

Increasing and Retaining Support for
Ninth Grade Block Intervention Classrooms

A Special Project

Presented to

Dr. Robert Kraig

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of the Requirement for the Degree
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Cindy L. Rogich

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FACULTY APPROVAL

Increasing and Retaining Support for
Ninth Grade Intervention Classrooms

Approved for the Faculty

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ABSTRACT

Increasing and Retaining Support for Ninth Grade Block Intervention Classrooms

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Yelm Middle School, a grade seven, eight, and nine school, instituted a block format intervention classroom for highly capable, low motivated students in an attempt to meet state standards and avoid being sanctioned under the No Child Left Behind regulations. Students from a traditional classroom and the intervention classroom were surveyed and Pre and Post tested using Measure of Academic Progress (MAP) to determine the significance of improvement in Algebra 1A. The results of this project showed a slightly higher improvement in the traditional classroom. The researcher concluded that the students in the intervention classroom did not show a higher percentage in grade level achievement than the students in the traditional classroom and that additional study is necessary.

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CHAPTER 1

Introduction

Background for the Project

Washington State standardized testing (WASL) has evolved over the past several years. The cause of the evolution was the lack of significant measurable progress in student's mathematics scores, especially at the middle and high school level. Middle level schools throughout the state were failing to meet the state standards in mathematics.

In 2002, Congress passed the No Child Left Behind (NCLB) Act in order to insure that all student academic needs were addressed and that all students met standard. Each individual school, as well as the districts, must meet Adequate Yearly Progress (AYP). Progress was calculated from the results of the State standardized tests. The schools not meeting AYP were offered various stages of assistance from the federal government.

Study results were released in 2006 by the Editorial Projects in Educational Research Center, a non-profit organization located in Bethesda, Md. It revealed that freshmen were more likely to fail a class or be suspended than upperclassmen, hindering their ability to meet standard and graduate on time. The study revealed that more than 30 percent of high school students quit prior to

graduating and in most states the greatest share of loss of academic success occurred in the ninth grade.

In a proactive effort to address student needs, Yelm Middle School (YMS) added a ninth grade intervention classroom to the master schedule. This classroom was established for students who did not meet Washington State standards in mathematics, failed eighth grade mathematics, and did not qualify for other support services. The classroom served 17 freshman students in a block format. The schedule included Algebra 1, Physical Science, and English in the same classroom, reducing passing times and disruptions. Differentiated instruction for ELL students, and a variety of grade level skills in reading and writing was offered, as well as the integration of technology into the discipline areas of Science and English.

The class was staffed with a full time instructor and an instructional assistant who provided additional one on one instruction as needed. Over the previous four years a trend emerged that the majority of the students, who agreed to attend the intervention classroom format were visual and/or kinesthetic learners. To accommodate these learning styles, some classroom assessments were conducted through demonstration and presentation, in addition to traditional means.

Statement of the Problem

An unacceptable number (49.4%) of Yelm Middle School (YMS) eighth grade students either failed math classes and/or did not meet standard on the WASL, taken in April 2008. In addition, YMS had a no retention policy. Among this group of eighth graders, most did not qualify for support services, Special Education (SPED) or Learning Assistance Program (LAP). Underachievement in mathematics was not unique to YMS students. The Spring, 2008 State Report Card of WASL scores showed only 51.8 percent of statewide students, who completed the mathematics assessment, met standard.

According to *The Final Report of the National Mathematics Advisory Panel*, published by the U.S. Department of Education in Washington, DC, 2008:

The sharp falloff in mathematics achievement in the U.S. begins as students reach late middle school, where, for more and more students, algebra course work begins. Success in mathematics education also is important for individual citizens, because it gives them college and career options, and it increases prospects for future income. A strong grounding in high school mathematics, through Algebra II or higher correlates

powerfully with access to college, graduation from college, and earning in the top quartile of income from employment.

In order to support their transition from eighth to ninth grade and prepare them for high school upper level mathematics courses, college, and a career, YMS offered a group of students an intervention classroom with a block schedule, smaller class size with a maximum of eighteen students, and a full time teacher along with an instructional assistant. The goal of the intervention classroom was to provide students with an opportunity to make significantly greater gains in skill/grade level concepts as measured by the Measurement of Academic Progress (MAP) test in preparation for taking and passing the tenth grade Mathematics WASL.

Purpose of the Study

The Washington State education standards required that all students meet standard as measured by the 10th grade Washington Assessment of Student Learning (WASL) in mathematics, reading, and writing as a requirement for high school graduation. One hundred twenty seven Yelm Middle School students, approximately one-third of the Class of 2012, did not meet standard on the April, 2008 WASL. An administrative decision was made to target students within this group who scored above 350 on the WASL, but less than the 400 needed to pass.

In theory, this group was most likely to be able to pass the tenth grade Math WASL with intervention. Factors, such as attendance, discipline referrals, and the level of parental involvement throughout the seventh and eighth grade years were also considered in the selection process. Thirty students were invited to attend the block format classroom with seventeen accepting.

The purpose of this study was to determine whether a ninth grade intervention classroom environment that integrates reading into mathematics curriculum provides enough assistance to result in an increase in test scores for struggling students in Algebra I. In addition to formative assessment, students would take summative assessments in the Fall, Winter, and Spring to monitor growth in conceptual understanding and mastery. The Measure of Academic Progress (MAP), a computer based assessment was used for this purpose. The students and parents also agreed to register for and take the tenth grade WASL, as freshman, for diagnostic purposes.

Delimitations

This project was delimited to thirty nine ninth grade students at Yelm Middle School, Yelm, Washington. Many of these students failed eighth grade math and did not meet standard on the WASL in the 2007/08 school year. Two groups of students were surveyed, as well as pre and post tested by Measure of

Academic Progress (MAP) testing. One group of twenty one students was in a traditional Algebra I classroom setting with transitions to the other disciplines of English and Science. The other group of seventeen students was in the intervention/block classroom for Algebra I.

All students took Algebra I in the 2008/09 school year at Yelm Middle School. Both teachers used the same district adopted Algebra I curriculum, Prentice Hall Mathematics Algebra I, 2007 edition.

Assumptions

The ninth grade intervention group classroom was staffed with a full time certified instructor, endorsed in Mathematics and a full time instructional assistant. Instruction of two of the intervention classroom students included an online computer version of the district adopted math curriculum. The instructional assistant, highly skilled in mathematics and technology, monitored the progress and time schedules of the students doing online work. In the smaller intervention classroom students were monitored closely by observation and one on one daily contact to check for understanding and ability to demonstrate knowledge of concepts. In particular, math story problems were difficult for all the intervention classroom students. An emphasis was placed on reading in mathematics, which included searching for context clues, word structure and origin, vocabulary

meanings in relation to mathematics, and learning to eliminate unnecessary information that did not relate to solving the problem. Critical thinking skills building in logic and reasoning was practiced daily.

In the larger traditional classroom with one instructor, students were not as willing to ask for help when they had difficulty with a concept. There was also potential for a struggling student to be overlooked during instruction and practice in the classroom if they are sitting on the perimeter of the room, particularly near the rear of the class. This was due to small classroom square footage and the number of students, and furniture in the room making it difficult to maneuver throughout the classroom to monitor individual student understanding.

Individual deficiency of certain concepts, such as division and factoring which hindered the student's performance in Algebra was apparent in a similar number of students in each classroom. These deficits were identified in the beginning of the year MAP pretest, and a review of concepts was done in whole group and individual instruction. Further, none of the students qualified for Learning Assistance Programs (LAP). There was a daily study hall available for all the students to voluntarily seek assistance for thirty minutes prior to the start of the school day.

It was assumed that each student did their best on their daily assignments and assessments. It was assumed that the instructors followed the curriculum in a spiral or scaffolding method and at a pace that students could grasp and in time master the concepts.

It was assumed that the environments were similar. Both classrooms were all in good condition, located on the YMS campus, and had appropriate support material available. Temperature and lighting were similar and suitable for a learning environment.

The researcher acknowledges that a small percentage of students may experience test anxiety or otherwise have a “bad testing” day when taking the Fall or Winter MAP tests. The scores of students who only completed one testing window, either Fall or Winter, were not included in the study results.

Hypothesis

Ninth grade students in a block schedule that includes a language imbedded discipline, such as English or Science, will show higher growth in the understanding of mathematics concepts of number sense and word problem solving, as measured by MAP testing, than students not on a block schedule. Students will perceive improvement in math instruction through an integrated

reading and language intervention, using a block schedule configuration as reported on a survey.

Null Hypothesis

Students will not benefit from a block schedule intervention classroom with integrated reading and language and mathematics instruction. Ninth grade students in a block schedule will not show higher growth in mathematics concepts of number sense and word problem solving, as measured by MAP testing, than students not on a block schedule.

Significance of the Project

The purpose of this project was to provide a factual base of information regarding the effectiveness of Algebra I intervention classes for ninth graders at Yelm Middle School to determine if a language embedded instruction method would effect student achievement in mathematics as evidenced by pre and post tests using MAP.

YMS must continue to show growth in mathematics scores in order to meet State standards and avoid the sanctions of not meeting Adequate Yearly Progress as outlined by Federal guidelines. By using the recommendations from the Department of Education's Advisory Panel 2008 Report, the instructors

adapted their instruction to meet individual student needs, while adhering to the State standards and the district adopted curriculum.

Procedure

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

1. Permission to conduct research at Yelm Middle School and publish the results was granted by Lorene Rang, principal. (See Appendix)
2. A survey was created to analyze student perception of skills in Mathematics and administered to each class in September, 2008 and in January, 2009. (See Appendix)
3. A MAP pretest was administered to thirty four ninth grade students in two Algebra 1 classrooms in September 2008 by Cindy Rogich, and Lindsay Welsh.
4. In both classrooms, the students were instructed during the study period, using the scaffolding method of instruction, differentiated instruction to meet grade levels and learning styles of the students, and administered in class assessments.
5. A MAP posttest was administered to same students in January, 2009, by the same instructors.
6. An analysis of the difference in test scores was conducted by the researcher from the MAP results Teacher Reports.

Definition of Terms

No Child Left Behind – Federally mandated education reform law.

Washington Assessment of Student Learning – Washington State

Standards Assessment

Measure of Academic Progress – Summative Assessment taken on computer.

Nine Characteristics of High Performing Schools – Report generated to distribute results of research to determine the characteristics of schools with high percentages of students successfully meeting or exceeding state standards.

Heuristic – Multi-method approach to problem solving using logic and reasoning.

Acronyms

NCLB – No Child Left Behind

AYP – Adequate Yearly Progress

MAP – Measure of Academic Progress

OSPI – Office of Superintendent of Public Instruction

WASL – Washington Assessment of Student Learning

NCTM – National Council of Teachers of Mathematics

EALR – Essential Academic Learning Requirements, Washington

State Standards

GLE – Grade Level Expectations, Washington State Standards

YMS – Yelm Middle School, Yelm, Washington

CHAPTER 2

Review of Selected Literature

Introduction

This chapter has been organized around the following topics: (a) High stakes testing and No Child Left Behind, (b) Highly Effective Schools study and interventions, (c) Education reform in mathematics, (d) Heuristic Approach to Algebra, and (e) summary.

High Stakes Testing and No Child Left Behind

Washington State Assessment of Student Learning (WASL) evolved over several years as the assessment of the high standards for education set by the Office of Superintendent of Public Instruction. (OSPI) The cause of the evolution was the lack of significant student progress in mathematics, especially at the middle and high school level. Middle level schools throughout the state were failing to meet the state standards in mathematics.

In 2002, Congress passed the No Child Left Behind Act (NCLB) in order to insure that all student's academic needs were being addressed and that all students meet education standard. Each individual school, as well as the district, must meet Adequate Yearly Progress (AYP), which was calculated from the results of the State standardized tests. The schools not meeting AYP were offered

various stages of assistance from the State Office of Superintendent of Public Instruction following the federal guidelines.

High stakes testing was the result of states setting standards to meet the federally mandated goals of No Child Left Behind. Each state had the task of creating grade level expectations measurable by state standardized grade level tests. When the majority of Washington State students tested below the standard, the A+ commission was formed to study successful schools whose students were meeting standard in reading and mathematics. Armed with this information the State of Washington began the reform effort with an emphasis on improving reading scores. The rationale being, students who didn't comprehend text had difficulty in more than one subject area as evidenced by teachers, and administrators. Teaching strategies and curriculum were reviewed by the district and changes were implemented. In 2004, the A+ Commission for School Improvement was decommissioned and their results forwarded to the State Department of Education as documented in the OSPI website under research.

As reading scores increased, OSPI moved their focus to mathematics reform statewide due to less than fifty percent of students having met standard. Two approaches to mathematic reform were intervention through integration of disciplines and a more heuristic idea of incorporating logic, and critical thinking

into mathematics instruction instead of simply requiring memorization of algorithms. (Sharps) The researcher reviewed standards based studies and practices including L and J Consulting Group, Inc. (2003) Dr. Lee Jenkins offered professional development seminars in how to motivate student learning by graphing and charting continuous improvement, getting to the root causes of educational frustration, and involving students in the entire process of learning. Another useful source was the Heuristic and Algorithmic Processing in English, Mathematics, and Science Education by Matthew Sharps published in The Journal of Psychology, January 2008. This article advocated the researched based approach of actively teaching students contextual real world problems in all disciplines in order to activate the cognitive processing and recall of root concepts and apply them to new situations. Sharps and his team of researchers concluded that, “A student must be able to apply appropriate heuristics to a given problem domain requiring verbal and mathematic skills.” (p. 73)

At Yelm Middle School educational management strategies needed to be replaced by Effective School Leadership, as stated in the OSPI commissioned study published in June, 2007, Nine Characteristics of High-Performing Schools, in order to better identify problem areas of curriculum and instruction, and offer differentiated, culturally sensitive, standards based education to all students.

Michael J Bosse' of East Carolina University, Department of Mathematics and Science Education, (2006) investigated the principles and standards of the National Council of Teachers of Mathematics, NCTM, from an aesthetic perspective. He advocated teaching the beauty of the human achievement of mathematics, along with the concepts.

Yelm School District's Director of Assessment placed more emphasis on identifying individual students who were close to meeting standard but had not passed the WASL. The YMS staff was provided with additional professional development in and out of district in differentiated instruction, Professional Learning Communities, and early intervention strategies.

Highly Effective Schools Study in Washington State

As a result of the passing of House Bill 1209, the Superintendent of Public Instruction, Terry Bergeson, commissioned a research committee to create a resource guide for districts to use as a guideline for decision making regarding improved student learning. In 2007, the Office of Superintendent of Public Instruction's (OSPI) senior researcher G. Sue Shannon prepared and published the 146 page report called *Nine Characteristics of High-Performing Schools*. Included in the report were the subsections: Effective School Leadership, Clear and Shared Focus, High Standards and Expectations for All Students, Curriculum and

Assessment Aligned to the Standards, and Frequent Monitoring of Learning and Teaching.

Literacy was the topic of many studies reviewed. A movement toward “disciplinary literacy” was the focus of an article published in the Harvard Educational Review Spring, 2008, authored by Timothy Shanahan and Cynthia Shanahan. The result of their reviews of literacy studies was, although the reading scores were improving for adolescent students, their literacy hadn’t improved since the 1970’s. While students learned to decode words in the early grades, their skills were not effective when reading specialized text in higher disciplines, “putting them at risk of marginalization when they leave school.” (p56) As a result of these studies, the Carnegie Corporation funded several pre-service teacher-education projects. The project objectives required institutions across the country to challenge the basic literacy curriculum and develop a course that would teach disciplinary literacy. This would include teaching students how to read technical text by involving teachers from the arts and sciences. Each discipline had its own “language”, and it must be taught accordingly. Another form of literacy needing to be taught according to the Shanahan’s was interdisciplinary word usage. For example, it was taught in English class that the use of words such as value or worth could be understood by using context clues. However, when

students encountered the words in mathematics, such as absolute value, referring to a specific concept they had a hard time understanding the meaning of value in another disciplinary context.

English-Language Learners (ELL) found this translation of skills even harder according to Barbara Freeman, Fielding Graduate University and Lindy Crawford, University of Colorado at Colorado Springs. Authors of the article *Creating a Middle School Mathematics Curriculum for English-Language Learners*, pointed out that “Mathematics involves two main types of languages, the language of words (hypotenuse, scale) and the language of symbols (>greater than), variables n or x ...”, (p11) all of which are very challenging to students, but especially to ELL students. Among the most effected were Hispanic students, experiencing a dropout rate of 30% in 2002, four times higher than Caucasian students. (2008)

Education Reform in Mathematics

Since the publishing of the report, *Nine Characteristics of High Performing Schools*, school districts along with assistance from the Office of Superintendent of Public Instruction (OSPI), have explored research based strategies and products that support the goals of assisting all students in meeting standard. In addition, a

renewed emphasis was placed on Professional Development for both administrators and teaching staff to learn and implement the strategies available. One product examined by the researcher was marketed by *From L to J Consulting Group, Inc.* Lee Jenkins, Ph.D. developed a program that emphasized leadership in education rather than management. In his system of education a student was informed the first day of school of the standards and concepts he/she must master by the end of that year. The progress was measured and graphed by both the students and the teacher. The psychology behind his method was that student became engaged and motivated to learn when they could monitor their own progress. Jenkins advocated removing system barriers by driving fear out of the education system, for both, students and staff, unifying people and effective practices. (2003) The intended result was classrooms of students using their imagination and regaining their curiosity for learning.

Eugene Judson and Daiyo Sawada of Arizona State University published a study in December, 2000, indicating middle school mathematics students scored higher in statistical areas when they used what they learned in mathematics class to measure and graph statistical data in a science class. This was a modest action research study on the effects of integration conducted by a middle school teacher after attending the 1997 Arizona Collaborative for Excellence in the Preparation

of Teachers (ACEPT) Physics-Math Summer Workshop. The science instructor collaborated with a math teacher who shared students from one of his science classes. He integrated the use of graphing calculators with probe technology into his science class. He had hoped to show a higher level of mastery in his students by having them use the technology to analyze and interpret data, make inferences about measures of central tendency, and make graphs, charts and tables to represent the data. While his students did not show marked progress increases in Science, they did in their math class. This was a short three week project in which the two teachers collaborated frequently and the end result was a significant grade increase in the experimental group over the control group. The unfortunate outcome documented in this study was the math teacher declined to incorporate the graphing calculators and probe technology into her math class, even though she had attended a short seminar to learn how to use them, citing that she did not consider herself well prepared and didn't want to risk anything going wrong.

Heuristic and Algorithmic Approaches to Problem Solving

Heuristic training was a process of encouraging cognitive reasoning to solve problems through strategies of logic rather than through predetermined procedures, instructions, and steps or algorithms. (Sharps, 2008) In algorithmic

training with embedded language, solutions or desired outcomes were virtually guaranteed. Heuristic training did not always guarantee a solution to a problem because the problem solver may not have been cognitively trained or at a developmental stage to use logic or reasoning. The heuristic training approach encouraged abstract thinking and problem solving.

The Journal of Psychology, January 2008 edition featured research results from a study by Matthew J. Sharps, et al, at the University of California, Fresno, comparing the effects of collegial assessments between heuristically presented mathematics story problems and the algorithmically (calculated) type story problems. The researchers tested the different presentations in Mathematics, Science, and reading comprehension. The results implied that the participants who had been trained in heuristic cognition and reasoning scored higher on the assessments than those using algorithmic problem solving skills. The results were especially evident in the mathematics portion of the assessment leading to the recommendation that heuristic training be incorporated at all levels from elementary to college courses using techniques similar to those of Schoenfeld. (1979)

However, as successful as the study was in showing the positive influence of heuristic methods of problem solving in mathematics, it did not translate to

reading comprehension. It was concluded that more research was needed in the reading comprehension area, as one possible explanation was that reading text relied mostly on inferential skills in interpreting and comprehending text. While a participant may be using heuristic reasoning skills, it was not as easily detected in this study.

Summary

After reviewing the available research, the researcher acknowledged the relevance of teaching English language along with mathematics to encourage better understanding of vocabulary in mathematic context. The method was proposed to increase critical thinking skills into instruction for all three disciplines in the intervention classroom, which was a more heuristic approach to instruction as opposed to memorization.

Middle and high school mathematics at YMS incorporated Student and Family Access to the teacher's grade book as a means for students and care givers to monitor academic progress on an as need basis. In addition, the summative assessment of MAP pre and post testing was used to measure student progress over a semester. The results for each student was placed in their portofolio of evidence and discussed with parents/guardians at the Yelm Middle School Student Led Conferences.

The studies reviewed provided evidence and strategies that were implemented into the intervention classroom to integrate the disciplines of mathematics with English reading and writing. It was projected that students would gain a better understanding of multiple meanings of vocabulary usage by discipline, as well as practicing critical thinking, analyzing, and logic to solve problems.

CHAPTER 3

Methodology and Treatment of the Data

Introduction

The methodology used in this research project was both descriptive and quasi-experimental research of two group comparison. The use of perceptual surveys in September, 2008 and in January, 2009, gave student voice to the research project. The use of the Measure of Academic Progress (MAP) pre and post testing gave the researcher concrete data to compare between the pretest administered in September, 2008, and the posttest administered in January, 2009. The data from students in an intervention block classroom with English embedded in the mathematics instruction were compared with a traditional classroom not taught in a block format.

The participants were ninth grade Algebra 1A students. Thirty six students were able to complete the surveys, and pre/post tests. Seventeen students were in the intervention classroom with language embedded instruction, and 20 students were in a traditional mathematics instruction classroom. Students in both classrooms demonstrated varying grade level abilities, and learning styles.

Initially, the researcher developed a perception survey that each teacher gave to their respective students. Student voice was an accepted and

recommended assessment tool within the Washington State Effective Teaching Standards. Secondly, each class was given a MAP pretest. Both assessment methods were completed in September, 2008. In mid-January, 2009, all participants were given the perceptual survey again and completed the MAP posttest.

Data from the surveys was documented and compared as a measure of perceived growth and to add student voice to the research project. Further, the pre/post test scores were studied from the MAP Teacher Reports printed from the NWEA computer based analysis system. The data from 34 students was reviewed. The change from 36 to 34 was due to student attendance and not completing both pre and post tests.

Methodology

Student summative assessment scores were reviewed at the beginning, middle, and end of the 2007/08 school year by teachers and counselors to establish a list of students of concern to be monitored to insure their individual needs were being met. The results were used to create instruction modifications for advanced instruction, intervention, and remediation, as needed. These assessments were school-wide, and the results were also used to assess measurable growth and make sure all students were at or above grade level for mathematics, language arts and

science. The assessment method used was the Measure of Academic Progress. (MAP) The strand breakdown in the mathematics assessment matches closely with the Washington Assessment of Student Learning. (WASL)

For this project, the researcher chose to use the MAP pre/post tests from the beginning and middle of the year, one semester, to determine whether a language embedded math instruction in an intervention classroom would show a higher percentage increase of student growth in number sense and algebraic sense related to math story problems. These two strands emerged from the perceptual surveys as weaknesses in student mastery of mathematic concepts.

Participants

Participants of this survey were freshman students from Yelm Middle School, Yelm, Washington. (YMS) They ranged in age from fourteen to sixteen year of age. The demographics of the classrooms participants were very similar. Gender split in the traditional classroom was thirteen males and seven females. The intervention classroom consisted of eleven males and five females. Ethnicity distribution was very similar, as well. Between the two classrooms, there were twenty nine Caucasian, two Native American, three Hispanic, and two African American students. The researcher did not get a demographic breakdown for students receiving free or reduced lunch.

Five students were eliminated from the research project due to not completing all surveys or assessments administered. This was due to either leaving or entering the district between the pre/post test periods, or being enrolled, but absent on one of the testing days.

Instruments

Data was gathered in two ways, Math Survey and Measure of Academic Progress pre and post tests. The Math Survey was given in September and January of the 2008/09 school year. It consisted of five questions with a one to five scale for students to rate their skill level, one being strongly disagree and five being strongly agree.

The MAP testing was administered electronically in the computer lab at YMS. Students were given as much time as needed to answer fifty two mathematics questions. It was a graduating assessment, as students answer questions correctly, the level of challenge increased.

The reliability of the data from the perceptual surveys was considered by the researcher as high. Students who completed the survey were speaking for themselves. The degree of honesty, where students answered as accurately as they perceived their abilities to be was considered high. Monitoring students during the survey, the researcher concluded that the students took the survey seriously.

The service provider of the MAP testing program had aligned the test questions to the Washington State Mathematic Standards. The alignment lent a high reliability rate for test scores as a measure of progress due to instruction and the natural developmental level of the student. As the test progressed and students showed an understanding of concepts, the questions gradually increased in level of challenge. The validity of students answering the questions to the best of their ability was also considered high by the test facilitators. Scripted instructions were read to both test groups in the Fall and Winter testing. The tests were given to the two classrooms within 10 school days of each other to minimize the differential of instruction time for both classes.

Design

This study was designed to include student voice through self assessment. A student perception survey was given the second week of school, just prior to the MAP assessment. Measure of Academic Progress assessment was a commercial computer based assessment product that YMS contracted for through Northwest Educational Assessment. (NWEA) This assessment tool was chosen because it was already being used by the administration and school district to measure student achievement. The Teacher Report portion of the assessment results gave a breakdown of the assessment by strands that were aligned to the State standards. It

was a common assessment that could be administered by both teachers in an objective environment, outside both classrooms, in the computer lab. This provided for a consistent testing environment for both groups of students in the study. The variables in the study were the challenge of the MAP test increasing as students showed mastery in the concepts, which was controlled by the student responses to the test questions, and the level of student motivation to do their best on the assessment, which was student controlled.

Procedure

The perception survey was given to the students by their mathematics teachers in their respective classrooms. The testing environment was quiet in both classrooms as students thoughtfully completed their surveys. The testing environment for the MAP testing was scripted and controlled. The computer lab was reserved for the respective testing dates, so no interruptions to the testing process would occur. Teachers assigned student tests in the computers prior to the students arriving in the computer lab. Upon arrival in the lab, students sat at their assigned computer. Scripted instructions were read to the students prior to the start of the assessment. Students began the assessment simultaneously and completed the fifty two question assessment at their own pace. The students who finished earlier than the others sat quietly and read while the others finished.

Individual results were printed for student participants and put in their portfolios so they would have a means to monitor their own progress throughout the year.

Report results were accessed and printed through the NWEA Teacher Reports. These results were analyzed and reviewed by the researcher to complete the study.

Treatment of Data

The data for the perceptual surveys was loaded into an Excel spreadsheet for examination by the researcher. The data for students of each classroom was compared from September, 2008 to January, 2009 to determine if the students perceived a change in their understanding and ability to solve math story problems.

The MAP testing data was calculated and analyzed within the MAP program. An overall score of student ability was given each student based on the number of correctly answered questions. This was referred to as a RIT score. The students were also assigned a RIT Range score based on the graduating challenge of the test based on their increased understanding. A printout, or Teacher Report of the scores of all students in both classrooms was analyzed by the researcher. The scores of the students who participated in both Fall and Winter testing blocks and who had completed both perceptual surveys were loaded into an Excel

spreadsheet. The mean, median, and standard deviation was calculated with the Excel program for each classroom.

Summary

After reviewing both the perceptual surveys, which measured student voice and confidence in their understanding of mathematic concepts and the MAP testing of cognitive development, the researcher concluded that the students in both classes perceived a better understanding of math story problems at semester end. The traditional classroom students showed a higher reported level of confidence than the intervention classroom students. The MAP scores trended toward the same conclusion. The traditional classroom students had a higher percent rate of change than those students in the intervention classroom with the block format and imbedded language instruction.

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.

Description of the Environment

This project was delimited to thirty six ninth grade students at Yelm Middle School, located in Yelm, Washington. Many of these students failed eighth grade math and did not meet standard on the WASL in the 2007/08 school year. Two groups of students were surveyed, pre and post tested by Measure of Academic Progress (MAP) testing. One group of twenty students was in a traditional Algebra I classroom setting with transitions to the other disciplines of English and Science. The other group of sixteen students was in the intervention/block classroom for Algebra I.

All students took Algebra I in the 2008/09 school year at Yelm Middle School. Both teachers used the same district adopted Algebra I curriculum, Prentice Hall Mathematics Algebra I, 2007 edition.

The Measure of Academic Progress (MAP) pre and post tests were administered to all students in the campus computer lab, outside their regular classrooms. The post test for five students in the intervention classroom was terminated early due to time restrictions and students resumed and completed the test the following day. Thirty six students began the study in September, 2008, and thirty three completed the study in January, 2009. Attendance and student transfer were the reasons for the two students not completing the post test or the survey. The results of the one student who did not complete the study was not included in the data analysis.

Hypothesis

Ninth grade students in a block schedule that includes a language imbedded discipline, such as English or Science, will show higher growth in the understanding of mathematics concepts of number sense and word problem solving, as measured by MAP testing, than students not on a block schedule. Students will perceive improvement in math instruction through an integrated reading and language intervention, using a block schedule configuration as reported on a survey.

Null Hypothesis

Students will not benefit from a block schedule intervention classroom with integrated reading and language and mathematics instruction. Ninth grade students in a block schedule will not show higher growth in mathematics concepts of number sense and word problem solving, as measured by MAP testing, than students not on a block schedule.

Results of the Study

The perceptual surveys administered in January, 2009, showed that students from both classes perceived growth in their understanding and being able to solve math story problems. Sixteen students in the intervention classroom participated in the survey in September. For the survey question: I understand and can solve math story problems, 1 strongly agreed, 5 agreed, 7 were neutral, one disagreed and 2 strongly disagreed. In the January survey, the same student's scores increased to: 3 strongly agreed, 8 agreed, 4 neutral, and 1 disagreed. The results of the same survey given to twenty students in the traditional classroom were: 1 strongly agreed, 17 agreed, and 2 were neutral. The January survey of these students revealed: 16 strongly agreed, and 4 agreed.

The MAP testing results for the intervention classroom in September, 2008, showed a mean RIT score of 231.8 with a standard deviation of 12.1. The

January, 2009 test scores rose to a mean RIT score of 233.1 and a standard deviation of 14.5.

The Rate of Change Percentage for the Intervention classroom was 0.005197. As the table below indicates, a number of students showed negative growth. This could be due to the level of challenge increasing as the test goes on. It could also be due to the testing of concepts not yet covered in the instruction. (see Figure 1)

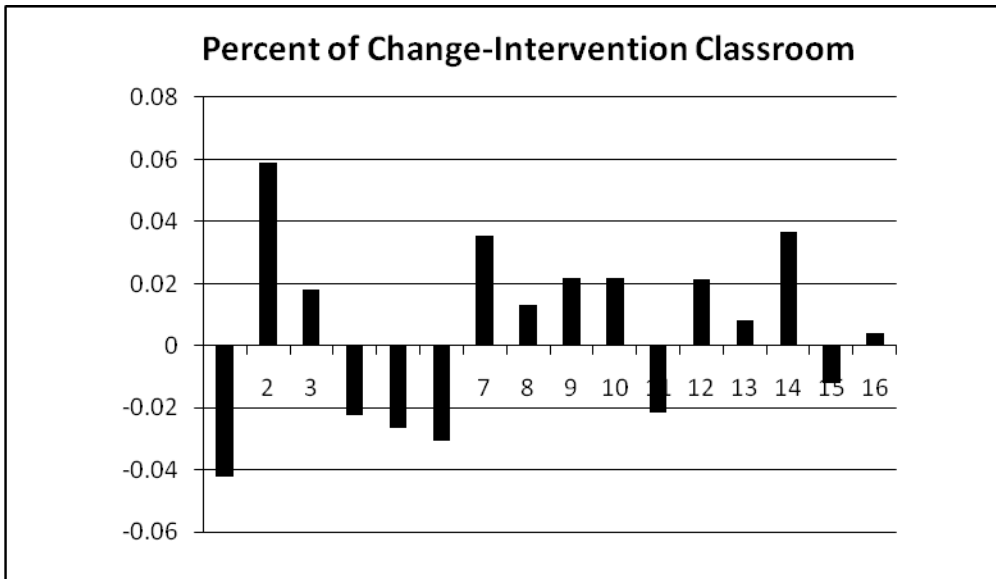


Figure 1

2008/09 Pre and Post Mathematic Test Scores Intervention Classroom

The pre (dark gray) and post (lt. gray) test scores for students 1-16 in the ninth grade intervention block classroom does not clearly indicate an overall increase in test scores between September, 2008 and January, 2009. Six of the student's scores were lower on the post test and one student remained unchanged, leaving 9 students with modest increases. (see Figure 2)

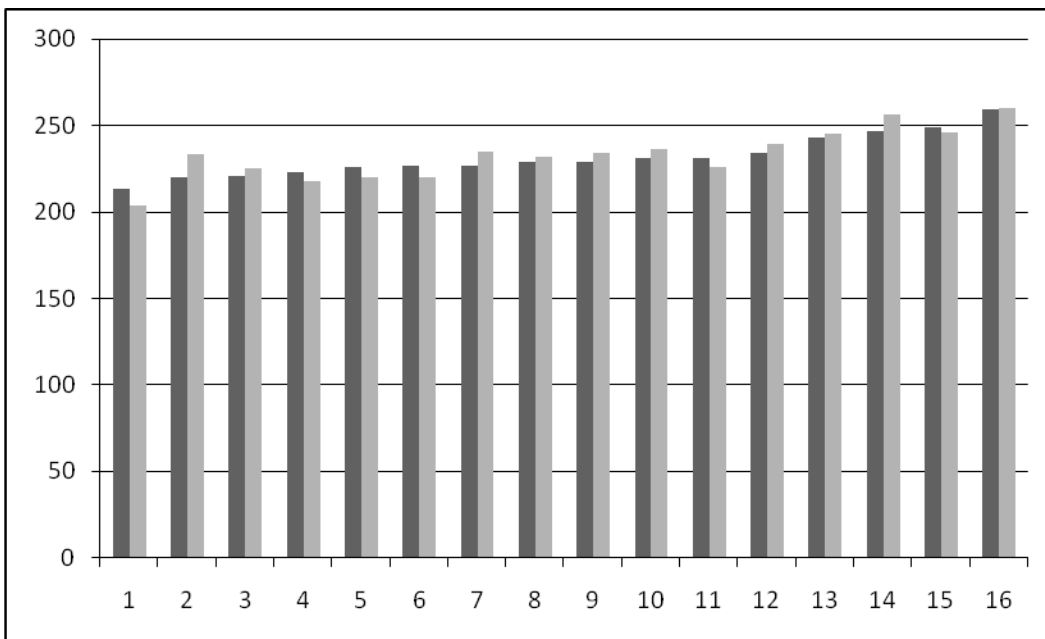


Figure 2

The results for the same testing period for the students in the traditional classroom showed a mean RIT score in September of 242.3 with a standard deviation of 5.4. The students scores increased in the January testing to a mean RIT score of 244.1 with a standard deviation of 6.8.

The Rate of Change Percentage for the Traditional classroom was 0.007602. Fewer students showed negative growth in the traditional classroom, five compared to six in the intervention classroom. However, the graph clearly shows the level of positive growth was higher than in the intervention classroom. (see Figure 3)

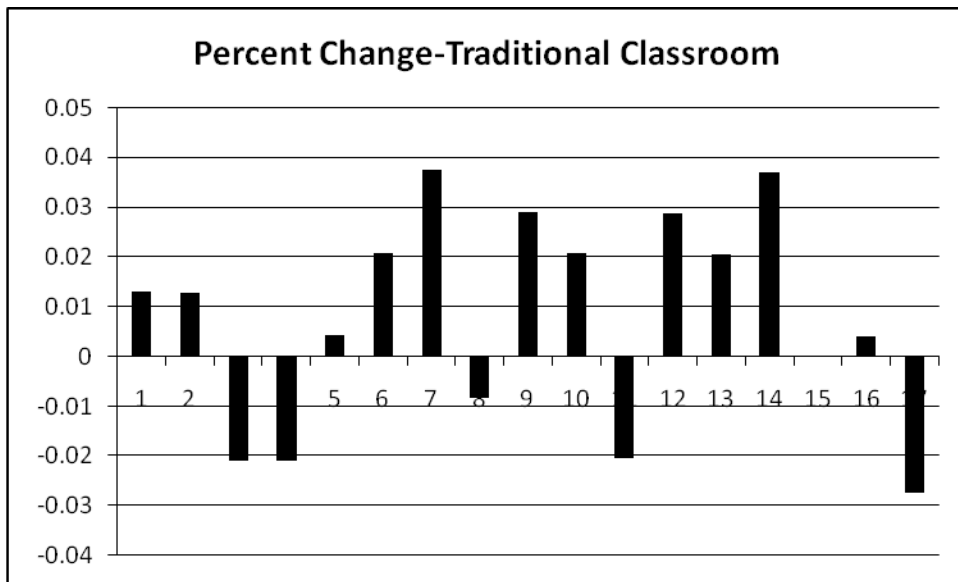


Figure 3

2008/09 Pre and Post Mathematic Test Scores Traditional Classroom

The pre (dark gray) and post (lt. gray) test scores for students 1-17 in the ninth grade traditional classroom does indicate an overall increase in test scores between September, 2008 and January, 2009. Five of the student's scores were lower on the post test and one student remained unchanged, leaving 11 students with modest to significant increase in scores. (see Figure 4)

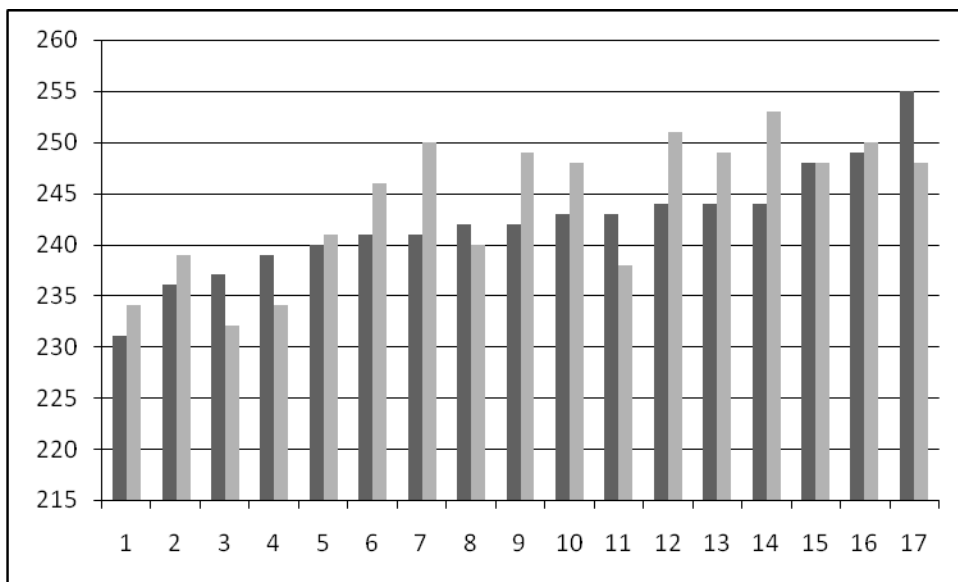


Figure 4

t-Test for Nonindependent Samples

In this two-tailed test of significance, it was assumed by the researcher that all students would show positive measureable growth in mastering mathematic concepts and problem solving. The degree of freedom was limited to 34 students in two groups. While most students in Group B, receiving traditional instruction methods, showed positive growth in skills, Group A, the intervention method of instruction students, showed growth of 0.78 in their t-score. The testing environment and the exam was the same for both groups. The two-tailed test of significance allowed for the possibility for a difference to occur in either direction. (see Figure 5)

Significance of .05

| | t-score | T-Signifneed |
|--------------|---------|--------------|
| Intervention | 0.78 | 2.11 |
| Traditional | 1.46 | 2.12 |

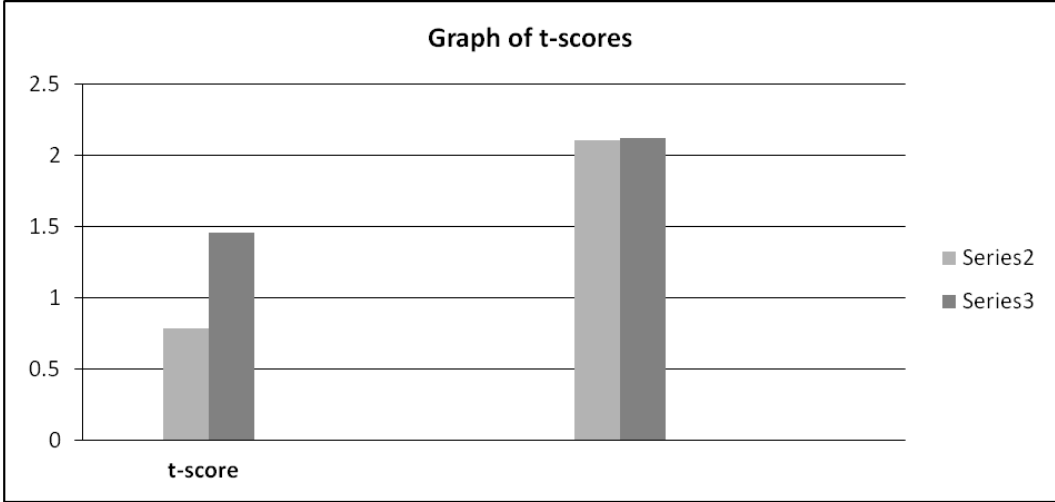


Figure 5

Findings

The researcher was unable to support the hypothesis based on the data analyzed. While the students in both classes perceived growth in the area of understanding and solving math story problems, the traditional classroom students scored a higher percentage of growth, on the MAP post test, than the students in the intervention block classroom. Both classrooms showed about one third of the students showing negative growth, and of the total student growth calculated by rate of change, the traditional classroom showed a positive rate of 0.007602. The intervention classroom's positive growth rate was 0.005197.

Comparing the classes through a t-test, neither class showed significant improvement. At .05, the significance for the intervention classroom should be 2.110, for degree of freedom for the 15 students who completed both MAP tests. The result for the intervention classroom students was 1.25. The students in the traditional classroom with a degree of freedom of 16 students, the score needed to be over 2.120, to be significant. Their score was 1.82, although not significant, the data indicates good improvement.

Discussion

Although, the students in the intervention classroom did not show significant improvement in this short study, the researcher would recommend tracking these

students for another year or two for indications of improvement of reading and language skills and compare their mathematics tenth grade WASL results with their peers. It could be that some of the students in the intervention classroom were behind grade level in reading which could have been a factor for non significant improvement on language based math story problems. In the Sharps study of Heuristic and Algorithmic Processing in English, Mathematics, and Science, reading comprehension was cited as a concern among low performing students.

While all students received standards based instruction and assessment following the State of Washington Grade Level Expectations and Mathematics Standards, the students in the intervention classroom had the advantage of more one on one assistance, development of relationships with the instructor and instructional assistant, and offered “reteach” and “retake” opportunities when the standards were not met, as advised by both the study and publication of The Nine Characteristics of High-Performing Schools, and The L and J workshop by Dr. Lee Jenkins, the student’s scores did not reflect the increased level of confidence they expressed on their perceptual surveys.

Summary

The researcher concluded from the results of the surveys and the MAP pre and post tests that while the students may have benefitted from having the language imbedded block format overall, and particularly with vocabulary understanding, they did not show significant growth in mathematics problem solving. Although, the students in the traditional classroom showed good improvement, their scores on the MAP testing did not indicate significant growth either.

The Measure of Academic Progress testing system is valuable as a diagnostic tool and provides instructors, administrators, and the curriculum and assessment director with information regarding improvement, but the concept of the intervention classroom may need to be reexamined as a solution for students with failing grades and low motivation to learn.

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

The project study was conducted because of the concerns of middle and high school student's failure rate in mathematics as measured by the WASL. The federal legislation of No Child Left Behind has penalties for schools that do not show adequate yearly progress in student scores for mathematics, language, and science. As a result of not meeting standard, Yelm Middle School invited several students with WASL scores just below passing to attend a block format classroom for their Algebra, English, and Physical Science classes.

It was hypothesized that these students, who were receiving concentrated mathematic along with language imbedded instruction, and a lower staff/student ratio would show a higher percentage of growth on their Measure of Academic Progress scores than those in a traditional, non block setting. While their scores were certainly closer to grade level than the previous year scores had shown, they

did not show a higher percentage of increase of growth than the students in the traditional classroom.

The parents of all the students in the study gave permission in the fall for them to participate, as freshmen, in the tenth grade WASL scheduled for April, 2009. An unforeseen event occurred during the study period. A new Superintendent of Public Instruction being elected in November, 2008. Due to an unexpected National Economic downturn that occurred simultaneously, one of his first decisions in January, 2009, prior to the MAP posttest, was to eliminate the ninth grade testing window. Only tenth graders were able to participate in the tenth grade WASL in the Spring of 2009. This was a cost cutting measure and a transitional decision based on the move from paper and pencil tests to computer generated testing in the year 2010.

Conclusion

It was concluded that while this was disappointing to the students, parents and teachers, the student's level of work ethic, completion of assignments, and test results would have been similar if the WASL had not been cancelled.

Recommendation

This researcher recommends that further study is done to determine if the intervention method of instruction is effective and whether more than one year of

intervention is required for these students to master the Mathematic concepts and problem solving skills.

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Appendices



YELM MIDDLE SCHOOL

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Fax: 360.458.6122

Lorene Rang - Principal

Corrina DuRocher - Assistant Principal/Athletic Director

Lorene Rang-Principal
Yelm Middle School
PO Box 476
Yelm WA 98597

Ms. Rang,

I am seeking permission to study and publish the Measure of Academic Progress (MAP) results of two ninth grade Algebra 1A classrooms at Yelm Middle School. The purpose of the study is to examine and determine if students in an intervention block format classroom will show significant improvement in mathematics MAP scores on their as compared to a traditional classroom.

I have contacted Lindsay Welsh, who has agreed to participate in the study representing students in a traditional classroom setting. My class of students in Success House will be the other study group representing the intervention block setting.

The results will be published without indicating individual student names or student numbers. The scores will be run through a statistical analysis in the form of a t-Test to determine if significant growth has taken place between the fall, September, 2008, and the winter, January, 2009 testing period.

This study is being conducted to satisfy the special project and thesis requirement for my Master's in Teaching and Learning through Heritage University in Toppenish, Washington, and taught on the Centralia College campus by Dr. Robert Kraig. Thank you in advance for your support and consideration.

Cindy Rogich
Researcher

Lorene Rang
Principal

Pride - Tradition - Spirit
www.ycs.wednet.edu

Math Survey

Fall 2008/09 Semester One

This survey is being conducted to collect input from students regarding their skills in mathematics at the end the first semester of their Freshman year.

Please circle the appropriate number.

| | | | | |
|---------------------------|--------------|----------------|-----------------|---------------------------|
| 5 | 4 | 3 | 2 | 1 |
| Strongly Agree | Agree | Neutral | Disagree | Strongly Agree |

1. I have mastered 90% or more of the concepts taught in my math class this year.

5 4 3 2 1

2. I have mastered 80-89% of the concepts taught in my math class this year.

5 4 3 2 1

3. I know my Math WASL score from either eighth or ninth grade.

5 4 3 2 1
(If you know your score enter it here: Grade _____ Score _____)

4. I am prepared to enter a sophomore level math class with a review of the concepts I learned this year.

5 4 3 2 1

5. Math is my favorite subject.

5 4 3 2 1

Math Survey

End of Semester One

This survey is being conducted to collect input from students regarding their skills in mathematics at the end the first semester of their Freshman year.

Please circle the appropriate number.

| | | | | |
|-----------------|--------------|----------------|-----------------|-----------------|
| 5 | 4 | 3 | 2 | 1 |
| Strongly | Agree | Neutral | Disagree | Strongly |
| Agree | | | | Agree |

1. I have mastered 90% or more of the concepts taught in my math class this year.

| | | | | |
|----------|----------|----------|----------|----------|
| 5 | 4 | 3 | 2 | 1 |
|----------|----------|----------|----------|----------|

2. I have mastered 80-89% of the concepts taught in my math class this year.

| | | | | |
|----------|----------|----------|----------|----------|
| 5 | 4 | 3 | 2 | 1 |
|----------|----------|----------|----------|----------|

3. I know my Math WASL score from either eighth or ninth grade.

| | | | | |
|----------|----------|----------|----------|----------|
| 5 | 4 | 3 | 2 | 1 |
|----------|----------|----------|----------|----------|

(If you know your score enter it here: Grade _____ Score _____)

4. I am prepared to enter a sophomore level math class with a review of the concepts I learned this year.

| | | | | |
|----------|----------|----------|----------|----------|
| 5 | 4 | 3 | 2 | 1 |
|----------|----------|----------|----------|----------|

5. Math is my favorite subject.

| | | | | |
|----------|----------|----------|----------|----------|
| 5 | 4 | 3 | 2 | 1 |
|----------|----------|----------|----------|----------|