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The Effectiveness of One Week of Remediation for Geometry

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THE EFFECTIVENESS OF ONE WEEK OF REMEDIATION FOR GEOMETRY

A RESEARCH PAPER PRESENTED TO THE GRADUATE
FACULTY OF THE DEPARTMENT OF
OCCUPATIONAL AND TECHNICAL STUDIES
AT
OLD DOMINION UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE
MASTER OF SCIENCE

BY
MARTHA L. HOPKINS
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APPROVAL PAGE

This research paper was prepared by Martha L. Hopkins under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science.

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CHAPTER I

INTRODUCTION

On January 8, 2002, President George W. Bush signed into law P.L. 107-110, the No Child Left Behind Act (NCLB). This nation-wide legislation provided a strategy to champion aspirations to improve academic achievement in failing United States public schools. No Child Left Behind was founded on four basic pillars: “stronger accountability of results, more freedom for states and communities, proven education methods, and more choices for parents” (ED.gov, 2004).

NCLB takes significant steps to promote high educational standards in addition to closing the decades-old “achievement gap” of minorities. American public schools are now held accountable for the academic performance of all students. The implementation of the NCLB act resulted in addressing Washington’s growing concerns for failing public schools and the situation of American youth ill-prepared academically to compete in the global economy of the 21st century. American children need a change; “children who fare poorly in the system of public education-who fail to learn basic math or reading skills or who either drop out of school or graduate unequipped with the skills needed in today’s market” are being reduced in numbers for academic environments (Borg, Plumlee, & Stranahan, 2007, p. 695).

An alternative to measure academic achievement of students and to hold public schools accountable is through comprehensive standardized testing in core subjects taught in schools, e.g., English, reading, mathematics, science, and history. Student’s academic standardized test scores determine the annual state and school district report cards to inform parents and communities about state and school academic progress (ED.gov, 2004).

The Commonwealth of Virginia's educational system recognized in 1995 the need to ensure that students and teachers in the public school system were meeting academic standards. The Virginia Department of Education accomplished this herculean task by introducing an updated curriculum framework called the *Virginia Standards of Learning* (Johnson, 2001). The emphasis of this framework was to focus the attention of students and teachers on core subject areas such as English, mathematics, science, and the social sciences.

In 1998 the Virginia Education Department created Standard of Learning exams to measure the effectiveness of the new academic framework standards in public schools as well as students' comprehension of subjects taught (Johnson, 2001). Since 1998 standardized testing became the watershed of meeting and enforcing educational standards in Virginia. Upon enacting the NCLB act into law in 2002, the Virginia Department of Education ensured compliance by holding public schools accountable by setting and enforcing educational standards. Standardized testing provided the tools used by the Education Department to measure academic achievement.

Standardized testing assesses students' academic understanding of core content taught throughout the school year. To ensure fairness, conditions in the testing environment are timed and set processes with the same methodology for all tests. Standardized tests are in a multiple-choice question format, which is used to measure problem solving and critical thinking; this format proven to be reliable for most school assessments.

Additionally, students have the opportunity to work out problems on extra paper and then select their chosen answer. "The major purpose of a standardized test is to allow reliable and valid comparison to be made among students taking the test" (Nichols, Glass,

& Berliner, 2006). All students must achieve passing scores for these standardized tests in all core subjects to receive their high school diploma in Virginia.

For Virginia high school students to receive verified credit towards their high school diploma (standard or advanced), they must earn a combination of standard and verified units of credits approved by the Virginia Board of Education. A standard unit of credit for a course is awarded when a student completes 140 clock hours of course instruction and meets course objectives (Virginia Opportunities, 2006-2007).

Students must meet a minimum requirement to graduate from a Virginia public high school by receiving one verified credit in mathematics for a standard diploma or two verified credits in mathematics for an advanced studies diploma. Geometry is among one of the different mathematics credits offered to students. Successfully passing the Geometry SOL test will allow students an earned verified credit for mathematics toward their diploma. However, not all students successfully pass SOL tests. In some cases, it takes students additional attempts to achieve academic success and earn the required credits to graduate from high school.

This research paper looks at twelve students who did not pass their geometry SOL test given in the spring of 2006, even though they passed their high school geometry course during the academic school year. SOL tests challenge students' skills mentally and academically. As a result, Virginia recognizes these challenges to students and offers a Remediation Recovery Program to enhance students' knowledge levels prior to SOL retesting. The Geometry SOL Remediation Recovery Program provided valuable information for remediation recovery for these twelve students as they reviewed topics covered during the school year of 2005-2006 to prepare them to retake the SOL test in the summer.

Virginia requires students to earn a minimum score of 400 on their SOL test to show a minimum academic proficiency in a core subject. A score of 400 equates to understanding 60% of the information tested. When students earn a retest score on their SOL greater than 400 they will receive one verified credit for mathematics towards their diploma. Students have multiple opportunities to successfully achieve a passing SOL test result by their senior year.

STATEMENT OF PROBLEM

The purpose of this study was to explore how remediation affects SOL retake scores in geometry.

HYPOTHESIS

The following hypothesis was developed to guide this study:

H₁: Students who passed high school geometry, but failed the SOL test, will pass the SOL retest after completing the one-week Geometry SOL Remediation Recovery Program.

BACKGROUND AND SIGNIFICANCE

Remediation programs were established for students to retake their standardized tests in public schools if they failed the test, but passed the course in the academic school year in core subjects. Each state provides tailored remediation programs to meet the needs of their students. State remediation programs run during different time frames for example: one-week during the summer, a number of weeks each semester, and throughout the academic school year, or on Saturdays. Remediation programs offered in the public school ranged in comprehensive review of core course material in the

traditional “brick and mortar” classes with instruction provided by teachers. Additionally, instruction augmented with multimedia and computer-based technologies was offered.

Virginia provided one-week remediation programs to retest all core subjects for students to receive verified credits. Students must receive six verified credits for a standard diploma and eight verified credits for an advanced diploma to graduate from high school. Although not mandatory, students who do not pass the SOL tests can enter a SOL Remediation Recovery Program prior to retesting if they meet criteria set by the public school.

However, SOL core remediation programs were necessary and vital in assisting students with additional skills to master core subject content and to successfully pass their SOL retest. Supporting this assertion, a “Washington-based research and advocacy organization concluded that remedial programs can be effective in helping students clear the threshold after one or more failures, but that more research is needed to find out what works best” (Gwertz, 2007).

Moreover, there were no requirements at the state level for evaluation on remediation programs and no past statistics were available (Session 2001). There is a need for research on one-week remediation programs to evaluate present and future needs for remediation programs.

LIMITATIONS

The limitations of this study include the following:

1. The study was based on one high school geometry remediation program in Virginia.

2. The study was conducted with twelve students who failed the geometry SOL test with scores ranging from 325 to 399, but who passed the course for the academic school year.
3. The study was conducted during the 2005-2006 school year, utilizing spring and summer SOL test and retest scores for the twelve students in the remediation program.
4. This research only dealt with the Geometry Remediation Program in one local Virginia high school.

ASSUMPTIONS

The following assumptions were made regarding this study concerning the effects of remediation programs:

1. The data provided by students' scores for the SOL test in the spring did not represent their best attempts; after remediation class each student developed mastery skills to pass the retest.
2. Twelve students voluntarily completed a one-week Geometry SOL Remediation Recovery Program.
3. This was an alternative learning method for students to receive a chance to retake SOL tests in geometry to satisfy Virginia's instruction for remediation in mathematics graduation requirements.

PROCEDURES

The subjects of this study were twelve eleventh and twelfth grade geometry students enrolled in the Geometry SOL Remediation Recovery Program for five consecutive days during the summer. The instruments used for this study were spring 2006 SOL test scores and summer 2006 SOL retest scores. The high school test

administrator provided both sets of test scores for each student to be compiled and analyzed using the t-test for significance comparisons.

DEFINITION OF TERMS

The following definitions are defined to aid the reader:

1. Geometry SOL Remediation Recovery Program – The Virginia Department of Education’s (VDOE) one-week summer program for students to receive practical applications in reviewing content in the Virginia’s public school system.
2. Standards of Learning (SOL) – Test for the state of Virginia governed by the Department of Education, which measures the degree of knowledge that each student must gain for a particular grade level.
3. t-test – “The t-test is used to determine if there is a significant difference between two sample means. Typically, one mean represents an experimental group receiving some treatment and the other mean represents a control group” (Ritz, 2006, Lesson 9, note taking guides p. 1).

OVERVIEW OF CHAPTERS

Chapter I of this research study provides the purpose of the No Child Left Behind Act and the implementation for the Geometry SOL Remediation Recovery Program. All public schools must comply to standardize testing in order to gauge students’ level of core subject comprehension. However, not all students will reach the minimal level of content understanding on their first attempt taking the SOL test. Subsequently, each school is required to provide their own form of standardized remediation programs.

The research problem is to determine whether the Geometry SOL Remediation Recovery Program is effective in aiding students in preparing to pass SOL retests. The

research hypothesis establishes a means to explore Virginia's Remediation Recovery Programs and the effects it has on SOL retest taking for a verified credit in mathematics.

The research was limited to twelve students' performance on the spring 2006 Geometry SOL test compared to their summer 2006 Geometry SOL retest after enrollment into a one-week remediation program in a Virginia public high school. Data were collected from the spring and summer SOL test and retest scores for each student after a one-week remediation program and utilized the t-test for significance comparisons. The definition of terms provides a clear understanding of terms and abbreviations that may not be common to readers of this paper. Chapter I provides an introduction to this research concerning the effectiveness of the one-week Geometry Remediation Program.

Chapter II examines literature related to this study that covers standardized testing, structure of remediation, and present and future assessments. Standardized test development and implementation provides test guidelines in public school systems. The structure of remediation covers different instructional techniques and policies for remediation programs from various states. The assessments provide positive and negative views of different researchers' interpretations.

Chapter III covers the methods and procedures used in this research on the Remediation Recovery Program for SOL tests. These items include population, research variables, instrument design, classroom procedures, methods of data collection, and statistical analysis. The population observed includes twelve selected students. The variables included the Geometry SOL Remediation Recovery Program and the SOL test scores. The t-test was used after the scores were collected to provide the statistical analysis.

Chapter IV provides the findings from data collected from the twelve students. Chapter V is the final chapter in this research project that summarizes the data collected and proposes conclusions and recommendations based upon the findings of this research. This chapter summarizes and concludes with recommendations for both traditional and digital remediation programs.

CHAPTER II

REVIEW OF LITERATURE

This chapter provides a review of literature related to topics on standardized tests, the structure of remediation, and present and future assessments. The covered variables have been significant for remediation programs in the past, are important in the present, and will continue to be crucial in the future.

STANDARDIZED TESTS

Standardized testing assesses the academic performance of the American students in the public school systems. As educational standards in public school systems become heightened to meet growing concerns surrounding the ability of American youth to compete globally, improvement is needed in research and development. It is important for students to have a solid foundation in the arts and sciences taught in today's public schools. Subsequently, the public and lawmakers have increased expectations for better achievement in public education.

Practices and methods in education have evolved and the task of educating today's American youth seems daunting, but the educational achievement gap in public schools can be closed. Among the efforts toward this end is the bipartisan education legislation enacted in 2002, which aims to hold America's public school systems accountable by raising the expectations. Although not the only viable solution to prepare our youth educationally for the future, the No Child Left Behind Act is a federally mandated education policy that requires standardized testing in the public school systems to measure educational performance in our changing technological academic environment.

This legislation provides for the development and implement guidelines for state standardized testing. NCLB requires states to analyze present and past testing results which enable state school systems to determine strengths and weakness in their educational practice. This process allows the public school systems to understand educational shortfalls and reallocate fiscal, instructional, and material resources to address those shortfalls. As a result, “No Child Left Behind...empowers states and local districts to make more decisions with federal funds for goals such as teacher quality, English language proficiency, technology, and after school enrichment” (Fact Sheet, 2002).

Each state is required to establish a policy for standardized testing and guidelines to meet the educational needs of each student and to enable them to master skills in core subjects for progress to the next grade level. Federal mandates by NCLB require states to establish important educational policy guidelines to meet the academic practices and implementation of state standardized testing. According to former Virginia Governor George Allen, “We finally have accountability in the schools for academic performance. We are now measuring our schools based on students actually learning the basics” (Starr, 1998).

Although the initiative to implement standardized testing is a viable measuring tool for holding teachers and administrators accountable for students’ academic achievements, the SOL test has added pressure on the educational process. Some argue that the pressure it places on students, teachers, and public administrators is unrealistic. Furthermore, there are concerns that standardized testing can negatively impact students’ academic performance and thus is not a valid tool to measure comprehension.

There are studies that have evaluated the pressure and significant impact that testing applies to educators and their students. Particularly, “to measure the impact of high-stakes testing pressure on achievement and to account for the differences in testing pressure among the states, researchers created the Pressure Rating Index (PRI)” (Nichols, Glass, & Berliner, 2006, p. 4). The authors have concluded that there is no convincing evidence that pressure leads to any important benefits for student’s achievement.

However, standardized testing does provides valuable feedback to teachers, students, and school administrators concerning the student’s academic comprehension of core curricula introduced to them at the appropriate grade level during the academic year (About Test Scores in Virginia, 2004-2005). Standardized tests are not necessarily a panacea to diagnose specific problems of student’s full comprehension of core grade-level curriculum or the teacher’s technical abilities to educate, but the students must perform during these tests to prove their academic capacities.

There are often debates about the viability and effectiveness of standardized testing throughout many communities. However, most educators recognize and support the use of standardized testing as a measurable standard in the public schools to evaluate the academic achievement and progress of students and the teachers. Standardized testing provides schools with a viable mechanism to adequately evaluate students understanding of core curricula presented to students. The National Education Association (NEA) agrees that standardized tests are useful tools; “when used appropriately and keyed to standards and curriculum they can show performance relative to learning goals” (Standardized Testing, n.d).

Yet, the NEA cautions the overuse of standardize tests. Particularly, they often narrow the focus of the curriculum to the content that is measured and may not

necessarily provide reliable, thorough diagnostic information on students' needs.

However, standardized tests do provide demographics of strengths and weakness within the school system that highlight educational needs. Improvements are required, through attention to resources for instruction, teacher quality, and facilities (Standardized Testing, n.d).

All states have an ongoing evaluation process to aid teachers and administrators in identifying strengths and weaknesses in their classroom strategies. For example, Virginia, like Iowa, provides documentation of strengths and weaknesses to reflect the process for standardized tests. The Iowa Testing Programs (2006) provide standardized tests to improve instructional methods, but they will not replace teachers' observations that are used as important assessment tool in the classroom.

SOL test scores identified a sampling of students' understanding of course material and aided teachers in improving their instructional techniques. Overall, the purpose for standardized testing in the public schools is to collect vital information on students' core subject comprehension and improve school curriculum and instructional methodology in the learning environment (Standardized Testing, n.d).

STRUCTURE OF REMEDIATION

In order to support the academic needs in preparing students for a SOL retest, a view of the structure for remediation programs is needed. Virginia's remediation program guidelines give the schools' principals the authority, responsibility, and flexibility to develop a customized remediation program. This program must meet the needs of a school's students and determine which students are eligible for a remediation recovery program. A reasonable expectation is that each student will be successful on the retake of the applicable SOL after participating in the recovery program. Virginia Remediation

Recovery Instruction (2006) file IKG-R provides guidance on standards, purposes, and target populations for participation in remediation. An example is Virginia's Remediation Recovery Programs for geometry, which offers one-week of preparation to contribute toward the mastery of geometry skills and prepares students to retake the SOL tests for verified credits in mathematics. The content covered in geometry includes properties, measurements, and relationships of points, lines, angles, surfaces, and solids.

The SOL Remediation Recovery Program encourages students who qualify to retake the SOL during the summer. Remediation programs are not offered during regular school hours nor are they intended to augment regular school mathematics courses. Criteria for students to enter the program are based on a SOL test score ranging from 325 to 399 and a passing grade in a core subject during the academic school year. The recovery program environment requires one teacher for a maximum of ten students, with a minimum of ten contact hours for this program. "Programs may occur before, during*, or after school, on Saturdays, and/or over the summer. *Remediation recovery programs scheduled during the school day cannot occur during or replace core instructional time" (Instruction IKG-R, 2006, p. 8). Traditional teacher-to-students classroom instruction seeks to cover practical applications in core subjects. To be sure, public school remediation programs are an important resource to assist students in obtaining mastery of academic skills needed to successfully pass their SOL retest.

PRESENT AND FUTURE ASSESSMENTS

Federal and state governments set policies and provide funding for education. The government expects structures of accountability, while at the same time, empowering the public schools to set educational standards and testing requirements. While many people have opinions of the value of standardized testing - some negative and some

positive - most of these views center around the increased pressure for students to perform well on the standardized tests. Others question whether or not remediation programs offered by the school system are an effective use of taxpayer resources.

Thus, the following questions arise: Is one week of academic remediation a worthy initiative to aid students in successfully meeting graduation requirements by providing them an opportunity to correct academic deficiency and pass a SOL retest? Can students who have been enrolled in a course for a year and failed their SOL test be required to participate in an after school remediation programs that is intended to facilitate their achievement to master competencies for standardized learning retests?

Standardized tests are here to stay and are the way of the future to gauge student comprehension. Students will pass SOL tests and students will fail at their attempts to pass SOL tests. So, many states provide a variety of remediation programs for students who have taken a standardized test but, need additional academic instruction in core subjects. Many will argue the pros and cons of remediation programs and the benefits they provide. Indeed, there are many questions pertaining to the future of standardized testing (Gross & Goertz, 2005, p. 35).

The implementation of states' standardized testing may bring about negative feelings due to the amount of work and time involved, but administrators and teachers envision an improvement in academic achievement. Creating remediation programs increases students' access to verified credits via retake test scores. And as Johnson (2001) stated, while the SOL test will remain, these tests only provide a checkpoint.

Because standardized testing will figure prominently in the future, the need for public school systems to incorporate remediation programs for those students who do not succeed in passing standardized tests will remain as well. Indeed, "remediation is a

major strategy employed by high schools to bring their students up to the minimum state accountability requirement” (Gross & Goertz, 2005, p. 84).

After conducting remediation programs, many teachers have optimistic views for each student who enters the one-week remediation program. Kidd (2006) expected each of the twelve students in his remediation class to pass the geometry SOL retests. Moreover, remediation programs provide a few possibilities to receive verified credits. “An even larger question (not related to testing) concerns the potential mismatch between curricular material and teaching techniques and the impact this could have on some students” (Pipho, 1999). This calls for utilizing traditional teacher-to-students classroom environments and implementing additional aspects of remedial effects including computer-based software.

There are different approaches to remediation programs in mathematics. One researcher, Neal (2004), has developed a program using constructivist pedagogy for 34 students. This remediation program was designed for 11th and 12th grade students who were not successful on their first attempt of the state exit exam. Neal explains: “Topics focused on collaborative learning, cooperative learning, and computer-assisted instruction for a 16-week period” (Neal, 2004, p. iii). Teachers served as mentors as students shared their results with the class; then the teachers met individually with each student to discuss the progress of the lab reports. Evaluation was carried out using a questionnaire for each student at the beginning of the class, on the third and final weeks. Finally, an achievement test, reflecting the exit exam, was mandated to establish mastery of mathematics skills. A sample population of 34 students was utilized for the constructivist pedagogy program and 21 students met the standards as the end results.

States have revised laws to implement remediation programs to improve standardized test scores, California provides an example in that. “California Gov. Arnold Schwarzenegger signed into law Oct. 12 Assembly Bill 347, amending existing portions of the state’s Education Code covering high school exit examinations” (Nagel, 2007). There are questions regarding the future impact these opportunities will have for students. This law provides up to two years of intensive remediation for students who have failed either portion of the exit exam in the 12th grade. “Roughly 90 percent of students do pass the exam, but there remain about 34,000 students from the class of 2006 and 29,000 from the class of 2007 in California who have not passed it” (Nagel, 2007). These students began taking their exam in the 10th grade and need to pass it to receive their diploma. This explains the reason to amend this law.

The public schools systems’ enact policies that are different from state to state, and create standards and requirements that provide accountability. Policies are continuously revised and funding is disbursed as a result of these policies. Both negative and positive opinions are generated by standardized tests and the decisions surrounding the allocation of funds for remediation programs from state to state.

SUMMARY

Chapter II provided a review of literature and covered important variables that affect standardized testing in core subject areas and the implementation of remediation programs in several states. The SOL originated in 1995 in Virginia through the use of examinations to evaluate how well students had mastered their core subjects. The Standard of Learning Remediation Recovery Program provided instruction for students prior to retaking the SOL test, so that they may receive verified credits towards graduation upon their retest. The structure of the remediation classes was examined as

well as the outcome. Past and present assessments of state testing provided academic demographics across the nation. Many people have different views on standardized testing, both negative and positive. Remediation programs were offered during summer school, in the hours before and after school, Saturdays, and even extended past the 12th grade year to provide for proficiency in students' cognitive skills to meet exit exam standards throughout the nation. The government mandates testing for each state to measure the results of remediation programs.

Chapter III will address the methods and procedures that were used to collect data for this study. It will cover the population, research variables, instrument design, methods of data collection, the statistical analysis, and provide a summary. This information presented pertains to the Geometry SOL Remediation Recovery Program in one public school in Virginia from the summer of 2006.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this chapter is to outline the methods and procedures used to collect data. This experimental research presented here examines standardized test scores and the effects of a remediation program. This chapter includes the population of this study, the research variables, the instrument design, classroom procedures, methods of data collection, statistical analysis, and provides a summary.

POPULATION

The population for this study includes the students from a geometry class who passed the course, as determined by the teacher's evaluations, but failed the state's standardized geometry test. The only students not allowed to attend the remediation class were students who failed the class for the academic school year or scored less than 325 on the SOL test. Twelve students made up the population for this Geometry SOL Remediation Recovery Program in the summer of 2006.

RESEARCH VARIABLES

This study investigated how the remediation program in geometry, an independent variable, influenced twelve students in the eleventh and twelfth grade. Traditional teaching was carried out in a teacher-to-students classroom environment on the subject of geometry for one week. Class began at 8:00 a.m. on Wednesday, July 05, 2006 with a quiz to determine at which point to start teaching. Numerous lectures, worksheets, and breaks continued throughout the week. Each student was allowed to take notes and if needed, study at home. The program concluded on Tuesday, July 11, 2006, with the retest at 10:00 a.m.; the students felt they had mastered the geometry content that was covered. A minimum of 27 accurate answers out of 54 questions on the SOL retest

score was required for a passing score of 401. Virginia's geometry SOL maximum score was 600. This served as the dependent variable.

INSTRUMENT DESIGN

The instrument used in this study was the SOL tests for geometry. The initial test was administered during spring of 2006. The second test was a version of the Virginia Standards of Learning Assessments, End of Course Geometry 2006. Both tests included 54 multiply choice questions on lines and angles, triangles and logic, polygons and circles, three-dimensional figures, and coordinate relations and transformations. A minimum of 27 correct answers for the SOL test resulted in a score of 401.

CLASSROOM PROCEDURES

Students covered the same topics during the academic school year that were covered during the Geometry SOL Remediation Recovery Program. The recovery program was a one-week refresher program. The subject areas covered included lines and angles, triangles and logic, polygons and circles, three-dimensional figures, and coordinate relations and transformations.

Students who entered the geometry class for the academic school year met 90 minutes every other school day. The above topics were covered in even intervals for students to receive the knowledge base in order to apply geometry functions. Students participated in class work and homework throughout the year. In May of 2006, the spring SOL tests were administered to all students in the geometry class.

Twelve students participated in the Geometry SOL Remediation Recovery Program. This was a one-week program for students to reflect upon and improve their weaknesses in geometry functions so that they might retest for a verified credit toward graduation. In July of 2006, the summer SOL retests were administered on the fifth day

of the recovery program to the twelve students. The spring and summer 2006 SOL tests were administered similarly; students were given a 54 questions multiply choice test and were allowed two hours to complete the examination.

METHODS OF DATA COLLECTION

A cover letter for permission to undertake this study and collect spring and summer 2006 test scores was collected, see Appendix A. The assistant principal delegated the collection task to the high school test administrator who provided both sets of test scores for each student. The test scores provided data for the t-test to determine the significant difference between the two test scores.

STATISTICAL ANALYSIS

The data collected were analyzed using the t-test for significance to determine the difference in the test and retest scores. Scores from the regular instruction and the remedial instruction were compared.

SUMMARY

Chapter III has examined the methods and procedures used in this study including the techniques and procedures employed. The population involved twelve students eligible for the Geometry SOL Remediation Recovery Program in Virginia. Research variables were the remediation program for geometry and retest scores. The first and second SOL test scores received by the twelve students were analyzed using statistics to determine if significant improvement was achieved.

CHAPTER IV

FINDINGS

The purpose of this study was to determine if students who passed a high school geometry course, but failed the SOL test, could be successful upon completing a one-week Geometry SOL Remediation Recovery Program. A report of the findings includes the t-test results to determine if there was a significant difference between the spring 2006 and summer 2006 SOL test scores for students who completed the one-week Geometry SOL Remediation Recovery Program in Virginia.

REPORT OF THE FINDINGS

A total of twelve students were identified to attend this remediation program in July of 2006. The test scores for the spring session were: 342, 342, 342, 366, 366, 376, 385, 385, 386, 395, 395, and 396. The summer retake scores were: 362, 371, 371, 400, 411, 362, 388, 428, 369, 366, 413, and 366. While the spring scores show the results of the first test for 2006, the second set of numbers from the summer presents the retest scores for the students who participated in the one-week Geometry SOL Remediation Recovery Program in Virginia.

DATA ANALYSIS

Data analysis indicates that eight of twelve students performed better after completing the remediation program, but only four students scored high enough with a passing SOL retest score. The spring 2006 sum was 4476 and the summer 2006 sum was 4607. The mean for the spring 2006 was 373 and the mean for the summer 2006 was 384. The t-test produced a value of the degree of freedom was 22 and the t-test score was 1.2. With a sample size of 12 scores for both groups, the normal-curve value was 1.717 at the 0.5 level of significance.

SUMMARY

In this chapter the results of this research study were presented for students who completed the Geometry SOL Remediation Recovery Program in Virginia. The remediation program used the traditional school setting of a teacher-to-students training method for the twelve students. The findings section showed that the Geometry SOL Remediation Recovery Program in the Virginia public school system did increase some of the SOL test scores. Eight students improved their scores, but only four received the 400 points or better score needed to pass the test.

Chapter V concludes this research study with a Summary, Conclusions, and Recommendations for further research. Beginning with an introduction, this chapter will precede with a summary of Chapters I through IV. Then, the conclusions will provide detailed data collected to support the research hypothesis. Finally, Recommendations will be made based on the results of this study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter V summarizes information given in the previous chapters with conclusions and recommendations based on the findings of this study. This chapter consists of the following headings: Summary, Conclusions, and Recommendations.

SUMMARY

The purpose of this study was to explore how remediation, as it currently exists, affects SOL retake scores. The following hypothesis was developed to guide this study:
H₁: Students who passed high school geometry, but failed the SOL test, will pass the SOL retest after completing the one-week Geometry SOL Remediation Recovery Program.

This study sought to determine whether or not students would retest successfully after completing the geometry remediation program. Remediation programs are important for students to refresh their knowledge, application, and comprehension on topics presented during the academic school year. This researcher gathered information from twelve students who failed the SOL test with scores ranging 325 to 399 in geometry, but passed the course for the academic school year 2005-2006 in a southeast community of Virginia. The instruments used to collect data in this study were the results from the spring 2006 SOL test scores and the retest scores from the summer 2006. The following test scores were presented with spring scores; summer retake scores are then presented in parentheses for each of the students: 342 (362), 342 (371), 342 (371), 366 (400), 366 (411), 376 (362), 385 (388), 385 (428), 386 (369), 395(366), 395 (413), and 396 (366). T-test was employed to determine the significant difference between the two sets of scores.

CONCLUSIONS

The following hypothesis was proposed for this study:

H₁: Students who passed high school geometry, but failed the SOL test, will pass the SOL retest after completing a one-week Geometry SOL Remediation Recovery Program.

Based upon the collected data, the study indicates that eight out of twelve students achieved a better score after completing the remediation course; however only four students achieved high enough SOL retest scores after completing the Geometry SOL Remediation Recovery Program for a verified credit in mathematics. The t-test score was 1.2. The level of significance at the .05 level was 1.717. Since the t-test score of 1.2 did not exceed 1.717, the observed difference between the means was not significant. After viewing both sets of test scores, the researcher would seem justified to reject the hypothesis and assume that the Geometry SOL Remediation Recovery Program did not help a significant amount of students achieve a passing test score.

This study has shown the positive impact of the geometry remediation program. The study has also shown both strengths and weaknesses of the remediation program and has indicated a need to modify the program to assist the students' needs. Students should be the focal point in order to guarantee that curriculum assists students' needs to achieve passing standardized test scores each year. Utilizing the t-test formula revealed the insignificant results that the Geometry SOL Remediation Recovery Program had on these students.

RECOMMENDATIONS

Based on the findings and conclusions for this study, the following recommendations are:

1. A combination of traditional classroom and computer-based programs are needed for students who have demonstrated a lack of knowledge during the one-week summer program. There are a number of companies that provide off-the-shelf packages with resources for all academic core subjects. For example, a student using a computer-based program can move at his or her own pace repeating topics as needed and reinforcing teacher's lectures. Slavin and Lake (2007) have conducted research on achievement outcomes of three types of approaches to improve mathematic knowledge: curricula, CAI, and instructional process programs. Each of these affected the mathematics programs. The evidence supporting various instructional process strategies was documented. The study covered a time period of twelve weeks of curriculum of various mathematics programs designed to change daily educational performance.
2. A remediation program throughout the academic school year, both during and after school would meet the needs of diverse student population. For example, if students feel the need for extra time in a given geometry area, the student could enter this new program. This would empower the student with self-pacing, self-mastery, and instructor-as-tutor as needed. Hannafin (2002) has conducted remediation evaluation reports on 375 students utilizing the PLATO program for remediation at Central Cabarrus High School in North Carolina. These students had failed the courses required to earn credits for graduation in 1999. Data were collected from the 2000-2001 academic year, including the summer of 2001. This report was geared toward students who failed high school competency exams but were allowed to earn credits required from courses previously failed. PLATO remediation began in January 1999, continued for one semester (in an after school

program), and extended into two weeks during the summer to master 80 percent of the needed curriculum with earned credits. A few students came during school hours; however, they were exceptions. Some seniors used their free period to make up credits they needed for graduation. Students worked at their own pace through a computer-based curriculum of modules with a lab instructor to help facilitate individual progress. This method proved successful; of the total of 370 students enrolled in the remediation program, 320 students earned credits and graduated from high school. Neal (2004) also conducted research that supports this type of remediation program.

3. Finally, a hybrid of one and two above could provide one classroom with two facilitators and computers for remediation sources over the course of the academic school year. This class could open thirty minutes before the start of the first class of the day and end one hour after the last class of the day. This arrangement would cover before school, lunch time, and after school time frames. This research provides examples of successful cases implemented by other states in their remediation solutions with computer-based programs for standardized tests (Hannafin, 2002; Neal, 2004; & Slavin & Lake, 2007).

Overall, this study has answered questions pertaining to the support and need for remediation programs. This information may be beneficial for future researchers and may one day demonstrate a significant change in students who take the SOL Remediation Recovery Program resulting in 100 percent passing scores.

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APPENDIX A

Cover Letter

June 05, 2007

100 North College Drive
Franklin, Virginia 23851

Mr. William T. Lawrence, Assistant Principal
Franklin High School
310 Crescent Drive
Franklin, Virginia 23851

Dear Mr. Lawrence:

I am currently studying for my Master's degree at Old Dominion University, Norfolk, Virginia. Part of my curriculum obligation is to conduct a research project; I want to focus on the effects of the Geometry SOL Remediation Academy class at your school. The data that I am requesting will not be published and will only be used for fulfilling the requirements of the Problems in Occupational and Technical Studies class I am enrolled in.

Standardized tests are affecting each state and I would like to analyze the impact, if any, on the remediation aspect for Geometry. The student population for Geometry Remediation Academy class at Franklin High School, Franklin, Virginia is a diverse group. SOL test scores from the spring 2006 and retest scores are requested to complete my comparative study.

All information will be kept confidential. All I request are matching scores for students from their spring and summer 2006 testing. I do not need student's names if you provided the matched pairs of scores. I will compare the significant of the results from the remediation academy in Geometry when this data is compared. All information will be kept confidential and aggregated data will be reported.

If you have any questions, please call (757)562-5815. Your cooperation is important for this study. Thank you for your assistance in this project and if you have, questions feel free to contact me at home 757-562-5815.

Sincerely,

Martha L. Hopkins