THE EFFECTS OF MATH INTERVENTION ON STUDENT ACHIEVEMENT

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ABSTRACT

Within diverse classrooms, sometimes teachers need extra assistance to reach all students. This quantitative research design was used to determine the affects of math intervention on student achievement. Students in this study were selected by their *Not Met* PASS scores from their 3rd grade year. A survey assessing student attitudes towards math was given to all students. Teachers were also involved in a survey, asking if they felt the school needed a math interventionist. The measuring instruments for this study were pre-assessments, chapter tests, AIMS data, MAP scores, and 2015 ACT scores. The results of the research showed that the use of a math interventionist increased student achievement. All of the students in this study made gains.

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Chapter 1

Being proficient in math is a necessary skill for life. Interventions are being provided for students nationwide who perform below basic on various assessments. In this research study, 4th grade students at Harborview Elementary who scored "Not Met" on the Palmetto Assessment of State Standards will have the opportunity to receive extra math assistance. The focus is to provide extra support to students who struggle and need more assistance then what their teacher can provide in a routine classroom setting. The methods to this research study will begin with identifying students who need extra support in math. At the beginning, 4th grade teachers will pull data from spring 2014 PASS scores. Letters will be sent home asking parents to allow their students to work with an interventionist once a week for thirty minutes during the school day revisiting curriculum covered in the classroom. A data binder will record students pre-assessment and post assessment scores. Every day, students will go to the computer lab to get on IXL for thirty minutes with Harbor View Elementary's lead teacher. Students will also be taking the AIMS Web progress monitoring monthly. MAP data will be collected fall 2014, winter 2015, and spring 2015 to display student growth. The goal at the end of the study will be to have the students who scored "Not Met" on the Palmetto Assessment of State Standards to perform "Met." If this goal is achieved this proves a math interventionist is necessary for the 2015-2016 school year.

Statement of the Problem

As an experienced practicing professional educator the teacher-researcher has observed over the years that students in 4th grade come more prepared as readers then they do as mathematicians. Students are required to read at home nightly, have 25 books read by the end of the school year, and have the opportunity to work with a reading interventionist if they are struggling readers. Charleston County, South Carolina, does not fund a math interventionist for Harborview Elementary School. The purpose of this quantitative study is to determine what, if any, affect an intensive math intervention would support students with math that enter fourth grade. The curriculum and small group will be constructed by looking at data. The teacher will analyze data from PASS, MAP, pretests, posttests, IXL and AIMS Web to provide small group instruction that promotes student growth in math.

Research Question

What impact does an intensive math intervention have on math achievement of fourth grade students at HVES as measured by PASS?

Hypothesis

It is the hypothesis of the teacher researcher that this study will be important evidence to support students learning in mathematics. Students deserve an equal amount of support in math as they do reading.

Research Design

The research will study mostly quantitative data. Students were selected by their 2014 *not met* PASS scores. These scores range from 535 to 591. Students current MAP data will be

examined mid September 2014, January 2015, and May 2015. Students will be given the AIMS test monthly to show growth. IXL will take place every day 7:50- 8:20. These two programs will serve as a refresher of skills or spiraling reviews. Each curriculum unit will have a pre-assessment, quiz, and post-assessment. The student's scores will be recorded in the teacher's data binder. Common Core Curriculum standards will be used for reliability and validity.

Another type of data the researcher will collect is qualitative data. The researcher will use observations as an assessment during small group. Previously, students were asked to complete a survey ranking: Math is fun to learn. Math is challenging. Math frightens me, with the choices agree, not sure, disagree. Students were asked to respond to the open ended question: "How do you feel when you teacher says, "Take out your math book." Teachers at HVES were also asked "Do you think a math interventionist would be beneficial at HVES to service students without IEP's who need extra support in math? These questions will provide the researcher with valuable information how students and teachers perceive math.

Rationale of the Study

A data driven study pertaining to an intensive math intervention will provide the teacher-researcher with valuable information relative to addressing students learning. If the research proves to be effective, this could lead to funding by Charleston County for a Math Interventionist for the school.

Chapter 2

In Robert Frosts, “Revelation” Robert Frost speaks of the tendency of humans to hide their true identity from others while at the same time hoping that someone will find them out. “We make ourselves a place apart, behind light words that tease and flout, but oh, the agitated heart till someone find us really out. 'Tis pity if the case require (or so we say) that in the end we speak the literal to inspire the understanding of a friend. But so with all, from babes that play at hide-and-seek to God afar, so all who hide too well away must speak and tell us where they are” (Frost). In a poem that is most likely talking about faith and love, from a teacher’s standpoint it may have a deeper meaning. “If only students could tell us where they are.” “In the absence of such a revelation, the teacher has to practice the assessor’s art: find out what the students know and can do- and lead each to the next upward step” (Scherer, 2014, pp. 7).

Mrs. Brown has a very heterogeneous fourth grade class. More than half of her students are gifted and talented, two students have Individualized Education Plans, six are in the fiftieth percentile in Math, and five students have been promoted because they have been “pushed through the system.” No classes’ demographics are perfect, however why have the five struggling students not been serviced or tested for their weaknesses in math? Now the teacher has to figure out a way to catch these students up while adhering to the rigorous new standards.

Let us face the facts; teachers are directly responsible for "crucial, life saving work" (Buffman, 2010, pp. 10). "Educators today are like tightrope walkers without a safety net, responsible for meeting the needs of every student, with little room for error" (Buffman, 2010, pp. 10). Students who graduate today have a good chance of surviving in the global marketplace, while others who fail in school are a greater risk of poverty, welfare, or an early death. The pressure is on for teachers to provide the essential skills needed to survive in today's society.

Response to Intervention

Why intervention? The purpose of RTI (Response to Intervention) is to support struggling children before they qualify for special education. Schools should provide interventions to students as soon as they demonstrate the need. Most teachers recognize a weakness in a student at a young age and the student can be "RTIed." "The purpose of RTI is to systematically provide every student with the additional time and support" (Buffman, 2010, pp. 14). This is a leveled system that provides steps for teachers to take before a child is tested for special education. The first step, tier one, is a teacher's responsibility, making sure he or she is teaching the standards and differentiating instruction with re-teaching and enrichment. Tier two, begins small group instruction. "Research has shown that small-group instruction can be highly effective in helping students' master essential learning" (Buffman, 2010, pp.10). Tier three guarantees intensive support for the student in the subject area. This additional help is individualized and tracks at risk students. A team from the school will follow the child's progress. If Tier three has no effect then special education testing will take place. RTI has been proven beneficial nationwide and should be implemented as soon as possible.

Pre-Assessments

Teachers are like detectives who "look for clues about student's learning progress and like doctors, they use diagnostic tests to examine suitable treatment options" (Scherer, 2014, pp. 7). Teachers analyze assessments to show students where they are in relation to skills and understanding. "Most mastery learning models stress the importance of administrating a quick and targeted pre-assessment to all students before beginning instruction to determine whether they have the prerequisite knowledge and skills for success in the upcoming learning sequence" (Guskey, 2010, pp. 54). Teachers can also give an oral assessment by accessing prior knowledge. "Pre-assessment is a way to gather evidence of student's readiness, interests, or learning profiles before beginning a lesson or unit then using that evidence to plan instruction that will meet learners' need" (Hockett, 2014, pp. 50). After the teacher analyzes the results they design instruction that fits the student. "Formative assessment is-or should be- the bridge between today's lesson and tomorrows" (Tomlinson, 2014, pp. 11). During pre-assessments teachers should encourage students that is ok to make mistakes and this can only help us help them learn better. Formative assessments allow the teacher to discover what the child knows, understands, and is able to do. This "samples student standings in relation to the material so the teacher has a reasonable approximation of who may experience difficulty, who may show early mastery, and who may bring misunderstandings to the unit of study" (Tomlinson, 2014, pp. 12). Pre-assessments are a great tool to build teaching from.

Small group

"Following formative assessments, mastery learning teachers provide high quality corrective instruction designed to remedy whatever learning problems the assessment identified" (Guskey, 2010, pp. 55). Using Taylor Cox's Math Intervention: Building Number Power with Formative Assessments, Differentiation, and Games, Grades 3-5, the teacher will create a small

group promoting one-on-one instruction focusing on different math concepts. The teacher will "target math instruction to struggling students by:

(1) Diagnosing weaknesses

(2) Providing specific, differentiated instruction

(3) Using formative assessments

(4) Offering corrective feedback

(5) Motivating students by using games (Taylor-Cox, 2009, pp. 5)

Taylor-Cox emphasizes four main goals for math instructors. They must help students achieve: "accuracy, efficiency, flexibility, and fluency in solving math problems" (Taylor-Cox, 2009, pp.1). Small groups are designed for accommodating "differences in students learning styles, learning modalities, or types of intelligence" (Guskey, 2010, pp. 56). During whole group instruction "many students, who struggle in math, become anxious... group work and hands-on learning can reduce their anxiety" (Medoff, 2013, pp.46). Within small group the teacher will need to give clear directions. "Choose activities or problems with several possible solutions and strops to deriving those solutions to promote the idea that there are many ways to be "smart" in math" (Medoff, 2013, pp. 46). "Make it clear through your words and behaviors that you believe everyone can learn math by putting in the effort" (Medoff, 2013, pp. 47). Creating a comfortable learning environment allows students to hone in on their one-on-one instructional experience.

MAP

MAP provides "the ability to track student growth over time, perceive trends and weakness of the curriculum and provide the teachers with the tools they need to be successful in

the classroom" (NWEA, 2012, pp. 1). A case study was performed in a suburban school district in Indiana, Mt. Vernon Schools, and they are advocates for measuring academic performance. "We would sooner give up the ISTEP + state-mandated test than give up NWEA because of the value it gives us in decision making" (NWEA, 2012, pp 1). Using MAP data, the Mt. Vernon County was able to determine that they were using textbooks that were too difficult for their students to comprehend. To address the problem, differentiation took place and two sets of textbooks were ordered for the students based on their reading levels. MAP also compares students to their peers. This is important for parents to know so they can understand if their child is making growth. Parents "know their MAP scores before and after each test and they are involved in setting their goals" (NWEA, 2012, pp. 2). Teachers in Mt. Vernon believe MAP helps the students and teachers prep for the state mandated tests. One teacher said, "If we didn't have NWEA, we'd have no idea what to expect from and how to prepare for ISTEP"(NWAE, 2012, pp. 2). Teachers "gain meaningful insight into the ways students learn, so they can best support them in meeting growth targets and passing important tests" (NWEA, 2012, pp. 2). Educators use MAP data "when the academic focus is on helping kids reach their growth targets" (NWEA, 2012, pp. 2). This type of assessment can help predict what students will make on state mandated tests. At the end of the day this type of data is very important because it measures growth. Students can show they gained knowledge throughout the year. This is important because students may have a bad test taking day on the state mandated test and the teacher has evidence the student has learned something this year more than a not met, met, or exemplary.

AIMS

In Tier 2 intervention, teachers monitor at-risk students more frequently to evaluate the effectiveness of instructional changes. "AIMS web is the leading assessment and RTI solution in

school today—a complete web-based solution for universal screening, progress monitoring, and data management for Grades K-12" (AIMSweb, 2011, pp.1). This program progress monitors to determine the effectiveness of the teacher interventions, and whether students are progressing sufficiently to meet year-end goals. A case study at Helen Smith Elementary School in Clark County, Las Vegas, Nevada, takes achievement to new heights; school earns Blue Ribbon status after turning to AIMSweb for RTI. One teacher noted, " We're data driven now, which is such an improvement." "In the past, a teacher might have suspected that a student had learning difficulties, but lacked the tools to make an accurate evaluation" (AIMSweb, 2011, pp. 2). This program is an effective resource to map student growth. "Parents like seeing the data and they're often surprised how much information we have about their child" (AIMSweb, 2011, pp. 2). Students have begun to make the shift too, "they know where they are and where they need to be at the beginning, middle and the end of year." "They have control over their own performance" (AIMSweb, 2011, pg. 2). AIMSweb is an assessment that can be used as often as needed and can be used as guide to progress monitoring.

IXL

The purpose of IXL is to "practice and excel." This online program is used in 50 states and 170 countries. Students have the opportunity to practice skills and develop confidence in reading of math. For fourth grade math specifically there are 279 math skills available for practice. Students use visual representation, listening skills, and interactive activities to reinforce their learning. At the end of each week students, parents, and teachers can see if the student has "mastered" a specific skill. If a student does not master the skill they will be given a percentage of mastery so the teacher and parent can know that is a skill they still need to work on. People all over the world are raving about IXL. A fourth grade parent from California said, "This program

takes the frustration out of math because it allows the student to practice at his/her own pace and stay focused." "It's okay if you mark one wrong because another one will be waiting." "This is a great tool to have" (IXL.com). A fourth grade teacher from Brooklyn Center, Minnesota, said, "My students love it!" "It really challenges them to master the concepts." "I told one of my students to change to another topic so she could practice for the upcoming tests, and she said, 'No, wait" "I want to get to 100% first!**"** "I have never seen her more motivated to succeed!" (IXL.com). Finally, the most important, a student from Alberta Canada said, "My favorite feature of IXL is that if you get a question wrong IXL will tell you how to solve it and what you did wrong." "Another thing I really enjoy is that IXL provides awards and progress reports showing how you do over time." "I think these 2 things are very effective because they make the student feel like they are actually studying and not wasting time" (IXL.com). These testimonies are proof IXL is a great tool for practice promoting mastery. Students can have fun while learning!

Summary

In this chapter the researcher discusses literature reviews on the breakdown of Response to Intervention, the importance of pre-assessments, the formatting of an effective small group, and methods to intervention. Using this knowledge the researcher will begin Tier two intervention, track data with MAP, pre-assessments, IXL and AIMS web, and plan small group activities.

Chapter 3

The purpose of this study is to provide tier two Response to Intervention to students who struggle in math. The researcher will compare data from MAP 2014 to 2015 during the fall, winter and spring. The researcher will analyze this data and compare student growth to the students PASS 2015 scores. The researcher will evaluate student growth during this time period using programs such as AIMSweb and IXL. The researcher is using small groups with standard based targeted instruction to prove or disprove the validity of response to intervention.

Research Design

The data being collected is both quantitative and qualitative. The MAP, IXL, AIMS, pre-assessments, quizzes, and post assessments are quantitative data. Student and teacher surveys along with small group observations will be means of qualitative data. The dependent variable is the students MAP scores. The independent variable is the small group instruction and methods of intervention. The controlled variable is the students will receive the same Curriculum Tests (pre-assessments, quizzes, post-assessments).

Population Being Studied

The target population all received scores of not met on PASS ranging from 535 to 591. These students do not have Individualized Education Plans. Students scored a “low” on math

skills in grades 1, 2, and 3 by their classroom teacher on their permanent records. Students are diverse in their own way with anxiety, 504 plans, ODD, and ADHD affecting their learning.

Assumptions and Limitations

The researcher assumes the regular education teacher is teaching the unit of study according to the district pacing guide and grade level. Limitation: students may have a bad testing day and their MAP scores will not increase. Students may be absent on a day of small group.

Treatment of Data

Will intense intervention increase student growth? This question can be answered according to the growth students make from their 2014 fall MAP score to their winter 2015 score. On average students gain 6 points from fall to winter and 12 points fall to spring. This test is personalized to student levels so student growth may be different. Students will be identified as on, below, or above grade level after the test. MAP data can be used to project PASS performance.

Data Needed

Using pre-assessments to guide instruction the researcher will collect data on students' knowledge before a unit and after. The students need to show improvement from their pretest to post test showing they have gained knowledge. AIMS Web will give the researcher data on curriculum covered throughout the entire year, students will be spiraling the information. Every month the researcher would like to see the students do two more problem than last time. Students need to show growth from their 2014 fall MAP scores to their 2015 winter MAP scores by at least 6 points. If a student does not meet their 6 point goal mid-year it is the researchers hope that

the student will gain the full 12 points in the spring. Students also need to show mastery in a skill in weekly IXL, weekly AIMS, and gains from their pretest to posttest.

Location of Data

The school's lead teacher or curriculum coach will administer the test. NWEA will log the score and the researcher will further analyze the data. Throughout the time of study the researcher will find IXL weekly reports online while AIMS web and formative assessments will be hand graded and recorded in a data binder.

Chapter 4 Results

As an experienced, practicing, professional educator the teacher/researcher has observed that the students at Harbor View Elementary in the Charleston County School District are better readers than they are mathematicians. However, the Charleston County School District does not, currently, fund a math interventionist. The purpose of this quantitative study is to determine what, if any, effect an intensive math intervention has on students that enter fourth grade who are in of need extra math assistance. Using data from the students' third grade year, students were selected for this study based on their *Not Met* PASS scores. The research question is what impact does an intensive math intervention have on math achievement of fourth grade students? In this chapter the researcher will display the various forms of data, analyze them, and make interpretations.

Data Presentation:

"Tables can be used effectively for summarizing results, especially if a report involves a large amount of statistical material" (Wiersma and Jurs, 2009, pg. 91). The researcher will utilize descriptive statistics to analyze results and draw conclusions. Using pre-assessments, post assessments from place value, adding and subtracting, multiplication, division, patterns, fractions, decimals, measurement, perimeter, area, geometry, Fall MAP, Winter MAP, Spring MAP, along with 2014 PASS scores, 2015 ACT scores, and AIMS web, the researcher's goal is to determine whether small group interventions have an impact on student growth.

The scales of measurement consist of ordinal and interval. For most of the data the researcher will use measures of central tendencies, specifically the mean and range. Because the data compiled is straightforward and uncomplicated in nature, it will be displayed in the format of a table and show the amount of growth the students made throughout the year.

Data Analysis:

Table 4.1 Student Performance in Math as Measured by 2014 PASS

Student 1	Not Met
Student 2	Not Met
Student 3	Not Met
Student 4	Not Met
Student 5	Not Met
Student 6	Not Met

Students were selected for this research study because of their 2014 Mathematics PASS score. As displayed in Table 4.1, Student Performance in Math as Measured by 2014 PASS, students 1 through 6 scored *Not Met* on the Palmetto Achievement State Standards Test.

Table 4.2 Student Performance in Math as Measured by MAP during the 2014-2015 Academic Year

	Fall	Winter	Spring	Growth
Student 1	202	203	215	+13
Student 2	199	208	208	+7
Student 3	197	197	200	+3
Student 4	202	207	205	+3
Student 5	195	195	201	+6
Student 6	194	196	204	+10

As can be seen by Table 4.2, Student Performance in Math as Measured by MAP during the 2014-2015 Academic Year, 100% of the students realized gains. Student 1, who had a spring score of 215, realized an overall gain of +13 when compared to the fall score of 202. Student 2, who had a spring score of 208, realized an overall gain of +7 when compared to the fall score of

199. Student 3, who had a spring score of 208, realized an overall gain of +3 when compared to the fall score of 197. Student 4, who had a spring score of 205, realized an overall gain of +3 when compared to the fall score of 202. Student 5, who had a spring score of 201, realized an overall gain of +6 when compared to the fall score of 195. Finally, student 6, who had a spring score of 204, realized a gain of +10 when compared to the fall score of 194. In all, 100% of the students realized gains from MAP testing from fall to spring.

Table 4.3 Student Performance on Unit Assessments

	Place Value	Addition/ Subtraction	Multiplication	Division	Patterns	Fractions	Decimals	Measurement	Geometry	Mean
Student 1	92	65	67	61	36	60	60	74	87	67
Student 2	86	78	53	79	74	87	60	69	87	75
Student 3	50	78	73	86	67	73	51	69	80	70
Student 4	71	82	90	93	93	80	71	75	87	85
Student 5	81	73	75	82	69	36	80	60	79	70.5
Student 6	64	73	75	58	88	86	87	93	90	79

As table 4.3 displays, students had different areas of weakness with different skills. For example, at the beginning of September students took their first test and their scores varied from a 50 to a 92. Student 1 received a 92, student 2 received an 86, student 3 received a 50, student 4 received a 71, student five received an 81, and student six received a 64. Students then took a summative addition and subtraction test. Their scores ranged from a 65 to an 82. Student 1 received a 65, student 2 received a 78, student 3 received a 78, student 4 received an 82, student 5 received a 73, and student 6 received a 73. In October, the students were given their multiplication test. Their scores ranged from 53 to 90. Student 1 scored a 65, student 2 scored a 53, student 3 scored a 73, student 4 scored a 90, student 5 scored a 75, and student 6 scored a 75.

In November students took their division test. Student scores varied from 58 to 93. Student 1 scored a 61, student 2 scored a 79, student 3 scored an 86, student 4 scored a 93, student 5 scored an 82, and student 6 scored a 58. Patterns were the next unit of study and student scores ranged from 36 to 93. Student 1 received a 36, student 2 scored a 74, student 3 scored a 67, student 4 scored a 93, student 5 scored a 69, and student 6 scored an 88. In January, students took a fraction assessment. The test scores ranged from a 36 to an 87. Student 1 scored a 60, student 2 scored an 87, student 3 scored a 73, student 4 scored an 80, student 5 scored a 36, and student 6 scored an 86. In February students learned a new skill, decimals, and student scores varied from a 51 to an 87. Student 1 received a 60, student 2 received a 60, student 3 made a 51, student 4 made a 71, student 5 made an 80, and student 6 made an 87. Measurement scores ranged from a 60 to a 93. Student 1 made a 74, student 2 made a 69, student 3 made a 69, student 4 made a 75, student 5 made a 60, and student 6 made a 93. Lastly, geometry scores ranged from 79 to 90. Student 1 received an 87, student 2 received an 87, student 3 received an 80, student 4 received an 87, student 5 received a 79, and student 6 received a 90. In the final column of table 4.3 each student has an average for their test scores. The mean for student 1 was 67, student 2 was 75, student 3 was 70, student 4 was an 85, student 6 was a 70.5, and student 6 was a 79.

Table 4.4 Student Quarterly Report Card Grades 2014-2015 Academic Year

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Mean
Student 1	73	60	70	78	70
Student 2	71	72	81	71	74
Student 3	81	85	80	76	81
Student 4	85	87	85	86	85
Student 5	84	76	67	83	80
Student 6	83	75	75	68	75

Table 4.4 represents Student Quarterly Report Card Grades and their final average. This includes homework, quizzes, projects, and tests. There were four different reporting terms. The

purpose of this table was to track student performance over the year. Student 1's report card grades were: 73, 60, 70, 78, and 70. Their final average for fourth grade was a 70. Student 2 received a 71, 72, 81, 71, and 74. Their final average was a 74. Student 3's report card grades were an 81, 85, 80, and a 76. Their final average was an 81. Student 4 received an 85, 87, 85, 86 and their final average was an 85. Student 5 scored an 84, 76, 67, and an 83. Their final average was an 80. Finally, student 6 received an 83, 75, 75, and a 68.

Table 4.5 Student Performance AIMS Web

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	Growth
Student 1	6	6	6	5	4	6	7	7	9	+3
Student 2	5	6	6	7	5	6	7	7	7	+2
Student 3	10	12	11	10	10	11	11	12	12	+2
Student 4	9	10	10	10	8	9	10	10	11	+2
Student 5	6	6	7	7	6	7	8	9	10	+4
Student 6	5	6	6	10	10	11	11	11	12	+7

Table 4.5, Student Performance on AIMS Web, represents the number of problems performed correctly and was collected by the researcher monthly. Students were given 8 minutes to complete as many problems as possible. As the table shows, 100% of the students made gains. Student 1 went from solving 6 problems in September to solving 9 problems in May, thus realizing a gain of +3. Student 2 went from solving 5 problems in September to solving 7 in May, realizing a gain of +2. Student 3 went from solving 10 problems in September to solving 12 problems in May, thus realizing a gain of +2. Student 4 went from solving 9 problems in September to solving 11 problems in May, thus realizing a gain of +2. Student 5 went from solving 6 problems in September to solving 10 problems in May, thus realizing a gain of +4.

Student 6 went from solving 5 problems in September to solving 12 problems in May, thus realizing a gain of +7. In all, Table 4.5 displays student growth on AIMS Web throughout the school year.

Table 4.6 Student Performance on 2015 ACT Aspire

Student 1	Ready
Student 2	Close
Student 3	Close
Student 4	Ready
Student 5	Close
Student 6	Close

The final table, Table 4.6, displays Student Performance on the 2015 ACT Aspire. In May the students took this timed 55 minute test. Before the test, the teacher reviewed the entire curriculum covered throughout the school year. As stated in table 4.6. The students performed in the ranges from *Close* to *Ready* this can be converted to a *Not Met* and *Met* score in comparison to PASS. Student 1 scored *Ready*, student 2 scored *Close*, student 3 scored *Close*, student 4 scored *Ready*, student 5 scored *Close*, and student 6 scored *Close*. Therefore, student 1 and 4 would scored a *Met* on PASS and students 2, 3, 5 and 6 would have received a *Not Met*.

Chapter 5 Discussion

Summary

The purpose of this research study was to determine if providing extra student support in the area of math would increase student achievement. After a survey, one hundred percent of teachers at Harbor View Elementary believe a math interventionist should be available for students who struggle in math. Six students were selected for this study based on their 2014 PASS Math scores. Data was collected throughout the year by MAP, curriculum pretests, post tests, IXL and AIMS Web along with small group observations. The results are organized and displayed in tables that provide the reader with valuable information relative to the students' learning and progress.

Conclusions

When looking at the data, the teacher/researcher perceives growth. In many of the tables there is a representation of an increase of knowledge and retention. Most of the students struggled with rounding and identifying the various number forms. The teacher/researcher observed students struggled with regrouping and borrowing across zero. Judging from pre-assessments students struggled with basic facts in multiplication and division. The students also had trouble memorizing multi-step processes. The teacher used acronyms and songs as a way to make the information repetitious for the students. The teacher also sent home extra practice for the students to complete for a treat on Friday's. Most of the students struggled with the

application and with being able to transfer information from a chart to their own paper. Fractions and decimals were introduced and this concept proved to be one of the hard ones for the students. Students had trouble grasping the concept of parts of a whole and tenths and hundredths. The last two units involved memorization and spacial reasoning; students did well with memorizing different shapes and formulas for perimeter and area. Student performance on unit assessments was used as a tool to track students' strengths and weaknesses. Student 1 displays the most understanding in place value but struggled with patterns. Student 2 did well with geometry and fractions but struggled with multiplication. Student 3 performed well with division but struggled with place value and decimals. Student 4 passed every test and received a B average. Student 5 performed the best in division and struggled the most with fractions. Student 6 performed high in the second part of the year with A's and B's but performed poorly with division and place value. The report card correlation is similar to the student's unit tests. The teacher/researcher acknowledges increases and decreases relative to a particular skill.

When the students took AIMS Web, the teacher observed students making careless errors due to the time constraint, however, gains were present. The ACT scores showed two of the students performing as *Ready* which is similar to a *Met* score on PASS while the other four students scored *Close*. Again, most students did not perform well because of the time restraint. Students had to complete 31 problems in 55 minutes and complete written responses. This does not compare to PASS because the Palmetto State Standards Assessment was not timed. Although the goal was to have all the students meet *Met* there was a different test given so comparisons may be skewed. The most influential data the researcher collected was the seasonal MAP scores because one hundred percent of the students showed growth. This in itself should speak loudly. MAP scores are reliable and show growth for each child.

Recommendations

The following recommendations for further research are made:

1. There is a need to conduct research on intervention effects on male and female ability in math.
2. This study should include student behavior.
3. This study should include student attendance.
4. This study should include student socio-economic status.

Limitations

One limitation of this study was the end of the year assessment changed from the previous year. South Carolina's State Department of Education has no consistency. For the researcher to conduct an effective study there needs to be reliability of assessments.

Impact on Education

This research proves to be effective. As a result of this study, one hundred percent of the students made gains in mathematics from receiving small group interventions. Charleston County needs to provide a math interventionist for every school.

Works Cited

AIMSweb. (2011). "Nevada Elementary School students take achievement to new heights; school earns coveted Blue Ribbon status after turning to AIMSweb and RTI. *Pearson*, pp. 1-2. http://www.aimsweb.com/wp-content/uploads/AIMSweb-Case-Study_Helen-M-Smith-CCSD.pdf

Buffman, Austin. (2010, October). "The why behind RTI" *Educational Leadership*, pp. 10-16.

Frost, Robert. (2003, January). "Revelation" *Poem Hunters* http://www.poemhunter.com/poem/revelation/

Guskey, Thomas. (2010, October). "Lessons of mastery learning" *Educational Leadership,* pp.53-57

Hockett, Jessica. (2014, January). "Turning on the lights: what pre-assessments can do" *Educational Leadership*, pp. 50-54.

IXL. (2014, September). "Testimonies" www.ixl.com/testimonials/math

Medoff,Lisa. (2013, September). "Getting beyond I hate math" *Educational Leadership*, pp. 44-48.

NWEA. (2012, May). "Mt. Vernon Schools empower students and teachers to succeed by partnering with NWEA" District level bench and growth marking, pp. 1-2 https://www.nwea.org/resources/district-level-benchmarking-growth/

Scherer, Marge. (2014, March). "The assessor's art*" Educational Leadership*, pp. 7

Taylor-Cox, J. (2009*). Math intervention: Building number power with formative assessments, differentiation, and games, Grades 3-5* pp. 1-5. Eye on Education.

Wiersma, W., & Jurs, S.G. (2009). Research and Methods in Education (9th ed). Boston: Allyn and Bacon.

Appendix A

Teacher Survey

Do you think a math interventionist would be beneficial at HVES to service students without IEP's who need extra support in math? Circle your choice. If no, explain.

Yes No

Student Survey

Open-ended question

What feeling do you get then the teacher says, "Now take out your math books?"

_____

_____

Rating scale

Math is fun to learn.	Agree	Not sure	Disagree
Math is challenging.	Agree	Not sure	Disagree
Math frightens me.	Agree	Not sure	Disagree

Appendix B

Student Letter

Dear parents,

My name is Ms. Ulichnie and I am a 4th grade teacher at Harborview Elementary. Your child has been selected to receive extra support in math during the school day. Math small group will meet on Monday's from 2:00- 2:30. My goal is to provide extra practice for the students while building their confidence in mathematics. We will be reviewing curriculum from their classroom while spiraling material throughout the year. By signing below you acknowledge their participation. Thank you; I can't wait to see their growth!

_____ Staci Ulichnie

Signature