

Table 8a compared the grades earned in English in grades 7 through 12. The data indicates that the number of "A"s earned under block scheduling rose from 13% to 19.3%. This indicates a 49% increase. The number of "B"s also increased under block scheduling with a 13.4% difference. The amount of "C"s, "D"s, and "F"s, decreased which indicates a substantial drop in those areas. Students responded more favorably in English under a block schedule than they did under a traditional schedule.

Application of the sign test resulted in a positive direction flow of 3.3% for the achievement of grades for English. This 3.3% was significant at the level of .0039.

Table 8b

All Grades - All Credits - Grades 7 through 12 - Mathematics

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 100 | 14.2 | 230 | 26.4 | 86.2 | 95 | 9500 | 21850 |
| B | 185 | 26.2 | 270 | 31.0 | 18.2 | 85 | 15725 | 22950 |
| C | 214 | 30.3 | 236 | 27.1 | -10.7 | 75 | 16050 | 17700 |
| D | 132 | 18.7 | 46 | 5.3 | -71.8 | 65 | 8580 | 2990 |
| F | 75 | 10.6 | 90 | 10.3 | -2.8 | 50 | 3750 | 4500 |
| Total | 706 | 100 | 872 | 100 | | | 53605 | 69990 |
| Credits Attempted | 1.0 | Credits | 1.3 | Credits | | | | |
| Credits Earned | | | | | | | 75.93 | 80.26 |
| (A+B+C+D) Enroll-Adm | 631 722 | | 782 697 | | | | | |
| Credits/Student | 0.87 | Credits | 1.12 | Credits | | | | |
| Est. Change in Credits Per Student | | 28.4% | | Est. Change: Academic Mastery | | 5.7% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 34.1% | |

In Mathematics, the data indicates a substantial difference of "A"s and "B"s under block scheduling as compared to traditional scheduling. There is an 86.2% rise for the number of "A"s and the number of "B"s rose 18.2%. The number of "C"s dropped slightly under 11%, but a huge difference occurred in the number of "D"s. This number dropped 71.8%, which indicates a strong difference under block scheduling. The number of failures did not follow this pattern, but the estimated total change in grading patterns and increases in credits completed successfully was 34.1%.

Application of the sign test resulted in a positive direction flow of 5.7% for the achievement of grades for Mathematics. This 5.7% was significant at the level of .0039.

Table 8c

All Grades - All Credits - Grades 7 through 12 - Social Studies

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|--------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 129 | 20.7 | 218 | 32.1 | 54.6 | 95 | 12255 | 20710 |
| B | 155 | 24.9 | 172 | 25.3 | 1.5 | 85 | 13175 | 14620 |
| C | 194 | 31.2 | 130 | 19.1 | -38.7 | 75 | 14550 | 9750 |
| D | 110 | 17.7 | 94 | 13.8 | -21.8 | 65 | 7150 | 6110 |
| F | 34 | 5.5 | 66 | 9.7 | 77.6 | 50 | 1700 | 3300 |
| Total | 622 | 100 | 680 | 100 | | | 48830 | 54490 |
| Credits Attempted | 0.9 | Credits | 1.0 | Credits | | | | |
| Credits Earned | | | | | | | 78.50 | 80.13 |
| (A+B+C+D) Enroll-Adm | 588 722 | | 614 697 | | | | | |
| Credits/Student | 0.81 | Credits | 0.88 | Credits | | | | |
| Est. Change in Credits Per Student | | 8.2% | | Est. Change: Academic Mastery | | 2.1% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 10.2% | |

Table 8c differentiates the grades received by all grades in Social Studies. The number of "A"s increased 54.6% under block scheduling, the number of "B"s increased only slightly. There was a substantial decrease in the number of "C"s and "D"s but a rise in the number of "F"s. Social Studies did not drop in the number of failures as in other subject areas, however the estimated total change in mastery from changes in grading patterns and increases in credits completed successfully was 10.2%, indicating the positive impact of the block schedule.

Application of the sign test resulted in a positive direction flow of 2.1% for the achievement of grades for Social Studies. This 2.1% was significant at the level of .0039.

Table 8d

All Grades - All Credits - Grades 7 through 12 - Science

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 126 | 21.4 | 282 | 45.3 | 111.9 | 95 | 11970 | 26790 |
| B | 156 | 26.5 | 160 | 25.7 | -2.9 | 85 | 13260 | 13600 |
| C | 178 | 30.2 | 100 | 16.1 | -46.8 | 75 | 13350 | 7500 |
| D | 85 | 14.4 | 42 | 6.8 | -53.2 | 65 | 5525 | 2730 |
| F | 44 | 7.5 | 38 | 6.1 | -18.2 | 50 | 2200 | 1900 |
| Total | 589 | 100 | 622 | 100 | | | 46305 | 52520 |
| Credits Attempted | 0.8 | Credits | 0.9 | Credits | | | | |
| Credits Earned | | | | | | | 78.62 | 84.44 |
| (A+B+C+D) Enroll-Adm | 545 722 | | 584 697 | | | | | |
| Credits/Student | 0.75 | Credits | 0.84 | Credits | | | | |
| Est. Change in Credits Per Student | | | | 11.0% | Est. Change: Academic Mastery | | 7.4% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 18.4% | |

Table 8d compared the grades earned in Science in all grades. The number of "A"s increased dramatically by 111.9%. The number of "B"s earned does not reflect the same positive influence however the number of "C" grades decreased from 178 in 1997 - 1998 to 100 in 1998 - 1999 under a 4 x 4 block schedule. Both "D" grades and "F" grades declined, falling by 6.8% and 6.1% respectively. Overall, under the 4 x 4 block schedule, students completed 11% more credits and increased academic mastery by 7.4%.

Application of the sign test resulted in a positive direction flow of 7.4% for the achievement of grades for Science. This 7.4% was significant at the level of .0039.

Table 8e

All Grades - All Credits - Grades 7 through 12 - World Languages

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 116 | 36.4 | 178 | 45.1 | 23.9 | 95 | 11020 | 16910 |
| B | 90 | 28.2 | 119 | 30.1 | 6.8 | 85 | 7650 | 10115 |
| C | 63 | 19.7 | 48 | 12.2 | -38.5 | 75 | 4725 | 3600 |
| D | 25 | 7.8 | 23 | 5.8 | -25.7 | 65 | 1625 | 1495 |
| F | 25 | 7.8 | 27 | 6.8 | -12.8 | 50 | 1250 | 1350 |
| Total | 319 | 100 | 395 | 100 | | | 26270 | 33470 |
| Credits Attempted | 0.4 | Credits | 0.6 | Credits | | | | |
| Credits Earned | | | | | | | 82.35 | 84.73 |
| (A+B+C+D) Enroll-Adm | 294 722 | | 368 697 | | | | | |
| Credits/Student | 0.41 | Credits | 0.53 | Credits | | | | |
| Est. Change in Credits Per Student | | 29.7% | | Est. Change: Academic Mastery | | 2.9% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 32.6% | |

Table 8e illustrates the comparison of grades 7 through 12 in the subject of World Languages. The number of "A" grades earned under the traditional schedule was 116 while the number of "A" grades under the 4 x 4 block schedule was 178, indicated an 8.7% increase. "B" grades also increased under the block schedule, rising from 28.2% to 30.1%. "C" grades fell in number by 7.5%. "D" grades and failures also show a slight decrease. Overall, student completed more credits and mastered more subject matter under a block schedule.

Application of the sign test resulted in a positive direction flow of 2.9% for the achievement of grades for World Languages. This 2.9% was significant at the level of .0039.

Table 8f

All Grades - All Credits - Grades 7 through 12 - English as a Second Language(E.S.L)

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 13 | 8.6 | 34 | 18.1 | 111.5 | 95 | 1235 | 3230 | |
| B | 29 | 19.1 | 88 | 46.8 | 145.3 | 85 | 2465 | 7480 | |
| C | 62 | 40.8 | 32 | 17.0 | -58.3 | 75 | 4650 | 2400 | |
| D | 31 | 20.4 | 20 | 10.6 | -47.8 | 65 | 2015 | 1300 | |
| F | 17 | 11.2 | 14 | 7.4 | -33.4 | 50 | 850 | 700 | |
| Total | 152 | 100 | 188 | 100 | | | 11215 | 15110 | |
| Credits Attempted | 0.2 | Credits | 0.3 | Credits | | | | | |
| Credits Earned | | | | | | | 73.78 | 80.37 | |
| (A+B+C+D) Enroll-Adm | 135 722 | | 174 697 | | | | | | |
| Credits/ Student | 0.19 Credits | | 0.25 Credits | | | | | | |
| Est. Change in Credits Per Student | | | 33.5% | | Est. Change: Academic Mastery | | | 8.9% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 42.4% | | |

Table 8f showed the impact of block schedule on grades 7 through 12 in the subject of English as a Second Language. There was a significant increase in "A" grades, totaling nearly 10%. "B" grades also reflected an increase, rising from 19.1% to 46.8%. "C" grades also favor a block schedule, as the numbers fell from 40.8% in 1997 - 1998 to 17.0% in the 1998 - 1999 school year. "D" grades and failures also reflect a decrease under a block schedule falling 9.8% and 3.8% respectively.

Application of the sign test resulted in a positive direction flow of 8.9% for the achievement of grades for English as a Second Language. This 8.9% was significant at the level of .0039.

Table 8g

All Grades - All Credits - Grades 7 through 12 - Arts

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|-------------------------------|---------|-------------------------|------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 292 | 43.4 | 682 | 53.9 | 24.2 | 95 | 27740 | 64790 | |
| B | 247 | 36.7 | 388 | 30.5 | -16.9 | 85 | 20995 | 32810 | |
| C | 90 | 13.4 | 152 | 12.0 | -10.2 | 75 | 6750 | 11400 | |
| D | 25 | 3.7 | 8 | 0.6 | -83.0 | 65 | 1625 | 520 | |
| F | 19 | 2.8 | 38 | 3.0 | 6.3 | 50 | 950 | 1900 | |
| Total | 673 | 100 | 1266 | 100 | | | 58060 | 111420 | |
| Credits Attempted | 0.9 | Credits | 1.8 | Credits | | | | | |
| Credits Earned | | | | | | | 86.27 | 88.01 | |
| (A+B+C+D) Enroll-Adm | 654 722 | | 1228 697 | | | | | | |
| Credits/Student | 0.91 | Credits | 1.76 | Credits | | | | | |
| Est. Change in Credits Per Student | | | 94.5% | | | Est. Change: Academic Mastery | | | 2.1% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 96.5% | | |

Table 8g shows the impact of a 4 x 4 block schedule on grades 7 through 12 in the Arts. "A" grades increased by 10.5% under the block schedule. Although "B" grades did not increase under a block schedule, "C" and "D" grades fell 1.4% and 3.1% respectively. Failure grades show no significant change. Overall, students increase their credit completion and their academic mastery under a block schedule.

Application of the sign test resulted in a positive direction flow of 2.1% for the achievement of grades for Arts. This 2.1% was significant at the level of .0039.

Table 8h

All Grades - All Credits - Grades 7 through 12 - Business/Tech Education

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|------------------------------------|---------|-------------------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 31 | 27.2 | 75 | 44.6 | 64.2 | 95 | 2945 | 7125 | |
| B | 36 | 31.6 | 42 | 25.0 | -20.8 | 85 | 3060 | 3570 | |
| C | 28 | 24.6 | 42 | 25.0 | 1.8 | 75 | 2100 | 3150 | |
| D | 10 | 8.8 | 5 | 3.0 | -66.1 | 65 | 650 | 325 | |
| F | 9 | 7.9 | 4 | 2.4 | -69.8 | 50 | 450 | 200 | |
| Total | 114 | 100 | 168 | 100 | | | 9205 | 14370 | |
| Credits Attempted | | Credits | | Credits | | | | | |
| Credits Earned | | | | | | | 80.75 | 85.54 | |
| (A+B+C+D) Enroll-Adm | 105 722 | | 164 697 | | | | | | |
| Credits/Student | 0.15 Credits | | 0.24 Credits | | | | | | |
| Est. Change in Credits Per Student | | | 61.8% | | | Est. Change: Academic Mastery 5.9% | | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 67.7% | |

Table 8h compared the grades and credits earned under both traditional and block schedules in grades 7 through 12 in the subject of Business/Tech Education. The increase in "A" grades earned under the block schedule was significant, yielding an improvement of 17.4%. "B" grades did not show the positive effects of block schedule, but "C", "D", and "F" grades all decreased after the implementation of the block schedule. Overall, students complete more credits and yield a higher academic mastery with the block schedule.

Application of the sign test resulted in a positive direction flow of 5.9% for the achievement of grades for Business/Tech Education. This 5.9% was significant at the level of .0039.

Table 8i

All Grades - All Credits - Grades 7 through 12 - Physical Education

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|-------------------------------|---------|-------------------------|------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 223 | 31.8 | 288 | 44.0 | 38.6 | 95 | 21185 | 27360 | |
| B | 224 | 31.9 | 194 | 29.7 | -7.0 | 85 | 19040 | 16490 | |
| C | 151 | 21.5 | 96 | 14.7 | -31.8 | 75 | 11325 | 7200 | |
| D | 66 | 9.4 | 62 | 9.5 | 0.8 | 65 | 4290 | 4030 | |
| F | 38 | 5.4 | 14 | 2.1 | -60.5 | 50 | 1900 | 700 | |
| Total | 702 | 100 | 654 | 100 | | | 57740 | 55780 | |
| Credits Attempted | 1.0 | Credits | 0.9 | Credits | | | | | |
| Credits Earned | | | | | | | 82.25 | 85.29 | |
| (A+B+C+D) Enroll-Adm | 664 722 | | 640 697 | | | | | | |
| Credits/Student | 0.92 | Credits | 0.92 | Credits | | | | | |
| Est. Change in Credits Per Student | | | -0% | | | Est. Change: Academic Mastery | | | 3.7% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 3.5% | | |

Table 8i shows the difference in grades earned and credits completed in a block schedule versus a traditional schedule. This particular data was collected in grades 7 through 12 in the area of Physical Education. There was a 12.2% increase in "A" grades with the implementation of a 4 x 4 block schedule. "B" grades did not reflect significant change, but "C" grades dropped 6.8%. "D" grades reflected almost no change, yet failures decreased by 2.3%. Overall, there was no change in credits per student, but there was a positive block scheduling influence in academic mastery of 3.7%.

Application of the sign test resulted in a positive direction flow of 3.7% for the achievement of grades for Physical Education. This 3.7% was significant at the level of .0039.

Table 9

Senior High School - All Grades - All Credits - Grades 9 through 12

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 768 | 25.5 | 1,643 | 40.2 | 57.8 | 95 | 72960 | 156085 | |
| B | 902 | 30.0 | 1,228 | 30.1 | 0.4 | 85 | 76670 | 104380 | |
| C | 759 | 25.2 | 704 | 17.2 | -31.6 | 75 | 56925 | 52800 | |
| D | 395 | 13.1 | 259 | 6.3 | -51.7 | 65 | 25675 | 16835 | |
| F | 186 | 6.2 | 248 | 6.1 | -1.7 | 50 | 9300 | 12400 | |
| Total | 3010 | 100 | 4082 | 100 | | | 241530 | 342500 | |
| Credits Attempted | 6.4 | Credits | 8.6 | Credits | | | | | |
| Credits Earned | | | | | | | 80.24 | 83.90 | |
| (A+B+C+D) | 2824 | | 3834 | | | | | | |
| Enroll-Adm | 474 | | 475 | | | | | | |
| Credits/Student | 5.96 | Credits | 8.07 | Credits | | | | | |
| Est. Change in Credits Per Student | | | 35.5% | | Est. Change: Academic Mastery | | | 4.6% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 40.0% | | |

Table 9 compared the grades achieved in all grades 9 through 12, illustrating the impact of 4 x 4 block schedule. There was a large increase in "A" grades, 40.2% under a block schedule. "B" grades reflected almost no change. "C" grades decreased as did "B" grades; both reflected the positive effects of a block schedule. Failures reflected almost no change. Overall, credit completion increased 35.5% and academic mastery increased 4.6%.

Table 9a

Senior High School - All Grades - All Credits - Grades 9 through 12 - English

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 50 | 11.5 | 98 | 18.1 | 57.5 | 95 | 4750 | 9310 | |
| B | 144 | 33.2 | 200 | 37.0 | 11.6 | 85 | 12240 | 17000 | |
| C | 135 | 31.1 | 144 | 26.7 | -14.3 | 75 | 10125 | 10800 | |
| D | 81 | 18.7 | 52 | 9.6 | -48.4 | 65 | 5265 | 3380 | |
| F | 24 | 5.5 | 46 | 8.5 | 54.0 | 50 | 1200 | 2300 | |
| Total | 434 | 100 | 540 | 100 | | | 33580 | 42790 | |
| Credits Attempted | 0.9 | Credits | 1.1 | Credits | | | | | |
| Credits Earned | | | | | | | 77.37 | 79.24 | |
| (A+B+C+D) Enroll-Adm | 410 474 | | 494 475 | 0.2% | | | | | |
| Credits/Student | 0.86 | Credits | 1.04 | Credits | | | | | |
| Est. Change in Credits Per Student | | | | 20.2% | Est. Change: Academic Mastery | | | | 2.4% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 22.6% | | |

Table 9a compared all grades earned in English in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. The "A" grades earned under the traditional schedule were 6.6% less than the block schedule. "B" grades showed an increase of 3.8%. "C" grades did not reflect a similar increase, however "D" grades dropped significantly by 9.1% under the block schedule. Failures may have increased 3% under the block schedule, but credit completion increased by over 20%. Finally academic mastery increased under the block schedule by 2.4%.

Application of the sign test resulted in a positive direction flow of 2.4% for the achievement of grades for English. This 2.4% was significant at the level of .0039.

Table 9b

Senior High School - All Grades - All Credits - Grades 9 through 12 - Mathematics

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 69 | 15.2 | 156 | 25.4 | 67.2 | 95 | 6555 | 14820 |
| B | 121 | 26.7 | 200 | 32.6 | 22.2 | 85 | 10285 | 17000 |
| C | 136 | 30.0 | 168 | 27.4 | -8.7 | 75 | 10200 | 12600 |
| D | 90 | 19.8 | 34 | 5.5 | -72.1 | 65 | 5850 | 2210 |
| F | 38 | 8.4 | 56 | 9.1 | 9.0 | 50 | 1900 | 2800 |
| Total | 454 | 100 | 614 | 100 | | | 34790 | 49430 |
| Credits Attempted | 1.0 | Credits | 1.3 | Credits | | | | |
| Credits Earned | | | | | | | 76.63 | 80.50 |
| (A+B+C+D) Enroll-Adm | 416 474 | | 558 475 | 0.2% | | | | |
| Credits/Student | 0.88 | Credits | 1.17 | Credits | | | | |
| Est. Change in Credits Per Student | | 33.9% | | Est. Change: Academic Mastery | | 5.1% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 38.9% | |

Table 9b compared all grades earned in Mathematics in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. The "A" grades earned under the block schedule increased by 9.8%. "B" grades also reflected an increase, while "C" grades slightly declined. "D" grades were the most severely impacted, falling by 14.3% in a block schedule. Failures showed a slight rise, but overall academic mastery increase by 5.1%.

Application of the sign test resulted in a positive direction flow of 5.1% for the achievement of grades for Mathematics. This 5.1% was significant at the level of .0039.

Table 9c

Senior High School - All Grades - All Credits - Grades 9 through 12 - Social Studies

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|-------------------------------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 89 | 23.7 | 186 | 39.9 | | 58.2 | 95 | 8455 | 17670 |
| B | 97 | 25.9 | 98 | 21.0 | | -18.7 | 85 | 8245 | 8330 |
| C | 107 | 28.5 | 68 | 14.6 | | -48.9 | 75 | 8025 | 5100 |
| D | 64 | 17.1 | 68 | 14.6 | | -14.5 | 65 | 4160 | 4420 |
| F | 18 | 4.8 | 46 | 9.9 | | 105.7 | 50 | 900 | 2300 |
| Total | 375 | 100 | 465 | 100 | | | | 29785 | 37820 |
| Credits Attempted | 0.8 | Credits | 1.0 | Credits | | | | | |
| Credits Earned | | | | | | | | 79.43 | 81.16 |
| (A+B+C+D) Enroll-Adm | 357 474 | | 420 475 | 0.2% | | | | | |
| Credits/Student | 0.75 | Credits | 0.86 | Credits | | | | | |
| Est. Change in Credits Per Student | | | | | 17.4% | Est. Change: Academic Mastery | | | 2.2% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | | 19.6% |

Table 9c compared all grades earned in Social Studies in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. "A" grades earned reflected the highest improvement, rising from 23.7% in a traditional schedule to 39.9% in a block schedule. "B" grades show a decrease, but not nearly as significant as the decrease in "C" grades. "D" grades earned decreased 2.5% under a block schedule, although failures reflect an increase of 5.1%. Overall, academic mastery rose 2.2%.

Application of the sign test resulted in a positive direction flow of 2.2% for the achievement of grades for Social Studies. This 2.2% was significant at the level of .0039.

Table 9d

Senior High School - All Grades - All Credits - Grades 9 through 12 - Science

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 67 | 19.8 | 246 | 56.9 | 187.8 | 95 | 6365 | 23560 | |
| B | 94 | 27.7 | 88 | 20.2 | -27.2 | 85 | 7990 | 7480 | |
| C | 100 | 29.5 | 46 | 10.6 | -64.2 | 75 | 7500 | 3450 | |
| D | 49 | 14.5 | 30 | 6.9 | -52.4 | 65 | 3185 | 1950 | |
| F | 29 | 8.6 | 24 | 5.5 | -35.7 | 50 | 1450 | 1200 | |
| Total | 339 | 100 | 436 | 100 | | | 26490 | 37640 | |
| Credits Attempted | | Credits | | Credits | | | | | |
| Credits Earned | | | | | | | 78.14 | 86.33 | |
| (A+B+C+D) Enroll-Adm | 310 474 | | 412 475 | 0.2% | | | | | |
| Credits/ Student | 0.65 | Credits | 0.87 | Credits | | | | | |
| Est. Change in Credits Per Student | | | 32.6% | | Est. Change: Academic Mastery | | | 10.5% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 43.1% | | |

Table 9d compared all grades earned in Science in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. There was a significant increase reported for "A" grades totaling 37.1%. "B" grades do not show similar results, and actually favor the traditional schedule by 7.5%. "C" grades reported a decline, as did "D" grades and failures. The estimated total change in mastery from changes in grading patterns and increases in credits completed favor block schedule at 43.1%.

Application of the sign test resulted in a positive direction flow of 10.5% for the achievement of grades for Science. This 10.5% was significant at the level of .0039.

Table 9e

Junior/Senior High School - All Grades - All Credits - Grades 9 through 12 - World Languages

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------------------------------|-------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 88 | 36.4 | 150 | 47.2 | | 29.7 | 95 | 8360 | 14250 |
| B | 67 | 27.7 | 96 | 30.2 | | 9.0 | 85 | 5695 | 8160 |
| C | 51 | 21.1 | 36 | 11.3 | | -46.3 | 75 | 3825 | 2700 |
| D | 18 | 7.4 | 16 | 5.0 | | -32.4 | 65 | 1170 | 1040 |
| F | 18 | 7.4 | 20 | 6.3 | | -15.4 | 50 | 900 | 1000 |
| Total | 242 | 100 | 318 | 100 | | | | 19950 | 27150 |
| Credits Attempted | 0.5 | Credits | 0.7 | Credits | | | | | |
| Credits Earned | 224 474 | | | | | | | 82.44 | 85.38 |
| (A+B+C+D) Enroll-Adm | 224 474 | | 298 475 | 0.2% | | | | | |
| Credits/ Student | 0.47 Credits | | 0.63 Credits | | | | | | |
| Est. Change in Credits Per Student | | | 32.8% | | Est. Change: Academic Mastery | | | 3.6% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 36.3% | |

Table 9e compared all grades earned in World Languages in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. Both "A" and "B" grades reflected an increase under the block schedule, of 10.8% and 2.5% respectively. "C" grades indicate a decrease of nearly 10%, "D" grades and failures both show a decline after the implementation of the block schedule. Overall, the estimated total change in academic mastery and credit completion is 36.3%.

Application of the sign test resulted in a positive direction flow of 3.6% for the achievement of grades for World Languages. This 3.6% was significant at the level of .0039.

Table 9f

Junior/Senior High School - All Grades - All Credits - Grades 9 through 12 - English as a Second Language (E.S.L.)

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|-------|-------------------------------|---------|-------------------------|------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 13 | 11.6 | 30 | 20.3 | 74.6 | 95 | 1235 | 2850 | |
| B | 24 | 21.4 | 74 | 50.0 | 133.3 | 85 | 2040 | 6290 | |
| C | 47 | 42.0 | 24 | 16.2 | -61.4 | 75 | 3525 | 1800 | |
| D | 21 | 18.8 | 10 | 6.8 | -64.0 | 65 | 1365 | 650 | |
| F | 7 | 6.3 | 10 | 6.8 | 8.1 | 50 | 350 | 500 | |
| Total | 112 | 100 | 148 | 100 | | | 8515 | 12090 | |
| Credits Attempted | 0.2 | Credits | 0.3 | Credits | | | | | |
| Credits Earned | | | | | | | 76.03 | 81.69 | |
| (A+B+C+D) Enroll-Adm | 105 474 | | 138 475 | 0.2% | | | | | |
| Credits/Student | 0.22 | Credits | 0.29 | Credits | | | | | |
| Est. Change in Credits Per Student | | | | 31.2% | | Est. Change: Academic Mastery | | | 7.4% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 38.6% | | |

Table 9f compared all grades earned in English as a Second Language in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. There were significant increases in both "A" and "B" grades. The "A" grades increased by 8.7% and the "B" grades rose by 28.6%. "C" and "D" grades earned both decreased, while failures showed no significant change. The estimated change in credits per student was 31.2% and the estimated change in academic mastery was 7.4%, both favoring the block schedule.

Application of the sign test resulted in a positive direction flow of 7.4% for the achievement of grades for English as a Second Language. This 7.4% was significant at the level of .0039.

Table 9g

Junior/Senior High School - All Grades - All Credits - Grades 9 through 12 - Arts

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 219 | 45.2 | 496 | 51.7 | 14.2 | 95 | 20805 | 47120 |
| B | 178 | 36.8 | 308 | 32.1 | -12.8 | 85 | 15130 | 26180 |
| C | 56 | 11.6 | 118 | 12.3 | 6.2 | 75 | 4200 | 8850 |
| D | 17 | 3.5 | 6 | 0.6 | -82.2 | 65 | 1105 | 390 |
| F | 14 | 2.9 | 32 | 3.3 | 15.2 | 50 | 700 | 1600 |
| Total | 484 | 100 | 960 | 100 | | | 41940 | 84140 |
| Credits Attempted | 1.0 | Credits | 2.0 | Credits | | | | |
| Credits Earned | | | | | | | 86.65 | 87.65 |
| (A+B+C+D) Enroll-Adm | 470 474 | | 928 475 | 0.2% | | | | |
| Credits/ Student | 0.99 Credits | | 1.95 Credits | | | | | |
| Est. Change in Credits Per Student | | 97.0% | | Est. Change: Academic Mastery | | 1.1% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 98.2% | |

Table 9g compared all grades achieved in Arts in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. There was an increase in "A" grades under the block schedule of 6.5%. "B" grades reflect a slight decline as compared to the traditional schedule, and "C" grades do not illustrate much of a change. "D" grades decreased under the block schedule, yet again failures showed no significant change. The largest impact of the block schedule was the change in credits per student which was estimated at 97.0%.

Application of the sign test resulted in a positive direction flow of 1.1% for the achievement of grades for Arts. This 1.1% was significant at the level of .0039.

Table 9h

Junior/Senior High School - All Grades - All Credits - Grades 9 through 12 - Business/Tech Education

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|-------------------------------|-------|-----------------|---------|-------------------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 31 | 1.0 | 75 | 1.8 | 78.4 | 95 | 2945 | 7125 | |
| B | 36 | 1.2 | 42 | 1.0 | -14.0 | 85 | 3060 | 3570 | |
| C | 28 | 0.9 | 42 | 1.0 | 10.6 | 75 | 2100 | 3150 | |
| D | 10 | 0.3 | 5 | 0.1 | -63.1 | 65 | 650 | 325 | |
| F | 9 | 0.3 | 4 | 0.1 | -67.2 | 50 | 450 | 200 | |
| Total | 114 | 3.8 | 168 | 4.1 | | | 9205 | 14370 | |
| Credits Attempted | 0.2 | Credits | 0.4 | Credits | | | | | |
| Credits Earned | | | | | | | 80.75 | 85.54 | |
| (A+B+C+D) Enroll-Adm | 105 474 | | 164 475 | 0.2% | | | | | |
| Credits/Student | 0.22 | Credits | 0.35 | Credits | | | | | |
| Est. Change in Credits Per Student | | 55.9% | | Est. Change: Academic Mastery | | 5.9% | | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 61.8% | | |

Table 9h compared all grades achieved in Business/Tech Education in grades 9 through 12 in order to show the discrepancies between a traditional and a block schedule. The "A" grades earned reflected a slight increase, and "B" grades a slight decrease. Neither of these changes was significant. Similarly, there was almost no change in "C" grades at all "D" grades and failures were increased under the 4 x 4 block schedule by the identical amount of .07%. Overall, the estimated total change in mastery from schedules in grading patterns and increases in credits completed successfully was 61.8%.

Application of the sign test resulted in a positive direction flow of 5.9% for the achievement of grades for Business/Tech Education. This 5.9% was significant at the level of .0039.

Table 9i

Junior/Senior High School - All Grades - All Credits - Grades 9 through 12 - Physical Education

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|--|-------------------------------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 142 | 31.1 | 204 | 47.2 | | 51.6 | 95 | 13490 | 19380 |
| B | 141 | 30.9 | 122 | 28.2 | | -8.7 | 85 | 11985 | 10370 |
| C | 99 | 21.7 | 58 | 13.4 | | -38.2 | 75 | 7425 | 4350 |
| D | 45 | 9.9 | 38 | 8.8 | | -10.9 | 65 | 2925 | 2470 |
| F | 29 | 6.4 | 10 | 2.3 | | -63.6 | 50 | 1450 | 500 |
| Total | 456 | 100 | 432 | 100 | | | | 37275 | 37070 |
| Credits Attempted | 1.0 | Credits | 0.9 | Credits | | | | | |
| Credits Earned | | | | | | | | 81.74 | 85.81 |
| (A+B+C+D) Enroll-Adm | 427 474 | | 422 475 | 0.2% | | | | | |
| Credits/Student | 0.90 Credits | | 0.89 Credits | | | | | | |
| Est. Change in Credits Per Student | | | -1.4% | | | Est. Change: Academic Mastery | | | 5.0% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 3.6% | |

Table 9i compared all grades earned in Physical Education in grades 9 through 12 in order to show the discrepancies between a traditional and block schedule. "A" grades achieved reflected an improvement, from 31.1% in 1997 - 1998 to 47.2% in 1998 - 1999. "B" grades did not experience the same increment, but "C" grades fell by 8.3%. "D" grades showed a minor decline, but failures decreased by 4.1%. Overall, the change in credits per student did not record a significant change, but the change in academic mastery was 4.1%.

Application of the sign test resulted in a positive direction flow of 5.0% for the achievement of grades for Physical Education. This 5.0% was significant at the level of .0039.

Table 10

Junior High School - All Grades - All Credits - Grades 7 through 8

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 357 | 22.3 | 502 | 31.8 | 42.3 | 95 | 33915 | 47690 |
| B | 457 | 28.6 | 503 | 31.8 | 11.4 | 85 | 38845 | 42755 |
| C | 430 | 26.9 | 344 | 21.8 | -19.0 | 75 | 32250 | 25800 |
| D | 218 | 13.6 | 121 | 7.7 | -43.8 | 65 | 14170 | 7865 |
| F | 138 | 8.6 | 111 | 7.0 | -18.6 | 50 | 6900 | 5550 |
| Total | 1600 | 100 | 1581 | 100 | | | 126080 | 129660 |
| Credits Attempted | 6.5 | Credits | 7.1 | Credits | | | | |
| Credits Earned | | | | | | | 78.80 | 82.01 |
| (A+B+C+D) Enroll-Adm | 1462 248 | | 1470 222 | | | | | |
| Credits/Student | 5.90 | Credits | | 6.62 | Credits | | | |
| Est. Change in Credits Per Student | | 12.3% | | Est. Change: Academic Mastery | | 4.1% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 16.4% | |

Table 10 compared all grades earned in all credits grades 7 and 8. The block schedule caused a significant increase in "A" grades and a slight increase in "B" grades. "C" grades fell by 5.1% and "D" grades and failures both recorded a decline under the block schedule. Overall, the estimated change in credits per student was 12.3% and the estimated change in academic mastery was 4.1%. Both numbers support the 4 x 4 block schedule.

Table 10a

Junior High School - All Grades - All Credits - Grades 7 through 8 - English

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------|-------------------------------|-------------------------|--------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 45 | 2.8 | 80 | 3.8 | 34.9 | 95 | 4275 | 5700 |
| B | 93 | 5.8 | 100 | 6.3 | 8.8 | 85 | 7905 | 8500 |
| C | 74 | 4.6 | 88 | 4.3 | -7.0 | 75 | 5550 | 5100 |
| D | 48 | 3.0 | 28 | 1.8 | -41.0 | 65 | 3120 | 1820 |
| F | 39 | 2.4 | 22 | 1.4 | -42.9 | 50 | 1950 | 1100 |
| Total | 299 | 18.7 | 278 | 17.6 | | | 22800 | 22220 |
| Credits Attempted | 1.2 | Credits | 1.3 | Credits | | | | |
| Credits Earned | | | | | | | 76.25 | 79.93 |
| (A+B+C+D) Enroll-Adm | 260 248 | | 256 222 | -10.5% | | | | |
| Credits/Student | 1.05 | Credits | | 1.15 | Credits | | | |
| Est. Change in Credits Per Student | | | | 10.0% | Est. Change: Academic Mastery | | 4.8% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 14.8% | |

Table 10a is a comparison of all credits grades 7 and 8 in the subject of English. It shows the effects of a block schedule on academic mastery and credits per student. For example, "A" grades show a 1% increase and "B" grades reflect a .5% increase. The "C" grades achieved under the 4 x 4 block schedule showed a slight decrease, as did "D"s and failures. Overall, the estimated change in credits per student was 10% and the estimated change in academic mastery was 4.8%. Both figures reflect the positive influence of a block schedule.

Application of the sign test resulted in a positive direction flow of 4.8% for the achievement of grades for English. This 4.8% was significant at the level of .0068.

Table 10b

Junior High School - All Grades - All Credits - Grades 7 through 8 - Mathematics

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|-------------------------------|---------|-------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 31 | 1.9 | 74 | 4.7 | | 141.6 | 95 | 2945 | 7030 |
| B | 64 | 4.0 | 70 | 4.4 | | 10.7 | 85 | 5440 | 5950 |
| C | 78 | 4.9 | 68 | 4.3 | | -11.8 | 75 | 5850 | 5100 |
| D | 42 | 2.6 | 12 | 0.8 | | -71.1 | 65 | 2730 | 780 |
| F | 37 | 2.3 | 34 | 2.2 | | -7.0 | 50 | 1850 | 1700 |
| Total | 252 | 15.8 | 258 | 16.3 | | | | 18815 | 20560 |
| Credits Attempted | 1.0 | Credits | 1.2 | Credits | | | | | |
| Credits Earned | | | | | | | | 74.66 | 79.69 |
| (A+B+C+D) Enroll-Adm | 215 248 | | 224 222 | -10.5% | | | | | |
| Credits/Student | 0.87 | Credits | | 1.01 | Credits | | | | |
| Est. Change in Credits Per Student | | 16.4% | | Est. Change: Academic Mastery | | 6.7% | | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 23.1% | |

Table 10b compared the block schedule versus the traditional schedule in all credits grades 7 and 8 in Mathematics. The results show a significant increase in "A" grades, from 1.9% in 1997 - 1998 to 4.7% in 1998 - 1999. "B" grades reflect a slighter increase and "C" grades show a slight decrease. The "D" grades achieved under the block schedule show a definite decline, although the decrease in failures was insignificant. Overall, the estimated total change in mastery from changes in grading patterns and increases in credits completed successfully was 23.1%.

Application of the sign test resulted in a positive direction flow of 6.7% for the achievement of grades for Mathematics. This 6.7% was significant at the level of .0068.

Table 10c

Junior High School - All Grades - All Credits - Grades 7 through 8 - Social Studies

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | |
|--|-----------------|-------------|-------------------|-------------------------------|---------|-------------------------|---------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 40 | 2.5 | 32 | 2.0 | -19.0 | 95 | 3800 | 3040 |
| B | 58 | 3.6 | 74 | 4.7 | 29.1 | 85 | 4930 | 6290 |
| C | 87 | 5.4 | 62 | 3.9 | -27.9 | 75 | 6525 | 4650 |
| D | 46 | 2.9 | 26 | 1.6 | -42.8 | 65 | 2990 | 1690 |
| F | 16 | 1.0 | 20 | 1.3 | 26.5 | 50 | 800 | 1000 |
| Total | 247 | 15.4 | 214 | 13.5 | | | 19045 | 16670 |
| Credits Attempted | 1.0 | Credits | 1.0 | Credits | | | | |
| Credits Earned | | | | | | | 77.11 | 77.90 |
| (A+B+C+D) Enroll-Adm | 231 240 | | 194 222 | -10.5% | | | | |
| Credits/Student | 0.93 | Credits | | 0.87 | Credits | | | |
| Est. Change in Credits Per Student | | -6.2% | | Est. Change: Academic Mastery | | 1.0% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | -5.2% | |

Table 10c compared the block schedule with the traditional schedule in order to show the estimated total change in academic mastery and in credits completed successfully in Social Studies in grades 7 and 8. The "A" grades reflect a slight decrease under the block schedule and "B" grades show a 1.1% increase. "C" grades earned were less under the block schedule, as were "D" grades. Failures recorded a 3% increase and the overall estimated change in academic mastery was 1.0%.

Application of the sign test resulted in a positive direction flow of 1.0% for the achievement of grades for Social Studies. This 1.0% was significant at the level of .0068.

Table 10d

Junior High School - All Grades - All Credits - Grades 7 through 8 - Science

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|-------------|-------------------|-------------|---------|-------------------------------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 59 | 3.7 | 34 | 2.2 | | -41.7 | 95 | 5605 | 3230 |
| B | 62 | 3.9 | 72 | 4.6 | | 17.5 | 85 | 5270 | 6120 |
| C | 78 | 4.9 | 54 | 3.4 | | -29.9 | 75 | 5850 | 4050 |
| D | 36 | 2.3 | 12 | 0.8 | | -66.3 | 65 | 2340 | 780 |
| F | 15 | 0.9 | 14 | 0.9 | | -5.5 | 50 | 750 | 700 |
| Total | 250 | 15.6 | 186 | 11.8 | | | | 19815 | 14880 |
| Credits Attempted | 1.0 | Credits | 0.8 | Credits | | | | | |
| Credits Earned | | | | | | | | 79.26 | 80.00 |
| (A+B+C+D) Enroll-Adm | 235 240 | | 172 222 | | | -10.5% | | | |
| Credits/Student | 0.95 | Credits | | 0.77 | Credits | | | | |
| Est. Change in Credits Per Student | | | -18.2% | | | Est. Change: Academic Mastery | | | 0.9% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | -17.3% | |

Table 10d illustrates the effects of a block schedule in grades 7 and 8 in Science on grades earned and credits completed. Although "A" grades do not reflect an increase, "B" grades show a 0.7% incline. "C" grades have fallen under the 4 x 4 block schedule, as have "D" grades. Failures recorded no perceptible change. The block schedule had a -18.2% effect on credits completed per student, but the estimated change in academic mastery favors the block schedule by 0.9%.

Application of the sign test resulted in a positive direction flow of 0.9% for the achievement of grades for Science. This 0.9% was significant at the level of .0068.

Table 10e

Junior High School - All Grades - All Credits - Grades 7 through 8 - World Languages

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|---------|---------|-------------------------------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 28 | 1.8 | 28 | 1.8 | | 1.2 | 95 | 2660 | 2660 |
| B | 23 | 1.4 | 23 | 1.5 | | 1.2 | 85 | 1955 | 1955 |
| C | 12 | 0.8 | 12 | 0.8 | | 1.2 | 75 | 900 | 900 |
| D | 7 | 0.4 | 7 | 0.4 | | 1.2 | 65 | 455 | 455 |
| F | 7 | 0.4 | 7 | 0.4 | | 1.2 | 50 | 350 | 350 |
| Total | 77 | 4.8 | 77 | 4.9 | | | | 6320 | 6320 |
| Credits Attempted | 0.3 | Credits | 0.3 | Credits | | | | | |
| Credits Earned | | | | | | | | 82.08 | 82.08 |
| (A+B+C+D) Enroll-Adm | 70 248 | | 70 222 | -10.5% | | | | | |
| Credits/Student | 0.28 | Credits | | 0.32 | Credits | | | | |
| Est. Change in Credits Per Student | | | | 11.7% | | Est. Change: Academic Mastery | | | 0.0% |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 11.7% | |

Table 10e shows the effect of a block schedule in grades 7 and 8 in World Languages. "A" grades recorded no perceptible change and "B" grades also showed no significant increase. Similarly, the "C", "D", and "F" grades did not change under the block schedule. Although there was no change in academic mastery there was an 11.7% estimated change in credits per student.

Application of the sign test resulted in a positive direction flow of 0% for the achievement of grades for World Languages. This 0% was significant at the level of .0068.

Table 10f

Junior High School - All Grades - All Credits - Grades 7 through 8 - English as a Second Language (E.S.L.)

| Traditional | | 4 X 4 Block | | Diff. % | Mastery Est. In Percent | Avg. Percent of Mastery | | |
|---|--------------------|-------------|----------------------|-------------------------------|-------------------------------|-------------------------|---------|-----------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | | | % | 1997-98 | Est. 1998-99 |
| A | 0 | 10.0 | 4 | 0.3 | -97.5 | 95 | 0 | 380 |
| B | 5 | 0.3 | 14 | 0.9 | 183.4 | 85 | 425 | 1190 |
| C | 15 | 0.9 | 8 | 0.5 | -46.0 | 75 | 1125 | 600 |
| D | 10 | 0.6 | 10 | 0.6 | 1.2 | 65 | 650 | 650 |
| F | 10 | 0.6 | 4 | 0.3 | -59.5 | 50 | 500 | 200 |
| Total | 40 | 12.5 | 40 | 2.5 | | | 2700 | 3020 |
| Credits Attempted | 0.2 | Credits | 0.2 | Credits | | | | |
| Credits Earned | | | | | | | 67.50 | 75.50 |
| (A+B+C+D) Enroll-Adm | 30 248 | | 36 222 | -10.5% | | | | |
| Credits/ Student | 0.12 | Credits | | -10.5 | Credits | | | |
| Est. Change in Credits Per Student | | 34.1% | | Est. Change: Academic Mastery | | 11.9% | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 45.9% | |

Table 10f shows the effects of a 4 x 4 block schedule on grades 7 and 8 in English as a Second Language. Although the "A" grades do not favor the block schedule, "B" and "C" grades do reflect a 0.6% increase and a 0.4% decrease respectively. "D" grades remained unaffected while failures showed a slight decline. Overall, the estimated change in credits per student was 34.1%, while the estimated change in academic mastery was 11.9%

Application of the sign test resulted in a positive direction flow of 11.9% for the achievement of grades for English as a Second Language. This 11.9% was significant at the level of .0068.

Table 10g

Junior High School - All Grades - All Credits - Grades 7 through 8 - Arts

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|-------------------------------|---------|-------|-----------------|-------------------------|--------------|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | | % | Est. In Percent | 1997-98 | Est. 1998-99 |
| A | 73 | 4.6 | 186 | 11.8 | | 157.9 | 95 | 6935 | 17670 |
| B | 69 | 4.3 | 78 | 4.9 | | 14.4 | 85 | 5865 | 6630 |
| C | 34 | 2.1 | 34 | 2.2 | | 1.2 | 75 | 2550 | 2550 |
| D | 8 | 0.5 | 2 | 0.1 | | -74.7 | 65 | 520 | 130 |
| F | 5 | 0.3 | 6 | 0.4 | | 21.4 | 50 | 250 | 300 |
| Total | 189 | 11.8 | 306 | 19.4 | | | | 16120 | 27280 |
| Credits Attempted | 0.8 | Credits | 1.4 | Credits | | | | | |
| Credits Earned | | | | | | | | 85.29 | 89.15 |
| (A+B+C+D) Enroll-Adm | 184 248 | | 300 222 | -10.5% | | | | | |
| Credits/ Student | 0.74 | Credits | | 1.35 | Credits | | | | |
| Est. Change in Credits Per Student | | 82.1% | | Est. Change: Academic Mastery | | 4.5% | | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | 86.7% | |

Table 10g shows the effects of a 4 x 4 block schedule on grades 7 and 8 in the Arts.

While the traditionally scheduled students achieved 4.6% grade "A"s, the 4 x 4 block scheduled students achieved 11.8% "A" grades. The "B" grades show a slight increase under a block schedule while "C" grades show no significant change. "D" grades show a decrease which favors the block schedule and failures show no significant change. Overall, the estimated change in credits per student was 82.1% and the estimated change in academic mastery was 4.5 %.

Application of the sign test resulted in a positive direction flow of 4.5% for the achievement of grades for Art. This 4.5% was significant at the level of .0068.

Table 10h

Junior High School - All Grades - All Credits - Grades 7 through 8 - Business/Tech Education

| Traditional | | | 4 X 4 Block | | | Diff. | Mastery | Avg. Percent of Mastery | |
|--|-----------------|---------|-------------------|-------------------------------|---------|-----------------|---------|-------------------------|-----|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 0 | 0 | | 0 | | ERR | 95 | 0 | 0 |
| B | 0 | 0 | | 0 | | ERR | 85 | 0 | 0 |
| C | 0 | 0 | | 0 | | ERR | 75 | 0 | 0 |
| D | 0 | 0 | | 0 | | ERR | 65 | 0 | 0 |
| F | 0 | 0 | | 0 | | ERR | 50 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | | | | 0 | 0 |
| Credits Attempted | 0 | Credits | 0 | Credits | | | | | |
| Credits Earned | | | | | | | | ERR | ERR |
| (A+B+C+D) Enroll-Adm | 0 248 | | 0 222 | -10.5% | | | | | |
| Credits/ Student | 0.0 | Credits | | 0.0 | Credits | | | | |
| Est. Change in Credits Per Student | | ERR | | Est. Change: Academic Mastery | | ERR | | | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | | ERR | |

Table 10h reflects the influence of a block schedule in grades 7 and 8 in the subject of Business/Tech Education after the implementation of a block schedule.

Since Business/Tech Education is not offered to student in grades 7 through 8, there is no difference. Application of the sign test could not be completed in this area.

Table 10i

Junior High School - All Grades - All Credits - Grades 7 through 8 - Physical Education

| Traditional | | 4 X 4 Block | | Diff. | Mastery | Avg. Percent of Mastery | | | |
|--|-----------------|-------------|-------------------|---------|-------------------------------|-------------------------|---------|--------------|--|
| Grades Earned | 1997-98 Credits | % | Est 98-99 Credits | % | % | Est. In Percent | 1997-98 | Est. 1998-99 | |
| A | 81 | 5.1 | 84 | 5.3 | 4.9 | 95 | 7695 | 7980 | |
| B | 83 | 5.2 | 72 | 4.6 | -12.2 | 85 | 7055 | 6120 | |
| C | 52 | 3.3 | 38 | 2.4 | -26.0 | 75 | 3900 | 2850 | |
| D | 21 | 1.3 | 24 | 1.5 | 15.7 | 65 | 1365 | 1560 | |
| F | 9 | 0.6 | 4 | 0.3 | -55.0 | 50 | 450 | 200 | |
| Total | 246 | 15.4 | 222 | 14.0 | | | 20465 | 18710 | |
| Credits Attempted | 1.0 | Credits | 1.0 | Credits | | | | | |
| Credits Earned | | | | | | | 83.19 | 84.28 | |
| (A+B+C+D) Enroll-Adm | 237 248 | | 218 222 | -10.5% | | | | | |
| Credits/Student | 0.96 | Credits | | 0.98 | Credits | | | | |
| Est. Change in Credits Per Student | | | 2.8% | | Est. Change: Academic Mastery | | | 1.3% | |
| Est. Total Change in Mastery from Changes in Grading Patterns and Increases in Credits Completed Successfully. | | | | | | | 4.1% | | |

Table 10i reflects the influence of a block schedule in grades 7 and 8 in the subject of Physical Education. There was a slight increase in "A" grades achieved under the block schedule, countered by the slight negative effect on "B" grades achieved. The "C" grades achieved in the 1998 - 1999 school year totaled 3.3%. The "D" grades showed no significant change and failures only a slight decrease. Overall, the estimated change in credits per student was 2.8%. The estimated change in academic mastery was 1.3%. Both numbers are favorable for the 4 x 4 block schedule.

Application of the sign test resulted in a positive direction flow of 1.3% for the achievement of grades for Physical Education. This 1.3% was significant at the level of .0068.

Table 11

Honor Roll - Second Marking Period - Palisades Park Junior/Senior High School

| | 1997 - 1998 | 1998 - 1999 |
|-------------|----------------------------------|----------------------------------|
| Grade Level | Number of Students Honor Roll | Number of Students Honor Roll |
| Grade 7 | 8 | 18 |
| Grade 8 | 11 | 31 |
| Grade 9 | 9 | 29 |
| Grade 10 | 7 | 18 |
| Grade 11 | 9 | 30 |
| Grade 12 | 4 | 45 |
| | | |
| TOTAL | 132 | 269 |

Table 11 is a comparison between traditional scheduled students and block scheduled students. It clearly illustrates that student under a block schedule achieve honor roll status more often. The most significant increase was among seniors, of which only four achieved honor roll status in 1997 - 1998. That number increased tenfold under the block schedule. In fact, every grade level reported more students making the honor roll with a block schedule.

Student Satisfaction

The null hypothesis of student satisfaction that there is no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student satisfaction was rejected. To test the hypothesis

that there is a significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student satisfaction, three areas were examined - student attendance, student suspensions and student dropout rates.

Schools changing to a block schedule usually report a quieter climate in the school and improvements in discipline. There are fewer changes in classes and teachers deal with only three classes and about 40% students each day.

There are other measures of student conduct that should be considered: attendance, suspensions, and drop outs. Other high schools initiating block schedules have generally found improvements in these rates. Will that be true in Palisades Park during the first semester under a block schedule? The first area is student attendance.

Students don't learn if they aren't in class. Since the students are mastering more of the curriculum, they should be attending school more regularly. Are they? Consider the following table.

Table 12

Analysis of Attendance - Grades 7-12

| Months | Traditional Spring Semester | Block Fall Semester | |
|-----------|--------------------------------|------------------------|------------|
| | 1997 - 1998 | 1998 - 1999 | Difference |
| September | 95.7% | 95.4% | 0.3% |
| October | 96.2% | 94.4% | 1.8% |
| November | 94.8% | 94.9% | -0.1% |
| December | 93.9% | 94.2% | -0.3% |
| January | 94.1% | 93.8% | 0.3% |

Table 12 compares the attendance rates recorded from September through January of the 1997 - 1998 school year, under a traditional schedule, with the same data and months of 1998 - 1999 school year under a block schedule. Attendance rates range from 93.8% to 96.3% averaging about 94%, which is a very good attendance regardless of schedule. After one semester, there does not appear that the implementation of a block schedule caused or was accompanied by a clear change in rates of attendance.

The change in the number of suspensions can be a useful measure of the status of discipline in a school. The following table compares to the number of suspensions of the first five months of the first semester for the 1997 - 1998 school year, under a traditional schedule, with the suspensions recorded during the same months of the 1998 - 1999 school year, under a block schedule. These suspensions represent the more serious disciplinary cases, the cases that are most disruptive of learning in Palisades Park's classes.

Table 13

Analysis of Student Suspensions - Grades 7 - 12

| Months | Traditional Fall Sem. | Block Fall Sem. | Difference | |
|---------------|--------------------------|--------------------|------------|--------------|
| | 1997 - 1998 | 1998 - 1999 | Number | Percent |
| September | 32 | 14 | 18 | 56.3% |
| October | 25 | 24 | 1 | 4.0% |
| November | 34 | 21 | 13 | 38.2% |
| December | 40 | 22 | 18 | 45.0% |
| January | 24 | 24 | 0 | 0.0% |
| TOTALS | 155 | 105 | 50 | 32.3% |

Table 13 shows that the number of suspensions declined during the first five months under a block schedule in four of the five months. The declines, ranging from no change to a 56% decline, average a substantial decline of about 32%.

A single semester's data is not enough to draw a conclusion concerning suspensions. However, these data are consistent with the positive responses of the students on the surveys. It is also consistent with first year data from other schools moving to a block schedule. Students who are academically more successful and who have improved relationships with their teachers are less likely to become discipline problems.

The final area examined is student dropouts. Reducing the dropout rate is an important objective for Palisades Park Junior/Senior High School. If students feel better about their school experience and if they are more successful in their studies, they are more likely to stay in school. Most schools that have initiated a block type schedule have reported improved, lower dropout rates. However, only four students dropped out during

the first semester of the 1997 - 1998 school year, under a traditional schedule, as compared to six students dropping out during the first semester of the 1998 - 1999, under a block schedule. There is no significant message in these data. It will take more time and data to see if moving to a 4 x 4 block schedule had an impact on the retention of students at Palisades Park Junior/Senior High School.

Teacher Methodology

The null hypothesis that there is no significant difference that exists between teachers operating in a traditional program and teachers operating under a block scheduling program with respect to teacher methodology was also rejected. Two series of classroom observations were completed, the first in the spring of 1997 - 1998 school year when classes were traditionally scheduled and the second in the fall of 1998 - 1999 when the school was operating under a block schedule.

These two series of classroom observations were conducted to record teacher methodology and the actual allocation of time to different types of classroom activities. The observers were recently retired teachers who were selected because they were considered to be capable teachers. They were not previously associated with the Palisades Park School system. Every teacher was observed for a full period, 40 minutes for the first series of observations under a traditional schedule and 80 minutes for the second series under a block schedule. The observers recorded the number of minutes allocated to each of the following types of classroom activity for each class observed:

Lecture. Teacher is doing all or almost all of the talking, directing (using notes, etc.)

Audio Visual. A video tape, audio cassette, etc. is played. Students watch or listen as they would if the teacher was lecturing.

Teacher/Student. Interactive, whole class instruction. (Teacher leading; student responding, asking questions)

Student/student/Group Work. Students working together in groups of perhaps two's or three's with the teacher as facilitator. Students reporting to the class concerning work they have completed. More formally organized groups which may be evidenced by the teacher either organizing the groups or telling the class to organize into their groups, which the teacher has previously organized.

Laboratories. The students are either working individually or in groups doing lab assignments. These could be laboratories for a science course, an industrial arts or home making course, or a computer science laboratory.

Seat Work. Students working individually at their desks or stations, whether doing traditional pencil and paper work or doing homework. The teacher may be moving from student to student or responding to a students request for help.

Down Time. Nothing is really happening. For example, student may have their books and materials packed and are waiting for the bell to ring. There may be a delay in starting the class due to a problem or some other delay. Disciplinary problems may create down time. The teacher is not involved instructionally.

There is a place for all of these instructional activities and some seat work and down time may be expected, particularly at the beginning and ending of a period. The

question is: How has classroom time actually been allocated and how has that allocation changed after the introduction of the block schedule?

The findings from these two series of observations for the Palisades Park Junior High School and the Palisades Park Senior High School combined are compared in the following tables.

Junior High School Observations

The following table presents the allocation of time by junior high school teachers as recorded by the observers. The major use of time found in both series of observations was the use of teacher/student interactive discussion, which increased about 6% under a block schedule. There was a 9% decline in the use of lectures, from 13% to 4%, which was supportive of the students responses to the six statements that dealt with the amount of lecturing. The most notable changes in the use of time during the fall 1998 - 1999 semester is the decline in seat work of about 27% and an increase student-student/group work of about 24%. These observations are consistent with the junior high student's responses to the six statements that deal with grouping, three at statistically significant levels. There was more group work under a block schedule.

The average number of changes per period in use of time increased from an average of 2.4 to an average of 3.4, which supports the teacher responses which indicate that more teachers used several approaches and techniques in each class.

Table 14

Comparison of Classroom Observations at Palisades Park Junior High School

| SPRING 1998 OBSERVATIONS WITH FALL 1998 OBSERVATIONS BASELINE SPRING 1998 OBSERVATIONS | | | | | | | | | |
|--|---------|-----------------|--------------------|-------------------|----------|--------------|---------------|--------|-------------------|
| APPROXIMATE MINUTES OF DIFFERENT USES OF INSTRUCTIONAL TIME | | | | | | | | | |
| | LECTURE | AUDIO VISUAL | TEACHER STUDENT | STUDENT GROUPS | LABS | SEAT WORK | DOWN TIME | TOTALS | NO. PER PERIOD |
| Minutes Observed | 108 | 0 | 312 | 87 | 0 | 304 | 22 | 833 | 50 |
| Percentage | 13.0% | 0.0% | 37.5% | 10.4% | 0.0 % | 36.5% | 2.6 % | 100% | 2.4 |
| FALL 1998-99 OBSERVATIONS | | | | | | | | | |
| Minutes Observed | 69 | 120 | 701 | 566 | 0 | 140 | 25 | 1611 | 71 |
| Percentage | 4.3% | 7.4% | 43.5% | 34.5% | 0.0 % | 8.7% | 1.6 % | 100% | 3.4 |
| Percentage Change | -8.7% | 7.4% | 6.1% | 24.1% | 0.0 % | -27.8% | - 1.1 % | 0.0% | 1.0 |
| 80 Min. Classes as compared to the 40 minute classes The percentages of time allocations are the basis for valid comparisons of use of time | | | | | | | | | |

Senior High School Observations

Tables 15 and 16 present the observer's record concerning the use of time by the senior high school teachers. The observers found that teacher/student interactive whole class instruction utilized about one-third of the classroom time, whether organized under a traditional or a block schedule. Student/student group work jumped from about 16% to 32%, a significant increase. Seat work dropped sharply. These results are supported by the senior high student responses to the six statements dealing with grouping. Students

indicated that there was more grouping under a block schedule on all six statements, five at statistically significant levels. It should be noted that the observers found little change in the amount of time allocated to lecturing. The students indicated less lecturing in four of the six statements dealing with lecturing and indicated more lecturing on two statements. These findings appear to support each other.

Table 15

Comparison of Classroom Observations at Palisades Park High School

| SPRING 1998 OBSERVATIONS WITH FALL 1998 OBSERVATIONS BASELINE SPRING 1998 OBSERVATIONS | | | | | | | | |
|---|---------|-----------------|--------------------|------------------|-------|--------------|--------------|--------|
| SPRING 1998 OBSERVATIONS WITH FALL 1998 OBSERVATIONS BASELINE SPRING 1998 OBSERVATIONS | | | | | | | | |
| APPROXIMATE. MINUTES OF DIFFERENT USES OF INSTRUCTIONAL TIME | | | | | | | | |
| | Lecture | Audio Visual | Teacher Student | Student Group | Labs | Seat Work | Down Time | Totals |
| Minutes Observed | 90 | 95 | 453 | 202 | 30 | 352 | 30 | 1252 |
| Percentage | 7.2% | 7.6% | 36.2% | 16.1% | 2.4% | 28.1% | 2.4% | 100.0% |
| FALL 1998 OBSERVATIONS | | | | | | | | |
| Minutes Observed | 155 | 218 | 837 | 805 | 50 | 430 | 25 | 2520 |
| Percentage | 6.2% | 8.7% | 33.2% | 31.9% | 2.0% | 17.1% | 1.0% | 100.0% |
| Percentage Change | -1.0% | 1.1% | -3.0% | 15.8% | -0.4% | -11.1% | -1.4% | 0.0% |
| *The Fall 1998 observations were of 80 min. classes as compared to the 40 min. classes observed in the spring 1998 classes. The percentages of time allocations are the basis for valid comparisons of use of time. | | | | | | | | |

Table 15 indicates that the use of classroom time has shifted to activities which are associated with better instruction as in cooperative group instruction and a greater variety of instructional activities.

Student Engagement

Are most students involved in what they're supposed to be doing and paying attention? Are they asleep, mentally elsewhere, or disruptive? Observers were asked to rate the levels of student engagement in the classes they observed. The rating was on a five point Likert scale. Table 16 presents the ratings of both junior high and senior high classes in terms of engagement.

The junior/high and senior high school high ratings (1 or 2) dropped about 10%; more important, the low ratings (4 or 5) dropped from about 29% to 5%. The shift was to the middle "3" rating which doubled from about 33% to 66%. On balance, there was a higher level of student engagement under a block schedule.

Table 16

Estimated Levels of Student Engagement at Palisades Park Junior/Senior High School

| SPRING 1998 SEMESTER: BASELINE 1 (HIGH) to 5 (LOW) | | | | | |
|--|-------|-------|--------|------|--------|
| 1 | 2 | 3 | 4 | 5 | TOTALS |
| 0 | 8 | 7 | 6 | 0 | 21 |
| 0.0% | 38.1% | 33.3% | 28.6% | 0.0% | 100.0% |
| FALL 1999 SEMESTER: | | | | | |
| 0 | 6 | 14 | 1 | 0 | 21 |
| 0.0% | 28.6% | 66.7% | 4.8% | 0.0% | 100.0% |
| 0.0% | -9.5% | 33.3% | -23.8% | 0.0% | 0.0% |
| SENIOR HIGH SCHOOL FALL 1998-99 SEMESTER: 1 (HIGH) TO 5 (LOW) | | | | | |
| 1 | 2 | 3 | 4 | 5 | TOTAL |
| 0 | 8 | 7 | 6 | 0 | 21 |
| 0.0% | 38.1% | 33.3% | 28.6% | 0.0% | 100.0% |
| FALL 1999 SEMESTER: | | | | | |
| 1 | 15 | 16 | 0 | 0 | 32 |
| 3.1% | 46.9% | 50.0% | 0.0% | 0.0% | 100.0% |
| 3.1% | 8.8% | 16.7% | -28.6% | 0.0% | 0.0% |

The senior high school observations, shown in table 16, found that there were higher levels of student engagement under a block schedule. The percentage of "1" and "2" ratings increased from 38% to 50% while the percentage of "4" and "5" ratings declined from 29% to -28.6%. In summation, the observations find that instructional time is more varied and that students are more highly engaged in their class work under a block schedule.

Chapter V

Introduction, Conclusions, Implications, Recommendations

Introduction

The purpose of this study was to compare block scheduling and traditional scheduling and its relationship to student achievement, student satisfaction, and teacher methodology in a junior/senior high school.

Increasing instructional time in order to achieve educational improvements has become the main objective of educational reform. The idea of lengthening the school year is an unpopular one. Many researchers (Carroll, 1987, Canady and Rettig, 1993) have discovered that even large increases in instructional time yield only minor improvements.

Time has been deemed to be so crucial in education that Public Law 102-62 caused the establishment of the National Education Commission on Time and Learning (1991) to examine the correlation between time and learning. The Commission concluded that high schools are poorly designed and do not allow students the time required for in-depth reflection.

One focus of educators in the past, which is evidenced by the mission statements of many schools, was the level of difficulty of instruction. While much research has been completed in this area, little time has been dedicated to the research in regard to

restructuring American education according to student satisfaction, student achievement and the improvement of instructional methodologies.

Conclusions

This particular study analyzed three main components. The first component that was studied was student achievement. This study showed favorable results under a block schedule. Students not only achieved better grades, but also were offered a larger variety of courses which lead to greater amounts of knowledge.

The research completed in Palisades Park Junior/Senior High School indicates that time is a most critical area in increasing student achievement. These issues must be dealt with if a change is desired. The large amount of research on time and learning that has been conducted consistently reveals the total instructional time in a designated curriculum area positively relates to student achievement.

Literature indicated that block scheduling improves student achievement. An implementation of a block schedule in the Palisades Park Junior/Senior High School yielded higher grade point averages under block scheduling as compared to traditional scheduling. Since students have more time to learn a concept in-depth, or to complete a project, or to do laboratory work, these students demonstrated a greater understanding and retention of key ideas as indicated through an increase in grade point average. These students also used higher, more critical thinking skills compared to their traditionally scheduled counterparts.

With respect to Hypothesis 1 (research Questions #1, 2, 3, 4) there are no significant differences that exist between students enrolled in a traditional program and

students enrolled in a block scheduling program with respect to student achievement. Research conducted in this study in Palisades Park Junior/Senior High School showed a marked difference between these two groups. Student achievement in areas such as improved grades, honor roll, completion of advanced courses and graduation rate can be attributed to a change in scheduling.

A block schedule allows for a more concentrated approach to academic areas. It permits more labs and field trips. Students consistently approve of a schedule that promotes more course choices. For example, the science department at Palisades Park Junior/Senior High School has increased their course offerings from 7 to 14. The same can be found in the history department. (See Appendix A)

The number of students that achieved honor roll status under the block schedule has also increased. Compared to the 1997 - 1998 school year during which only 32 students made the honor roll, 269 students made the honor roll under block scheduling in the 1998 - 1999 school year. This indicates an increase of 104% under block scheduling. More honor roll students signifies increased grades. These numbers clearly illustrate the positive effects of block scheduling.

With respect to Hypothesis 2 (Research Questions # 5, 6, 7) there are no significant differences that exist between students enrolled in a traditional program and student enrolled in a block scheduling program with respect to student satisfaction. Research collected in this study in Palisades Park Junior/Senior High School shows that indeed there are discrepancies between these two groups with respect to student

satisfaction. Student satisfaction encompasses elements such as dropout rates, absenteeism, discipline referrals and suspensions.

The results for the majority of these categories are as follows. The number of suspensions went from 155 in 1997 - 1998 to 105 in 1998 - 1999. This figure is noticeably in favor of the block schedule. Daily attendance rates showed almost no change (see Table 11), but the number of students that achieved honor roll showed an increase of 103.7%. Also, the number of discipline referrals diminished under the block schedule. If educators are serious about a reform, then block scheduling should be considered.

This third focus was more teacher-centered. It was an analysis of the impact of an intensified schedule on teacher methodology. It was a determination of the extent to which an increase in instructional time promoted an increase in instructional strategies. Furthermore, it showed the impact of varied instructional methods on active learning.

In regard to Hypothesis 3 (Research Question #8) which states that there are no significant differences that exist between teacher methodology in a traditional program and teacher methodology in a block scheduling program, Palisades Park Junior/Senior High School showed some discrepancies.

The biggest allocation of time found in both scenes of observations was the use of teacher-student interactive discussion, which showed a 6% increase under a block schedule. Lectures recorded a 9% decline, which was supportive of the student response to questions dealing with the amount of lecturing. The most significant changes in the use of time during the fall 1998 - 1999 semester was the decline in seat work. This

decrease was calculated at 27%. An increase in student to student group work was noted at 24%. Five statements indicated significant levels. It should not go unnoticed that observers saw little change in the amount of time dedicated to lecture. In four of six statements observers recorded less lecturing; two of six recorded more lecturing. These conclusions appear to support each other. Most research points to better instruction with use of cooperative groups and a variety of other strategies.

Data illustrates a significant movement away from the traditional lecture strategy which enables students to remain positive learners. A block schedule allows teachers to experiment with different teaching strategies, thereby varying the experience of the learner. Positive changes include: cooperative learning, team teaching, out reach programs, field trips and independent study. Through all of these methods, students become an integral part of the learning process.

It is apparent that block scheduling excels over the restrictive traditional scheduling. Student satisfaction, student achievement and teacher methodology all improve with such flexible scheduling.

The research indicates a strong relationship between an implementation of block scheduling and improvement in the three areas of this study. Elongated class periods have consistently revealed positive effects in all three areas. These positive effects outweigh some problems that are found in the initial transformation to a block schedule, such as teacher resistance and student adjustment.

Implications

The initial questions posed by this study dealt with student achievement. Standardized test scores have become important in both New Jersey and nationwide. The keys to the success of a major schedule change include: sequencing, curricular adjustments, pacing of content delivery, staff development and teacher supervision. Time is of the essence for the proper exploration of individual schools. A change would be impossible in a six month span.

School-wide grade distributions tended to increase with the change to elongated periods. This leads to the conclusion that more intense periods of instruction coupled with fewer daily classes fosters the student-teacher relationship. The implication here is that the 4 x 4 semester plan may work better than other forms of block scheduling. This aspect needs more research.

The second focus of investigation was to determine whether student satisfaction increased under block scheduling. Results in this area were positive. Daily attendance rates tended to increase. The rise in attendance averages is attributed to longer class periods and fewer preparations.

The third focus of this study was teacher methodology. Teachers must feel a part of the decision making process in order to feel free to adopt a new schedule. A balance of clinical supervision, peer coaching, and peer evaluation needs to be developed. Longer class periods would foster the utilization of different, creative techniques. Therefore, the

major implication of this study towards a movement from traditional scheduling to block scheduling indicates better student achievement, greater student satisfaction and better methodology.

A longitudinal study using Palisades Park Junior/Senior High School should be completed to see if the results are similar. These changes would have to be met with more in-service workshops for teachers, and planning time to reconstruct lessons. This would have to be maintained on a consistent basis.

Recommendations

The goal of this study was to compare block scheduling with traditional scheduling. The study was conducted at the junior/senior high school level. Indicators include student achievement, student satisfaction, and teacher methodology factors. The sample school was chosen due to its multi-cultural population and due to its operation of a 4 x 4 semester block scheduling format. Due to the newness of the project, some data was difficult to gather. Now that larger block scheduling samples are available, a follow up study is suggested. With time, more schools will adopt the 4 x 4 system which will enable easier access to data. Yet another option would be to reconduct studies on the same schools after time to mark progress.

A similar study needs to be conducted using larger junior/senior high schools or inner city schools, rather than the middle class suburban school used in this study. This should be done to determine whether participant views differ under these circumstances.

As this study analyzed only the 4 x 4 semester format, other types of block schedules need to be evaluated. A similar study examining the A/B system or trimester system would reveal useful data. A comparative study between the various types of

block scheduling formats would also be beneficial. Educators pulling for school reform would then have a foundation for comparison more suited to individual purposes.

A study should be conducted on various types of block scheduling schools for a longer period of time. A period of three to five years is suggested to monitor students' achievement, attendance, and perceptions.

Curriculum revision provides yet another opportunity for study under the change of time scheduling. Sequencing of courses and the rate at which content will be dispersed, both impact student achievement. Studies in these areas may spark the development of school-wide standards.

A study should be conducted in collaboration with teachers from different disciplines who can provide necessary data for analysis. For example, a study focusing on a single department such as foreign language or mathematics, can provide the researcher with comparative test scores for all levels of the subject using the scores of students before and after the implementation of block scheduling.

Another suggestion for research is the effect of block scheduling upon non-major subjects and special education programs. Areas such as art and music would provide important information. The monitoring of special needs individuals, including the gifted, would be vital.

A study should be conducted in subject areas where standardized achievement test scores are available for statistical analysis. For example, SAT or HSPA scores could be used to compare scores on different subjects achievements tests before and after the implementation of block scheduling.

A study should be conducted to identify the students who are benefitting the most from block scheduling. For example, a study could analyze whether the top or the lower 25th percentile of students' benefitted the most from the implementation of block scheduling. Schools from different parts of the country should be studied in order to achieve a broader outlook on the effects of block scheduling on students academic achievement.

Various state associations should review the content of this dissertation and other dissertations so that principals and superintendents might benefit from such research.

One final suggestion for study is the effect of block scheduling upon staff development and teacher supervision. Both of these aspects seem crucial to the success of changing teacher behavior. A study in this area or in any of the aforementioned areas will help build a foundation for educational reform.

The issues in this study have been debated across the country for decades. The manner in which this increased instructional time can be utilized more effectively is an issue that will refine the roles of teacher and learner. If these efforts in reform are to be successful, more in-depth learning and higher-order thinking skill must be encouraged. Leading theorists criticize the exaggeration of factual knowledge. Teaching strategies that target more effective ways of processing and retaining information must be utilized in every classroom. Block scheduling provides one method of encouraging educators to explore these pedagogical practices.

So far in the short history of block scheduling, it seems that the reform shows great promise. The question is, to what extent is it the panacea to the myriad of problems

facing education today? Will effective use of block scheduling better prepare students to be productive members of an ever changing society? Will a block schedule nourish society with creative problem-solvers who work successfully alone and in groups? Can a change in class structure provide the country with adept workers who possess strong communication and writing skills? These questions require the devotion of research. Thus, broader-based and more sophisticated research is needed before a choice is made.

Block scheduling provides unique opportunities for students, teachers and administrators. It changes the student's approach to learning as well as the teacher's approach to methodology. Content material, classroom assignments and homework assignments must all undergo a change. The school's total commitment to block scheduling must be reflected in the relationships between students and their teachers and between their administrators. Block scheduling has some problems, but if students, teachers and administrators are willing to dedicate themselves to the reform, they can offer students a way to meet the changing needs of society. If administrators and teachers are willing to accept this commitment, then this can offer students a significant way to meet their needs for the new millennium.

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Appendix A

Palisades Park Junior/Senior High School

Course List 1997 - 1998

PALISADES PARK JUNIOR/SENIOR HIGH SCHOOL
COURSE LIST 1997 - 1998
GRADES 9 - 12

English Department

English I
 English I Honors
 English II
 English II Honors
 English III
 English III Honors
 English IV
 AP English IV Honors
 Journalism I
 Creating Writing Exp.
 SAT Prep
 SRA Verbal
 HSPT READ/WRITE

Science Department

Physical Science
 Biology
 Biology Honors
 Chemistry
 Chemistry Honors
 Physics Honors
 Anatomy & Physiology
 Honors

ESL Department

ESL I
 ESL II
 ESL III

Mathematics Department

Algebra I
 Geometry
 Geometry Honors
 Algebra II
 Algebra II Honors
 PreCalculus Honors
 AP Calculus Honors

Algeo I
 Algeo II
 Algeo III
 Advanced Business
 Math
 SAT Prep
 SRA Math
 HSPT Math

History Department

US History I
 US History I Honors
 US History II
 US History II Honors
 World Cultures
 World Cultures Honors
 Psychology

Computers &**Technology Department**

Word Processing I
 Word Processing II

**Physical Education
Department**

Physical Education 9 -
 12
 Drivers Education
 Health

**World Languages
Department**

French I
 French II
 French III
 French IV Honors
 French V Honors
 Spanish I
 Spanish II

Spanish III
 Spanish IV Honors
 Spanish V Honors
 Italian I
 Italian II
 Italian III
 Italian IV Honors
 Italian V Honors
 Latin I
 Latin II

**Fine & Appl. Arts
Department**

Band 7 - 12
 Chorus 7 - 12
 Art I
 Art II
 Art III
 Art IV
 Wood Shop

**Home Economics
Department**

Clothing I
 Clothing II
 Foods I
 Foods II
 Personal/Social
 Relations

Appendix B

Palisades Park Junior/Senior High School

Course List 1998 - 1999

PALISADES PARK JUNIOR/SENIOR HIGH SCHOOL
COURSE LIST 1998 - 1999
GRADES 9-12

English Department

English I
 English I Honors
 English II
 English II Honors
 English III
 English III Honors
 English IV
 AP English IV Honors
 The Short Story
 Literature in Film
 Journalism I
 Journalism II
 Debate/Public Speaking
 The "Beat" Generation
 Technical Writing
 Creative Writing Exp.
 Multicultural Literature
 Cont. Issues in Adult Lit.
 Shakespeare
 The Novel
 Modern Literature
 SAT Prep
 Research (AP English IV Only)
 SRA Verbal

Science Department

Physical Science
 Biology
 Biology Honors
 Chemistry
 Chemistry Honors
 Physics
 Physics Honors
 Anatomy & Physiology Honors
 Environmental Science
 Biology II - Botany
 Astronomy
 Metaphysics
 Bacteriology
 Our Earth

ESL Department

ESL I
 ESL II
 ESL III
 ESL Writing
 ESL Reading

Mathematics Department

Algebra I

Basic Algebra
 Basic Geometry
 Geometry
 Geometry Honors
 Algebra II
 Algebra II Honors
 Pre-Calculus Honors
 AP Calculus Honors
 Algeo II
 Computer Programming
 Statistics (Calculus Only)
 Advanced Business Math
 SAT Prep
 Linear Algebra
 SRA Math
 Choices & Decisions
 Patterns/Fractals/Tessellations
 Probability Application of
 Secondary Math

History Department

US History I
 US History I Honors
 US History II
 US History II Honors
 World Cultures
 World Cultures Honors
 Women in History
 The History of Sports
 Psychology
 Current Events
 The Holocaust
 Middle Ages - Early Renaissance

Computers & Technology Department

Web Page design
 Computer Applications I
 Exploring Microsoft Office '98
 Presentation Applications I
 Desktop Publishing Applicant I

Physical Education Dept.

Physical Education 9 - 12
 Drivers Education
 Health

World Languages Dept.

French I
 French II
 French III

French IV Honors
 French V Honors
 Spanish I
 Spanish II
 Spanish III
 Spanish IV Honors
 Spanish V Honors
 Italian I
 Italian II
 Italian III
 Italian IV Honors
 Italian V Honors
 Latin I
 Latin II

Fine & Appl. Arts Dept.

Music Theory
 Pop Music Composition
 Jazz Ensemble
 Strings
 Keyboards
 Band 7 - 12
 Chorus 7 - 12
 Music Video Production
 Select Choir
 Beginning Instrumental Music
 Introduction to Fine Arts
 Drawing/Painting
 Sculpture/3D Art
 Printmaking
 Wood Shop
 Electronics Technology
 Computer Aided Design

Home Economics Dept.

Clothing I
 Clothing II
 Foods I
 Foods II
 Child Development
 Personal/Social Relations
 Life Skills

Appendix C

Teacher Classroom Observation Form

**Palisades Park Junior Senior High School
Summary of Teacher/Classroom Observations**

| Department of the Classes Being Observed | Approx. Minutes of Different Uses of Instructional Time | | | | | | | | | | Level of Student Exchange 1 (High) to 5 (Low) | | | | |
|--|---|--------------|-----------------|----------------|------|-----------|-----------|----------------------|---|---|--|---|---|--|--|
| | Lecture | Audio Visual | Teacher Student | Student Groups | Labs | Seat Work | Down Time | Number of Types Used | 1 | 2 | 3 | 4 | 5 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| English | | | | | | | | | | | | | | | |
| Mathematics | | | | | | | | | | | | | | | |
| Social Studies | | | | | | | | | | | | | | | |
| Science | | | | | | | | | | | | | | | |
| World Languages | | | | | | | | | | | | | | | |
| English as a Second Language (E.S.L.) | | | | | | | | | | | | | | | |
| Arts | | | | | | | | | | | | | | | |
| Business/Tech Education | | | | | | | | | | | | | | | |
| Physical Education | | | | | | | | | | | | | | | |

Appendix D

Introductory Explanation Letter To Superintendent

33 East Harwood Terrace
Palisades Park, NJ 07650
March 1, 1998

Dr. Charles Smith
270 First Street
Palisades Park, NJ 07650

Dear Dr. Smith:

I am a doctoral candidate at Seton Hall University, South Orange, New Jersey, and I am requesting permission to conduct my dissertation research in the Palisades Park School System.

The topic that I will be researching is the comparison of block scheduling and traditional scheduling and it's relationship to student satisfaction, student achievement and teacher methodology in a junior/senior high school in New Jersey. I believe that Palisades Park Junior/Senior High School would be a very appropriate setting for my study since Palisades Park Junior/Senior High School will be implementing block scheduling in September, 1998.

Enclosed is information explaining my dissertation study. Thank you for your consideration in allowing me to conduct this study at the Palisades Park Junior/Senior High School. I will contact you in a few days to hear your decision and hopefully to discuss procedures for implementation. Thanks again.

Sincerely,

Thomas Matarazzo

Enclosure

Introduction

The basis of my proposal is to compare block scheduling and traditional scheduling and it's relationship to student satisfaction, student achievement and teacher methodology in a Junior/Senior high school in New Jersey.

This study will be approved by each member of my dissertation committee as well as the Institutional Review Board of Seton Hall University.

To study this, I will need to collect pre and post data from student records. The students records that I need to examine would include:

- a) quantity and quality of courses taken
- b) grades earned in regular courses
- c) grades earned in advance placement courses
- d) students on the honor roll
- e) student failures in courses offered
- f) student attendance records
- g) student drop out records
- h) student disciplinary referrals
- i) mean scores of teacher observation

Complete confidentiality relative to the students and teachers is guaranteed once the results are in and the

dissertation completed. A copy of the final dissertation will be sent to you.

What follows are excerpts from chapters one and three of my dissertation to provide additional information.

Problem Statement

One of the arguments against block scheduling is that there will be a decrease in actual hours of seat time of classroom instruction. By increasing the number of courses a student can take per year within the exciting school day, class time per course may be reduced. Proponents of block scheduling agree that lecture time in block scheduling is less than it will be with a traditional schedule. In fact, Canady (1993) describes a study indicating that instructional activities in a traditional setting averaged only 28 minutes (54.2%) of each 55-minute class period.

Although time spent learning is an important factor in educational reform, little research has been conducted in this area. Advocates of block scheduling purport impressive advantages: achievement gains, improved student-teacher relationships, and such improved student outcomes as decreasing dropout rates, absenteeism, and disciplinary referrals. While there is some support for such claims (Bateson, 1990; Canady and Rettig, 1995a, 1995b; Carroll, 1994a, 1994b; Guskee and Kifer, 1995; Sharman, 1990; Whitla, Bempechat, Perron and Carroll,

1992), there is a limited amount of research about block scheduling.

In order to fulfill student potential and increase motivation, educators need to reexamine the method that students are taught. Educators must redesign the structure of American education to maximize the school day as well as maximize the individualization of instruction.

While most educators believe that students will be instructed at a correct level of difficulty, and while this is reflected in any school by their mission statement, very little time and research has been made to the restructuring of American education with regard to student satisfaction, student achievement and the improving of instructional methodology on the part of American educators.

This study will analyze three main parts. The first part that will be examined is student satisfaction. If students are satisfied in their learning process, then there will be less discipline problems and lower dropout rates which will only increase the students level of satisfaction. (Canady and Rettig, 1995a).

Student satisfaction can also affect attendance. It will be discovered that when block scheduling is implemented, student attendance will increased. (Butcher, 1996).

Other areas such as disciplinary problems and the school climate will also be examined. As supported by

Shore (1995) school climate is greatly improved under block scheduling. A much greater personalized environment will be created to enhance the learning process in education.

The second point analyzed will be student achievement. Students will not only received better grades, but they also have more courses available to them which leads to greater amounts of knowledge. (Smith, 1995).

Teacher methodology is the third area that will be examined. It will be determined that a change in schedule is a condition that translated into a change in teaching as well as in learning. (Carroll, 1994). Block scheduling will force educators to alter their methods of teaching. Effective and innovative teaching methods will be instituted into the teaching format which leads to greater student success. (Canady and Rettig, 1995a).

Purpose of the Study

The purpose of this study will be to compare block scheduling and traditional scheduling and it's relationship to student satisfaction, student achievement and teacher methodology in a junior/senior high school in New Jersey.

Eight major research questions form the focus of this study:

1. Is there a difference between the mean scores of students enrolled in a traditional program and

students enrolled in a block scheduling program with respect to the quantity and quality of courses taken?

2. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to grades in regular courses and grades in advanced placement courses?

3. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a program with respect to honor roll?

4. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to a decrease in the number of failures per course?

5. Is there a difference between the mean scores of the students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student attendance?

6. Is there a difference between the mean scores of students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student drop out rates?

7. Is there a difference between the mean scores of students enrolled in traditional program and students

enrolled in a block scheduling program with respect to student disciplinary referrals?

8. Is there a difference between the mean scores of teacher observation in a traditional program and the mean score of teacher observation in a block scheduling program with respect to instructional methodology utilized?

Hypothesis

The hypothesis that will be developed for the study will be based upon the stated purpose of the study and the eight questions presented for research and analysis which will support the purpose of this study.

Hypothesis #1. There will be no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student achievement. (Research Questions #1, 2, 3, 4).

Hypothesis #2. There will be no significant difference that exists between students enrolled in a traditional program and students enrolled in a block scheduling program with respect to student satisfaction. (Research Questions #5, 6, 7).

Hypothesis #3. There will be no significant difference that exists between teachers operating in a traditional program and teachers operating under a block scheduling program with respect to teacher methodology.

The basis of the dissertation will be an in-depth analysis of 750 junior/senior high school students. A comparative analysis will be conducted to determine if significant differences, if any, exist in student achievement, student satisfaction and teacher methodology with respect to this junior/senior high school operating under a traditional schedule and consequently under a block scheduling format. The school selected is the junior/senior high school located in Palisades Park, New Jersey. All of the students to be examined in this study are to be enrolled in this junior/senior high school. The school was selected because it will represent a highly diverse multi-cultural population and had adopted a block scheduling format for implementation in 1998 thus allowing collection of base line data for comparison purposes.

Instrumentation

The observation form utilized will be developed by Dr. Joseph Carroll, author of the Copernican Plan, and will be designed to evaluate teacher methodology under the traditional scheduling and teacher methodology under block scheduling.

This survey was designed to examine several dimensions and techniques used by teachers in the Palisades Park Junior/Senior High School. The areas to be examined grew out of the attention given to the teaching methods used prior to block scheduling and after the implementation of block scheduling.

33 East Harwood Terrace
Palisades Park, NJ 07650
March 3, 1998

Charles Smith, Ed.D.
Superintendent of Schools
Palisades Park Board of Education
270 First Street
Palisades Park, NJ 07650

Dear Dr. Smith:

I am writing to you as a doctoral candidate at Seton Hall University, South Orange, New Jersey. I am researching information on student achievement, student satisfaction and teacher methodology as part of my study. I will be using the observation form created by Copernican Associates, Ltd., Dr. Joseph Carroll. I would like to assure the faculty of complete anonymity and that the faculty's participation in this project is completely voluntary. Refusal to participate will involve no penalty or loss of benefits to which the faculty is entitled.

Thank you in advance for your cooperation in participating in my research. Please find enclosed the consent form needed for my committee.

Sincerely yours,

Thomas Matarazzo

Appendix E

Consent Letter From Superintendent Of Schools

PALISADES PARK PUBLIC SCHOOLS
Palisades Park, NJ 07650

Dr. Charles R. Smith
Superintendent of Schools

270 First Street
Tel. (201) 947-3560
Fax: (201) 947-4079

March 3, 1998

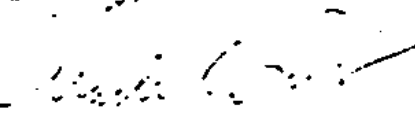
Mr. Thomas Matarazzo
33 E. Harwood Terrace
Palisades Park, NJ 07650

Dear Mr. Matarazzo:

I enthusiastically endorse your proposal to research block scheduling in Palisades Park Jr./Sr. High School.

I will be putting forward your proposal to the Board of Education at our March 16th meeting. A copy of the official Resolution approving your study will be forthcoming soon after the meeting.

Sincerely,



Charles R. Smith, Ed.D.
Superintendent of Schools

CRS:pr

Appendix F

Resolution From Board Of Education

Granting Permission

PALISADES PARK BOARD OF EDUCATION
Palisades Park, New Jersey

March 11, 1998

BE IT RESOLVED, that the Palisades Park Board of Education, upon the recommendation of the Superintendent of Schools, approve Thomas Matarazzo to conduct a study on block scheduling at the Palisades Park Jr/Sr High School during the 1998/99 school year.

INTRODUCED BY: Ms. Dontas

SECONDED BY: Mr. Katz

VOTE: All ayes on roll call
Ms. Dontas
Mr. Katz
Mr. Kim
Mrs. Lemonie
Mr. Mattessich
Mrs. Nurick
Mr. Ring

I, Diane Montemurro, do hereby
certify that this a true and
correct copy of a Resolution
adopted by the Palisades Park
Board of Education



Diane Montemurro
Board Secretary

Adopted: March 9, 1998

Appendix G

Introductory Explanation Letter To Principal

33 East Harwood Terrace
Palisades Park, NJ 07650
March 1, 1998

Ms. Jean Colosso, Principal
Palisades Park Junior/Senior High School
Veterans Plaza
Palisades Park, NJ 07650

Dear Ms. Colosso:

I am a doctoral candidate at Seton Hall University, South Orange, New Jersey, and I am requesting permission to examine student records and observe teachers for their methods at the Palisades Park Junior/Senior High School. This study will be conducted during the 1998-1999 school year.

The topic that I will be researching is the comparison of block scheduling and traditional scheduling and it's relationship to student satisfaction, student achievement and teacher methodology in a junior/senior high school in New Jersey. I believe that Palisades Park Junior/Senior High School would be a very appropriate setting for my study since Palisades Park Junior/Senior High School will be implementing block scheduling in September, 1998.

This study will be approved by each member of my dissertation committee as well as the Institutional Review Board of Seton Hall University.

To study this, I will need to collect pre and post data from student records. The students records that I need to examine would include:

- a) quantity and quality of courses taken
- b) grades earned in regular courses
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- d) students on the honor roll
- e) student failures in courses offered

Ms. Jean Colosso
Page 2
March 1, 1998

- f) student attendance records
- g) student dropout records
- h) student disciplinary referrals
- i) mean scores of teacher observation

Complete confidentiality relative to the students, and teachers is guaranteed once the results are in and the dissertation completed. A copy of the final dissertation will be sent to you.

Teacher observations would be needed to conduct the difference in teacher methodology in the traditional scheduling as compared to teacher methodology in block scheduling. This will be completely confidential and this will not be a critique of the teacher's performance, but rather to study the teacher methodology utilized in the classroom. This will be completely voluntary and would not affect the employment or future employment of any participant.

To further clarify what my study entails, I have enclosed segments of my chapters one and three to answer any questions that you may have. If, after reviewing the enclosed information, you have any further questions, please feel free to contact me at any time.

Sincerely,

Thomas Matarazzo

Enclosure: Chapter segments

The following excerpts are from chapters one and three of my dissertation to provide additional information.

Problem Statement

One of the arguments against block scheduling is that there will be a decrease in actual hours of seat time of classroom instruction. By increasing the number of courses a student can take per year within the exciting school day, class time per course may be reduced. Proponents of block scheduling agree that lecture time in block scheduling is less than it will be with a traditional schedule. In fact, Canady (1993) describes a study indicating that instructional activities in a traditional setting averaged only 28 minutes (54.2%) of each 55-minute class period.

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significant differences, if any, exist in student achievement, student satisfaction and teacher methodology with respect to this junior/senior high school operating under a traditional schedule and consequently under a block scheduling format. The school selected is the junior/senior high school located in Palisades Park, New Jersey. All of the students to be examined in this study are to be enrolled in this junior/senior high school. The school was selected because it will represent a highly diverse multi-cultural population and had adopted a block scheduling format for implementation in 1998 thus allowing collection of base line data for comparison purposes.

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Appendix H

Consent Letter From Principal

PALISADES PARK JUNIOR/SENIOR HIGH SCHOOL

Palisades Park, NJ 07650

Telephone (201) 941-3100

Fax (201) 941-3230

Jean Colosso
Principal

John P. Hayes
Vice Principal

March 6, 1998

Dear Mr. Matarazzo,

As per my telephone conversation with Dr. Smith, I would like to inform you of our decision to accept your request concerning the involvement of the Palisades Park Jr./Sr. High School in your doctoral dissertation. The administration will supply you with the necessary data to assist you in the comparative study of students in a traditional learning environment and those in a block scheduling environment.

Good luck in your study and please feel free to share the results of your study with us.

Yours truly,



Jean Colosso.

Principal

cc: Dr. Charles R. Smith, Supt of Schools

Appendix I

Thank You Letter To Board of Education

33 East Harwood Terrace
Palisades Park, NJ 07650
March 1, 1999

Palisades Park Board of Education
270 First Street
Palisades Park, NJ 07650

Ladies and Gentlemen:

Now that the observations and tabulations have been completed in your district, I'd like to thank you for allowing me to complete my dissertation in your school district. Your administrative and teaching staff were most cooperative and were great to work with. I'm hopeful that the study will yield some interesting and valuable information. I'll send you a copy of the dissertation in late spring. Thank you again for your assistance.

Sincerely,

Thomas Matarazzo

Appendix J

Thank You Letter to Superintendent

33 East Harwood Terrace
Palisades Park, NJ 07650
March 1, 1999

Dr. Charles Smith
Palisades Park Board of Education
270 First Street
Palisades Park, NJ 07650

Dear Dr. Smith:

Now that the observations and tabulations have been completed in your district, I'd like to thank you for the time and effort you put into coordinating this effort. Your administrative and teaching staff were most cooperative. I'm hopeful that the study will yield some interesting and valuable information. I'll send you a copy of the dissertation in late spring. Thank you again for your assistance.

Sincerely,

Thomas Matarazzo

Appendix K

Thank You Letter To The Principal

33 East Harwood Terrace
Palisades Park, NJ 07650
March 1, 1999

Mr. John Hines, Principal
Park High School
Veterans Plaza
East Columbia Avenue
Palisades Park, NJ 07650

Dear Mr. Hines:

Now that the observations and tabulations have been completed in your district, I'd like to thank you for the time and effort you put into coordinating this effort. Your teaching staff were most cooperative. I'm hopeful that the study will yield some interesting and valuable information. I'll send you a copy of the dissertation in late spring. Thank you again for your assistance.

Sincerely,

Thomas Matarazzo