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AN EVALUATION OF THE EFFECTIVENESS OF
THE ACCELERATED MATH PROGRAM AT
MONONGAHELA MIDDLE SCHOOL

By
John F. Schilling

A Thesis

Submitted in partial fulfillment of the requirement of the
Master of Arts Degree
Of
The Graduate School
At
Rowan University
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Approved by _____
Professor

Date Approved May 2004

Abstract

John F. Schilling

AN EVALUATION OF THE EFFECTIVENESS OF THE ACCELERATED MATH PROGRAM AT MONONGAHELA MIDDLE SCHOOL

2003-2004

Dr. Ronald Capasso

Master of Arts in School Administration

The purpose of this study was to analyze the effectiveness of the Accelerated Math Program at Monongahela Middle School in the Deptford Township School District. Monongahela Middle School is composed of 7th and 8th grade public school students, and is the only middle school in the district. Recently at Monongahela, the implementation of technology into the everyday structure has been recognized. Certain programs have been incorporated in the planning and development of lessons and as teacher aides.

The program was being used as the main tool of instruction in 7th and 8th grade Basic Skills classes throughout the school. Therefore, the population being studied includes all students that were enrolled in Basic Skills classes in the first semester of the 2003/2004 academic year.

Data was collected from student's achievement in class and their scores on the Star Math test. Data was compared and analyzed from the beginning to the end of the study. It was concluded that the Accelerated Math program produces effective results for 7th and 8th grade students enrolled in Basic Skills Math classes. The average increase in Grade Equivalent was 2.5. That score demonstrates an increase in over two grades. Many other scores, along with classroom achievement, showed increases.

Mini-Abstract

John F. Schilling
An Evaluation Of the Effectiveness of the Accelerated Math
Program at Monongahela Middle School
2003-2004
Dr. Ronald Capasso
Master of Arts in School Administration

The purpose of this study was to analyze the effectiveness of the Accelerated Math program on 7th and 8th grade students at Monongahela Middle School. Data collection and analysis concluded that the program is effective for students who are enrolled in Basic Skills classes at the middle school.

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Chapter 1

Introduction

Focus of the Study

With the development of technology in schools, districts try to find funding and knowledgeable people that are able to incorporate software into everyday classroom settings. Deptford Township School District has made every effort possible to ensure their schools are technologically up to date and that their staff have the necessary knowledge and resources to use this technology in their classrooms. The district uses the most recent software. Recently, at Monongahela Middle School, computer software programs have been implemented for use as teacher grade books, student attendance records and reading and math instruction. The successful implementation of programs such as Accelerated Reader, have lead to further possibilities. These tools are now everyday methods of teaching used in the building.

Computers are now serious teaching tools in Deptford Township. After examining the positive results associated with Accelerated Reader, administration decided to include Accelerated Math in the school's list of classroom tools. The program has been implemented slowly over the past two years. It is presently being used in all basic skills classes along with some special education classes.

The focus of this study is to analyze the effectiveness of the Accelerated Math Program in its current setting at Monongahela Middle School in the Deptford Township School District. The goal is to develop useful conclusions based on studies of 7th and 8th grade math students and teachers on Monongahela Middle School.

Purpose of the Study

The purpose of this study is to evaluate the effectiveness of the Accelerated Math Program on 7th and 8th grade middle school students that are enrolled in basic skills or special education classes. The study will result in an easily understood report informing teachers, parents, administration, and students as to the success of the program.

Definitions

Accelerated Math: A computer-based system that manages and monitors students' mathematics learning from first grade through calculus.

GEPA: Grade Eight Proficiency Assessment. Eighth grade statewide standardized test.

Renaissance Learning: Creators of reading, math, and writing programs for K-12 students.

Basic Skills Math: Math program in the school developed for students who have scored below a standard allotted by the district.

Educational Technology: The use of updated technological tools in the learning environment. The Deptford Township School District's mission concerning educational technology is to compliment, enhance, and enrich the learning process for all students, staff, and community members by further increasing the integration of technology into all levels of instruction and all levels of operation of its schools.

Limitation of the Study

The study includes 7th and 8th grade students who are enrolled in basic skills math and special education classes that use the Accelerated Math Program. Teachers associated

with the program will also be included in the study. There will not be any political or social influence on the study, however, the success of the study depends greatly on student involvement in the program, along with teacher participation.

This particular study will include opinions from both teachers and students associated with the program. This researcher does expect to have results that will be influenced by biased opinions. The teachers participating in the study are limited to those who will be using the Accelerated Math Program at Monongahela Middle School. Teaching styles and methods will not play a major role in this study, however, overall classroom management during Accelerated Math Classes will have an impact on this study. Also, it should be noted that teachers have their own beliefs concerning the use of technology in classroom lessons, especially math, and this researcher does not plan to persuade those who are opposed. Fortunately, all of the teachers who are participating in the study are extremely professional and highly respected.

The students participating in the study are chosen by their enrollment in a 7th or 8th grade math basic skills class or their presence in a 7th or 8th grade math special education class. Students were placed in these particular classes because of their test scores or their IEP placement. It should be recognized that these students are not being forced to participate and that the use of Accelerated Math is standard for these particular classes.

The results of this study will not be used to generalize conclusions for the rest of the middle school population or other 7th and 8th grade schools. Results will vary among other settings based on variables such as socioeconomic status.

Setting of the Study

The setting for this study is Monongahela Middle School in Deptford Township School District. Those teacher and students associated with the Accelerated Math Program in their classes will be the main population studied. That will include 7th and 8th grade Math Basic Skills classes and all Math Special Education classes in the building.

Monongahela Middle School is comprised of 7th and 8th grade students from the township of Deptford. The school is designed to meet the needs of its diverse student body. The school, which was originally built in 1964, is currently under renovation. The school is comprised of 2 administrators, 40 teachers, 4 other professionals and 4 support staff.

The school has recently incorporated team organization into its everyday classroom instruction schedule. Beginning in 2002, students and faculty were grouped into six teams for a school day of nine periods. Within these teams, a curriculum of literacy, mathematics, science, social studies, foreign language, art, music, study skills, computers, health and physical education are offered. Included in the double period of Literacy is the Reading Renaissance Program.

Also, those students who qualify for advance learning in mathematics are able to take pre-algebra in 7th grade and high school algebra in 8th grade. Another instructional method introduced in 2002 was the weekly double laboratory period occurring in all science classes. This has allowed the school to have a better chance to incorporate hands-on learning into the science classes. Computers have also become a very important resource and tool in the classrooms at Monongahela Middle School. From computer

classes, computer laboratories, math and science classes to art and literacy classes, computers frequently play a major component in the everyday lessons at Monongahela.

Monongahela Middle School represents the sole middle school in Deptford Township School District. Deptford Township, located in the northeast part of Gloucester County, has always been a growing community allowing the school district to play an important part. Many major transportation roads are located in the township, allowing for Deptford to be a desirable place for new housing construction. It is currently the third most populated municipality in the county (26,763) and takes up an area of 17.56 square miles. Approximately 6% of the population consists of senior citizens. This significant population number usually has an effect on school budget votes each year. Deptford is an area with rich history dating back over 300 years. The town is one of the oldest communities in Gloucester County. The first school in the county was located in Deptford Township.

Deptford continues its proud heritage and tradition today. The school district and the community continue to stress a cooperative relationship. Both the town and schools have worked hard to improve and strengthen the education system through renovation and updating technology. Deptford Township School District is the third largest educational system in Gloucester County. That fact, along with the diverse population that makes up the district, keeps Deptford constantly improving. The curriculum provides opportunities ranging from special services to gifted and talented.

Deptford Township School District is comprised of seven elementary schools, one middle school, and one high school. Its educational programs result in students scoring above the state and national norms on standardized tests. The district employs 19 full

time administration, 344 educational professionals, and 195 support staff. Its student population is slowly increasing, with a December, 2002 enrollment of 4,126 students. For the purpose of this study, the enrollment at Monongahela Middle School student population stands at 682 students.

The township government is currently Democratic. Deptford is located in the First Congressional District and the Fifth Legislative District. It has a Mayor and six Council members. In 2000, there were 10,013 households in Deptford Township. The average resident was 37.3 years of age and lived in the township for 13.2 years. The demographics of the township are as follows: Caucasian-83.4%, African American-12.4%, Hispanic-1.7%, and American Indian and other-less than 1%.

The median household income in the township is \$50,147. The median assessment of a home is \$106,000 with residents paying an estimated tax of \$2,957 on a median home. An analysis of the communities' educational background resulted in the following: 20% of the residents have less than a high school degree, 40.4% are high school graduated, 18.2 have some college with no acquired degree, 6.2% have an Associates Degree, 11% have received a Bachelors Degree and 4.2% have earned Graduates Degrees. Unemployment is a noteworthy 5.2%. The majority of the 94.8% employed hold positions in management, sales, or office positions.

For the 2003-2004 school year, the cost per pupil in the district is \$7,528 with 59.8% of the taxes to be paid by the local tax and 39.3% to be paid by the state. In the past, budget elections have been successful in Deptford Township. At one time, seven consecutive tax increases were passed by the community. Just recently, tensions has developed between the townspeople and the school district concerning the school budget.

Since 2000, the school budget was defeated 2 times along with a defeat of a bond referendum. The district was able to pass one budget vote along with a second try at a \$30 million bond referendum. There is a feeling that the community does not rate the education system as top importance. With construction on many of the schools, along with the development of a new, state of the art early childhood center, the district hopes to connect more effectively with the people of the community.

Significance of the Study

Technology in school is more noticeable than ever. School administration makes every effort to find funding that will provide their district with the most recent tools. The success of the Accelerated Reader Program at Monongahela has led to the use of the program in all literacy classes in the school. The significance of this study is to evaluate the effectiveness of the Accelerated Math Program in its present setting at Monongahela Middle School. The use of such programs has become more common. Administrators, teacher, parents, and students will all be interested in the conclusions of this study.

Organization of the Study

The remainder of the study is organized in the following way: Chapter 2 will include a review of related literature pertaining to school software programs and more specifically the Accelerated Math Program, Chapter 3 will include a general discussion of the design of the study and a description of the data collection techniques, Chapter 4 will present the research findings, and Chapter 5 will discuss implications and other conclusions.

Chapter 2

Review of Literature

Introduction

With increased authority in their classrooms, a teacher's responsibility level has jumped dramatically. With this higher level of authority, teachers have been given the opportunity to develop and shape their classrooms to meet the needs of their instructional methods. It has become more common for teachers to meet in school settings to discuss strategies and techniques for successful student learning. In recent years, technology has developed into a more recognized tool associated with teacher instruction. The stress associated with school reform and technology in the classroom is associated with all content areas. However, for the purpose of this study, it is necessary to review the advancements and strategies related to mathematics.

Math teachers seem to be impacted more often when dealing with the effects of test scores or curriculum studies. Math classes have also felt the full impact of the advancement of technology in schools. For years, the goals of educators was to find methods that enable students to handle and perform math calculations and successfully learn the necessary math skills to compete with the rest of the world. Today, math teachers are forced to advance with the changing times and change their methods of teaching the content that really hasn't changed for a long time.

Math History

The historical roots of mathematics incorporate arithmetic, algebra, geometry, and number systems (Bunt, 1976). Many of the concepts associated with math have been

developed through the years of the educational system. Many are under development still at present times. History of math dates back to Babylonian, Egyptian and Greek times. The earliest dated mathematic writings date back to approximately 3000 B.C. Today these engravings can be found on the stone head of the ceremonial mace of the Egyptian king Menes, the founder of the first Pharaonic dynasty. These numbers appear with pictures and prove that man was recording very large numbers and using mathematics around or before 3000B.C. Therefore, the use of math dates back before writing (Bunt, 1976). Anthropological studies reinforce the idea of prehistoric number ideas.

As the intellectual development of people became more advanced and a need for a greater and more structured system of schooling was diagnosed, mathematics became a central point for child conceptual development. As we know, early schools emphasized reading, writing, and arithmetic. Throughout the development of the modern school system, arithmetic has evolved into many concepts in the field of mathematics. There are hundreds of subjects associated with mathematics being taught in classes ranging from Pre-Kindergarten to graduate level college courses.

To stay focused with the problem of this study it is appropriate to stress the advancement in teachings of math throughout recent time. More specifically, the role technology has played in the development of strong, structured math classes. There has been much documented material based on the success of certain strategies, tools, and concepts when related to math classes. However, it must be noted that the goal of all studies, including this one, is to evaluate and challenge the effectiveness of certain math strategies pertaining to student success.

Advancements in the Teaching of Math

Math can be fun, but that is not often the reputation it can receive. There has been much documented collaboration among math educators concerning the development of an effective math teaching curriculum and the activities that should be included. An understanding of how children think and learn has had a major influence in the development of textbooks (Owens, 1993). Theories dwelled on everything from repetition to hands on materials as tools for effective teaching and learning. It wasn't long after the implementation of the calculator in everyday math classes that the vision became known concerning the use of computers in the classroom (Harvard Education Review, 1989). There was a time when teachers were told that they would never have to use a computer in their classroom unless they are teaching computer science. Now, teachers must incorporate computers into daily lesson and use them as classroom aids everyday. The purpose of this study is to evaluate a math program that is being used at the middle school level. Computers will become a necessary resource for the successful math teacher (Papert, 1980). The current movement in math reform stresses the widespread use of computers in instruction (Schifter, 1996). It must be stressed that the use of computer technology in classrooms is a way of testing another possibility to rely the material to students of the 21st century. It would be a major mistake to consider computers *the solution* to the problem if things happen to improve in today's math classes. One must ask the question whether or not computer technology will forever change the methods of mathematics instruction.

Technology in Math Classes

A school district's math curriculum cannot be strengthened by just incorporating the use of computers or using the means of a greatly advertised mathematics software. Teachers, administrators and researchers are now aware that technology does not offer a savior for the weaknesses of a school's math curriculum (Owens, 1993). Actually, the use of computers initially complicates a teacher's life. The success of a child is still related to the overall skill the teacher has in instructing his/her class.

As stated earlier, much has been documented about the use of technology for students and teachers as learning tools. However, most of the research has focused on distance learning. The goal of this study and review of literature is to analyze the effectiveness of technology as a way of enhancing teaching and learning in the classroom environment. To have a positive environment involving technology in the classroom, computer setup must include organization and readiness qualities. Also, most importantly, teachers must have a complete understanding of the technological resources in their learning environment (Levine, 2002). More often, teachers have the technology in their classrooms, they just don't know how to use the equipment. Because of this issue, state governments have included technology into their Core Curriculum Content Standards. For example, New Jersey has included 15 benchmarks associated with the Core Curriculum Content Standards. These benchmarks are intended to guide school districts with their technology plans.

There are those who oppose the use of technology in the classroom, however, that number is dwindling. There is more and more evidence that technology in classrooms makes a positive difference. In Becker & Anderson, 1998, a three-year study examined the relationship between teachers' philosophies and classroom practices pertaining to

computer usage. The study was based on a national survey of 4th-12th grade teachers of all subjects and identified that teacher attitudes and effectiveness were impacted by the successful implementation of technology in their classes. More than 4,100 teachers from over 1,100 schools participated. Hawkins, Panush, and Spielvogel, 1996 conducted an evaluation examining the key factors affecting technology integration in schools across the country. To have effective use of technology, they concluded, there must be coordination at higher levels than the individual schools. The presence of this coordination will help lead to proper and effective use of technology.

There are many possibilities for schools to include computer math programs into their curriculum. If the funding is there, the possibilities are within reach. The latest software enables students to strengthen their skills while teachers can receive immediate feedback. The present programs offer magnificent graphics and gaming features while also meeting today's increasing demands for demonstrating math achievement (Tassler, 2003). The inclusion of technology in the education system is no longer a "new" idea. The use of computers has moved far beyond just assisted instruction in the form of tutorials or drill and practice. Different types of computer software benefit students in different ways. Drill and practice or tutorial software includes software used for computer-based instruction (CBI). It is still fairly popular and revolves around the student interacting directly with the computer as part of the instructional activity (Heinich, Molenda, Russell & Smalldino, 1999). Feedback is usually immediate and students are able to work at their own pace. Another creative use of software is simulation software. Often, real life situations are impractical, too dangerous, time consuming or not available. That is where simulation software comes in to play. It is used by teachers to take the place of a real life

situation. Tool software includes items such as word processing. It not only provides students with a tool for typing papers, it can also give students additional ways to express themselves. Outfitting a word processor with an art tool can do exactly that (Holtberg, 1997). Text can be combined with other forms of media such as graphics and sound through multimedia/hypermedia software. Multimedia helps the reader construct mental models of information presented (Moeller, Hupert, 1997). Students working in groups to create projects by using multimedia often exhibit increased motivation and self-esteem (Bennett, Diener, 1997). Other uses of software include those that allow the use of e-mail for communication and the internet for an unlimited source of information on any topic imaginable.

As we proceed into the 21st century, the social goals for those in education will focus on four essential ideas. Those include developing mathematically literate workers, encouraging life-long learning, providing opportunities for all, and producing an informed electorate (Carlson, 1992). The National Council of Teachers of Mathematics (NCTM) has stressed the need to develop children at early stages in problem solving. According to NCTM, problem solving must be extremely important to school districts when developing math curriculums. Students must actively explore, develop, and justify their findings when participating in math activities (NCTM, 1989). Students are now presented with difficult tests in 4th, 8th, and 11th grade. They are asked to answer multiple choice, single constructed-response, and extended- response questions. Many educators feel that teachers are in need of helpful tools, which could be successful support in allowing the students to gain the needed skills in math. Rapid advancements will continue to reshape the learning environment in schools. Eventually, will be a thing of

the past. Every student will have their own “laptop” computer connected to the school’s network by a wireless connection. Books will be downloaded and monitors will replace chalkboards. The NCTM’s standards have therefore influenced the direction of mathematical instruction (Carl, 1991). Statewide organizations such as the New Jersey Mathematics Coalition and the New Jersey Department of Education have contributed to the development of math curriculum and instruction involving technology..

Literature Relevant to Accelerated Math

For the past decade, schools have spent many millions of dollars on instructional technology with the goal of improving and learning (Branzburg, 2001). Everyone from parents, administrators, to grant and funding agencies, to school boards want to know if it is working. More often than less, schools have to take a defensive approach concerning the effectiveness of their education programs and their spending on technology. The age of accountability is definitely here. Both teachers and administrators must struggle to meet the new standards of the millennium. According to Salpert (2002), meeting the standards is being done by incorporating new and productive programs in to schools using technology.

For the purpose of this study, this researcher feels as though it is important to review some of the recent literature published pertaining to the Accelerated Math Program. There are many types of educational software available, especially in the content area of mathematics. Computer math programs have long helped students refine their skills. They usually include a low-risk environment that offers immediate feedback along with automatic assessment. It is more common to see positive results achieved when students

are associated with a computer managed learning program (Gaeddert, 2001). Some results specifically associated with Accelerated Math demonstrated an increase on the amount of time spent on classroom activities and furthermore, concluded in a better achievement in mathematics for those students (Ysseldyke, Spicuzza, and Kosciolk, 2003).

Accelerated Math originates from Renaissance Learning. It provides teacher with reports on students scores, missed problems, specific objectives and student progress. According to Renaissance Learning, the reports should be used by both teachers and students in a joint effort to identify student problems areas. According to Yamagata (2001), the system works well for reinforcing mathematic skills. This occurs because the program immediately identifies incorrectly answered problems and matches them to the appropriate objectives. It should be a useful addition to a school's math programs only if teachers understand its limitations and if schools can afford the program.

It is important to instill a positive attitude in elementary and middle grades concerning mathematics. According to Sadusky and Brem (2002), Accelerated Math has the capability of raising the achievement and approval level in math class. This was also recognized in urban and Title I schools. The program has the capability of decreasing the amount of teacher paperwork without sacrificing results. Therefore, more time can be spent in the classroom helping students. The program works with existing curriculum by offering different areas of content. There are 31 total report possibilities including class reports that show the progress of the entire class (The Journal, 2002).

The program is being used in Spangdahlem and Geilenkirchen Elementary school in Germany. They are associated with the United States Air Force Base in Spangdahlem,

Germany. Both teachers and students love the program. According to Romero (2001), students really like it because they know what they can do, where they are and it's a challenge. The 245-student school houses kindergarten through sixth grades. They have been using the program since August 2000. Both teachers and administrators see the power of the program. According to one fifth teacher, it helps kids learn better and faster.

Conclusions

Accelerated Math derived from Renaissance Learning. Accelerated Reader comes from Renaissance Learning also. Accelerated Math is an individualized program that let's the students work at their own pace and skill. With this program students are able to move as needed to learn an objective. Those who support the program feel as though this is its major advantage compared to the usual class setup. They feel that in regular math classes it is a disadvantage for those who are advanced. The program works by allowing teachers to give group and individual lessons, printing out personalized assessment for students or the entire class, automatically scoring assignments with immediate feedback and generating the next practice assignment, taking into consideration the objectives already mastered (Renaissance Learning, Inc., 1998). There are those that oppose the use of Accelerated Math as the only means of teaching an everyday math class. Yamagata (2001), feels as though the system works well for reinforcing mathematic skills because it immediately identifies incorrect answers and matches them to objectives, however the program does not aid the student or teacher in identifying the misunderstandings of

mathematical concepts. Teachers also have difficulty in identifying student era patterns due to the multiple-choice format.

Chapter 3

Design of Study

Overview

Research has recognized an increase in the use of computers in the classroom. The impact of computers in the success of an individual's learning has been tremendous. Effective use of technology combined with effective teaching strategies can help reduce any achievement gap.

It has been observed that classrooms using Accelerated Math usually have more activities occurring in a period than traditional mathematics classrooms. Effective teaching using Accelerated Math means the instructor works with individual students or small groups, discusses practice assignments or tests, allows students to progress at their own effective rate, and includes cooperative learning. Through a study of those in the program, this researcher will identify the effectiveness of the Accelerated Math program on students in Monongahela Middle School.

Research Design

The goal of this project is to determine the effectiveness of the Accelerated Math program on a specified group of students at Monongahela Middle School in the Deptford Township School District. Effectiveness and the success of the program will be assessed through analysis of student academic achievement and a computer generated test called the Star Math Test, which is associated with the Accelerated Math Program. Star Math scores represent how students performed on the test compared with the performance of a sample of students representing the nation. The scores represent a look at the

achievement of the group at a specific point in time. It should be noted that the Star Math test scores give only one picture of how a student is doing academically. As with any test, many other factors can effect a student's test scores. The study will result in an easily understood report informing those interested as to the success of the use of the Accelerated Math program at the middle school.

This study will be of special importance due to the recent rise in the use of technology in schools. Administration makes every effort to find funding that will provide their district with the most up-to-date forms of technology. The success of the Accelerated Reader program has led to the use of the program in all Literacy classes. The goal of this researcher was to see if that is the future for the Accelerated Math program.

The purpose of this research is to evaluate the Accelerated Math program, which is currently being used by all 7th and 8th grade Basic Skills students in the building. This research will evaluate the effectiveness of the program through test and interview analysis.

Sampling

It was determined by this researcher that all students who use Accelerated Math in their classrooms were to be included in the study. The purpose of the study was to evaluate the program as to the achievement of those using it in the classroom. It was concluded after an analysis of the total population associated with the program that it was necessary to separate results pertaining to those using the program all year and those who only use the program half the year. For the purpose of this research it should be noted that Resource Math classes use the program all year as part of the everyday math

activities and Basic Skills classes only meet half the year, while using the program as their only means of instruction. The first step was to identify all teachers that will be using the program as their main means of instruction. Therefore, it was concluded that all Basic Skills Mathematics teachers in the building use the program as their main method and tool for instruction. It should also be recognized that only some of the Special Education Resource classes use the program. It becomes more supplemental in Resource classes.

The population for the study was to include all 7th and 8th grade students in Basic Skills Mathematics classes, along with those Special Education classes using the program. The total population includes 178. The time period for the study was the 1st and 2nd marking periods of the 2003-2004 academic year. Although the focus of the study was to analyze the effectiveness of the program associated with student achievement, it was also the goal of this researcher to identify necessary changes in the procedures of the program and to report on the overall teacher approval and acceptance of the Accelerated Math program in their classes.

Data Collection

It was the goal of this researcher to collect data by as many means as possible. Data was to be collected through interviews, analysis of test scores, and research. Data was collected from both teachers and students. For the purpose of supporting final conclusions, data was collected throughout the time-span of the study. Student achievement data was researched and collected with the help other teachers and the Guidance Department.

Student records from last year were studied. These records were used to help identify reasons for placement and as a comparison for end of study analysis. Data was collected and studied at the beginning of the study in an effort to give this researcher an overall review of the subjects and the need for instrumentation. This also occurred at the end of the research period. All staff members associated with the program were interviewed throughout the study. This was to help the researcher identify effective characteristics of the program. The study will result in a structured analysis of the results based on the case study.

Data Analysis

Analysis of staff through interviews was done on an as needed basis and conclusions were then made. The goal of these interviews was to identify any weak spots or negativity amongst those staff members that are using the program. Interviews consisted of questions pertaining the actual Accelerated Math program, along with the procedures and methods associated with implementing the program into everyday classrooms. Teachers were asked to give their opinion as to the effectiveness of the program and whether or not enough training was given in order to successfully use the program in their classes. Responses were analyzed and compared to the expectations of the program. Teacher's data was then grouped in an effort to draw conclusions as to the overall methodology and implementation of the program in the school.

Student achievement data was to be analyzed throughout the study by reviewing updated information, which the Accelerated Math program can report at any time. Student achievement on both the 7th grade Terra Nova test and 8th grade GEPA test could

not be used for this research. Both tests' results are not available until the summer months. Results were calculated and conclusions had to be made long before test results would be received by the school district. Final assessment on student achievement in the program was concluded through analysis of the Star Math Test results.

Conclusion

Time, effort and support are all components that are necessary when a school adopts a program into its classes. The goal of this study was to identify those characteristics in an effort evaluate the effectiveness of the Accelerated Math program in Monongahela Middle School in Deptford Township. Research was collected from staff through interviews and observations. Data was collected from students through their achievement in class and on the Star Math test. Questioning of staff was used to identify any weak components of the program in an effort to strengthen the program for the future. Student data was collected and analyzed by comparing and contrasting achievement of objectives in classes along with scores on the Star Math test. The Star Math test was given at the beginning of the school year in September and again at the end of the semester (marking period #2) in February. Scores were analyzed using the following methods:

*Grade Equivalent (GE) scores range from 2.0 to 12.9+. They represent how a student's test performance compares with that of other students nationally.

*Percentile Rank (PR) score compares a student's test performance with that of other students nationally in the same grade. It ranges from 1 to 99 and indicates the percentage of students nationally who obtained scores equal to or lower than the score of a particular student.

*Normal Curve Equivalent (NCE) is similar to Percentile Ranks, but they are based on an equal interval scale. NCEs range from 1 to 99 and are most useful for making meaningful comparisons between different groups of students.

*Scaled Score (SS) ranges from 250 to 1250 and spans grades 3 through 12. It is calculated based on the difficulty of the questions and the number of correct responses. Scaled scores are useful for comparing student performance over time and across grades.

The total population of students studied for the population was 178. This population included all students who are enrolled in Basic Skills Math classes and those who are enrolled in Special Education Resource Math class. The total population of teachers questioned included all teachers who are implementing the Accelerated Math program into their Math classes (16). Responses to questions were analyzed and comparisons as to effective methodology were concluded.

Conclusions were made through data analysis. Students' scores on the Star Math test in September compared to their scores in February of the same academic year. Evaluating teacher understandings and overall approval of the program was the main goal of questioning.

Chapter 4

Presentation of the Research Findings

Throughout the study, it was necessary to compile data for those students who are enrolled in Basic Skills classes separately from those who are enrolled in Resource Math classes. This was concluded after observing the two classes and identifying the different methods of using the program. For the purpose of this research, conclusions as to the effectiveness of the program in Math classes will be related to both classroom circumstances and results will be identified and evaluated according to the impact the program has in each particular setting.

Accelerated Math in Basic Skills Classrooms

There were a total of 49 7th grade students and 51 8th grade students who were enrolled in Basic Skills Math classes for the 1st and 2nd marking periods at Monongahela Middle School. Through observations and questioning, it was recognized that every classroom used the Accelerated Math Program as its main method and tool of instruction. This was the intent of building and district administration. When the program was introduced to the building two years ago, it was planned that this program would take over for textbook instruction in the Basic Skills classes. It is now 100% used in Basic Skills classes. It can be concluded by this research that the goal of administration to incorporate the program into all Basic Skills classes by this year was accomplished.

When evaluating the effectiveness of the program, it should be stated that student attitudes and work habits were not taken into consideration. Most of the students enrolled in Basic Skills classes in Monongahela perform at an average to below average

academic level. Also, teacher classroom management was not evaluated within the research of this project. It was the observation of this researcher, however, that those teachers with a structured and effective classroom management philosophy ultimately, were able to use the program to a greater extent.

Every student enrolled in Basic Skills classes was to take the Star Math test twice. Teachers were to sign up for the computer lab and the test is taken on the computer. Each student was to take the test at their own computer. The tests were timed and when completed a score was computed by the Star Math program. It was those scores that this researcher used in an effort to analyze the effectiveness of the program in raising student achievement. There is an element of guessing that data collection cannot convey appropriately. The Star Math test is a multiple-choice test. Also, it was not possible for this researcher to be present during each class' testing times. Therefore, the influence of teachers helping students or students helping other students should be considered. It would be inappropriate to say this practice did not impact the validity of the test.

In order to evaluate the program in Math classes, students had to take the test twice. Data collected for those students who only took the test once or not at all was not considered. Of the 51 8th grade students enrolled in Basic Skills Math classes at Monongahela Middle School, 40 students had taken the test twice, once at the beginning of the school year and the other at the completion of the 2nd marking period. There were 8 students that only took the test once, most likely missing the second test due to being absent. For unknown reasons, there were three students that did not take the test once. For the purpose of this research, only data those that had completed two test during the allotted time was analyzed.

To successfully evaluate the effectiveness of the program, data for Grade Equivalent (GE), Normal Curve Equivalent (NCE), Percentile Rank (PR), and Scaled Score (SS) was analyzed for the 40 samples. The effective program should result in a dramatic increase in score for the students. Teacher accountability for student achievement and advancement in content was not analyzed in this research. That topic could lead to further research and data collection. The population of 40 8th grade students was studied as a whole group.

The average increase in GE score was 2.5. It should be noted that there were 11 students that actually lowered their Grade Equivalent score. Even with those students not advancing in Math content knowledge, the program did show a Grade Equivalent increase of over two grades.

Tests taken in September had an average Percentile Rank of 33. In other words, the average student's math skills are equal to or better than 33% of other children in the 8th grade. The average PR for those scores from the February tests was 58. Therefore, the average students math skills are equal to or better than 58% of other students in the same grade. There was a rise of 21%.

Normal Curve scores showed similar increases as the other two scores. Average NCE scores in September 31.1. Scores in February's tests jumped to 41.9. This is a dramatic increase in such a short time.

Scaled Score was the most useful score produced by Star Math for this particular type of research. Scaled Score data can range from 250 to 1250. For this specified population, scores ranged from 630 to 946. To help understand the SS score it should be noted that a score of 630 equaled a GE of 4.4 and a SS of 946 equaled a GE of 12.9+.

Scaled Scores in September resulted in a mean of 704. Results showed a mean score of 779 in February.

There were a higher percentage of 7th grade students enrolled in Basic Skills Math classes that actually took the Star Math test twice. Data collected resulted in 47 of the 49 students enrolled taking the test in both the beginning and mid-year. The range of dates allotted for the test results was the same as the 8th grade students analyzed. However, more data can be collected, being that more students took the test twice. Data from those students who did not take the test twice will be excluded. For the purpose of this research, the same scores that resulted in the results for the 8th grade will be evaluated.

After analyzing the data it was concluded that 88% of the 7th grade students demonstrated an increase in Grade Equivalent score. Average increase was 1.8. GE ranged from a low of 3.8 to a high of 9.0 in the beginning of the school year. At the mid-point of the academic year GE ranged from a low of 4.2 to a high of 12.9.

Data collected pertaining to Percentile Rank demonstrated an increase of over 21 between the two testing time periods. Of the 47 7th grade students in which data was collected from, 12 demonstrated a decline in PR score.

NCE score went from an average of 37.2 in the fall to an average of 51.3. Scaled Scores for the 7th grade ranged from 583 to 809 in the beginning of the year. Average NCE was 672 for that testing period. Analysis of mid-year tests score showed a range of 617 to 926 for the 7th graders. Average NCE score in February was 810.

Accelerated Math in Special Education Classes

It was concluded that the data collected from the Special Education classes pertaining to the Accelerated Math would not be used to evaluate the program. The data demonstrated inconsistent use of the program. Only 12% of the students enrolled in Special Education classes that use the program took the Star Math test in both September and February. 55% of the students took the test only once and 33% did not have results recorded for even one test. Special Education classes that use the program include both Resource Room Math classes and LD Self-Contained Math classes. It was understood by this researcher that the nature of these classes is always changing, therefore leading to many methods and activities developed for teaching mathematics content. It was observed that Accelerated Math is used as a supplement in the everyday Special Education classes at Monongahela Middle School. The impact of the Accelerated Math program in the Special Education classes at Monongahela Middle School could be an issue of further study.

Teacher Data

Data was collected from all 16 teachers throughout the study. It was necessary for this researcher to collect information at the beginning of the study, therefore having something to compare. Most teachers responded to all questions. Questioning was done through interviews. This was decided because surveys are often not returned. With only 16 teachers to question, it was necessary to get all to respond.

It was concluded that all teachers use the program as their main means of instruction. Two teachers feel as though the program should be used as a supplemental method. The

rest like its current use of the program. Of the 16 teachers, 9 felt as though they need more training to fully understand the program. However, all feel as though they know enough to get by. It was observed that the program was used in the classroom by pairs of teachers. All felt as though this method was appropriate. As a result of teacher questioning, it was concluded that the Accelerated Math Program meets the approval of 85% of those teachers using the tool. However, teacher training should be analyzed by building administration allowing for teachers to fully understand the program and use it to its capabilities.

Chapter 5

Conclusions, Implications and Further Study

Conclusions

The goal of this study was to evaluate the effectiveness of the Accelerated Math program on 7th and 8th grade Basic Skills Math students. It was concluded that all Basic Skills classes in Monongahela Middle School use the program as their main tool for instruction. For that reason alone, it was necessary to analyze the effectiveness of the program in an effort to improve that achievement of students at Monongahela.

The Accelerated Math program is in its 3rd year of use at the school. The program stems from the same company that produces Accelerated Reader, which has been implemented successfully at Monongahela Middle School. The advancement of the use of technology in the Deptford Township School District has been significant. With the necessary funding, the district has developed its technology programs throughout the district in an effort to enhance student learning. Use of computers is an everyday occurrence in classrooms. Every classroom has been equipped with at least one computer.

Accelerated Math was designed to allow students to work toward independent goals with assistance from the teacher. Each Basic Skills Math class in Monongahela Middle School has two teachers assisting students. Average class size was 18 students. There were approximately 9 students for every teacher.

It was necessary for this study to analyze the programs use in both Basic Skills classrooms and any other classroom that used the program. As the study progressed, evaluation of the program in Basic Skills classes became the main issue of this study.

Effectiveness was evaluated by examining both student achievement and performance in class. Analysis of students' scores on the Star Math test was used to evaluate students' achievement and classroom grades were used to evaluate student performance in class.

It was concluded through data analysis that the Accelerated Math program had a positive impact on the learning of 7th and 8th grade Basic Skills students at Monongahela Middle School in the Deptford Township School District. The knowledge of content in mathematics has increased with the use of the program. The program was adopted to help aid the school district in its fight to change the recent low math scores on statewide, standardized tests. Every score collected showed an increase in average. This was true for both the 7th and the 8th grades.

The population of the study included 100 7th and 8th grade students who were enrolled in the Basic Skills Program at Monongahela Middle School. Students were enrolled in the program because of their preceding year's scores on state mandated tests. All classes that were deemed Basic Skills classes were to use the Accelerated Math program. All students who were using the program were required to take the Star Math test at the beginning and end of the study. This allowed for a comparison study and proper data analysis. If students did not take the test twice, their scores were not included in the evaluation and data analysis.

With the assistance of teachers, the use of the program has enabled students to have a better understanding of all math content areas. The Star Math test assesses a student's knowledge of all areas of math, including algebra, geometry and statistics. Basic Skills Math classes average 9 per class. This was definitely an advantage. Usage of computers and one-on-one instruction time was necessary for the classes to run smoothly.

Implications

All students and teachers associated with the Accelerated Math program were included in the study. However, only data collected from those students enrolled in Basic Skills classes was used to draw final conclusions. Student involvement and teacher participation in the program were two important factors in the success of the study. Use of computers and technology associated with the Accelerated Math program was necessary for the study to be done effectively. There were no problems with technology that would impact the results throughout the entire study.

Further Study

This study evaluated the effectiveness of the Accelerated Math program on 7th and 8th grade students. Specifically, those enrolled in Basic Skills classes were the center of the study. It was concluded through this research that more study is necessary to truly evaluate the program. One semester's worth of results was enough to draw conclusions for this particular population, however each year there is a different population with different characteristics. Other means of data collection could be used if more time was available.

It should also be understood that this particular population studied should be monitored throughout their future schooling. This would allow those involved in the program to identify any faults in the implementation of the program in their classes.

Lastly, to evaluate the program effectively, there should be another means of data analysis. The Star Math test was appropriate for this study. However, it was concluded that the test has its problems. The test was not 100% monitored by teachers. Students

were at their own computers and there was no way for teachers to see very student during the entire test. Also, the test was multiple-choice. This allows for the possibility of guessing correctly which would impact the validity of the test.

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