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An opinionnaire of secondary school mathematics instructors regarding block scheduling

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An Opinionnaire of Secondary School Mathematics Instructors Regarding Block Scheduling

by
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Approved by_____
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ABSTRACT

Elaine M. Groman, An Opinionnaire of Secondary of School Mathematics Instructors Regarding Block Scheduling, 1998, J. Sooy, Mathematics Education.

The purpose of this study was to investigate the impact of block scheduling on mathematics instruction at the secondary level in New Jersey public schools.

Surveys were sent to ten high schools identified as using block scheduling in New Jersey. Mathematics teachers and supervisors were asked to evaluate block scheduling and rate the impact it has on a scale from great affect to little affect in the areas of curriculum coverage, amount of time spent reviewing previously covered material, coverage of the New Jersey Core Curriculum Standards and sequence of mathematics courses a student takes. AP Calculus instructors were asked to rate the impact of block scheduling in their classes. All respondents were asked to identify what they felt were the advantages and disadvantages of block scheduling.

Analysis of the data indicate that block scheduling has little to no effect on mathematics instruction at the AP Calculus level. The majority of AP classes are scheduled in block for the first semester and every other day the second semester. The results of the AP Test were not affected. Overall, AP Calculus instructors are satisfied with block scheduling.

The advantages of block scheduling include more time for labs, experiments, hands-on activities, cooperative learning and greater one-to-one contact between the teacher and student. Block scheduling also allows a student to take more mathematics classes.

The disadvantages of block scheduling include less time for the student to absorb and process information, less curriculum covered and more preparation required by the

teacher. Absenteeism is also a problem under block as it affects the student's ability to make up larger amounts of material.

MINI-ABSTRACT

Elaine M. Groman, An Opinionnaire of Secondary School Mathematics Instructors Regarding Block Scheduling, 1998, J. Sooy, Mathematics Education.

The purpose of this study was to investigate the impact of block scheduling on mathematics instruction at the secondary level in New Jersey Public school.

Analysis of the data indicate that block scheduling has little to no affect on mathematics instruction at the AP Calculus level or on the sequence of mathematics courses a student takes. Less curriculum is covered under block scheduling and more time is spent reviewing previously taught material. The greatest advantage of block scheduling is more time for labs and experiments. The greatest disadvantage is the affect on the amount of curriculum covered.

Acknowledgments

I would like to thank Dr. John Sooy for his patience and guidance. I would also like to thank my family and especially my husband, Stephen Groman, for all the support and encouragement they lent me.

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CHAPTER 1

Introduction to the Study

Background

Block scheduling as an alternative to the traditional school schedule is not a new phenomenon. Many schools in British Colombia, Ontario and Alberta have been using it since the 1970s. In the United States, block schedules have become increasingly popular in the 1990s. In the New Jersey area, many schools have switched to some form of block scheduling. Other districts, such as Cherry Hill, New Jersey, are currently investigating block scheduling as an alternative to the traditional school schedule.

School administrators are attracted to block scheduling for a variety of reasons: improved student discipline, a more positive student attitude, lower drop-out rates and greater flexibility in scheduling classes. Preliminary studies have shown that block scheduling promotes all of these things.

Teachers, in particular, mathematics teachers, are often less supportive of a change to such schedules. They are concerned about the impact of such schedules on how they will teach and what they will teach. Given the length of each class under block scheduling, lecturing becomes less effective. As a result, teachers have to change how they teach. (Kramer 1997)

Statement of the Problem

The purpose of this study is to investigate block scheduling as it relates to the instruction of mathematics at the secondary level.

Justification of the Problem

Of great importance to mathematics teachers is the impact of block scheduling on the mathematics curriculum and the gaps block scheduling could create in sequential mathematical instruction. Mathematics teachers are concerned that they may not be able to cover the mathematics curriculum effectively under a block schedule (Kramer, 1997). For example, a student could take Algebra I in the fall of ninth grade, take no mathematics courses over the next two semesters, and then take Geometry in the spring of tenth grade. This in turn could lead a teacher to having to spend more time reviewing before going on.

The impact of AP mathematics courses is significant. Typically, AP courses are taught in the fall, but the AP tests are given in the spring. This gap between instruction and testing is troublesome and how to remedy the situation becomes a pressing question.

Survey and anecdotal data provide consistent evidence that teachers often cover less material under a block schedule (Brophy, 1978; King et al., 1978, O'Neil, 1995, Sturgis, 1995). Today New Jersey schools are currently implementing the new Core Standards into their curriculums. The question must be asked: How does block scheduling impact on the coverage of these standards?

Limitation of the Study

This study will be limited to secondary schools in New Jersey. Also, since the emphasis of this study is mathematics, it will be limited to mathematics teachers and supervisors at the secondary level.

Definitions

AP Mathematics:Advanced placement Calculus

Block scheduling: Block scheduling is a means of circumventing the time con-

straints of the single class period. "At least part of the daily schedule is organized into larger blocks of time (more than sixty minutes) to allow flexibility for a diversity of instructional activities." (Gawetti, 1994). Block courses may be scheduled for two of more continuous class periods or days. The following are some of the different types of block scheduling.

A) A/B or Alternating Day Block: Under this type of scheduling, students take three courses on two alternating days or six courses in all for the year.

B) 4/4 or Semester Block: In each of two semesters, students take four courses that are equivalent to a full credit or a year of instruction. Each class lasts ninety minutes each day.

New Jersey Core Standards: The state of New Jersey has developed a core curriculum for all public schools. Included in this curriculum are the minimum basic standards for mathematics which the state has made mandatory.

Traditional Scheduling: Traditionally, the school day is divided into six, seven, or eight class periods which last from forty-two to fifty-five minutes each. The majority of courses offered span the entire school year.

Procedures

The purpose of this study is to investigate block scheduling as it relates to the instruction of mathematics at the secondary level. A post card survey will be used to determine which schools in New Jersey are currently using block scheduling and what type

of block scheduling they are employing. This will be followed by a questionnaire/opinionnaire. The opinionnaire will focus on how mathematics teachers and supervisors feel about the impact of block scheduling on their instruction as it relates to their curriculum. It will also investigate the impact of block scheduling on the implementation of the New Jersey Core Standards for Mathematics.

From the data gained from the questionnaire/opinionnaire, insight will be determined as to what effect, if any, block scheduling has on the mathematics curriculum and the implementation of the New Jersey Core Standards.

Endnotes

Brophy, B. " Semestering and the Teaching-Learning Situation." *Canadian Journal of Education* 3(1978): 47-54.

Cawelti, Gordon. "High School Restructuring: A National Study. " Arlington, Virginia: Educational Research Service, 1994.

King, A.J.C: Warren, W.: Moore, J.: Bryans,G.: and Pirie, J. *Approaches to Semestering.* Toronto, Ontairio: Ontario Institute for Studies in Education, 1978.

Kramer, Steven L. "What We Know about Block Scheduling: A Review of the Literature, with Supplemental Data." *National Association of Secondary School Principals Bulletin.* In press.

O'Neil, J. "Finding Time To Learn. "*Educational Leadership* 3(1995): 11-15.

Sturgis J. "Teacher Opinions About Block Scheduling." Unpublished manuscript. 1995.

CHAPTER 2

Review of Related Research and Literature

Introduction

As block scheduling becomes more popular as an alternative to traditional scheduling in the United States, much research has been conducted as to its effectiveness. As a result, a wide variety of resources were available for this study. Among those utilized were: journal articles, internet data, dissertation abstracts, resource books and summative evaluations from individual high schools.

Review of Related Literature and Research

As early as the 1970's, block scheduling at the secondary education level has replaced the traditional scheduling in many United States high schools as a means of improving the quality of public education. An excerpt from the April, 1994, " Prisoners of Time Report" states: "Fixing the design flaw also makes possible radical change in the teaching and learning process. 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." This report published by the National Education Commission On Time and Learning in 1994 coupled with the United States Government Goals 2000 have spurred many schools systems into adopting block scheduling as a viable means of solving educational problems.

Advocates of block scheduling have listed the non-academic benefits to be achieved. Among them:

Reduction of the number of classes a student attends each day.

Fewer classes a teacher must prepare for each day.

Less discipline problems.

Decrease in tardiness to class.

A positive affect on school atmosphere.

A more positive teacher/student attitude.

Better student attendance.

Decrease in student failure and dropout rate. (Kramer, 1997)

Studies have shown that block scheduling does indeed have these results. An article prepared by CAREI (Center for Applied Research and educatinal Improvements) in January 1995 on the affect of block scheduling states:

"With so few studies available, the findings described above must be considered preliminary even though it appears there are significant outcomes form use of the 4-period day schedule. Decreasing the number of students for teachers and the number of classes for students and teachers seems to improve behavior, attitude and academic achievement of students."

In another article, Kramer states:

"There are many reasons a principal may want to consider adopting a block schedule. Research indicates that both major forms of block scheduling may have important nonacademic advantages, including a calmer school atmosphere, better discipline, and improved student attitudes toward school. In addition, intensive block schedules may be particularly helpful to at-risk students, reducing both failure and dropout rates.

But of growing concern to educators are the academic benefits reputed to be gained from block scheduling. Mathematics teachers, in particular, have concerns that the mathematics curriculum is not designed to fit into the longer time slot, that there will be

gaps in the sequence of mathematics courses, which might lead to more time spent reviewing and less curriculum content covered. Curriculum coverage is of special concern to New Jersey mathematics teachers who must comply with the recent installation of the New Jersey Core Curriculum Standards.

Another problem that needs to be addressed is the scheduling of AP Calculus classes. The AP test is given in May only. Students who take the course in the fall of the year suffer from the time gap until the test. Students who take the course in the spring of the year are not fully prepared because they have not covered the full curriculum. Several studies support these concerns.

A Canadian study by Drs. Dennis Raphael, Merlin W. Wahlstrom, and L.D. McLean looked at the effect of block scheduling on mathematics courses in Ontario schools. Their conclusion:

"Teachers in semester schools reported comparable coverage of mathematics content, but fewer hours of instruction in their courses. Number of years of teaching experience was not correlated with student achievement in semester schools, but a positive correlation was observed in year-long classes. Lower achievement in semester mathematics classes was observed with no advantage in student attitudes."

A recent study by Susan L. Lockwood, titled "Semesterizing the High School Schedule: the Impact of Student Achievement in Algebra and Geometry", compared the academic achievement of semestered schools to that of previous results under traditional scheduling of the high schools in Dothan, Alabama. In spite of lower scores under block scheduling, her statistical analysis showed that there was no significant harm under block scheduling. In conclusion, she states:"There are no significant differences in the achievement of students in algebra or geometry on the two schedules."

Gordon R. Gore, a retired physics and science teacher, has analyzed the result of the Provincial Exam Results and Timetables, based on 1995 data, published in the

Catalyst(Volume 39, Number 3) which compares the performances of students in schools on three major types of time tables used in British Columbia: 10-month, 2 semester, and Copernican quarter. The results of his analysis are shown in the following tables and chart.

Table 1 shows a comparison on achievement in the English section of the exam.

Table 1

English 12 Mean Scores Provincial Examinations 1995-1996

English 12	10 month	Semester	Quarter
Mean	68.14%	67.07%	65.14%
%A's	10.70%	7,52%	5.03%
%Fail	9.58%	9.40%	10.65%

Table 2 shows a comparison of the achievemenet level on the mathematics section of the exam.

Table 2

Mathematics 12 Mean Scores Provincial Examinations 1995-1996

Mathematics 12	10 month	Semester	Quarter
Mean	69.41%	64.63%	62.85%
%A's	24.27%	14.15%	10.70%
%Fail	15.13%	19.04%	21.49%

Table 3 compares the mean scores of all the sections of the exam by the type of scheduling used.

Table 3

Mean Score by Subject-Provincial Examinations 1994-1995

	Full Year	Semester	Quarter
English 12	67.65%	66%	63.77%
Mathematics 12	68.17%	63.89%	62.445
Physics 12	71.37%	68.15%	66.92%
Chemistry 12	69.96%	67.36%	64.46%
Biology 12	66.75%	65.56%	68.09%

Table 4 compares the number of A's awarded at the end of a cycle in each type of scheduling to the number of A's awarded on the Provincial Exam under the same scheduling.

Table 4

Difference in %A's Awarded, School-Based vs Provincial Exam Marks

		%A's(School Based)	%A's(Provincial Exam)	Difference in % of A's
English 12	Full Year	17.26%	10.70%	6.56%
	Semester	15.06%	7.52%	7.54%
	Quarter	16.29%	5.03%	11.26%
Math 12	Full Year	28.47%	24.27%	4.20%
	Semester	22.81%	14.15%	8.66%
	Quarter	20.79%	10.70%	10.09%
Biology	Full Year	27.70%	22.55%	5.15%
	Semester	20.89%	18.52%	2.37%
	Quarter	22.97%	19.21%	3.76%
Chem 12	Full Year	28.96%	24.20%	4.76%
	Semester	25.14%	22.12%	3.02%
	Quarter	30.25%	19.42%	10.83%
Physics 12	Full Year	33.01%	24.50%	8.51%
	Semester	60.17%	19.42%	10.75%
	Quarter	34.31%	22.58%	11.73%
French 12	Full Year	31.61%	20.23%	11.38%
	Semester	26.83%	19.85%	11.38%
	Quarter	27.30%	18.46%	8.84%
History 12	Full Year	18.97%	15.57%	3.40%
	Semester	18.57%	12.03%	6.54%
	Quarter	20.95%	10.81%	10.14%
Geography12	Full Year	14.73%	8.62%	6.11%
	Semester	12.50%	7.99%	4.51%
	Quarter	13.25%	5.25%	8.00%
Literature12	Full Year	21.31%	13.32%	7.99%
	Semester	21.96%	11.07%	10.89%
	Quarter	20.13%	9.27%	10.86%

Gore asks, " If the results on provincial examinations suggest inferior performance in these subjects, then why do these quarter-system schools claim that the quarter system is better?"

(Gore, 1996) He concludes:"It would appear the Copernican school students might be achieving disproportionately lower percentage of A's on the Common Provincial Examination in several subjects." (Gore, 1996)

Summary

Proponents and opponents of block scheduling seem to agree that block scheduling is a means of improving school atmosphere. But the academic impact of block scheduling is still debatable, evidenced by the growing number of web sites on the internet devoted solely to block scheduling and its pro and cons.

In a news bulletin on the internet dated September, 1996, the National Council of Teachers of Mathematics stated: "Some schools report benefits to the school atmosphere and grades in general, but the effect on mathematics education is mixed."

Endnotes

Bateson, David J. "Science Achievement in Semester and All-Year Courses."*Journal of Research in Science Teaching* 27(March 1990):233-40.

"Building Block or Stumbling Block.", New Bulletin, NCTM, September 1996.

Carroll, J. M. *The Copernican Plan Evaluated: the Evolution of a Revolution.* Topsfield, Mass.: Copernican Asspcoates. 1994.

Gore, Gordon R. "Provincial Exam Results and Timetables." Unpublished manuscript, 1996

Kramer, Steven L. "What We Know about Block Scheduling: A Review of the Literature, with Supplemental Data" *National Association of Secondary School Principals Bulletin.* In press.

Kruse, Carol A. and Gary D. "The Master Schedule and Learning: Improving the quality of Education." *National Association of Secondary School Principal Bulletin*, May 1995, Volume 79, Number 571.

Literature Review Research findings, CAREI, January, 1995

Lockwood, Susan L. "Semesterizing the High School Schedule: The Impact on Student Achievement in Algebra and Geometry in Dothan City Schools" PH. D diss., University of Alabama, 1995.

"Prisoners of Time Research:What we Know and What We Need to Know:, National Edu cation Commission in Time and learning, September, 1994.

Raphael, E., M. Whalstrom, and L. D. McLean, "Debunking the Semestering Myth." *Canadian Journal of Education* 11(winter 1986):36-52.

Sturgis, J. "Teacher Opinions About Block Scheduling." Unpublished manuscript, 1995.

Usiskin, Z. "Block Scheduling and the Teaching of Mathematics."Scott Foresman Newsletter USCM Perseptives 11(1995):7-10.

CHAPTER 3

Procedures

Introduction

The purpose of this chapter is to detail the procedures used by the researcher. The construction of the instrument of the investigation, a school questionnaire/opinionnaire, is explained in detail. High schools using block scheduling in New Jersey were the chosen samples of the population. The impact of block scheduling on mathematics instruction and achievement were the main ideas examined in the study.

Preliminary Steps

A review of recent literature which included information obtained from dissertation abstracts, magazine journals, and Internet sites indicated that block scheduling as an alternative to traditional scheduling is not a new phenomenon. However, it is a recent development in New Jersey schools. This convinced the researcher that block scheduling and the controversy surrounding it was a topic to pursue.

Initially, the scope of this research was limited to high schools using block scheduling in Southern New Jersey. The first task was to identify schools in Southern New Jersey using this type of scheduling. A post card survey was considered, but since the area to be surveyed was relatively small, the researcher decided to utilize a telephone survey.

The researcher contacted the Department of Education in Trenton, New Jersey. They provided the phone numbers of the superintendents' offices of the Southern New

Jersey counties. Each superintendent was called and inquired as to whether any schools in their county were currently employing block scheduling at the secondary level. The next step was to call each school to verify this information and get addresses. When it became apparent that limiting the survey to southern New Jersey schools would not provide enough data, the scope of the survey was expanded to include all of New Jersey high schools that were using block scheduling. Several more phone calls produced a total of ten high schools in New Jersey using block scheduling.

Construction of the Instruments

Before creating the survey, the researcher compiled a list of potential questions. As a part of this process, the researcher polled the members of the Delran High School Mathematics department for suggestions. The result was a survey consisting of eight questions pertinent to the study.

The researcher then created a rough draft of a cover letter explaining the purpose of the survey. Permission was obtained from the principal at Delran High School to use the school stationary for the cover letter and to have the surveys mailed back to the researcher's school.

Both documents were presented to a jury of mathematics educators. Each was carefully scrutinized by the jurors. The cover letter was acceptable with two minor changes. (Appendix A) The survey, however, needed further revision. It was decided that the order in which the questions were asked needed to be changed to be more effective. The format of the survey questions were open-ended calling for free response answers. It was decided by the jury panel that it would be more effective to put several questions into matrix form, thereby changing them to closed-form because as Best states closed-form is "easy to fill out, takes little time, keeps the respondent on subject, is

relatively objective, and is fairly easy to tabulate and analyze." The final draft of the survey

contained four matrix form questions which dealt with the impact of block scheduling on coverage of the curriculum, sequence of math courses, time spent reviewing previous material and coverage of the New Jersey Core Standards for mathematics. The rest of the survey consisted of three open-ended questions concerning the impact of block scheduling on AP Calculus classes and an open-ended question as to the advantages or disadvantages of block scheduling. (Appendix B)

The researcher then gave the revised survey to several members of the mathematics department at Delran High School to review and critique.

With the final approval of the survey, the researcher mailed a cover letter, several copies of the survey and a self-addressed-stamped envelope to the mathematics supervisor of each high school in the sample.

At the end of six weeks, sixty percent of the schools surveyed had replied.

Endnotes

Best, John W. and Kahn, James V. Research In Education. Boston: Allyn and Bacon, 1998.

CHAPTER 4

Analysis of Data

Introduction

This chapter describes the data obtained by a survey sent to high schools in New Jersey. The data obtained by the researcher represents a sample of 60% of the public high schools in New Jersey using block scheduling. Results of the data obtained will be described in three sections. The first section will describe the overall impact of block scheduling on mathematics instruction. The second section will describe the impact of block on AP Calculus instruction. The third section will discuss the results of an opinionnaire on the advantages/disadvantages of block scheduling and its impact on mathematics instruction.

Survey Results

Section 1

The researcher sent surveys to ten high schools in New Jersey identified as using block scheduling. Six schools responded with a total of twenty-four surveys completed. Because any one teacher teaches more than one level of mathematics the tallies in the response to a question were often more than twenty-four. The first section of the survey included four questions which asked the respondents to rate the impact of block scheduling on a scale of great affect to no affect.

Table 5 describes the responses to the first question in the survey which asked respondents to rate the affect block scheduling has on the amount of time spent reviewing previously taught material in mathematics classes.

Table 5

Affect of Block Scheduling on Time Spent Reviewing Previous Material

	Great	Some	Little	None
General Math	1	3	2	0
Pre-Algebra	2	2	2	1
Algebra I	2	4	7	1
Geometry	3	3	6	2
Algebra II	4	4	3	0
Trig/Pre-Calc	5	3	1	0
Calculus	1	3	0	0
AP Calculus	2	2	2	0

Comparison of the data in the some to great affect to the little to no affect categories produced the following: General Math : 67% to 33%, Pre-Algebra: 57% to 43%, Algebra I: 43% to 57%, Geometry: 43% to 57%, Algebra II: 73% to 23%, Trigonometry: 89% to 11% Calculus: 100% to 0% and AP Calculus: 67% to 33%. Analysis of this comparison indicates that the greatest affect was felt at the middle to upper level of instruction which includes Geometry Algebra II, Trigonometry, Calculus and AP Calculus. Of the courses in this category Geometry was the least affected and Calculus was the most affected. The least affect was felt at the lower level on instruction which includes General Mathematics, Pre-Algebra and Algebra I.

Analysis of the total responses indicates that 63% felt that block scheduling had great to some affect on the amount of time spent reviewing compared to 37% who felt that block scheduling had little to no affect on time spent reviewing. This is shown in Figure 1.

Figure 1

Overall Affect of Block Scheduling On Time Spent Reviewing

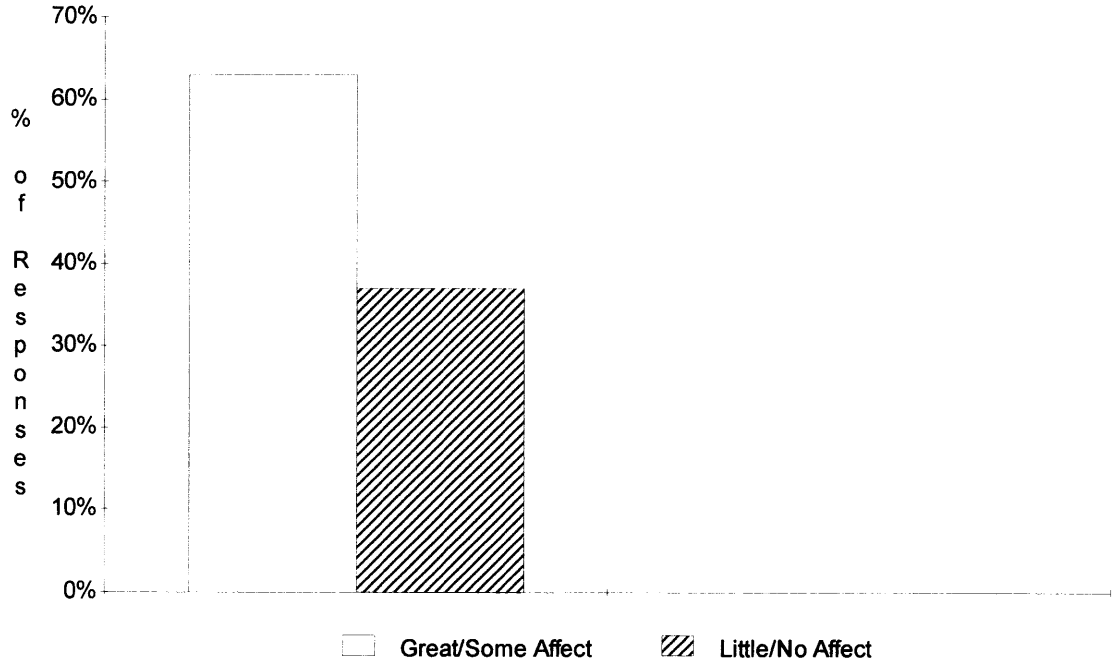


Table 6 describes the responses to Question 2 of the survey which asked the affect of block scheduling on the sequence of math courses a student takes.

Table 6

Affect of Block Scheduling on the Sequence of Courses a Student Takes

	Great	Some	Little	None
General Math	1	0	3	2
Pre-Algebra	1	0	4	3
Algebra I	2	0	5	5
Geometry	2	3	4	5
Algebra II	3	2	3	4
Trig/Pre-Calc	3	2	3	3
Calculus	1	2	1	2
AP Calculus	1	2	2	4

Results of the analysis indicates that block scheduling has the least affect on the sequence of mathematics courses at the lower level of instruction. Comparing some to great affect to the little to no affect produces the following: General Mathematics: 17% to 83%, Pre-Algebra: 13% to 87%, Algebra I: 15% to 85%. At the upper level the results were: Geometry: 36% to 64%, Algebra II: 42% to 58%, Trig/Pre-Calc: 45% to 55%, Calculus: 50% to 50% and AP Calculus: 33% to 67%. Overall, 32% of the respondents felt that block scheduling had some to great effect on the sequence of courses a student takes while 68% felt that is had little to no affect. This is shown in Figure 2.

Figure 2

Overall Affect of block Scheduling on
Sequence of Mathematics Courses
a Student May Take

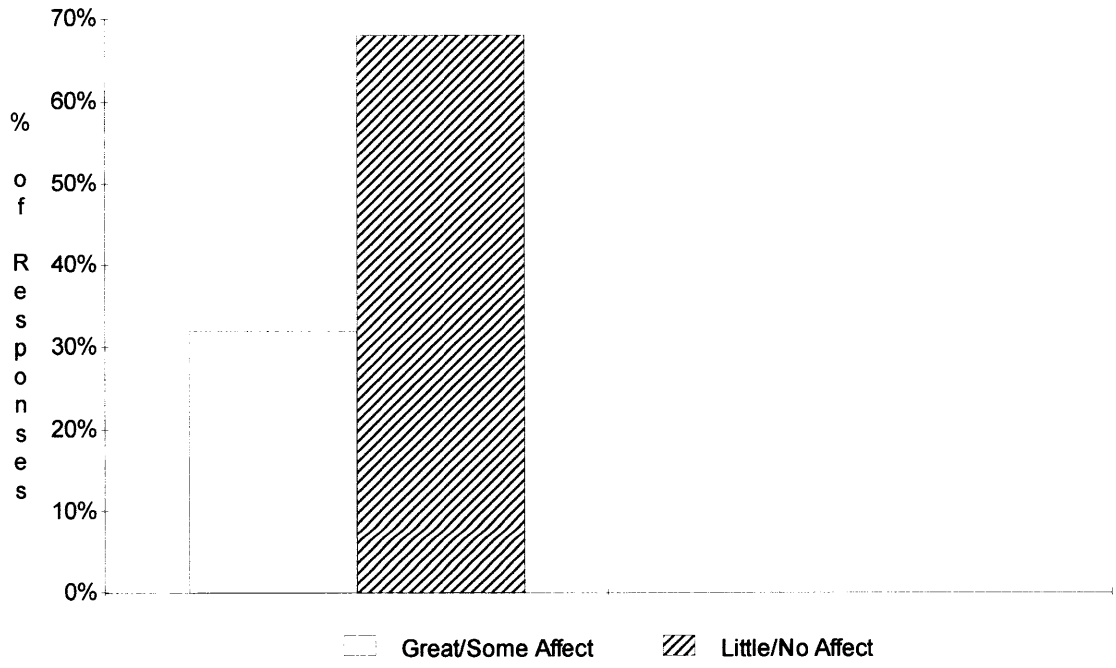


Table 7 describes the responses to the third question of the survey which asked respondents to rate the impact of block scheduling on the coverage of the mathematics curriculum on a scale from great affect to no affect.

Table 7

Affect of Block Scheduling on the Coverage of the Curriculum

	Great	Some	Little	None
General Math	1	3	1	1
Pre-Algebra	1	3	2	2
Algebra I	3	9	2	0
Geometry	3	9	2	0
Algebra II	4	6	0	1
Trig/Pre-Calc	4	5	1	0
Calculus	2	4	0	0
AP Calculus	2	3	1	1

Analysis of the data obtained from this question indicated that block scheduling has some affect to great affect on the coverage of the mathematics curriculum as every level. The results in each level comparing some to great affect to little to no affect is as follows: General Math: 67% to 33%, Pre-Algebra: 50% to 50%, Algebra I: 86% to 14%, Geometry: 86% to14%, Algebra II: 91% to 9%, Trig/Pre-Calc: 90% to 10%, Calculus: 100% to 0%, AP Calculus: 71% to 29%. Overall, the data indicated that 80% of the respondents felt that block scheduling had some to great affect on the coverage of the curriculum while 20% felt that it had little to no affect. This is shown in Figure 3.

Figure 3

Overall Affect of Block Scheduling on Coverage of the Curriculum

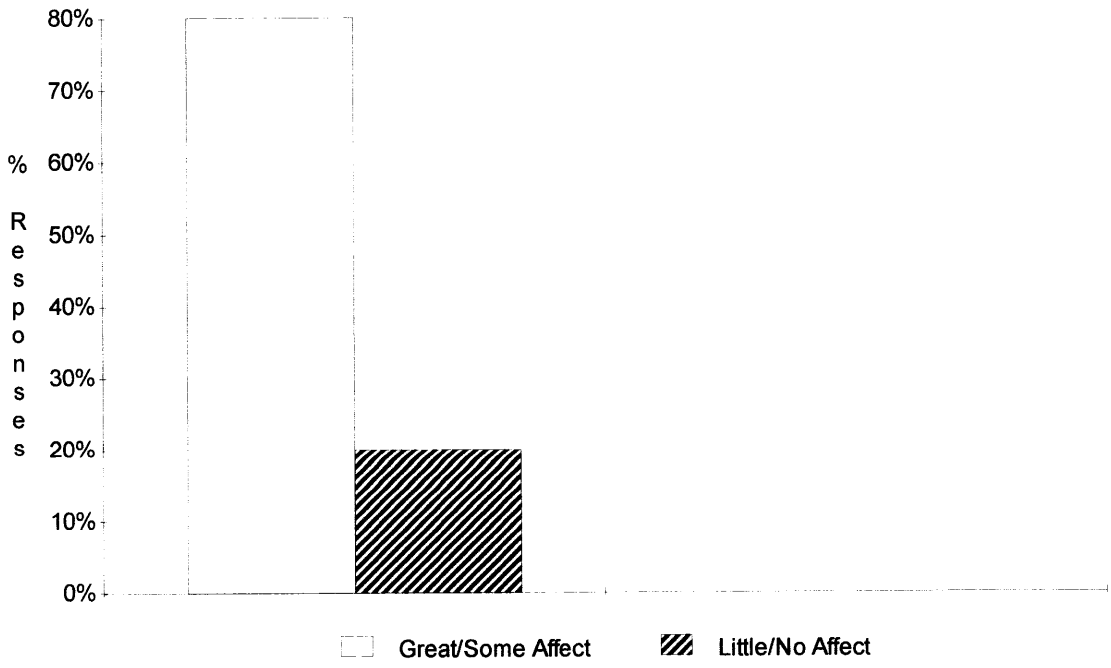


Table 8 describes the responses to the fourth question in the survey which asked respondents to rate the affect of block scheduling on the coverage of the New Jersey Core Standards for mathematics.

Table 8

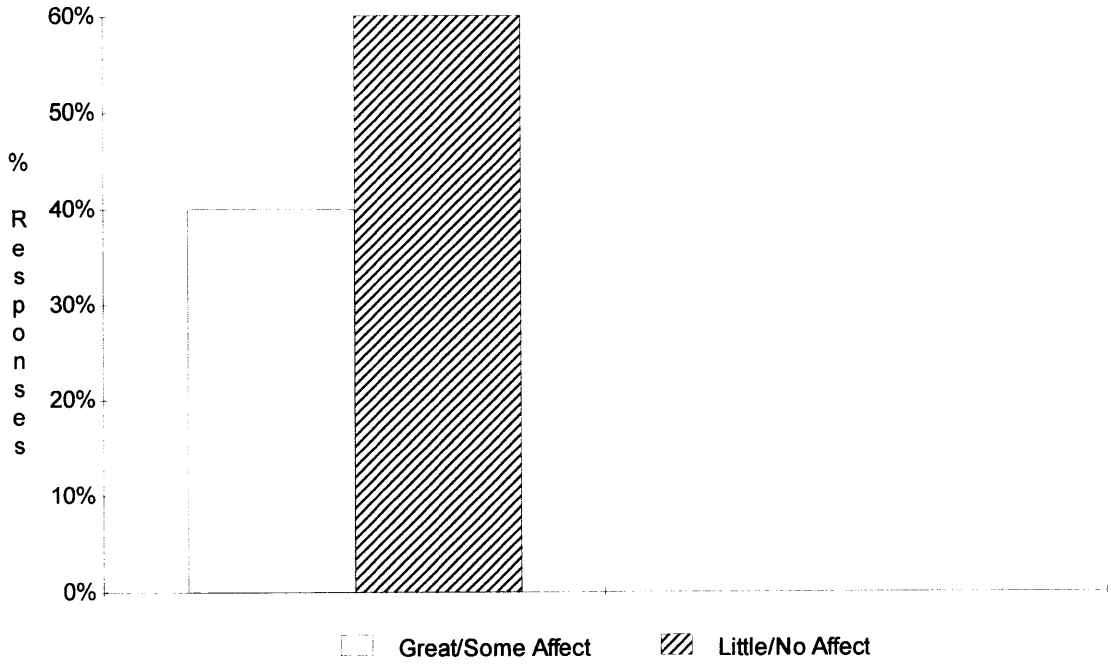
Affect of Block Scheduling on the Coverage of the New Jersey Core Standards

	Great	Some	Little	None
General Math	1	0	2	1
Pre-Algebra	1	1	3	3
Algebra I	2	3	3	4
Geometry	4	2	3	3
Algebra II	2	1	1	4
Trig/Pre-Calc	2	1	1	3
Calculus	2	0	1	1
AP Calculus	2	1	2	1

Analysis of the data indicates that block scheduling had the least affect at the lower levels of instruction. Comparing some to great affect to little to no affect produced the following: General Mathematics: 20% to 80%, Pre-Algebra: 25% to 75%, Algebra I: 42% to 58%, Geometry: 50% to 50%, Algebra II: 37.5% to 63.5%, Trig/Pre-Calc: 43% to 57%, Calculus: 50% to 50%, AP Calculus: 50% to 50%. Overall, the data indicated that 60% felt that block scheduling had little to no effect on the coverage of the New Jersey Core Standards while 40% felt that it did. This is shown in Figure 4.

Figure 4

Overall Affect of Block Scheduling on Coverage of the New Jersey Core Standards



Section 2

Section 2 of the survey contained three questions pertaining to AP Calculus classes. The first question asked how AP Calculus classes were scheduled. Of the five respondents, four indicated that AP Calculus classes were scheduled five days a week for the first semester and every other day for the second semester. One respondent replied that AP Calculus classes met five days a week for three quarters of the year and gave no indication as to what happened the last quarter of the year.

Question 2 in this section addressed the affect, if any, of block scheduling on the

results of the AP Exam. Of the six respondents to this question, five saw no affect on the results of AP Exam and only one respondent indicating that the students scored better than

before block scheduling. It must be noted that all respondents indicated that their results were acceptable. There was no indication that block scheduling had a negative affect on the results of the AP Exam.

Question 3 of this section asked respondents to indicate any changes they would make in the scheduling of AP classes under block scheduling. Of the seven respondents to the question, only one indicated a need to schedule AP Calculus classes for the entire year. The other respondents indicated that they were quite satisfied with the way their classes were scheduled.

Section 3

Section 3 of the survey asked respondents to list advantage and/or disadvantages of block scheduling and to share any additional comments they might have regarding block scheduling. An anaylysis of the eighteen respondents who answered the section produced the following list of advantages:

More time for hands on activities(labs, experiments)

Greater amount of individual student attention

Increase in number of mathematics courses taken

More time on task

Other advantages mentioned included more time for group work, less time spent repeating procedures, more time for deeper discussions in class, and less courses for a student to handle at one time.

The following is a list of disadvantages:

Inability to cover the curriculum

The need for more time for students to process and absorb information

The problem created by student absenteeism

Other concerns included increased time in review because of poor recall by students, less time available to work cooperatively with other teachers, lower grades, not enough time for students to practice skills, and teachers being overwhelmed by paperwork and preparation for longer classes.

CHAPTER 5

Summary, Conclusions and Recommendations

Introduction

The focus of this study is the impact of block scheduling on mathematics instruction at the secondary level. Specifically, the researcher was interested in how block scheduling affected the coverage of the mathematics curriculum and the coverage of the New Jersey Core Standards for mathematics. This chapter describes the results of the survey which were tabulated. The results were evaluated and conclusions were drawn.

Summary of Findings

Block scheduling as an alternative to traditional scheduling, although not a new phenomenon, is a recent development in New Jersey public schools. To date, few schools in New Jersey have implemented this change. As a result, the size of the sample for this survey was affected. Only six schools out of ten in New Jersey using block scheduling responded to the survey. A total of twenty-four surveys were completed. The survey contained three sections: four questions asking the respondents to rank the impact of block scheduling on mathematics instruction on a scale of great affect to no affect, three questions addressed specifically to AP Calculus teachers asking them to evaluate the impact of block scheduling in their classes and two questions asking respondents to list advantages/disadvantages of block scheduling and any changes they would suggest.

Analysis of the data from Section 1, Question 1 indicated that overall, 63% of the respondents felt that block scheduling had some to great affect on the amount of time spent on reviewing previously taught material compared to 37% who felt it had little to no affect.

Analysis of the individual areas indicated that the least affect was felt at the lower levels which includes General Mathematics and Pre-Algebra. In the middle level which includes Algebra 1 and Geometry, responses indicate an almost fifty-fifty split as to whether block scheduling affects the amount of time spent reviewing. At the upper level, which includes Trig/ Pre-Calculus, Calculus and AP Calculus, responses indicated that the greatest affect was felt.

Analysis of Section 1, Question 2 indicated that overall 63% of the respondents felt that block scheduling had little to no affect on the sequence of mathematics courses a student takes while 37% felt that it did.

Analysis of Section 1, Question 3 indicated that overall 83% of the respondents felt that block scheduling had some to great affect on the coverage of their curriculum as opposed to 17% that felt that it had little to no affect. At every level, the responses indicating that block scheduling had some to great affect far outweighed the responses indicating that it had little to no affect.

Analysis of Section 1, Question 4 indicated that 45% of the respondents felt that block scheduling had some to great affect on their coverage of the New Jersey Core Standards while 55% felt that it had little to no affect.

Analysis of Section 2 indicated that the majority of AP Calculus teachers felt that block scheduling had little affect on the results of the AP exam. Only one out of six respondents suggested changing the scheduling of AP Calculus classes to a full year. The rest were quite satisfied with block scheduling.

Analysis of the data from Section 3 indicated that the respondents felt that there were many advantages and disadvantages to using block scheduling. Among the advantages were more time for hands-on activities which included experiments, labs and group work, the opportunity for a student to take more mathematics classes, more individual attention to the student and less interruptions. Disadvantages included inability

to cover the curriculum, watering down of the curriculum, inability of students to process information in the allotted block class, less depth of instruction, lack of recall by the students, lower grades, and less time to work cooperatively with other teachers.

Conclusions

The non-academic advantages of block scheduling have been documented. As Steven Kramer notes, "Research going back to the 1970's confirmed most of the non-academic benefits attributed to block scheduling. Academic effects, on the other had, were mixed."

Analysis of the data suggest that the impact of block scheduling on academics is great. The majority of responses indicate that at all levels of instruction the amount of time spent reviewing previously taught material is greatly increased. This could be attributed to the opinion of the respondents that under block scheduling, there is not enough time for students to absorb the material taught and to process it.

The New Jersey Core Standards for Mathematics have in effect become the mathematics curriculum for all New Jersey public schools. Every eleventh grade student must take and pass the High School Proficiency Test in order to graduate high school. The Standards are used as a basis for this test. The majority of the responses indicate that block scheduling has great impact on the amount of curriculum covered and that less is covered. At the same time, almost half felt that block scheduling had little to no affect on the coverage of the Core Standards. This disparity could be due to the fact that many respondents indicated that in order to cover the mathematics curriculum, the curriculum had to be watered down.

Recommendations

This study was limited by the number of public schools in New Jersey currently using block scheduling. Additional research is needed in the form of a longitudinal study to determine future trends in the implementation of block scheduling. Analysis of the data also suggests that more emphasis needs to be placed on research indicating the impact of block scheduling on academic achievement.

Endnotes

Kramer, Steven L. "What We Know about Block Scheduling: A Review of the Literature, with supplemental Data." *National Association of Secondary School Principals bulletin.* In press.

APPENDIX A

SAMPLE OF SURVEY

Impact of Block Scheduling and Mathematics

Please answer the following:

1. What effect does block scheduling have on the amount of time you spend reviewing previous material? Please check in your area of expertise.

	Great effect	Some effect	Little effect	No effect
General Math				
Pre-Algebra				
Algebra I				
Geometry				
Algebra II				
Trig/Pre-Calc				
Calculus				
AP Calculus				

2. What effect does block scheduling have on the sequence of math courses a student takes?

	Great effect	Some effect	Little effect	No effect
General Math				
Pre-Algebra				
Algebra I				
Geometry				
Algebra II				
Trig/Pre-Calc				
Calculus				
AP Calculus				

3. What effect does block scheduling have on the coverage of your curriculum?

	Great effect	Some effect	Little effect	No effect
General Math				
Pre-Algebra				
Algebra I				
Geometry				
Algebra II				
Trig/Pre-Calc				
Calculus				
AP Calculus				

4. What effect does block scheduling have on your coverage of the N. J. core Standards for mathematics?

	Great effect	Some effect	Little effect	No effect
General Math				
Pre-Algebra				
Algebra I				
Geometry				
Algebra II				
Trig/Pre-Calc				
Calculus				
AP Calculus				

AP Calculus Instructors: Please answer 5, 6 and 7.

5. How are AP Calculus classes scheduled?

6. What effect, if any, does the scheduling have on the results of the AP Test?

7. What, if any, changes would you make in the scheduling of AP Calculus classes?

All Instructors: Please answer 8 and 9.

8. Describe what you feel are the advantages/disadvantages of block scheduling as it impacts on mathematics instruction.

ADVANTAGES **DISADVANTAGES**

9. Use this space to share any additional comments you have concerning block scheduling and mathematics instruction.

Please indicate whether you would like a copy of the results of this study: YES NO

APPENDIXES B

COVER LETTER

January 16, 1998

Dear Fellow Educator,

I am conducting a research study concerning the use of block scheduling in South Jersey High Schools and its effects on mathematics instruction. May I impose on you and your mathematical colleagues to complete the enclosed survey? I've enclosed a self-addressed, stamped envelope for your convenience.

Any additional information that you feel might be relevant to my study would be greatly appreciated.

Thank you again for your time and effort.

Sincerely,

Elaine M. Groman

APPENDIX C

LIST OF SCHOOLS IN SURVEY

List of Schools in Survey

Allentown Regional High School

Burlington County Institute of Technology

Cumberland Regional High School

Hunterdon Central Regional High School

Morris Regional High School

Rancocas Valley Regional High School

References

Bateson, David J. "Science Achievement in Semester and All-Year Courses."*Journal of Research in Science Teaching".* 27(March 1990):233-40.

Best, John W. and Kahn, James V. Research In Education. Boston: Allyn and Bacon, 1998.

Brophy, B. "Semestering and the Teaching-Learning Situation."*Canadian Journal of Education".* 3(1978): 47-54.

"Building Block or Stumbling Block"., News Bulletin, NCTM, September 1996.

Carroll, J. M. *The Copernican Plan Evaluated; The Evolution of a Revolution.* Topsfield, Mass.: Copernican Associated, 1994a.

Cawelti, Gordon. "High School Restructuring: A National Study." Arlington, Virginia: Educational Research Service, 1994.

King, A. J. C.: Warren, W.: Moore, J.:Bryans, G.: and Pirie, J. *Approaches to Semestering.* Toronto, Ontario: Ontario Institute for Studies in Education, 1978.

Kramer, Steven L. "What We Know about Block Scheduling: A Review of the Literature, with Supplemental Data". *National Association of Secondary School Principals Bulletin.* In press.

Kruse, Carol A. and Gary D. "The Master Schedule and Learning: Improving the quality of Education". *National Association of Secondary School Principals Bulletin,*

May 1995, Volume 79, Number 571

Literature Review Research Findings, CAREI, January, 1995

Lockwood, Susan L. "Semesterizing the High School Schedule: The Impact on Student Achievement in Algebra and Geometry in Dothan City Schools". PH.D Diss., University of Alabama, 1995.

O'Neil, J. "Finding Time To Learn. "*Educational Leadership".* 3(1995): 11-15.

"Prisoners of Time Research: What We Know and What We Need to Know".,National Education commission in Time and Learning, September, 1994.

Raphael, E., Whalstrom, M. and McLean, L. D., "Debunking the Semestering Myth". *Canadian Journal of Education* 11(Winter 1986): 36-52.

Sturgis, J. "Teacher Opinions About Block Scheduling". Unpublished manuscript, 1995.

Usiskin, Z. "Block Scheduling and the Teaching of Mathematics". Scott Foreman Newsletter USCM Perseptives 11(1995): 7-10.