ED. 595 Special Project

Number Sense

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A Special Project

Presented to

Dr. Robert Kraig

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Master of Education

_____

Gregorio M. Benavides

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FACULTY APPROVAL

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ED. 595 Special Project

Number Sense

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_____, Date

ABSTRACT

The purpose of the study at Manson Elementary School was to determine whether intervention on number sense made a difference on first grade student's performance on math essentials tests. The researcher also wanted to determine if students were supported in number sense, they would express more confidence when taking math essential tests. Math intervention was provided four times per week, twenty-five minutes per day. The math scores results were tabulated to see the effectiveness of the math interventions. Results demonstrated that all participants progressed. Although participants showed increase in math scores, there was not sufficient evidence to support the main hypothesis. The researcher was able to support an increase in confidence in taking math essential tests.

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CHAPTER 1

Introduction

Background for the Project

After observing the WASL scores at Manson School District, there was a concern in regards to the area of math. Since Manson school District was a Reading First, the effort was always toward reading. There were many opportunities for students to have reading intervention in the classroom and or outside the classroom. There were not many opportunities for math intervention. Instead, the students received support in math only during math class. There was not extra support to improve math skill. Since Manson elementary school was no longer guided by Reading First, during the 2009-2010 school year, there was more flexibility within the school schedule. There were more opportunities for math intervention or math support during math class and outside the math class time.

Statement of the Problem

The big concern was that Manson school district did not made Adequate Yearly Progress (AYP) for the second year in a row. According to the school years 07/08 and 08/09, the WASL math scores were not satisfactory. There was a discrepancy between white (W) and Hispanic (H) students. The WASL results

were as followed: School year 07/08 4th grade W 44%, H 31'1%. For 7th grade W 50%, H 27% 10th grade W 57.1%, H 43.6%. For the 08/09 school year 4th grade W 73%, H 29.4%. The 7th grade W 57.1% H 29.4% and 10th grade W 63.6% H 33.3%.

After observing the WASL scores, it became clear that math was one of the areas that needed to be addressed. Although first grade students did not have to take WASL test or any High Stakes Test, it was important to understand student's expectations on the upper grades. It became clear that the earlier that the students started getting a strong foundation in math the better they would be in upper grades.

Purpose of the Project

The purpose of the study was to determine whether or not interventions in number sense helped students to improve their math skills and increase math essential test results. Another point was to determine if the intervention on number sense increased first graders confidence when they took the math essential tests.

Delimitations

This project was delimitated to the researcher's first grade class at Manson Elementary School, located in Manson, Washington. The researcher conducted this study during the 2009-2010 school year. There were 14 students in this

experiment class, six girls and eight boys. The focus of the experiment was to provide interventions in number sense. The students did not receive any math intervention during the first quarter of the school year. The intervention began during the second quarter of the school year, after the pretest. The enrollment at Manson Elementary School was 378 students. The ethnicity make-up of Manson Elementary was as followed: American Indian/Alaskan Native 0.6%, Asian 0.6%, Asian/Pacific Island 0.6%, Hispanic 68.6.0%, and White 30.0%. The population of students who qualify for free and or reduced lunch was 68%.

The assessment tools used to gather data were Class Based Assessment tests (CBAs). Each student took the pre and post math assessments, individually as a way of measure academic growth.

Assumptions

The assumption was that all students who participated in this project tried their best on CBAs tests. Another assumption was that CBAs were a reliable test for this project. The assumption was made based on the idea that all students who received intervention in number sense would perform higher in math essential tests. Also it was assumed that intervention provided test takers confidence, therefore, the expected scores would increase.

Hypothesis

The first grade students who receive intervention on number sense will have a higher average increase on math essential tests than those students who do not receive intervention. Students who are supported in number sense will express more confidence when taking the math essential tests.

Null Hypothesis

The first grade students who received intervention on number sense will show no difference on math essential tests than those students who do not receive intervention. Students who are supported in number sense will express no more confidence when taking the math essential tests.

Significance of the Project

The purpose of the study was to collect evidence in regards to the effectiveness of number sense in math. The evidences collected in the study were used to determine whether or not math interventions in number sense were effective or not.

The intervention was given to students during the second quarter of the school year, after the pretest, but not in the first quarter. The students received interventions on a regular basis to obtain meaningful results. The results were important to determine whether intervention on number sense was a solution to boost math scores. The math intervention plan and math scores were shared with

the first grade team and school principal for evaluation and or possible interventions adjustments.

Procedure

For the purpose of this project, the following procedures were implemented:

1. Permission to do the research at Manson Elementary School was by the school principal Heather Ireland (see appendix A).
2. A review of the literature was conducted at Manson Elementary, Heritage University and through the internet.
3. Two meetings were held to determine the specifics of the math intervention for the period of 11/20/09 to 3/23/10.
4. Permission to use the math data was obtained from Manson Elementary School Principal Heather Ireland (see appendix A).
5. First grade team collaboration regarding math resources at11/19/09 and 3/23/10.
6. Quarterly data from Class Based Assessments tests, based on math essentials were collected.
7. Survey of student's learning styles for the 14 students were given and collected data (see appendix B).
8. The CBAs scores were tabulated (see appendices C, D and E).

9. Intervention strategies for number sense were implemented started at second quarter.
10. The result from the study were evaluated to draw a conclusion.
11. A meeting was conducted to determine the effectiveness of the study.

Definition of Terms

For the purpose of this study the following words word defined:

Washington Assessment of Student Learning. A state level assessment that "requires students to both select and create answers to demonstrate their knowledge, skills, and understanding in each of the Essential Academic Learning Requirements (EALR's)" (OSPI www.k12.wa.us/assessments/WASL). (First Grade Number Sense)

Essential Academic Learning Requirements. "Describe the learning standards for grades K-10 at three benchmark levels; elementary, middle, and high school (OSPI www.k12.wa.us/CurriculumInstruct/EALR_GLE.aspx).

Mathematics Standards. "Describe math learning expectations for each grade level"

Acronym

AYP. Adequate Yearly Progress.

CBA. Class Based Assessment

EALR's. Essential Academic Learning Requirements

GLE's. Grade Level Expectations

NCLB. No Child Left Behind Act

OSPI. Office of Superintendent of Public Instruction.

WASL. Washington Assessment of Student Learning

CHAPTER 2

Review of Selected Literature

Introduction

This chapter has been organized around the following topics: (a) No Child Left Behind, (b) Number Sense, (c) Strategies for Managing Mathematics, (d) Mathematics Interventions, (E) Summary.

No Child Left Behind

The No Child Left Behind (NCLB) Act in 2001, was supported by a large majority of Democrats and Republicans in both houses of the U.S.A Congress and signed by President George W. Bush. It was designed to create a stronger, more accountable education system (McCoarthy 2009). States were required to describe how they would close the achievement gap among all children. The states were expected to produce annual reports to inform parents about the academic progress made by the state and school district. Many of the federal school funded programs, such as Title 1, a provision of NCLB were originally designed to subsidize states' efforts to provided equal opportunity for the country's poorest students (McCoarthy 2009). Under the NCLB, McCoarthy 2009 mentioned that states were required to develop their own standards for

what students should know at every grade level in math, English, language arts, and science.

The states were recommended to developed a "single statewide accountability system" to ensure schools and school districts were making "adequate yearly progress" (AYP) in math, English, language arts, and science. Due to the recommendation, Washington State, decided to develop the statewide test called, Washington Assessment of Student Learning (WASL). The state expected to raise the bar in gradual increments, so by 2013-2014 all 100% of the students would have achieved proficiency in each subject area (OSPI).

Under the NCLB Act, school districts were required to meet the yearly AYP goals as a whole and by segregated student population groups. The student groups were specified by the law as followed; race/ethnicity, students with disability, limited English proficiency students, and students who were economically disadvantaged (OSPI).

Number Sense

Number sense was an essential element in regards to math skills. It was difficult to define the meaning of number sense but in general, it referred how people organized information about numbers and their relationship to solved mathematical problems (Bobis, 1996). Number sense had five components: number meaning, number relationship, number magnitude, operations involving

numbers and reference for numbers and quantities, (National Council of Teachers USA, 1989). These five elements were important because they contributed to the intuition of numbers and established the foundation for more advanced skills.

There were different methods for developing the skill on learning the numbers. For instance, a two year old child could indentify objects one, two, three before counting with comprehension. Learning to count with understanding required specific skills, such as perceived subgroups, alongside counting and provided a strong foundation of number sense. Apparently, students started by developing the skills with patterns and associated them with number sense. To teach numbers, it was recommended to use moveable objects. With objects, students developed groups, and then combined the small groups into a large group. Most children needed the concrete experience of physically manipulative before they could learn the value of numbers. Then, students discovered that five objects were equal to the number five (Way 2005).

Numbers enabled students to count, to measure to compare and to make prediction. To help students develop number sense appropriate modeling, posing to process questions, encouragement to think about numbers and a classroom environment that nurtured numbers sense were required. Students understood that

counting occurred in any direction, not just the standard left-to-right. (First Grade Number Sense 2010)

According to Confer (2005), to have a good number sense, children must know the sequence of number names. Children also needed understand how numbers related to one another, such as compared more, less, and same. The capacity to compose and decompose, and break numbers a part to determine what other numbers were inside a number. Children did not develop numbers by circling answers on workbook. Children constructed number sense relationship in their minds through experience and through discussions with others. In addition, Confer indicated that the time children invested in the early years to developed solid number comprehension, paid off greatly in the later years.

Jordan (2007), indicated how important it was to identify students with math disability in the early age. Math disability was estimated to be 6-10 percent of the population. Kindergarten students who used fingers to count often stopped using them at first grade and developed fluency by second grade. Jordan (2007) also indicated that, first's graders who depended on their fingers to count struggled with larger math number combinations and often failed to developed the calculation necessary for higher-level math classes. Low-income students were four times more likely to fall in the low performance. In schools, many students with math difficulties were not identified until fourth grade or later. The

recommendations were to test students in numbers sense as early as kindergarten to identify student difficulties in math. By helping students learn number sense right from the start, this gave them the background they needed to achieve in the later years.

Strategies for Managing Mathematics

Students approached learning in many different ways. Confer (2005) indicated that children developed strategies for computations. Children used what they knew to acquire new math skills. For instance, children counted objects to represent a set of numbers and understood that three objects plus four objects were equal to 3+4=7. That required educators to use a greater range of meaningful strategies to support the entire learner' needs. Wright (2010), indicated that when children began formal schooling in kindergarten, they developed number sense as an intuitive understanding of the foundation of number concepts and relationship among numbers. A central part of number sense was the student ability to internalize the number line as a precursor to perform mental mathematics.

The next strategies that reflected different opportunities approached the different student needs. Answer math problems can be as easy as drawing a picture to show the answer. The four-step approach helped students with the problem identification; understood the problem, devised a plan, carry out the plan

and checked the answer. Math drill worked to increased math computation fluency. Student motivation worked to increased high rates of active and accurate academic response. One proponent idea was to break big assignments into small assignments with instant feedback. Another idea consisted of permitting students to respond orally, rather than in written to speed the rate of correct response (Wright, 2010).

There were potential blockers to the student success, which could be overcome with the appropriate math intervention. Some of the blockers consisted the lack of math vocabulary comprehension, reading skills and arithmetic fluency. The intervention provided each of the students by this researcher matched the student math needs.

Mathematics Intervention

The purpose of mathematic intervention was to determine whether student scores improved. The idea of the intervention was to boost student's weak math areas and help students increase their math test scores.

There were different intervention approaches to helped students overcome math difficulties. The U.S. Office of Special Education Programs (OSEP, 2009) presented an intervention experiment. The intervention model provided by OSEP was competed in10 schools in 41 first-grade classrooms for 16 weeks. The intervention was done in small groups of two to three students for 30 minutes

three times per week. There were seventeen topics, which consisted of identified numbers in different ways, added and subtracted. They were assigned three-four lessons for each one of the topics. The lesson activities consisted of worksheets and math manipulative. The results enhanced the end of the year performance in computation and story problems.

Math intervention indicated that there were times when even good teaching was not enough. Some students lacked foundational skills necessary to achieve the key standards. Therefore, the designed time for intervention was used to fill the gaps of students. The intervention was a necessary step to assure all students became proficient learners of mathematics. It was recommended fifteen minutes of intervention for reviewing the selected math standards. It also suggested that the intervention was done in flexible small group format (Math Intervention 2000).

Math vocabulary played an important role on taught and learn math. Each math skill got its own vocabulary, in order for students to learn and manipulate the math concepts, it was important that they manipulate its vocabulary as well (Mathematics Standards of Learning for Virginia Public Schools – February 2009). Virginia's public schools math standards also indicated that mathematics had its own language, and the acquisition of specialized vocabulary and language pattern were crucial for student's understanding and appreciation of the concept.

Virginia's math standard also encouraged students to use the correct concepts, skills, symbols and vocabulary identified in the followed standards: Number senses, computation and estimation, measurement, geometry, probability, statistics, patterns and algebra.

Summary

The focus of this chapter was to address the available evidence to the topics of (a) No Child Left Behind, (b) Number sense, (c) Strategies for Managing Mathematics, (d) Mathematics Interventions. The idea of reviewing the literature subsets was to determined the impact in student's math essentials test results. The methodology and treatment of the data were reported in Chapter 3.

Now that federal and state government emphasized more than ever the importance of education, school districts, and teachers had to be more intentional in what to teach in order to meet AYP. The researcher wanted to show that students could learn the necessary skills to show positive increase on math essential test. The students would be comfortable when taking the math test. As well student had the regular math class plus math intervention four times per week, perhaps both the intervention and the regular math class could play an important role in student's success in math.

CHAPTER 3

Methodology and Treatment of the Data

Introduction

This chapter has been organized around the following topics: (a) Methodology, (b) Participants, (c) Instruments, (d) Design, (e) Procedure, (f) Treatment of Data, (g) Summary. Since Manson School District did not meet the AYP for the second consecutive year, it was decided to put more emphasis in math. The researcher wanted to find out whether math intervention in number sense helped first grade students to increased math essential scores. The intervention was provided four days per week, thirty minutes per day. Students were divided into three different groups to assist them according to their academic needs. The low group was the one who received the most support. This group worked with manipulative, math vocabulary to review what they missed in the regular math class. The middle group got more activities related to the regular math class so it was another opportunity for practice the skills. The high group had the opportunity to work on story problems, graphs and extended activities related to the regular math class.

Methodology

The researcher chose to do an experimental research study. The researcher worked with the same group of students during the 2009-2010 school year. Under the necessity of improving the math test scores, the research focused on this topic to ensure students understood the math expectations and worked toward it. The researcher provided math interventions on number sense four times per week, thirty minute per day, during the second and third quarters. The students did not received math intervention during the first quarter. The intervention began at the second quarter, after the pretest.

The researcher collected math student data from the second and third quarters of the school year. The data was uploaded into an Excel spreadsheet, which facilitated the analysis of the data. In addition, the data was graphed for better results appreciation. To conclude, the data was uploaded into a Stat Pak and used the *t* test to determine the independent tests of significances.

Participants

This project was delimitated into two different sections in a first grade class at Manson Elementary School, located in Manson, Washington. This study was conducted during the 2009-2010 school year. There were 14 students in this experiment class, six girls and eight boys. The students did not receive any math intervention, during the first quarter of the school year. The intervention began

during the second quarters of the school year, after the pretest. The enrollment at Manson Elementary School was 378 students. The ethnicity make-up of Manson Elementary was as followed: American Indian/Alaskan Native 0.6%, Asian 0.6%, Asian/Pacific Island 0.6%, Hispanic 68.6.0%, and White 30.0%. The population of students who qualified for free and or reduced lunch was 68%.

Instruments

The data was gathered from the math quarterly test. The math test consisted of the Class Based Assessments (CBAs), based on Washington State first grade math standard. After each pretest and posttest, the math scores were uploaded into an Excel spreadsheet sheet, (Microsoft Office Excel 2007). The data collected from pretest and posttest tests was tabulated to determine the difference between one another. The difference of pre and posttests of second and third quarters was uploaded into Stat Pak and used the *t* test to demonstrate the independent tests significances.

Design

This study was designed with the idea in mind to verify the effectiveness of math intervention on number sense. The results from mathematics second and third quarter pre and posttest of the 2009-2010 school year were calculated. A student survey was conducted to gather student opinion about what was the best way they learned mathematics. The survey consisted of four different questions

such as; I learn math better by working with whole class, working in a small group, working with a partner or working independently.

Procedure

For the purpose of this project, the following procedures were implemented:

Permission to do the research at Manson Elementary School was granted by the school principal, Heather Ireland. The school principal authorized the use of the necessary math student data, to conduct the research.

A review of the literature was conducted at Manson Elementary, Heritage University and through internet. The researcher reviewed different articles related to the topic.

Meetings were held to determine the specifics of the math intervention. The researcher met with the school principal and first grade team at 11/20/09 and 3/23/10 to review the math quarter assessments data. Also, the researcher met on regular basis with the first grade team to discuss and analyzed math student data. As first grade team there was opportunity to review student needs, resources, and the effectiveness of math intervention.

The data that the researcher collected consisted of the CBAs, based on the first grade math essentials. The math essentials were selected from the first grade, Washington State math standards. The researcher met with first grade team and

decided what math essentials to teach throughout the school year. Then the essentials were divided into four different sections, one section for each one of the quarters of the school year.

A Survey of student's learning styles was conducted to each one of the 14 students. The survey consisted of four different questions. Each question had four different options to choose from. The survey indicated that students either preferred to work independently, with a partner, in small group or whole class.

Treatment of Data

To analyzed the data the researcher used the Microsoft Excel spread sheet and Stat Pak for statistic calculation. The Stat Pak calculation was used to determined the student tests results significance. This calculation provided the probability of t-test, which gave the t-value and the degree of freedom.

Summary

This chapter was designed to review the methodology and treatment of data related to the study of number sense interventions. The purpose of the study was to determine whether math intervention in number sense helped first grade students to increase score in math essentials testes. The analysis of data and findings from this study were reported in Chapter 4.

CHAPTER 4

Analysis of the Data

Introduction

Chapter 4 has been organized around the following topics: (a) description of environment, (b) hypothesis, (c) results of the study, (d) findings, and (e) summary. The purpose of this study was to determine whether interventions in number sense helped students to improve their math skills and increase math essential test scores. Another point was to determine if the intervention on number sense increased first graders confidence when they took the math essential tests.

Description of the Environment

This project was delimitated to the researcher's first grade class at Manson Elementary School, located in Manson, Washington. This study was conducted during the 2009-2010 school year. There were 14 students in this experiment class, six girls and eight boys. The students did not receive math intervention during the first quarter of the school year. The intervention began during the second quarter of the school year, after the pretest. The enrollment at Manson Elementary School was 378 students.

The ethnicity make-up of Manson Elementary was as followed: American Indian/Alaskan Native 0.6%, Asian 0.6%, Asian/Pacific Island 0.6%, Hispanic 68.6.0%, and White 30.0%. The population of students who qualify for free and or reduced lunch was 68%.

The assessment tools used to gather data were Class Based Assessment tests (CBAs). Each student took the pre and post math assessments, individually as a way of measure academic growth.

Hypothesis/Research Question

The first grade students who receive intervention on number sense will have a higher average increase on math essential tests than those students who do not receive intervention. Students who are supported in number sense will express more confidence when taking the math essential tests.

Null Hypothesis

The first grade students who received intervention on number sense will show no difference on math essential tests than those students who do not receive intervention. Students who are supported in number sense will express no more confidence when taking the math essential tests.

Results of the Study

The researcher collected math data from two different quarters of the 2009-2010 school year. All of the fourteen participants showed growth in both of the quarterly tests. The overall increased sum in the second quarter represented 534 points, and the mean became 38.14. The following graph indicated that there was an overall growth of the mean to 38.14 between the pretest and the posttest during the second quarter of the school year.

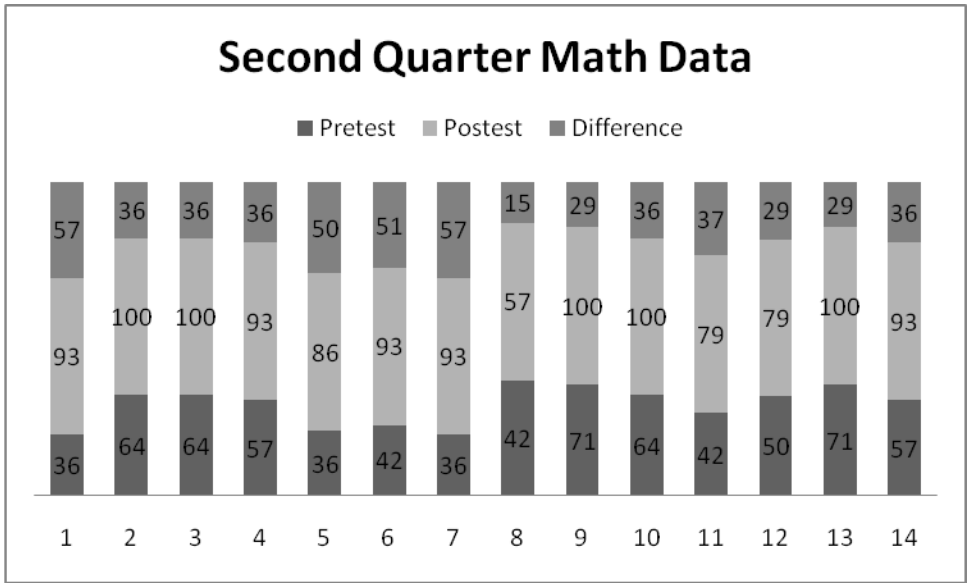

Figure 1

The overall increased sum in the third quarter represented 559 points, and the mean became 39.93. The graph showed that there was an overall growth of the mean to 39.93 between the pretest and the posttest during the third quarter of the school year.

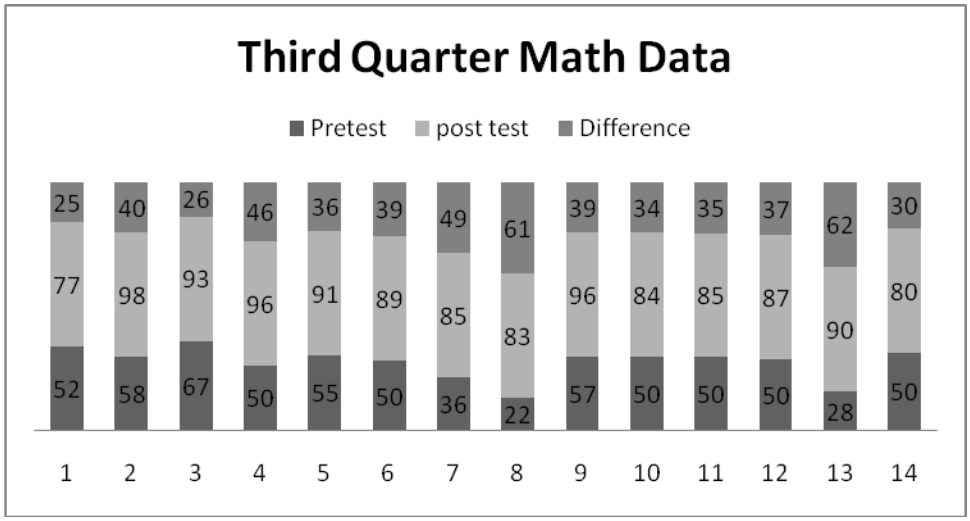

Figure 2

The researcher used the t-test to tabulate the student data for non-independent statistic sample analysis. The t-test showed the sum of D's 25.00, the mean of D's 1.79, the sum of D's squared 5057.55, there was the t-value of 0.34 and the degrees of freedom 13, for all fourteen students. For significance finding at t-test equals .05 with equal a degree of freedom 13, the t-value 2.160 was required. The researcher's t-value finding was 0.34 and therefore the null

hypothesis could not be rejected and the hypothesis could not be supported (see appendix C, figure 1 and 2).

The researcher segregated math data by gender, as it permitted another appreciation of the results. The results of data allowed determination if there was a significance of difference between boys and girls.

The next graph represented the math data for girls during the second quarter of the school year. The graph showed that there was an overall increase of 253 points between the pretest and posttest.

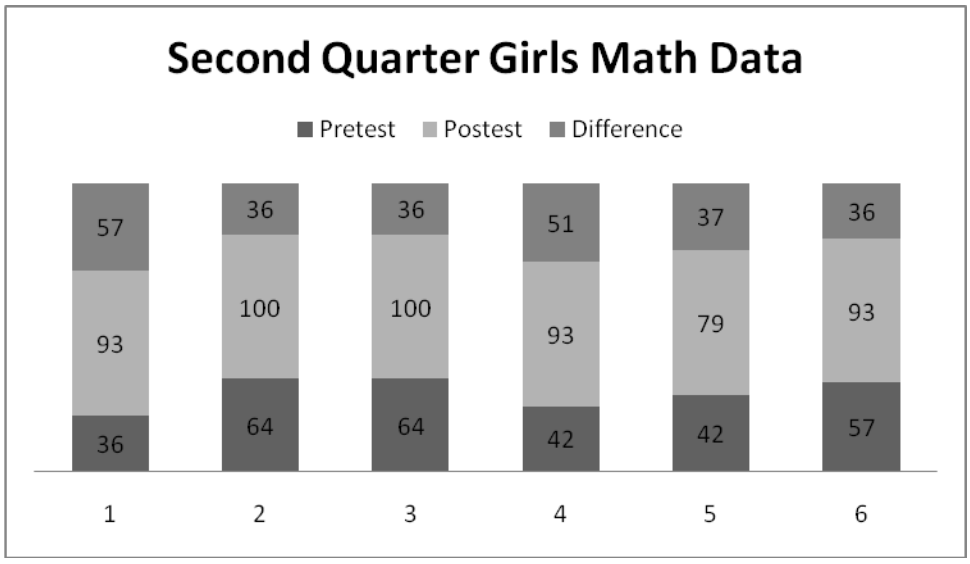

Figure 3

The next graph represented the math data for girls during the third quarter of the school year. The graph showed that there was an overall increase of 195 points between the pretest and posttest.

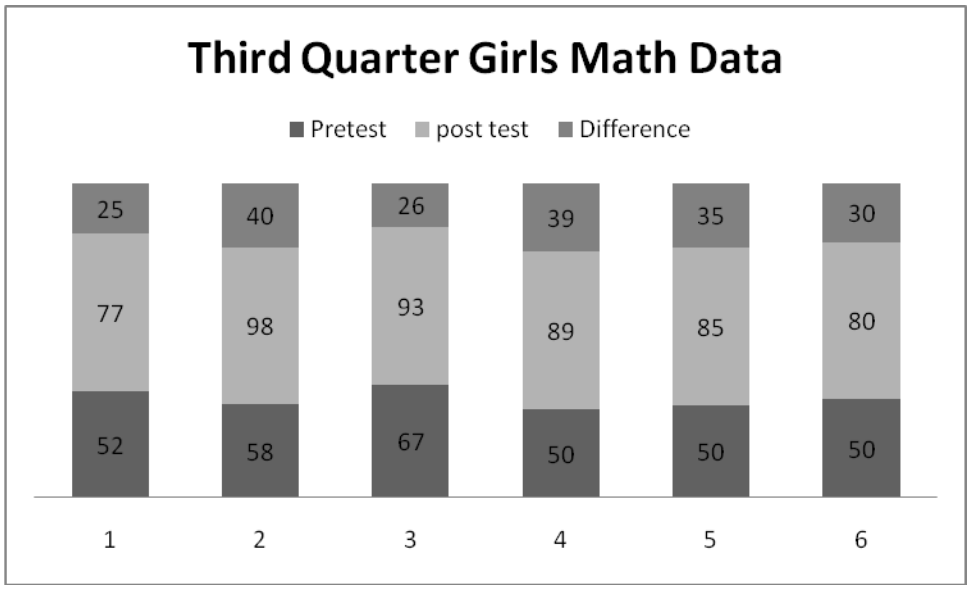

Figure 4

The researcher used t-test to tabulate male and female student data for non-independent statistic sample analysis. The t-tests for the six girls showed the sum of D's of -58.00, the mean of D's of -9.67, the sum of D's squared 1324.00, there was the t-value of -1.92 and the degrees of freedom of 5. For significance finding at =.05 with a degree of freedom 5, the t-value of 2.571 was required. The researcher's t-value finding was -1.92 and therefore the null hypothesis could not be rejected and the hypothesis could not be supported (see appendix D figures 3 and 4).

The following graph represented the data for boys during the second quarters of the school year. There was a growth of 281 points between the pretest and posttest of the second quarter.

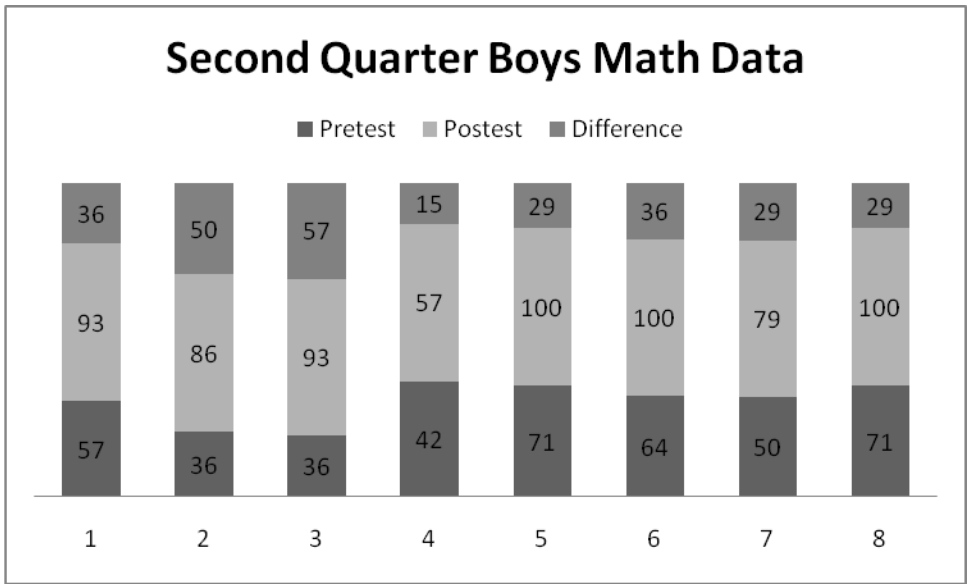

Figure 5

The next graph represented the math data for boys during the third quarter of the school year. There was a growth of 364 points between the pretest and posttest of the third quarter.

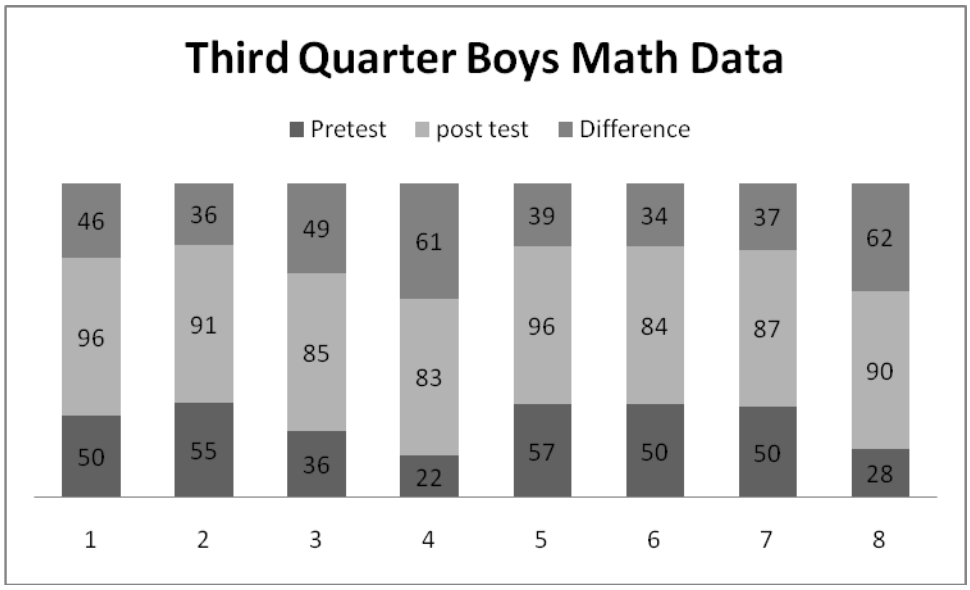

Figure 6

The t-test for the eight boys for non-independent statistic sample analysis was as followed: the sum of D's 76.00, the mean of D's 9.50, and the sum of Squared D's 3320.00, the t-value 1.39 and, the degrees of freedom equal 7. For significance finding at =.05 with a degree of freedom 7, the t-value 2.365 was required. The researcher's t-value finding was 1.39 and therefore the null hypothesis could not be rejected and the hypothesis could not be supported (see appendix E figures 5 and 6).

The researcher gave a survey to all of the fourteen participants to determine learning preference. The survey consisted of four different questions; learning by my-self, working in small group, working with a partner and or working together with whole class. Each question had four different options; strongly agree, agree, disagree and strongly disagree. The survey was read by the researcher to the participants to assist with comprehension. The participants indicated that 86% preferred independent work and only 14% strongly disagreed.

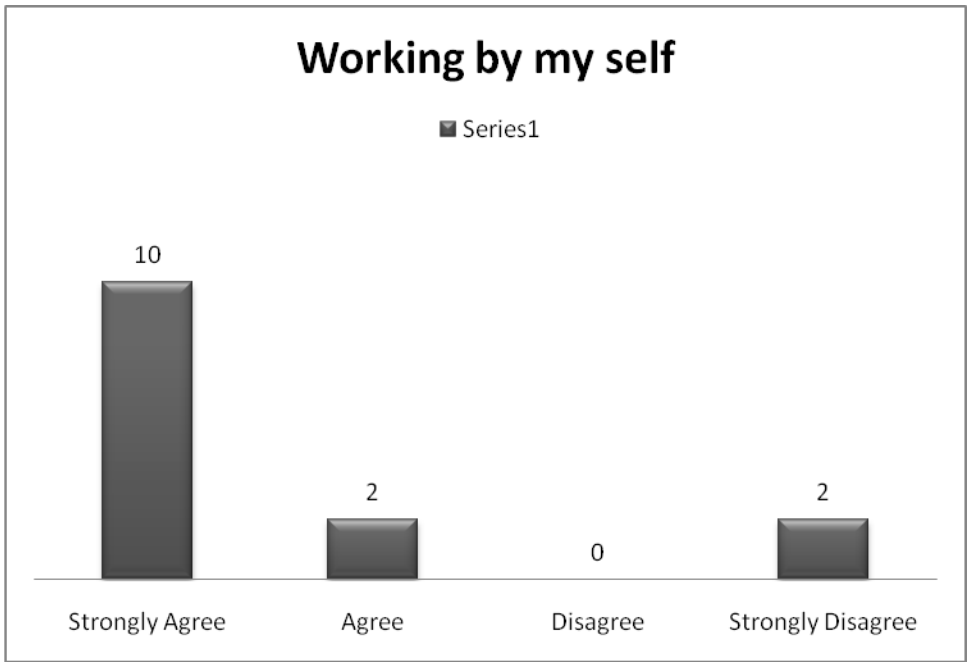

Figure 7

Working with a small group 57% of the participants agreed or strongly agreed. Of the fourteen participants 43% either disagreed or strongly disagreed that small group was not a prefered learning style.

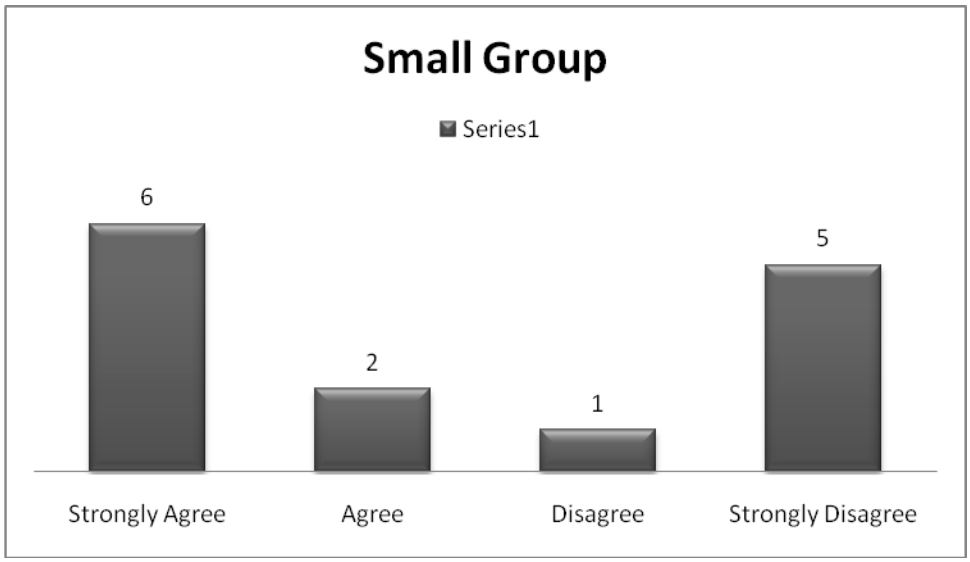

Figure 8

The participants agreed with about the same percentage which supported or rejected the idea of working with small group or partner work.

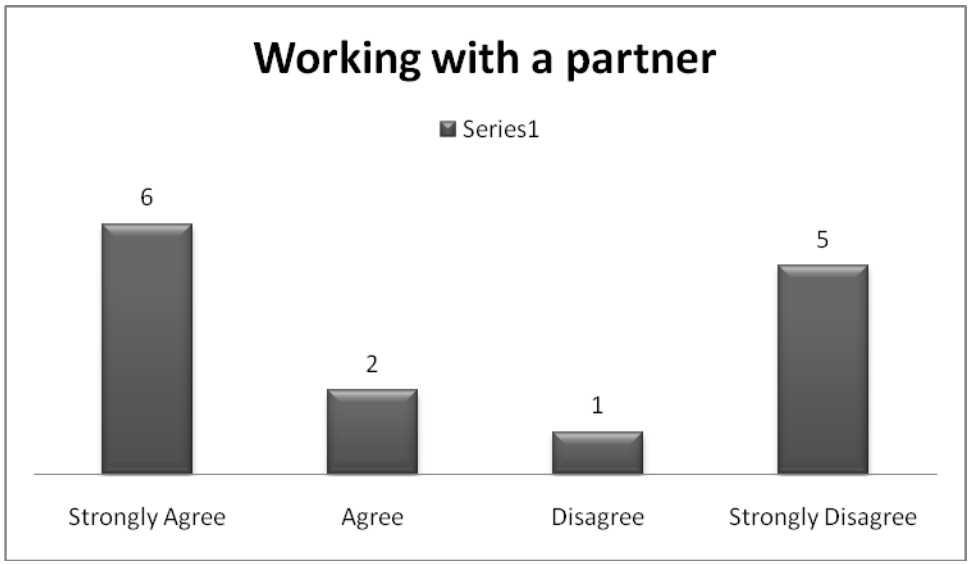

Figure 9

The participants results showed that 71% eithere agreed or strongly agreed and 29% disagreed or strongly disagreed about whole class work.

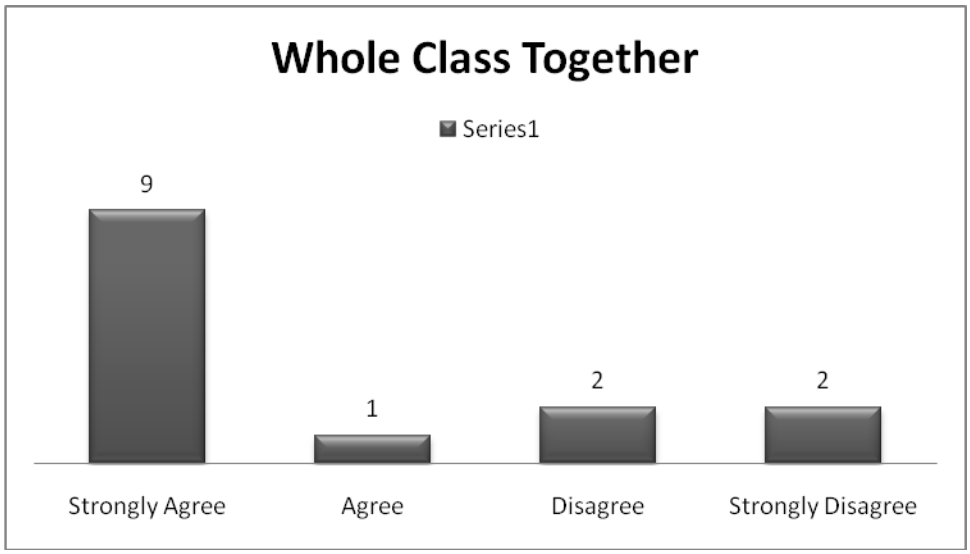

Figure 10

Findings

Comparing the pretest and posttests of each one of the quarters, results showed growth in all participants. It only showed a small increase of the mean between second and third quarter. The researcher used the t-test for non-independent statistic sample analysis to determine the effectiveness of number sense as a strategy to improve student math scores. The researcher analyzed the t-test results, which showed the t-value of .34 and the degrees of freedom of 13 in all fourteen participants. A showing of significance for degree of freedom of 13 at .05 required a t-test result of 2.160. The researcher's t-value finding was 0.34 and therefore the null hypothesis could not be rejected and the hypothesis could not be supported.

When the researcher segregated the data by gender, it reflected that boys got more growth than girls. The girl's results were t-value -1.92 and the degrees of freedom 5. A showing of significance for degree of freedom of 5 at =.05 required a t-test result of 2.571. The results for boys were t-value 1.39 and the degrees of freedom 7. A showing of significance for degree of freedom of 7 at =.05 required a t-test result of 2.365. The researcher's t-value finding was -1.92 for girls and 1.39 for boys, and therefore the null hypothesis could not be rejected and the hypothesis could not be supported.

Discussion

This project was delimitated to the researcher first grade class at Manson Elementary School, located in Manson, Washington. This study was conducted during the 2009-2010 school year. There were 14 students in this experiment class, six girls and eight boys.

The students did not receive math intervention during the first quarter of the school year. The intervention began during the second quarter of the school year, after the pretest. The enrollment at Manson Elementary School was 378 students. The ethnicity make-up of Manson Elementary was as followed: American Indian/Alaskan Native 0.6%, Asian 0.6%, Asian/Pacific Island 0.6%, Hispanic 68.6.0%, and White 30.0%. The population of students who qualify for free and or reduced lunch was 68%.

The assessment tools used to gather data were Class Based Assessment tests (CBAs). Each student took the pre and post math assessments, individually as a way of measure academic growth. The researcher also used a student survey to gather information about student learning styles preference.

The analysis of the data showed for all fourteen students results that there was a growth in the mean scores, the t-test for significance showed a t-value of .34 with degrees of freedom of 13, which required a t-value at .=05 of 2.160. Because of the t-test results, the researcher was unable to reject the null hypothesis. The null hypothesis indicated that, "The first grade students who received intervention on number sense will show no difference on math essential tests than those students who do not receive intervention". When the researcher disaggregated data by gender, it showed as followed: The second quarter showed that there was an overall increase of 253 points for girls between the pretest and posttest. The third quarter showed that there was an overall increase of 195 points between the pretest and posttest.

The data for boys showed that there was a growth of 281 points between the pretest and posttest of the second quarter. There was a growth of 364 points between the pretest and posttest of the third quarter.

When the researcher segregated the data by gender, it reflected that boys got more growth than girls did. The girl's results were t-value -1.92 and the degrees of freedom 5. A showing of significance for degree of freedom of 5 at =.05 required a t-test result of 2.571. The results for boys were t-value 1.39 and the degrees of freedom 7. A showing of significance for degree of freedom of 7 at =.05 required a t-test result of 2.365.

Because of the boys and girls t-test result, the researcher was unable to reject the null hypothesis and therefore, unable to support the hypothesis. The null hypothesis indicated that, "The first grade students who received intervention on number sense will show no difference on math essential tests than those students who do not receive intervention". The researcher was able to support the hypothesis on the student survey results and rejected the null hypothesis. The survey results did show that they had more confidence with taking the math essential tests.

Summary

Based on math t-test result for all fourteen students the researcher was not able to support the hypothesis. The hypothesis indicated that, "The first grade students who receive intervention on number sense will have a higher average increase on math essential tests than those students who do not receive intervention". The researcher was not able to support the hypothesis for the girls or boys, based in t-test result, when the data was segregated by gender.

The researcher was able to support the hypothesis and rejected the null hypothesis based on the student's survey results. The survey results showed that 68% of the students either agreed or strongly agreed that working independently, with a small group, working with a partner and or working together as a class was what they preferred to do. This chapter was designed to analyze the data and

identify the findings. Chapter 5 summarizes the study, draws conclusions, and makes recommendations.

CHAPTER 5

Summary, Conclusions and Recommendations

Introduction

This chapter has been organized around the following topic: (a) introduction, (b) summary, (c) conclusions, (d) recommendations.

Summary

After observation of the WASL scores at Manson School District, results indicated that there was a concern into regard to the area of math. Since Manson School District was a Reading First district, there was more effort put into reading. There were opportunities for students to have reading intervention in the classroom and outside the classroom. Math was left out, as the students received support in math only during math class. There was not extra support to improve math skill. Since Manson Elementary School was no longer guided by Reading First, there was more flexibility within the 2009-200-10 school year, schedule. There were more opportunities for math intervention or math support during math class and outside the math class time. The researcher reviewed a variety of articles related to number sense, math intervention, background of number sense, and teaching strategies related for grade level.

After tabulating student's data in a Microsoft spreadsheet and t-test for non-independent statistic sample analysis, it concluded that there was not sufficient evidence to believe that math intervention on number sense made significance difference into student math scores for all fourteen students. When the researcher segregated the math student data by gender, the t-tests for the six girls showed the sum of D's of -58.00, the mean of D's of -9.67, the sum of D's squared 1324.00, there was the t-value of -1.92 and the degrees of freedom of 5. The results for boys were sum of D's 76.00, the mean of D's 9.50, the sum of D's squared 3320.00, the t-value 1.39 and the degrees of freedom 7. A showing of significance for degree of freedom of 7 at =.05 required a t-test result of 2.365. Therefore, there were no sufficient evidences on the girls or boy's t-test results to support the hypothesis and rejected the null hypothesis.

Conclusions

Number sense has been considered as the baseline for student math success. By understanding number sense, students were allowed to manipulate numbers and use it as a strategy to manipulate and solve math problems. According to Bobie, (1996), Number sense was an essential element in regards to math skills. It referred how people organized information about numbers and its relationship to solved mathematical problems.

According to Confer (2005), to have a good number sense, children must know the sequence of number names, understand how numbers related to one another, compared more, less, and same. Jordan (2007), indicated how important it was to identify students with math disability in the early age.

Recommendations

The researcher, based on the results of this study proposed that number sense intervention helped students increase the ability in use and manipulate numbers to solve every day math problems. Based on the data results the researcher's recommendation was that number sense was an effective tool to help first grade students overcome mathematics straggles, although not at significant level. The researcher recommended progress monitoring as an opportunity to overcome student mathematics needs. The researcher recommended parent involvement and workshops to enhance parent's abilities for homework support. The researcher also recommended professional growth on number sense at the elementary level to get strategies to boost student's math skills, as well as a longer period of study and a larger number of students involved to determine if the additional time would result in significant impact. Students also indicated that they felt more confident in taking the math tests as a result of the additional assistance.

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The researcher gave a survey to all of the fourteen participants to determine learning preference. The survey consisted of four different questions; learning by my-self, working in small group, working with a partner and or working together with whole class. Each question had four different options; strongly agree, agree, disagree and strongly disagree. The survey was read by the researcher to the participants to assist with comprehension.

Stud #	Female	Male	Self	Small G	Partner	Together
1	1		2	4	1	3
2	1		2	2	2	3
3	1		4	1	1	1
4		1	1	1	1	1
5	1		1	1	1	1
6		1	1	3	2	1
7		1	1	4	2	1
8		1	1	1	1	1
9		1	1	1	1	1
10		1	1	4	3	4
11	1		1	4	1	1
12		1	1	4	2	2
13		1	1	2	4	1
14	1		4	1	4	4

The following table indicated that there was an overall growth of the mean to 38.14 between the pretest and the posttest during the second quarter of the school year.

	Data Collection	Sheet	
	Research 2010		
	Second Quarter		
Participants	Pretest	Posttest	Difference
1	36	93	57
2	64	100	36
3	64	100	36
4	57	93	36
5	36	86	50
6	42	93	51
7	36	93	57
8	42	57	15
9	71	100	29
10	64	100	36
11	42	79	37
12	50	79	29
13	71	100	29
14	57	93	36
Sum	732	1266	534

The chart showed that there was an overall growth of the mean to 39.93 between the pretest and the posttest during the third quarter of the school year.

	Data collection	Sheet	
	Research 20010		
	Third Quarter		
Participants	Pretest	post test	Difference
1	52	77	25
2	58	98	40
3	67	93	26
4	50	96	46
5	55	91	36
6	50	89	39
7	36	85	49
8	22	83	61
9	57	96	39
10	50	84	34
11	50	85	35
12	50	87	37
13	28	90	62
14	50	80	30
Sum	675	1234	559

The following graph indicated that there was an overall growth of the mean to 38.14 between the pretest and the posttest during the second quarter of the school year.

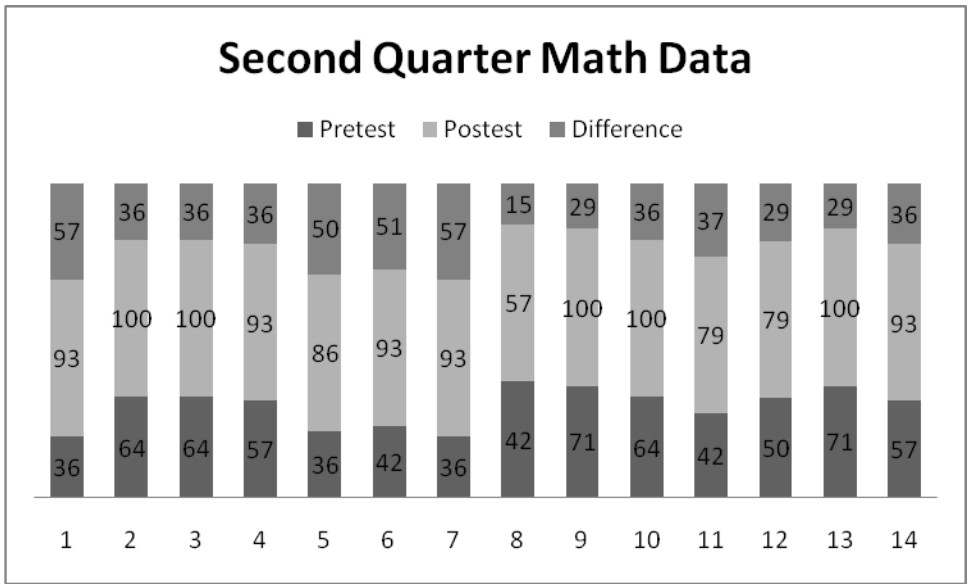

Figure 1

The graph showed that there was an overall growth of the mean to 39.93 between the pretest and the posttest during the third quarter of the school year.

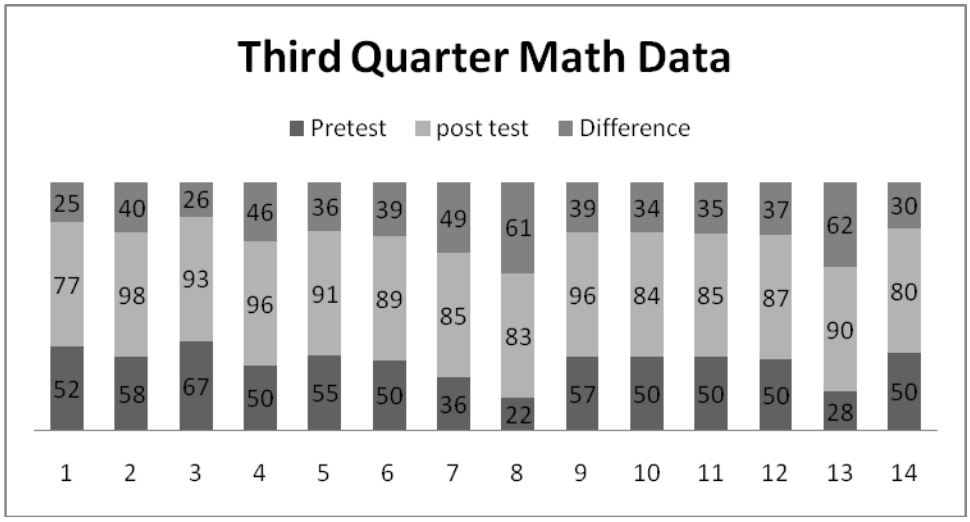

Figure 2

The next graph represented the math data for girls during the second quarter of the school year. The graph showed that there was an overall increase of 253 points between the pretest and posttest.

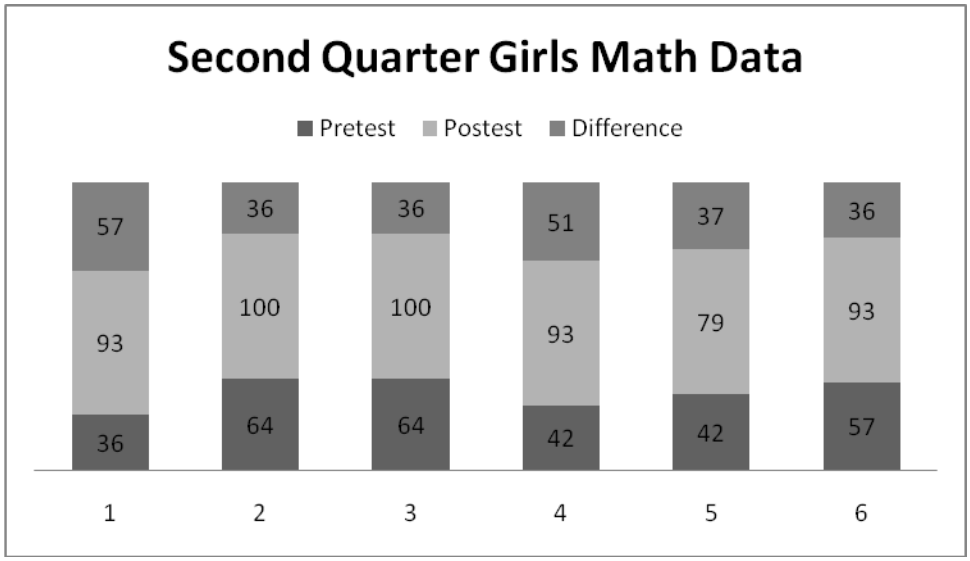

Figure 3

The next graph represented the math data for girls during the third quarter of the school year. The graph showed that there was an overall increase of 195 points between the pretest and posttest.

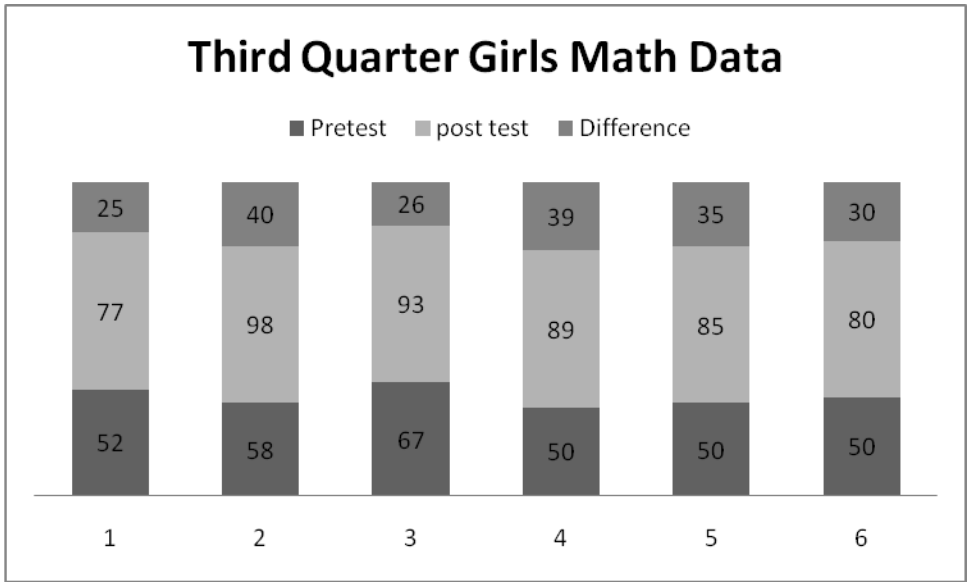

Figure 4

The following graph represented the data for boys during the second quarters of the school year. There was a growth of 281 points between the pretest and posttest of the second quarter.

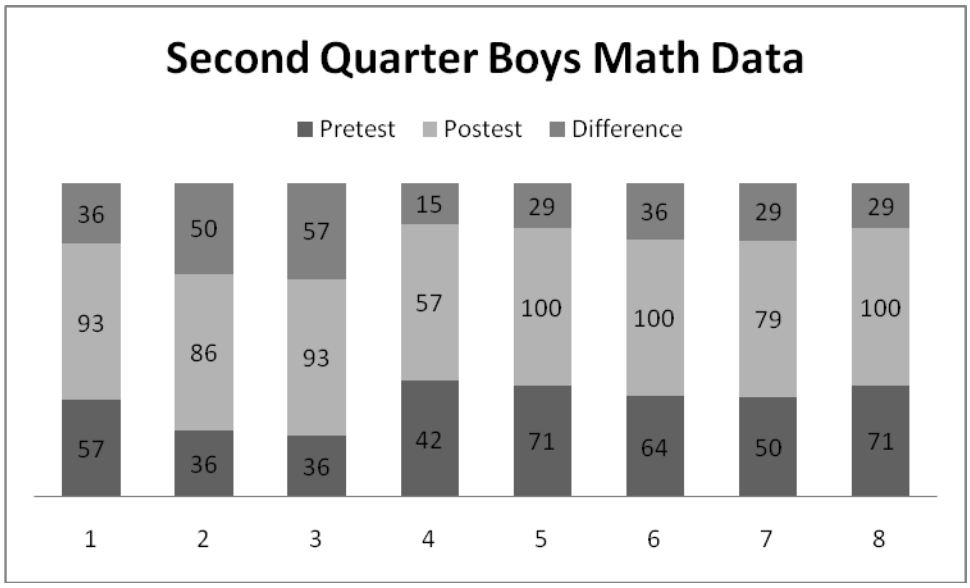

Figure 5

The next graph represented the math data for boys during the third quarter of the school year. There was a growth of 364 points between the pretest and posttest of the third quarter.

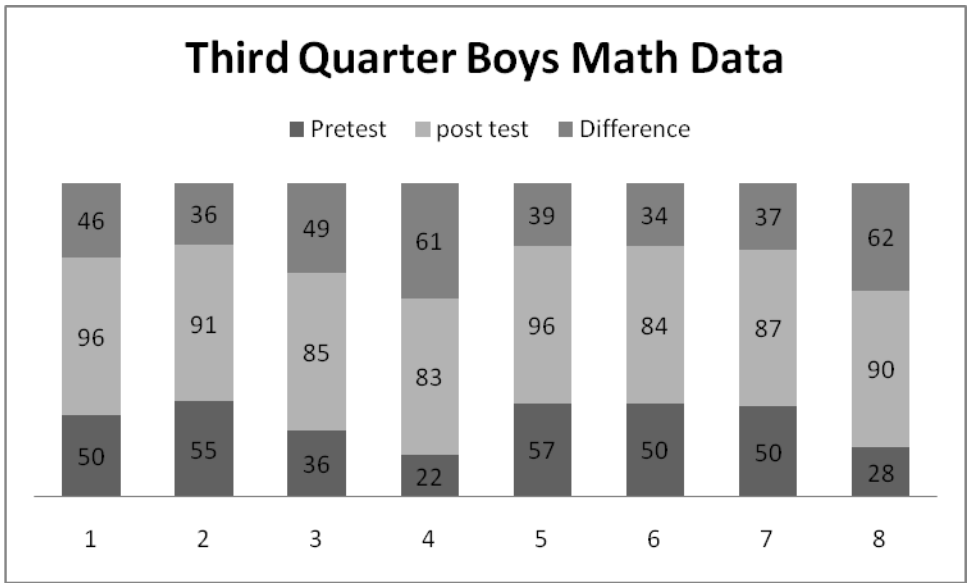

Figure 6

The researcher gave a survey to all of the fourteen participants to determine learning preference. The survey consisted of four different questions; learning by my-self, working in small group, working with a partner and or working together with whole class. Each question had four different options; strongly agree, agree, disagree and strongly disagree. The survey was read by the researcher to the participants to assist with comprehension. The participants indicated that 86% preferred independent work and only 14% strongly disagreed.

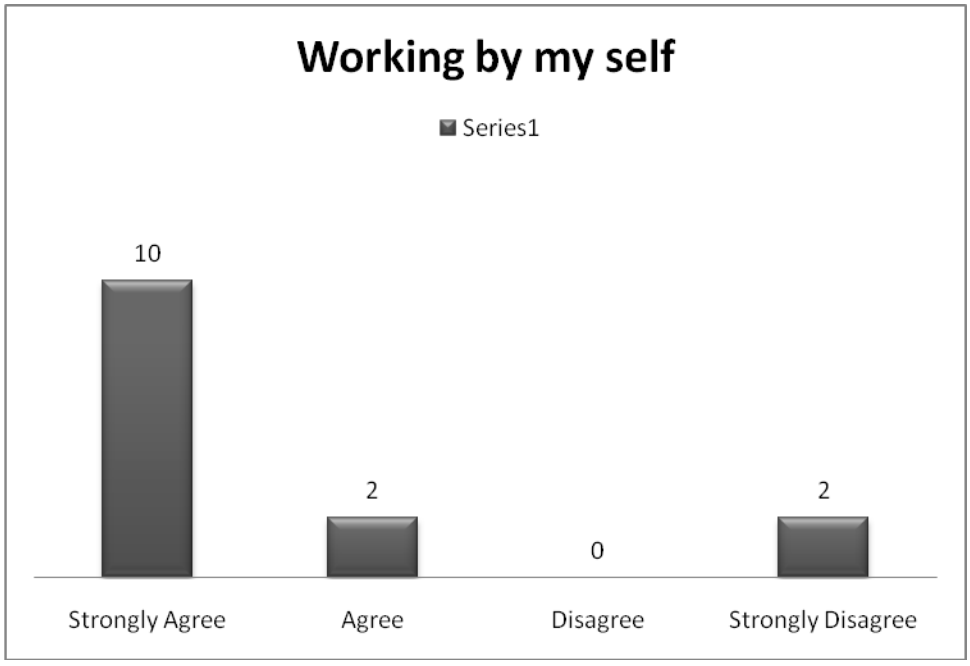

Figure 7

Working with a small group 57% of the participants agreed or strongly agreed. Of the fourteen participants 43% either disagreed or strongly disagreed that small group was not a prefered learning style.

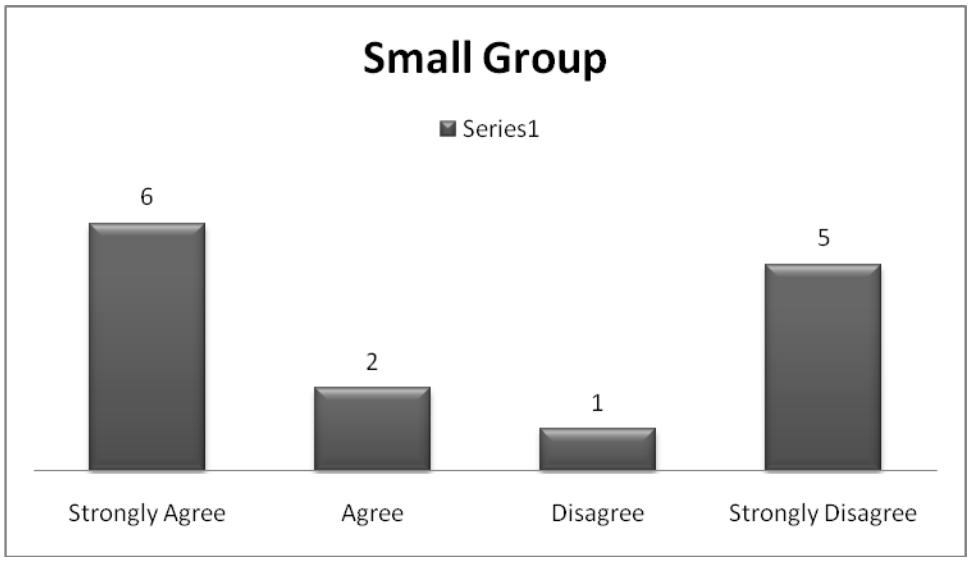

Figure 8

The participants agreed with about the same percentage which supported or rejected the idea of working with small group or partner work.

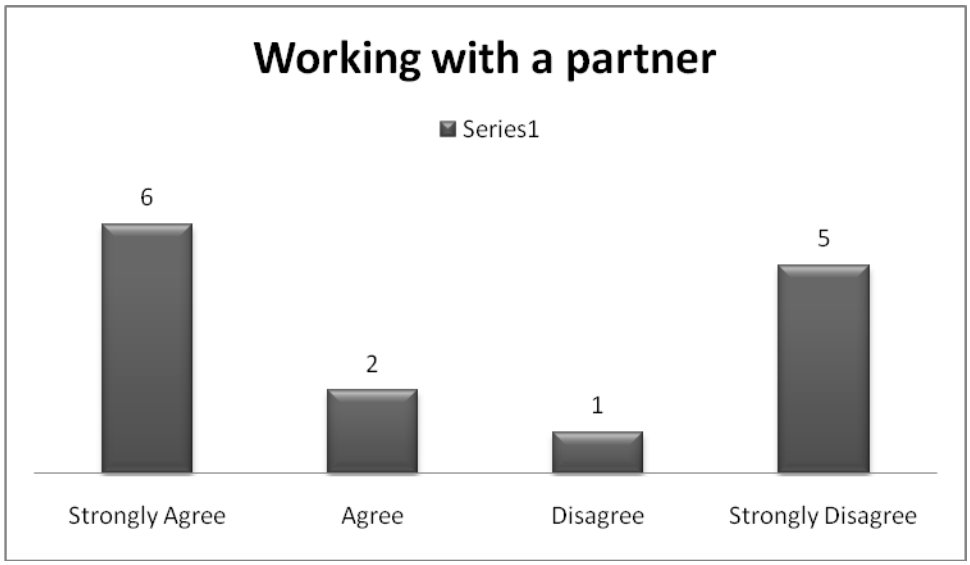

Figure 9

The participants results showed that 71% eithere agreed or strongly agreed and 29% disagreed or strongly disagreed about whole class work.

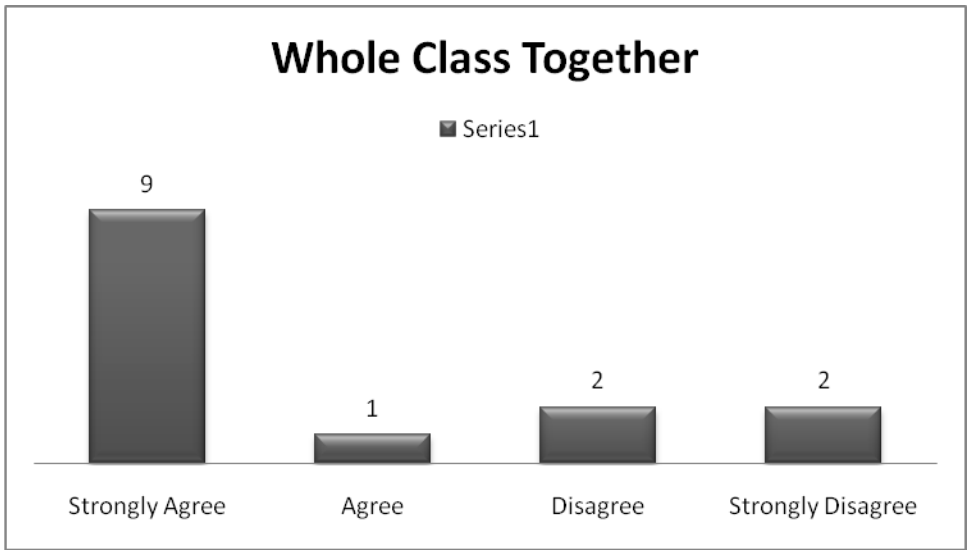

Figure 10

APPENDIX

North Library Databases and Electronic Support for Graduate Studies

The following are suggested electronic starting points for education research from the North Library website.

Education Database from EBSCO include: *Education Research Complete*, *ERIC, Teacher Reference Center, Professional Development Collection* and *Vocational and Career Collection.* Over 1,500 journals are indexed and more than 750 journals, 100 books and monographs, and numerous education-related conference papers are full text.

Education Journals from ProQuest include: *ProQuest Education Journals, ProQuest Psychology Journals, Education Module, ERIC* and *Teacher Journals.* Other databases to consider: *Alt-Press Watch, Ethnic NewsWatch, GenderWatch,* various newspapers and the *ProQuest Research Library* ProQuest Education Journals indexes over 760 journals and 600 are in full text. The *Psychology Journals* provide full text journals and 4000 dissertations.

Encyclopedia of Education from Thompson Gale plus print copy is available in the Library.

PsycArticles and PsycInfo through OVID

Mental Measurements Yearbook through OVID

ERIC - the Education Resources Information Center provides access to bibliographic records of journal and non-journal literature indexed from 1966 to the present. This collection contains bibliographic records for more than 1.2 million items indexed since 1966, including: journal articles, books, research syntheses, conference papers, and other education-related materials. ERIC currently indexes more than 600 journals and 115,000 full-text materials including conference papers and reports, rather than journal articles and books. Most materials published 2004 and forward include links to other sources.
All citations are given a number and type designation. **ED**123456 is a document. A link or information should be given regarding access to full text. **EJ**123456 is a journal. These items will be accessed through one of the full text databases (ProQuest, EBSCO, or PsycArticles) or via InterLibrary Loan. Access to documents before 2004 may be available on microfiche in the Library. Consult the Library for assistance.

A to Z Heritage University Serials Holding List is a list of all journals that are held by Heritage University Library in print or electronic format with the coverage dates.

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