

CHAPTER 1

Introduction

Background for the Project

As reading was the underlying foundations for the well-rounded individual, so was mathematics in the focus of the researcher. Mathematics was the cornerstone of education. Children were expected to show competence in mathematical fluency as well as problem solving abilities and critical thinking.

According to Terry Edwards, director of the Everett School District, "Having as much math as possible leaves doors open for the future" (Edwards, 2006, p.23). The focus of schools had been made to close the achievement gap in mathematics.

The responsibility had been put upon teachers, parents, the community at large and most specifically, students themselves. Students were becoming increasingly aware of the changes needed in mathematics courses and what the businesses in their communities were expecting when a student graduated from high school. Students were beginning to see

mathematics from a different perspective and in doing so were setting goals accordingly beginning in the intermediate elementary levels.

Statement of the Problem

Harrah Elementary fifth grade students were not receiving enough instruction in the math content. The fifth graders were limited in the amount of time needed to successfully accomplish the activities required by the math program *Investigations*.

The evidence showed that the students prior to any interventions were unable to pass the Measures of Academic Progress (MAP) test that was administered in the winter and spring testing periods.

Without making any changes in the time allotted to teach the math *Investigations* curriculum, students would continue to not pass the Measures of Academic Progress (MAP) test given in the winter and spring testing periods.

Purpose of the Project

The purpose of this project was to determine whether the extended length of time in the block scheduling of the fifth grade math classrooms would increase the MAP test scores.

Delimitations

This project took place during the 2005-2006 school year at Harrah Elementary in the fifth grade classrooms. The study included 40 fifth grade students during the 2005-2006 school year with 20 as the control group and 20 as the treatment group. Both groups were taught by the same teacher in two different one and one-half hour blocks of time during the day. Both groups scored in the same range when tested at the fall testing period.

Assumptions

The researcher assumed that the Measures of Academic Progress (MAP) test was administered by someone who was trained and able to give the test. The researcher assumed that the math *Investigations*

curriculum was taught according to the program specifications by someone who was trained in the program. The researcher assumed the students did their best when given the Measures of Academic Progress (MAP) test.

Hypothesis

The fifth graders that have received the extended time allowed to teach the math curriculum during a block schedule will show an increase in the Measures of Academic Progress (MAP) test when compared to the fifth graders who did not receive the extended block scheduling time in the 2005-2006 school year.

Null Hypothesis

There was no significant difference in the Measures of Academic Progress (MAP) test between the fifth graders of the 2005-2006 school year that received the extended block scheduling in math and those who did not. Significance was determined by $p \geq .05$, $.01$, and $.001$.

Significance of the Project

At the beginning of the 2005-2006 school year, the fifth grade staff began looking at the amount of time spent during the math period as a focus of concern. The fifth grade staff had adopted a block schedule of 90 minutes for math and science and 90 minutes of reading and language arts. The extra time was required in order for students to receive the full instruction in math with the adopted curriculum *Investigations* and the other math content needed for students to have received instruction in all of the fifth grade Grade Level Expectations (GLE) that were part of the requirements of the State of Washington for students in the fifth grade. *Investigations* was the adopted curriculum at Harrah Elementary.

After investigating the block schedule being used by other middle schools, the fifth grade staff decided to implement the block schedule for the 2005-2006 school year and allowed more time for math instruction to take place.

Procedure

When students entered school in late August they were tested at that time and placed into ability groups according to their reading scores. Prior to the Measures of Academic Progress (MAP) test in the fall, students were grouped to their abilities according to their reading levels.

Students were first tested using the Measures of Academic Progress (MAP) and were issued a Rasch Unit Scale (RIT) score. The RIT score was held as being highly accurate as to what math strands the student needed interventions in and which math strands they did not. As this was the only math assessment used in the school district, these were the only scores used in grouping students in the math classrooms.

Definition of Terms

Specialists. Individual classes of art, music, technology, library, and physical education.

Block schedule. Two and one half hour blocks of time, one in the morning and one in the afternoon.

Acronyms

MAP. Measures of Academic Progress

RIT. Rasch Unit Scale

NCTM. National Council of Teachers of

Mathematics

CHAPTER 2

Review of Selected Literature

Introduction

Harrah Elementary was faced with low Measures of Academic Progress (MAP) scores. Increased time was needed to cover all math core content and the adopted curriculum *Investigations*. A block schedule was put in place and Measures of Academic Progress (MAP) test scores were taken.

Students would be able to pass the Measures of Academic Progress (MAP) test when allowed more time in the math content area through block scheduling.

Importance of Quality Teaching in Mathematics

According to the Mathematical Association of America (1998) there seemed to be wide agreement that a well educated citizen should have some significant proficiency in mathematical thinking and the most useful elementary techniques that went with it. In western civilization, the idea went back at least to classical times, when four of the seven liberal arts considered essential for the education of a free

citizen were essentially mathematical. The role of mathematics was enlarged by the Enlightenment, by the Industrial Revolution, and by many events in modern science, technology, business, and the rapid intellectual evolution of humanity in general.

The National Council of Teachers of Mathematics (NCTM) developed the standards for teaching math in the classroom. Most mathematics courses in the universities were taught by mathematicians or graduate students of mathematics. There brought with this a strong adherence to the old school of thought that direct instruction, rigor and discipline created the brightest and most capable students to teach math.

According to Alsup (2003) mathematics learning was a rich, deep process, emphasizing conceptual understanding, reasoning, communication, problem solving and real-life applications. Students usually utilized a great wealth of informal, intuitive, and creative ideas when confronted with challenging problems whose solutions demand in-depth conceptual understanding.

Teachers who were constructivist in their ways of learning were also found to be able to teach in classrooms envisioned by the National Council of Teachers of Mathematics (NCTM).

According to Lowery (2002) teachers should work collaboratively to ensure the standards for math and science in their curriculum so that the teaching and learning in the subject area would be improved in our schools. Teachers have also found that inquiry-based programs and assessments need to be developed in order to accurately assess students in their learning.

Collaborative teaching was found to be first and foremost with the staff at Harrah Elementary as teaching in the longer blocks of time was sometimes a challenge in keeping students on task, interested and have minimal down time.

The importance of quality teaching was found at Harrah Elementary through the collaborative efforts of the teaching team. Experienced teachers noted that students were quick to hand in work that was not checked or sensible.

According to Menon (2004) number sense seemed to be the biggest challenge at the elementary school level. Number sense was referred to as "the general understanding of number and operations, along with the ability and inclination to use this understanding in flexible ways to make mathematical judgments and to develop useful and efficient strategies for managing numerical situations" (Menon, 2004).

Teachers at Harrah Elementary realized that they needed to focus on the concept of number sense in order to understand their student's way of answering math questions. This became the focus of the extended block scheduling in the math classrooms.

Block Scheduling

Bohince (1996) noted that block scheduling brought the opportunity and the necessity for including a wide variety of instructional activities.

According to Queen (1997) having participated in the development of a block schedule and having survived its first year of implementation required an

open mind, a flexible spirit, and a dedication to the success of the chosen schedule.

Schools that have used block schedules were seeing their students become motivated toward exploration and discovery in their classes. Having the establishment of achievable goals and/or steps seemed critical.

Block scheduling was used in the fifth grade at Harrah Elementary School as a solution to the time restraints put on a seven period day. The block schedule set an a.m. block from 8:30 - 12:00 with specialists' schedules taken from this time block. This could be anywhere from 30 minutes to 60 minutes per day, and a p.m. block from 12:45 - 3:00.

Block scheduling was needed to provide in-depth coverage of significant topics in the core content areas of mathematics, reading, and language arts. However, teachers knew that block scheduling would turn into another time management nightmare unless the teaching and instruction of the core areas did not also change.

According to Bryant (2000) block schedules offered extended time for individualized instruction, presentations, class activities, and opportunities to approach concepts in a variety of ways to accommodate the needs of more learners. The additional time permitted projects and interactive strategies such as mock trials and simulations.

The need for the teacher to address the individualized needs of the learner was foremost in teaching. The newly addressed Individualized Learning Plans (ILP) that had been state mandated for all fifth grade students was of infinite importance.

Bryant (2000) stated in traditional schedules, teachers with six or seven classes daily, often with high enrollments, found instructional efficiency nearly as important as effectiveness. Block scheduling provided more time, generally with fewer students. Block scheduling required different instructional approaches and allowed teachers to use various strategies in a single period.

Teachers that had been struggling with the question of what they would be able to do in that large block of time should instead be asking what would they not be able to cover in the amount of time given.

According to Bryant (2000) teachers should have considered a range of strategies and problem based learning that engaged students in active, thoughtful learning while allowing teachers to interact more personally with individual learners.

Teachers would devise lessons so that students discovered identified concepts through a series of meaningful activities. For teachers in transition from tightly limited time frames in which teacher-delivered instruction seemed most efficient, it helped to ask, "How can I get the kids to discover for themselves what I was planning to tell them?" (Bryant, 2000).

According to Walker (2000) in 1963, John Carroll of Harvard University stated that his research showed that some students would need more time to master

materials that others could learn in a shorter time. Walker developed a formula in which the degree of learning was equal to the function of the time actually spent over the time needed.

Walker (2000) noted there were five elements which determined the numerator and denominator of his formula. They were aptitude, ability to understand instruction, perseverance, time allocated, and quality of instruction. Three of these; aptitude, ability to understand instruction, and perseverance were internal to the student and therefore outside the control of educators. However, time allocated and quality of instruction could be controlled and were very germane to this study.

The researcher noted that quality of teaching in the time allocated was of major concern and, therefore, needed to be addressed by the fifth grade staff at Harrah Elementary.

According to Walker (2000) on John Carroll's research (1963) described situations in which large amounts of current allocated time were poorly

utilized. Walker (2000) realized that some students required more time to learn than others, but Walker also argued of the importance of quality instruction. Walker (2000) wrote that one of the major factors in learning was "the quality of instruction - a measure of the degree to which instruction is presented so that it will not require additional time for mastery beyond that required in view of aptitude."

According to Walker (2000) on Redding & Kamm's research(1999) noted this had led some reformers to concentrate on staff development to increase the skills of teachers so that time would be more effectively utilized. Efforts in this area have concentrated on improving methodology through programs such as cooperative learning and mastery learning. If implemented properly, it was believed that more academic learning time would result and, therefore, more learning would follow.

Block scheduling was a means to help accomplish this recommendation by increasing flexibility, promoting team teaching, working more effectively with

technology, and increasing the use of community resources in the instructional process. In other words, some schedule arrangements would result in more in-class time being created from the existing day and the rearrangement of time would encourage the better use of that time by increasing time on task and academic learning time in the classroom.

The fifth grade teachers at Harrah Elementary had spoken to the positives of block scheduling by stating they had more time for in-class reflection of student work, less stress, improved lessons with more planning time, and control over what was taught within the allotted time was quality instruction.

Having had to teach the core subjects in the allotted one and one half hour blocks had given teachers more time to team plan and more time to better assess quality work from students. The other added bonus was that students were able to learn at their own speed with time for teacher intervention when needed. Students knew who taught the math and science cores and who taught the reading and language

cores. This led to students becoming more comfortable in asking questions of both teachers in both core subjects.

Team Teaching

Team teaching was a most useful by-product of block scheduling. By allowing teachers to teach one or two main content areas, teachers were needed in sets of two to fill the need for all students to have learning in all the core areas.

So it was at Harrah Elementary that two fifth grade teachers taught math and science and two fifth grade teachers taught reading and social studies. Along with this schedule was a most useful side benefit of team teaching. Both teachers were needed to fulfill the need for the 100 fifth grade students and both classes were able to align themselves with each other. Both teachers taught the same curriculum at the same time. This allowed for adherence to aligning with the state mandated Grade Level Equivalent (GLE) standards and kept teachers accountable for teaching grade level mathematics.

This also allowed more time for teachers to assist those needing the extra help and to accommodate struggling students that were on the Individualized Learning Plans (ILP) for fifth grade students.

Team teaching was a method that had been successfully utilized in a wide range of subject areas. Doebler (1996) noted that the chief advantage of the team teaching approach was that each faculty member covered his/her specialty area. Each member of the teaching team was able to fully develop his/her expertise in certain topics by conducted research, attended workshops, and dated with the latest research in that area. This enabled him/her to provide students with a richer presentation of that topic than would otherwise be the case.

In addition, the students identified that faculty member with a particular area(s) of study, provided the students with a resource should they later encounter questions about that topic. Since all faculty members worked within their expertise, there were not the glossing over of the content area, rather

each topic was thoroughly covered by an instructor with an interest and expertise in that area.

An important advantage to team teaching was that each faculty member was able to work cooperatively with both the planning and the implementation of the content in the classroom. This brought about the best collaborative sessions that covered both the content area and the Individual Learning Plans (ILP) for those struggling students.

Day (1996) stated that while not a panacea for the problems encountered in education today, block schedules were certainly a step in the right direction. Their main goal was to continue to provide every means necessary to ensure the success of their students. Block scheduling was considered to be an excellent option in striving to meet that goal.

Bingham (1997) stated a corollary problem in the typical elementary school involved the lack of time scheduled for collegial planning, particularly time shared by all teachers at a given grade level. Given a goal of enhancing student performance through

collaboratively designed and implemented instruction, teachers without time for joint planning during the instructional day were compelled to meet before or after school hours.

Samuels (2004) stated that block scheduling would further allow for uninterrupted teaching schedules. Block scheduling would not do away with pull-outs such as English as a Second Language, art, music, or physical education classes. However, block scheduling would allow for these interruptions to have occurred more logically. A child who needed reading interventions would have it during the language arts block instead of having to miss a math lesson. Other schools that had adopted the block scheduling format had tackled the problem of fragmented elementary school days by setting guidelines for how much time a teacher should spend on each subject every day, and left the decision of how that would look up to the principal and the teaching team.

Measures of Academic Progress Testing

The Measures of Academic Progress (MAP) testing was developed by the Northwest Evaluation Association (NWEA) in 2001. The MAP test was a computerized adaptive assessment program that provided educators with information used to improve teaching and learning.

The NWEA (2004) stated that the difficulty of each test question was based on how well the student had answered the questions to a certain point. As the student answered questions correctly, the questions would become more difficult. If the student began to answer questions incorrectly, the questions adjusted and would become easier to answer. Within an optimal test, the student answered approximately half the items correctly and half incorrectly. The final score was an estimate of the student's achievement level.

Each student in a class would receive a different test so it would be unlikely that two students having taken the MAP tests would see the same test items.

Also, a single student having taken the test more than once would not see the same questions being asked.

Once testing was completed a Rasch Unit (RIT) score was given that related directly to the curriculum scale in each subject area. A baseline score was obtained and further testing throughout the school year would show growth, both by the student and by the class.

According to NWEA (2004) MAP tests provided highly accurate results that were used to identify the skills and concepts individual students have learned, diagnose instructional needs, monitor academic growth over time, provide data for decision making in all levels of the school system and placed new students into appropriate instructional programs.

At the Harrah Elementary School, MAP tests were used to assist staff in bridging the learning gap between what happened at home, during the learning day and how that correlated to the testing situation. According to Kasten (1998) data used from computerized adaptive testing would indicate a strong relationship

existed between early mathematics achievement and later mathematics achievement. Mathematics competency has proved to be a learned skill. Mathematics programs that were planned and operated to attempt to ensure success tended to have fewer remedial pupils and fewer nominal mathematics students. Prevention was far more successful than remediation; early remediation was more successful than late remediation.

There were those staff members at Harrah Elementary School that had never used computerized adaptive testing or teaching and were vehemently opposed to having this type of program as the cornerstone of the mathematics department and placement of students.

Reys (2006) stated that mathematical textbooks were critical tools for student learning. Teachers used them daily to plan and deliver lessons, and students used them in class to explore and learn mathematics. The students were able to take the textbooks home for further study and parents could

examine the books to know what was happening in their students' classrooms.

However, there was not a textbook series that allowed for testing on an adaptive testing level or one that allowed for all students to test to their individual abilities. The Harrah Elementary School staff came to a compromise of using MAP testing for tracking student progress to show growth and using the data to drive decision-making at the building level. Textbooks would be used to implement the GLE's and would drive the daily math instruction in the classroom.

According to Kingsbury (2004) among the many changes in education called for under the No Child Left Behind act was the need for states to test students in a number of grades and subject areas. Scores from these tests were to be used for a variety of purposes, from identifying individual student proficiency to helping determine whether schools were causing adequate growth for students.

Adaptive testing has found its way into elementary and secondary education. The test adapted to match the difficulty of the questions administered to the performance of each student as they took the test. The advantages of the adaptive testing paradigm included increased testing efficiency, and tests that were challenging but not frustrating for students.

In order for Harrah Elementary School to show growth in relation to adequate yearly progress as defined by the No Child Left Behind act, the adaptive testing was adopted and used to identify proficiency categories for each student, achievement growth, and inform instruction. In using the test scores for a variety of purposes, the accuracy of the scores for students of different achievement levels became a primary concern and enrichment and intervention programs were put into place.

Interventions to Improve Math Scores

In recent years educational reform efforts had been increasingly directed toward changing the way in which teachers delivered instruction. Concerns,

however, were often raised over the ability of teachers to implement innovative instructional methods, such as cooperative learning, with the traditional 50 minute class period (Slate, 2000).

As teachers knew too well each student was unique and each learner needed some kind of differentiated instruction in one way or another. However, it was important to realize that students did not only vary in their pace of work and their proficiency level but also in many dimensions, e.g., their prior experiences, conceptions, motivations, and strategies.

In working with groups the learner's competences would complement one another. Different competencies of cooperating students would complement one another in many arrangements of cooperative work. Often successful pairs of students were seen; one thinking quickly and spontaneously, the other one more slowly and carefully, reconsidering the ideas until they were well thought out.

Different knowledge allowed learning from each other. In a cooperative setting, a jig saw allowed

each student to be able to bring their knowledge of the topic to the table to share with others.

According to Prediger (2000) children offered different approaches in mathematics, not only due to different biographical or cultural background but also due to their individual ways of thinking. This concerned different calculating strategies as well as many other aspects like conceptions about different mathematical concepts (probability, symmetry, similarity...), attitudes and beliefs.

Beyond simply acknowledging the existence of different perspectives, confronting different approaches would yield even deeper changes for mathematics learning. Mathematics classrooms would develop toward independent learning in multiple ways.

Mac Iver (1988) suggested that the task structures, ability grouping practices, and evaluation practices present in a classroom were important determinants of the degree to which children's ability perceptions became evident within the classroom. The effects of classroom practices based on students'

self-perceptions of math ability could be used to foster growth in the math area.

At Harrah Elementary School mathematics ability was leveled with only the above grade level math students in a single classroom. All the other students at grade level or below were mixed into three other math classrooms. This allowed students that were stronger in math to assist those that were not as capable. Math has always lent itself to the ability to show another person how you have arrived at the same answer. This sharing of ideas was a large part of the intervention process at Harrah Elementary School in all math classes at all grade levels.

Harrah Elementary School adopted as a form of intervention to mentor all new teachers of math with in-depth relevant math trainings and pairing with a strong math leader at their particular grade level. At the upper elementary grade levels where block scheduling was taking place it was imperative that the math teachers were perceived as capable and highly qualified.

Summary

At Harrah Elementary School concern was expressed over the decrease in the fifth grade student's test scores using the MAP test in mathematics.

One solution to this problem was to create a block schedule format that would allow students an extended block of time for concentrated teaching in the math content area. Block scheduling would allow for extended teaching time for teachers to meet with individual students and allow time for independent study for the student with access to the teacher.

Wilkins (2004) stated that an important goal of teacher education programs would be to help pre-service teachers develop beliefs and dispositions that were consistent with current educational reform.

At Harrah Elementary School a strong mentor program was put in place. All math teachers were offered a multitude of opportunities for professional development in math concepts and the teaching materials, *Investigations*.

In addition, all new math teachers were offered support at their grade levels and in their content bands district wide. A district wide math focus assisted the building math team to provide evidence of interventions and assessments to ensure the interventions put into place were productive.

CHAPTER 3

Methodology and Treatment of Data

Introduction

The purpose of this experimental study was to determine if block scheduling at the elementary school level provided by the math teacher improved MAP testing scores of the fifth grade students at Harrah Elementary School.

To accomplish this purpose, a review of selected literature was conducted, baseline data was obtained and analyzed, and related conclusions and recommendation were formulated.

Methodology

The researcher conducted an experimental study at Harrah Elementary School located in Harrah, Washington. The researcher tested two groups of 20 fifth grade students in two different classrooms in the winter of 2006. The students ranged in ages 10-12 years old. The premise was to determine whether the block scheduling program implemented by the math teaching staff at Harrah Elementary School would be an

effective intervention for students in the fifth grade to allow more time to focus on math instruction using the adopted math series *Investigations*. This, in turn, would increase MAP testing scores at the fifth grade math level.

Participants

A convenience sample was used which involved those students enrolled in the classroom at the time of the experimental study.

There were 40 students enrolled in the study in which 32 of those students were Native American, three were Caucasian and five of the students were Hispanic.

Most of the Native American students lived on the Yakama Nation Reservation where the elementary school was located. The area was low-income with 84.1% of the students receiving free or reduced lunch. There was very little parent involvement, and Harrah Elementary School was the only elementary school in the district of White Swan.

Instrument

The fifth grade students were given the Measures of Academic Progress (MAP) assessment at the beginning and end of the 2005-2006 school year. The students were given instructions on the process of the assessment by their math teachers and the computer lab teacher.

The MAP assessment was a commonly used tool in education that was used as an indicator of student performance. The MAP assessment was generally used by math teachers to assess for math proficiency data by math strands. As there were very few math assessment formats recognized nation-wide, MAP scores have proven to have a high degree of reliability and validity.

Design

Throughout this experimental study, the researcher used a non-equivalent control group design which consisted of two groups of 20 students with a pre-test and post-test. A convenience sample was used and by coincidence there were an equal number of students in both groups.

Group X was the treatment group and consisted of 20 students who received instruction on a block schedule of one and one-half hours of math per day. Group Y was the control group and consisted of 20 students that received the identical math teaching materials with math taught for 45 minutes per day in a regular classroom setting.

The researcher recognized maturation, mortality and regression as common threats to the internal validity of the experimental study. Maturation as referred to as any "natural, physical, intellectual, and emotional changes that occur in the participants over a period of time" (Gay, 2000). The researcher recognized that incoming fifth grade students would change over the course of the year due to natural maturation.

Mortality was recognized in the study as students would move in and out of the classroom at different times during the school year for numerous reasons.

Statistical regression was accounted for in the choosing of the non-equivalent group design using a

convenience sample of participants. All participants were chosen as low achievers requiring interventions in mathematics.

Procedure

There were thirteen steps the researcher followed in the conduct of this study:

1. At the beginning of the school year the researcher obtained permission for this study from the principal, superintendent and the fifth grade teaching staff at Harrah Elementary School.
2. The researcher explained the basis of the study, how the participants would be chosen and the individual expectations of the teaching staff.
3. The researcher made sure that the teaching staff would agree and willingly participate in the course of the study.
4. At the beginning of the school year the fifth grade math teaching staff decided that two classes would remain in an original elementary school teaching setting and two teachers would block schedule.

5. Two classes would remain teaching the adopted math curriculum *Investigations* in an original time setting of 45 minutes per day and the other two classes would allow 90 minutes per day with the same curriculum.
6. Students were given the computerized MAP testing assessment to gather baseline data on all fifth grade students in the fall of 2005.
7. The MAP testing assessment was delivered in the computer lab and administered by the computer instructor. Students were provided as much time as needed to provide accurate assessment of their baseline scores.
8. A convenience sample of twenty students was chosen and by coincidence the same numbers of students were in both the control and treatment groups.
9. Students received math instruction during the day from the same teacher and the teacher followed the same teaching calendar as adopted by the district math team.

10. Formative and summative assessments were given with the math teaching area to track student's progress during the school year. Both formative and summative assessments were given at the same time and in the same manner in both classrooms.
11. The math teachers met weekly to provide feedback and discuss student progress.
12. In May, 2006 the students were given the final MAP assessment and the scores were analyzed.
13. All math teachers met as a team and analyzed the data. The data was referred to the district math team for further analysis.

Treatment of the Data

The data was taken from the students' Measurements of Academic Progress (MAP) math assessment. The researcher analyzed the pre-test and post-test data, compiled the data into a t-test and determined if significance was found between the treatment and control group.

Summary

Chapter 3 provided a description of the research methodology employed in the study, participants, instruments used, researched design, and procedure utilized. Details concerning treatment of the data obtained and analyzed were also present.

CHAPTER 4

Analysis of the Data

Introduction

This experimental study sought to determine whether block scheduling at the elementary level in math intervention provided by the math teachers would improve math scores using MAP data as the assessment. Chapter 4 contained a description of the environment, hypothesis, and results of the study.

Description of the Environment

This project took place during the 2005-2006 school year at Harrah Elementary in the fifth grade classrooms. The study included 40 fifth grade students during the 2005-2006 school year with 20 students in the control group and 20 students in the treatment group. Both groups were taught by the same teacher in two different two and one-half hour blocks of time during the day. Both groups scored in the same range when tested at the fall testing period.

Group X was the treatment group and consisted of 20 students and Group Y was the control group which also consisted of 20 students. The researcher conducted the study in two classrooms with one certificated teacher.

The classroom was enriched with an abundance of math materials, three computers, and manipulatives for student use.

Hypothesis

The fifth grade students that have received the extended time allowed to teach the math curriculum, *Investigations*, during a 90 minute block schedule will show an increase in the Measures of Academic Progress (MAP) test when compared to the fifth grade students who did not receive the extended block scheduling time in the 2005-2006 school year.

Null Hypothesis

There was no significant difference in the Measures of Academic Progress (MAP) test between the fourth graders of the 2005-2006 school year that received the extended block scheduling in math and those who did

not. Significance was determined by $p \geq .05$, $.01$, and $.001$.

Results of the Study

Table 1 described the post-test results for the control group Y and the treatment group X. A convenience sample was taken and by coincidence there were the same number of students in each group. The control group Y received 45 minutes of math instruction in a general classroom setting. The treatment group X received one and one half hour of instruction in a block schedule setting. The mean of the control group was 201.80 and the mean of the treatment group was 209.55.

Table 1

Data for MAP Post Test

Treatment	X	Control	Y
Student A	197	Student 1	210
Student B	213	Student 2	213
Student C	209	Student 3	195
Student D	201	Student 4	200
Student E	220	Student 5	207
Student F	208	Student 6	196
Student G	185	Student 7	207
Student H	200	Student 8	215
Student I	207	Student 9	201
Student J	209	Student 10	190
Student K	197	Student 11	193
Student L	210	Student 12	180
Student M	211	Student 13	204
Student N	212	Student 14	197
Student O	221	Student 15	195
Student P	219	Student 16	192
Student Q	212	Student 17	199
Student R	217	Student 18	206
Student S	222	Student 19	221
Student T	221	Student 20	215

Table 2 represented the distribution of t. The data showed the mean of the treatment group to be 209.55 and the control group to be 201.80. The data showed the t value as 2.48 and the df to be 38.

Statpak Analysis of Post MAP Data

Statistic	Value
No. of scores in Group X	20
No. of scores in Group Y	20
Sum of scores in Group X	4191.00
Sum of scores in Group Y	4036.00
Mean of Group X	209.55
Mean of Group Y	201.80
Sum of Squared Score in Group X	880013.00
Sum of Squared Score in Group Y	816400.00
SS of Group X	1788.95
SS of Group Y	1935.20
degrees of freedom	38
t value	2.48

Table 3 represented the distribution of t. The data showed the df to be 38 with significance at .05 of 2.021, .01 of 2.704, and .001 of 3.551.

Table 3

Distribution of t

df	<u>p</u>		
	.05	.01	.001
38	2.021	2.704	3.551

Findings

These data revealed that the mean of the treatment group was 209.55 and the mean of the control group was 201.80. The t value was 2.48 and the degrees of freedom were 38. The data concluded that significance was found at .05 and significance was not found at .01 and .001. The null hypothesis, which stated there was no significant difference in the MAP test between the fifth grade students that received the extended block scheduling in math, was rejected and the hypothesis which stated there was significant difference in the MAP test between the fifth grade students that received the extended block scheduling in math was supported.

Discussion

The researcher expected the MAP test scores to increase with the extended block scheduling in math classes at Harrah Elementary School. The MAP testing was a commonly used assessment among other school districts as an indicator of student performance.

The researcher considered the MAP testing to be a valid, reliable and consistent measure of academic progress. The researcher's expectations of allowing additional time in a block schedule setting in the math classroom to increase MAP scores at Harrah Elementary School was supported by the researcher's hypothesis.

Summary

In Chapter 4, the researcher presented Table 1 to illustrate how block scheduling at the fifth grade math level with extended teaching time as an intervention would increase scores on the Measures of Academic Progress (MAP) test. The findings concluded that significance was found at .05 and significance was not found at .01 and .001. The null hypothesis was rejected and the hypothesis was supported.

The extended amount of time spent on teaching the Investigations math in a block schedule was a productive intervention. This study showed that the block schedule in the fifth grade math level had a

significant impact on the Measures of Academic
Progress (MAP) assessment.

CHAPTER 5

Summary, Conclusions and Recommendations

Introduction

The purpose of this experimental study was to determine if block scheduling at the elementary school level provided by the math teacher improved MAP testing scores of the fifth grade students at Harrah Elementary School.

To accomplish this purpose, a review of selected literature was conducted, baseline data were obtained and analyzed, and related conclusions and recommendations were formulated.

Summary

The students at Harrah Elementary School were not receiving enough instruction time in the math content. The fifth graders were limited in the amount of time needed to successfully accomplish the activities required by the math program *Investigations*.

Schools that have used block schedules had seen their students become motivated toward exploration and discovery in their classes. Having made a change of

this magnitude required the establishment of achievable goals and/or steps.

According to Bryant (2000) block schedules offered extended time for individualized instruction, presentations, class activities, and opportunities to approach concepts in a variety of ways to accommodate the needs of more learners. The additional time permitted projects and interactive strategies such as mock trials and simulations.

The researcher recognized that quality of teaching in the time allocated was of major concern and, therefore, needed to be addressed by the fifth grade staff at Harrah Elementary School.

The data obtained from the study supported the hypothesis that stated the extended period of time in the block schedule increased the MAP testing scores in the math classroom.

Conclusions

Based on a review of selected literature and major findings produced from the present study, the following conclusions were reached:

1. The findings concluded that significance was found at .05. Significance was not found at .01 or .001. The researcher concluded that 95% of the time an extended block schedule in the math content area would increase MAP testing scores in math at the fifth grade level.
2. The extended block schedule program showed promise in allowing for more time for teachers to deliver concentrated intentional teaching in the fifth grade math classes when assessed using the MAP testing scores.

Recommendations

Based on a review of selected literature and major findings produced from the present study, the following recommendations were reached:

1. The researcher recommends additional studies be completed in the area of block schedules at Harrah Elementary School at the third and fourth grade levels.
2. The researcher recommends teachers should receive additional professional development in the

content area they are currently instructing and professional development in the area of time management in the block schedule.

3. The researcher recommends further studies be completed in all content areas such as reading, social studies and science to address the needs of the Washington Assessment of Student Learning (WASL), the state mandated assessment in grades three through twelve and increase MAP testing scores.

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