SCHOOL AND DISTRICT POLICIES AND STRATEGIES THAT IMPACT STUDENT PERFORMANCE ON THE MISSOURI END-OF-COURSE ALGEBRA 1 NCLB ASSESSMENT

A Dissertation Presented to

the Faculty of the Mathematics Education Program

at the University of Missouri-Columbia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

---

by

Nevels Nevels

Dr. Barbara J. Reys, Dissertation Supervisor

JULY 2012

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

SCHOOL AND DISTRICT POLICIES AND STRATEGIES THAT IMPACT STUDENT PERFORMANCE ON THE MISSOURI END-OF-COURSE ALGEBRA 1 NCLB ASSESSMENT

presented by Nevels N Nevels,

a candidate for the degree of Doctor of philosophy,

and hereby certify that, in their opinion, it is worthy of acceptance.

Professor Barbara J. Reys

Professor Robert E. Reys

Professor James E. Tarr

Professor Óscar Chávez

Professor Steven J. Osterlind

…… For Coach.

ACKNOWLEDGEMENTS

The process of obtaining my doctorate in mathematics education began as a result of a chance meeting with Robert "Bob" Reys during lunch at a Missouri Council of Teachers of Mathematics conference in Columbia, Missouri. For the next two years after our talk at lunch, Bob consistently called me, emailed me and twice visited my classroom in St. Louis, accompanied by Ira Papick. These encounters were my first experiences with mathematics educators, and with professionals who are passionate about the field of mathematics education. These encounters were enough to encourage my pursuit of a doctoral degree in mathematics education.

When I arrived in Columbia, I was immediately nurtured and trained by an outstanding group of faculty members lead by Barbara Reys and featuring Doug Grouws, Bob Reys, Fran Arbaugh, James Tarr, Kathryn Chval, Oscar Chavez and John Lannin. Barbara served as a living example of persistence, integrity and focus. Watching her work (and play) was inspirational and helped me to organize my life especially in the most overwhelming moments of reading, studying, researching and writing.

Moreover, Bob and Barb Reys were invaluably supportive and committed to helping me to be successful in my professional endeavors. They welcomed me as family and made my stay away from my nuclear family as accommodating as possible.

I wish to thank my St. Louis Public Schools family. It was Mulugheta Teferi who spoke words of encouragement to me as I was deciding whether or not to attend graduate school. I communicated to him that I did not think it was a 'good' time to pursue a doctorate and he replied, "Nevels, it will never be a good time. In fact, the longer you put this off, the more difficult it will become. I personally put my doctoral studies off much

longer than I should have. Do not repeat my miscalculation." I also wish to thank my two Valeries: Valerie Taylor and Valerie Carter-Thomas. Both of these women served as my principal at one point in time. These ladies were incredibly supportive in my pursuit of my doctoral degree. I will forever be grateful for their patience and understanding. Finally, I would be remiss if I did not thank my students for they have continually honed my teaching skills and research abilities.

I must thank my parents, Raymond and Erma Nevels. I thank my father for raising me to be a man and setting a high bar for education. I was born in Columbia, Missouri as my father worked towards a doctorate at the University of Missouri (Mizzou). In a twist of fate, I would find myself attending the same university working towards a doctoral degree as well. My mother has always encouraged me to be a great learner. When I told her that I would be attending Mizzou for doctoral studies she remarked, "That's silly. Why would you want to work that hard? If I were you, I would get my doctorate online!" My mother's sense of humor was bestowed upon me and it has kept me resilient.

I want to thank my daughters, Rachel and Constance, for allowing their father to be absent during their high school years and understanding that I did this for them. It has been gratifying being in school at the same time as my daughters.

Most of all I thank Eulonda, my truest support and my love for life. Eulonda has been encouraging the entire time of my studies and has been the ear I turn to in times of deep thought. Without Eulonda, this dream would have remained an abstraction.

SCHOOL AND DISTRICT POLICIES AND STRATEGIES THAT IMPACT STUDENT PERFORMANCE ON THE MISSOURI STATE END-OF-COURSE ALGEBRA 1 NCLB ASSESSMENT

Nevels Nevels

Dr. Barbara Reys, Dissertation Supervisor

ABSTRACT

The dissertation study reported here describes various policies and strategies used by school districts that impact student performance on the Missouri Algebra 1 End-of-Course (EOC) assessment. Analysis of state testing data, teacher survey data, and interview data were used to describe policies and strategies used by 42 teachers and administrators at 6 high schools having 9-12 grade structure.

Following the work of Yañez & Wenrick (2000); Williams, Kirst, Heartel, et al. (2005), a framework for school practices and policies that impact student performance was used to analyze interview and survey responses reported by administrators and teachers participating in this study.

The majority of schools participating in this study have made adequate yearly progress (AYP) during at least one year since the administering of the Missouri Algebra 1 EOC assessment began. Two of these schools have yet to make AYP during the administration of the Algebra 1 EOC assessment, but have made gains during each year.

The Missouri Department of Elementary and Secondary Education (MODESE) allows the Algebra 1 EOC assessments to be administered to students during any year from 6^{th} to 12^{th} grade. If students are administered the Algebra 1 EOC assessment prior to entering secondary school, test scores are banked until the year a student is enrolled in

secondary school. Therefore, one policy having a positive impact on student performance involves positioning the district to administer the Algebra 1 EOC to students prior to their entrance into secondary school. Another policy of successful districts was to place mathematics specialists in each elementary and middle school in the district. A successful strategy is to take advantage of Missouri's district delay policy that allows districts to delay testing of any student identified as "not ready to test."

In all, a total of eight strategies and policies that are used by successful school districts have been determined to have impact on student improvement on the Missouri Algebra 1 EOC assessment.

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

1. INTRODUCTION

The mathematics education performance of students has gained the attention of many United States citizens as our nation strives to improve learning opportunities for all school-age children. A combination of wanting all students to learn mathematics and a desire to make certain this happens, has led to the creation of the accountability era anchored by statewide testing. A recent approach to statewide testing, at the secondary level, has taken the form of End-of-Course assessments. Nationwide, these assessments have sought to document student performance in order to evaluate the quality of schools and districts.

Mathematics For All

Recent interest in all students receiving a quality mathematics education can be traced to at least four earlier events: (a) the National Council of Teachers of Mathematics' (NCTM) publishing of *An Agenda for Action: Recommendations for School Mathematics of the 1980s*, (b) the National Commission on Excellence in Education's (NCEE) publication of *A Nation at Risk* (NCEE, 1983), (c) NCTM's publishing of the *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989), and (d) the National Research Council's (NRC) publishing of *Everybody Counts: A Report to the Nation on the Future of Mathematics Education* (NRC, 1989).

In the first half of the 1980s, two major reports were developed that provided a foundation for the prominence of mathematics, as a school subject, experienced today. The first of these reports was sponsored by NCTM and titled *An Agenda for Action: Recommendations for School Mathematics of the 1980s* (NCTM, 1980). The 1970s were characterized by heated discussions about new mathematics and the need for basic skills

in mathematics to be addressed in school programs. In 1977, the National Science Foundation funded the Priorities in School Mathematics (PRISM) Project to collect data designed to illuminate differences between actual and desired practices in K-14 mathematics. The results of this survey combined with data from the first two National Assessment of Education Progress (NAEP) reports, fueled the desire for the proposed recommendations in the 1980 publication.

The writing of *An Agenda for Action* was stimulated by a need for a national direction in mathematics education. This publication (NCTM, 1980, p. 1) called for sweeping changes, most notably:

1. Problem solving should be the focus of school mathematics in the 1980s.
2. Basic skills in mathematics should be defined to encompass more than computational facility.
3. Mathematics programs should take full advantage of the power of calculators and computers at all grade levels.
4. Stringent standards of both effectiveness and efficiency should be applied to the teaching of mathematics.
5. The success of mathematics programs and student learning should be elevated to a wider range of measures than conventional testing.
6. More mathematics study should be required for all students and a flexible curriculum with a greater range of options be designed to accommodate the diverse needs of the student population.
7. Mathematics teachers should demand of themselves and their colleagues a high level of professionalism.

8. Public support for mathematics instruction should be raised to a level equal with the importance of mathematical understanding to individuals and society.

The second publication in the early 1980s, *A Nation at Risk* (NCEE, 1983) gave Americans a sense of urgency about improving the education of American students and served as the basis for federal, state and local reform efforts. The report, among other things, summarized trends in score deficiencies over a 17-year period on standardized tests such as the SAT Reasoning Test (formerly the Scholastic Aptitude Test). The report also indicated that between 1975 and 1980, remedial mathematics courses in public four-year colleges increased by 72 percent. Business and military leaders complained that they were spending millions of dollars on costly remedial education and training programs in such basic skills as reading, writing, spelling, and computation.

In response to these issues the committee offered 38 recommendations, grouped into five categories: content, standards & expectations, time, teaching, leadership and fiscal support. The general recommendations were:

1. *Content*. High school graduates should master four years of English, three of mathematics, science and social studies and one-half year of computer science.
2. *Standards & Expectations*. Schools should adopt more rigorous and measurable standards and expectations.
3. *Time*. Schools should strongly consider seven-hour days and a 200- to 220-day year
4. *Teaching*. Better teacher training; salaries should be "professionally competitive."

5. *Leadership and Fiscal Support*. Citizens should hold educators and elected officials responsible for leadership and fiscal support to drive reform.

Two equally important publications emerged in the second half of the 1980s. First, the authors of the *Curriculum and Evaluation Standards* (NCTM, 1989) were charged with two tasks: (a) create a coherent vision of what it means to be mathematically literate both in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied to diverse fields and (b) create a set of standards to guide the revision of the school mathematics curriculum and the associated evaluation toward this vision. The resulting work was the first nationally recognized document to include language promoting the idea that all students should learn mathematics, not just college bound students. The *Curriculum and Evaluation Standards* (NCTM, 1989) addressed social issues affecting women and minorities with statements such as:

> The social injustices of past schooling practices can no longer be tolerated. Current statistics indicate that those who study advanced mathematics are most often white males. Women and most minorities study less mathematics and are seriously underrepresented in careers using science and technology. Creating a just society in which women and various ethnic groups enjoy equal opportunities and equitable treatment is no longer an issue. Mathematics has become a critical filter for employment and full participation in our society. We cannot afford to have the majority of our population mathematically illiterate: Equity has become an economic necessity.(p. 4)

One key aspect of equity centers on the opportunity for all students to learn. This document also acknowledged differences in students' abilities and interests, and served as a forerunner to the concept of differentiated instruction and the opportunity to learn mathematical content:

> Finally, in developing the standards, we considered the content appropriate for all students. This, however, does not suggest that we believe all students are alike.

> We recognize that students exhibit different talents, abilities, achievements, needs, and interests in relationship to mathematics. The mathematical content outlined in the Standards is what we believe all students will need if they are to be productive citizens in the twenty-first century. If all students do not have the opportunity to learn this mathematics, we face the danger of creating an intellectual elite and a polarized society. The image of a society in which a few have the mathematical knowledge needed for the control of economic and scientific development is not consistent either with the values of a just democratic system or with its economic needs. (p. 4)

The other major report published in the second half of the 1980s, was the result of a National Research Council (NRC) study of mathematics education from kindergarten to graduate school. Published in 1989, *Everybody Counts* was a public call to revitalize mathematics education. It reflected the thinking of 70 leading Americans, among them classroom teachers; college and university faculty and administrators; research mathematicians and statisticians; scientists and engineers; mathematics supervisors; school principals; school superintendents; chief state school supervisors; school board members; members of state and local governments; and learners of parent groups, business, and industry. *Everybody Counts* (NRC, 1989), outlined the challenges facing mathematics educators in our country and emphasized how important it is that all students receive high-quality education in mathematics. Similar to the *Curriculum and Evaluation Standards*, *Everybody Counts* (NRC, 1989) also contained language promoting equity and social justice:

> Apart from economics, the social and political consequences of mathematical illiteracy provide alarming signals for the survival of democracy in America. Because mathematics holds the key to leadership in our information-based society, the widening gap between those who are mathematically literate and those who are not coincides, to a frightening degree, with racial and economic categories. We are at risk of becoming a divided nation in which knowledge of mathematics supports a productive, technologically powerful elite while a dependent, semiliterate majority, disproportionately Hispanic and Black, find economic and political power beyond reach. Unless corrected, innumeracy and illiteracy will drive America apart. (p. 14)

These four reports by the NCEE, NCTM and NRC, serve as the foundation and encouragement for the Mathematics for All movement and were typical of the early discourse surrounding this movement.

Implications of Mathematics for All

The Mathematics for All movement influenced the national political scene as the federal government began to refocus programs such as the National Assessment of the Education Progress (NAEP) to document individual state education reform efforts. To many, initial indicators of success in promoting Mathematics for All was success in *school algebra*. School Algebra is defined as the topics covered in courses traditionally titled Algebra 1 and Algebra 2 and that are taught over the duration of two consecutive or nonconsecutive years (see National Mathematics Advisory Panel, 2008).

In 2001, the federal government reauthorized the *Elementary and Secondary Education Act of 1965* and titled it the *No Child Left Behind Act* (NCLB). This Act set a goal of 100% proficiency in mathematics as measured by state assessments aligned to rigorous standards by the year 2014. From 2002 until 2009 Missouri used the Missouri Assessment Program (MAP) at 10th grade for Adequate Yearly Progress (AYP) at the high school level. The assessment covered topics from at least 2 years of secondary school including algebra, geometry, and data analysis. In 2008, Missouri adopted the End-of Course (EOC) structure to replace the grade 10 MAP mathematics assessment. In doing so, the content of the EOC was changed to focus on 1st year Algebra topics, primarily those covered in Algebra 1.

Statewide Testing in Missouri

History of Testing in Missouri

The state of Missouri has required statewide assessment of student academic achievement since the late 1970s. In its earliest form, Missouri required the testing of all eighth grade students on their competence in reading & language arts, mathematics, and government & economics. This statewide assessment was referred to as the Missouri Basic Essential Skills Test (BEST) and was administered in the spring of each year beginning in 1978.

In 1985, Missouri marked the start of an educational reform by passing the *Excellence in Education Act*. Even before the act became law, the Missouri Department of Elementary and Secondary Education (MODESE) set out to identify core competencies and key skills for the core subjects in grades 2 through 10. To ensure that key skills were commonly recognized among Missouri educators as essential to the academic progress of students, and central to the respective subjects, MODESE invited teachers and administrators throughout the state to participate in their development (MODESE, 1986).

As a result of the *Excellence in Education Act*, new tests were mandated to assess children in mathematics, science, social studies, and reading. Known as the Missouri Mastery and Achievement Tests (MMAT), they existed for each grade level from 2nd through 10th, and were administered in at least two nonconsecutive elementary and two nonconsecutive secondary grades each year. The MMAT tests were eventually phased out during the 1996-1997 school year to make way for a performance measure and process type test required by the *Outstanding Schools Act of 1993*. Process type test are

constructed to extend beyond measuring mathematics content by assessing a student's ability to process mathematics. Process standards first appeared in NCTM's *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989) and then in *Principles & Standards for School Mathematics* (NCTM, 2000). These two publications proved to be critical in defining five important mathematical processes: problem solving, reasoning and proof, communication, connections, and representation.

The Missouri Assessment Program (MAP) test is one of several educational reforms mandated by the *Outstanding Schools Act of 1993*. As a result of this legislation, the State Board of Education directed MODESE to identify the knowledge, skills, and competencies that Missouri students should acquire by the time they complete high school and to assess student progress toward these academic standards. MODESE staff worked with educators, parents, and business professionals throughout the state to develop the Show-Me Standards and to create the MAP test as a tool for evaluating the proficiencies represented by the Standards. The MAP test initially included mathematics assessments for grades 4, 8, and 10.

The initial rounds of the MAP mathematics assessment required about three hours of testing time, and included three types of test items: multiple choice, constructed response, and performance events. The multiple-choice component was the survey portion of the *Terra Nova*, a nationally norm-referenced achievement test published by MODESE's MAP test contractor, CTB McGraw-Hill. Constructed-response items required students to supply an appropriate answer and, in some instances, to show their work. Performance events called for students to work through more complicated problems and typically allowed for multiple approaches in solving the problem. All three

of these item formats, but especially the latter two, required students to apply what they have learned to complex, real-life situations.

Currently, in response to the federal NCLB legislation of 2001, the State of Missouri administers the MAP test in grades 3 through 8 and in 2009 replaced the grade 10 general MAP test with a course specific Algebra 1 End-of-Course (EOC) assessment. The Algebra 1 EOC assessment is typically administered in the 9th grade but can be appropriately administered to students from grade 6 through grade 12, depending on when the school or district deems the student has had the opportunity to learn the content assessed on the EOC assessment. The Algebra 1 EOC assessment is comprised of two sessions. Session I includes 47 selected-response (SR) items and Session II has two performance event (PE) scenarios, however, only 35 SR and one PE are graded leaving the remainder as embedded field test items. It is expected that each SR takes, on average, about 1 minute to answer and each PE scenario takes about 20 minutes to complete.

As part of the accountability provisions set forth in the law, the *No Child Left Behind Act of 2001* (NCLB) has set the goal of having every child become proficient on state-defined education standards by the end of the 2013–2014 school year. To reach that goal, every state has developed benchmarks and assessments to measure progress and to make sure every child has the opportunity to learn the specified mathematics. States are required to disaggregate student achievement data, holding schools accountable for the performance of all subgroups of students. A school or school district that does not meet the state's definition of "adequate yearly progress" (AYP) towards 100% proficiency for two straight years (school wide or in any subgroup) is considered to be *in need of improvement*.

Algebra 1 End-of-Course Assessment

The Missouri EOC Assessments were developed and first administered in 2008 for English II, Algebra 1, and Biology. The EOC assessments were created to address the needs of Missouri districts, schools, teachers, and students, while also meeting state and federal requirements. The Missouri State Board of Education identified the following purposes for the Missouri EOC Assessments: (a) measuring and reflecting students' mastery toward post-secondary readiness, (b) identifying students' strengths and weaknesses, (c) communicating expectations for all students, (d) serving as the basis for state and national accountability plans, and (e) evaluating programs.

Grade-Level Expectations (GLEs) outline the ideas, concepts, and skills that form the foundation for an assessed subject area based on student grade level. Course-Level Expectations (CLEs) outline the ideas, concepts, and skills that form the foundation for an assessed EOC subject area regardless of student grade level. Because a course such as Algebra 1 could be delivered at any grade level, CLEs were created to replace the previous GLEs. The Missouri EOC Assessments are offered in both paper-and-pencil and online administration modes.

Statement of the Problem

Because the AYP targets increase each year toward the goal of 100 percent proficiency by 2014-15, schools and districts that do not meet AYP targets one year are likely to continue to miss targets in subsequent years. These schools are especially vulnerable to quick fixes by stakeholders and decision makers.

Schools and districts that fail to make AYP targets may be tempted to make testing a primary focus–teaching to the test–and may resort to an increase in the amount

of testing to help ensure students are prepared for the state AYP assessment (Cimbricz, 2002; L. Shepard, 1990, 2002; L. A. Shepard & Dougherty, 1991). Over-emphasis on test results can have a negative effect on student motivation to learn. Shepard (2001), in reviewing the effects of high-stakes accountability pressures posits, "When teachers emphasize evaluation there is a corresponding decrease in students' intrinsic motivation and interest in the material for its own sake" (p. 3). The author argues that when students focus on how they are doing or how they will be evaluated, they become only superficially involved in the learning tasks, and are less likely to persist in solving difficult tasks.

Due to the cost of scoring constructed response (CR) and performance events (PE), in 2009, Missouri moved to a predominantly selected response (SR) test. This move seemed to be a direct response to increasing cost to grade non-SR-items, and as a result of the NLCB legislation to move all students to proficiency levels by 2014. This change in the assessment instrument conveys a message to teachers, which may result in them assigning fewer CR and PE items and subsequently depriving students of important learning opportunities.

If a school continues to perform below levels of proficiency on the EOC exam, it will continue to receive sanctions according to state policy that will likely lead to reactionary thinking. Districts must learn to support increased student learning in order to help break the cycle.

Purpose of the Study

The purpose of this study is to examine district and school policies and practices that are intended to raise student performance as measured by the Missouri Algebra 1

End-of-Course (EOC) assessment. More specifically, what decisions are being made and what actions are schools and school districts taking in response to participating in the Missouri Algebra 1 EOC assessment and what impact do these decisions and actions have on student performance? This study aims to identify factors associated with the desire to raise district performance on the Algebra 1 EOC assessment.

Research Questions

This study seeks to answer the following research questions:

1. What policies and strategies have districts and schools implemented in response to the Missouri Algebra 1 EOC assessment?
    a) Who was involved in making these decisions?
    b) Why were these decisions made?
    c) How and when were these decisions implemented?
2. What are the perceptions of teachers regarding the impact of the new policies and strategies on student performance?

Definition of Terms

Adequate Yearly Progress (AYP)

The No Child Left Behind Act (NCLB) of 2001 requires all schools, districts and states to show that students are making AYP. States are to establish annual targets for all students and student subgroups to meet in a progressive nature that would result in all students scoring at or above the proficient level on the state's assessment by 2014. The law also requires schools, districts, and states to meet an additional indicator based on improvement or established targets in attendance and/or graduation rates. Finally, the law requires all students and student subgroups to meet a 95% participation rate.

AYP Confidence Interval (CI)

The Missouri Department of Elementary and Secondary Education uses a confidence interval in order to account for the error inherent in making AYP classifications that are based on a targeted percentage of students who must attain proficiency. The use of confidence intervals increases the reliability of these classifications. For AYP purposes, a 99% confidence interval is applied to the annual proficiency target, which means that a *wide* range is established in order to obtain a very high level (nearly 100%) of confidence in the decision.

AYP Safe Harbor (SH)

If a school or district does not meet the Annual Proficiency Target for each subgroup, a provision called Safe Harbor allows another opportunity for the school or district to make AYP. Safe Harbor is not a requirement of NCLB. However, if a school or district does not meet AYP using any other method, safe harbor calculations are applied to determine if AYP is met for a subgroup based on a decrease in percent identified as "Not Proficient." The subgroup must decrease the percentage of students scoring below the proficient level by 10 percent to meet this guideline.

AYP Safe Harbor Confidence Interval (SHCI)

If a school or district does not meet AYP using Safe Harbor, a confidence interval is applied to the safe harbor calculation to determine if AYP is met. Safe harbor confidence interval is not a requirement of NCLB. However, if a school or district does not meet AYP using the previous methods, 75% confidence interval calculations are applied to safe harbor calculations to determine if AYP is met.

Algebra

The National Mathematics Advisory Panel (NMAP), commissioned by President W. Bush, recommended that school algebra be consistently understood in terms of identified "Major Topics" which include: (a) symbols and expressions, (b) linear equations, (c) quadratic equations, (d) functions, (e) algebra of polynomials, and (f) combinatorics and finite probability (National Mathematics Advisory Panel, 2008).

Course-Level Learning Expectations (CLEs)

Course-level learning expectations (CLEs) are statements that describe the content and processes students are expected to know and be able to perform as a result of their experiences in learning mathematics *in a particular course* and as approved by a state or local authorized agency. The difference between standards and CLEs is that CLEs are statements that describe mathematical content or processes with greater specificity with respect to a specific course.

Curriculum

Very broadly, curriculum refers to the substance or content of teaching and learning – the "what" of teaching and learning as distinguished from the "how" of teaching. The *intended curriculum* refers to local, state and/or national curriculum standards. The *textbook curriculum* is any and all curriculum materials provided to teachers and students by the school. *Implemented curriculum* refers to the materials and ideas that are the focus of learning activities by students in the classroom. (Center for the Study of Mathematics Curriculum, 2010)

District Delay

In the state of Missouri, districts are given the authority to determine the

eligibility criteria for students to take the Algebra 1 EOC assessment. This assessment can be administered to students in any of the grades from 6th to 12th, with specific criteria left to the discretion of the administering district. Therefore, taking or passing an Algebra course is not necessarily a requisite for taking the Algebra 1 EOC assessment. Since the identification of students who take the Algebra 1 EOC assessment is left to school policy, it has implications for how the results are understood, as one cannot assume that all students who take the assessment have had similar opportunities to learn the material represented in the assessment.

Standards

The term "standards" is used in this study to describe the general mathematical content and processes students are expected to know or be able to perform as a result of their experiences in learning mathematics.

Significance of the Study

For more than 30 years researchers, policymakers and educators have studied schools that have obtained higher than expected achievement, however, most of this research has been conducted at the elementary level. Junior and senior high schools are culturally and organizationally quite different from elementary schools and therefore limit the transferability of findings. Additionally, little attention is directed at the role of district leadership. Cuban (1984) questions the concentration upon the local school site and principal leadership that dominates the research but implicitly ignores the pivotal role that school boards and superintendents play in, "mobilizing limited resources, giving legitimacy to a reform effort, and the crucial interplay between central office and school sites that can spell the difference between implementation success and failure" (p. 6).

This study intends to address these concerns by focusing on the early high school context and on district policies that are intended to impact high stakes accountability system requirements.

2. REVIEW OF RELATED RESEARCH

The primary focus of this study is to examine district and school factors designed to positively impact student performance as measured by the Missouri Algebra 1 End-of-Course (EOC) assessment. More specifically, this study examines effective actions and decisions school districts participating in the Missouri Algebra 1 EOC take to help increase student performance. Given the nature of the issue under examination, a number of related research areas have been reviewed and used to inform this study, including: (a) differences in student achievement and persistence in mathematics, (b) a move towards a national curriculum, (c) research on large scale assessments and increased accountability, (d) course enrollment patterns related to school algebra, and (e) policies and practices related to teaching, learning and improving student performance.

This chapter includes reviews of the aforementioned research areas. It begins with a review of literature focusing on the differences in student achievement and persistence in mathematics. The second section is a review of the research related to increased accountability and efforts to establish common curriculum standards. The third section presents a review of enrollment patterns for courses equivalent to Algebra 1. The concluding section provides a review of research on policies and practices of schools and districts that also serves as the basis of the conceptual framework used in this study.

Differences in Student Mathematics Achievement and Persistence

Race, Sex, and Socioeconomic Status

For decades mathematics has served as a critical filter for access to advanced education and high paying jobs. Unfortunately, the record shows that women, Latino, African Americans, Native Americans and other minorities have had limited access to mathematics intensive career paths. Mathematics has been, and to a great extent continues to be, a powerful tool wielded primarily by white males (Hawkins, 1995; Watt, Eccles, & Durik, 2006). One seemingly accessible entry point to addressing this issue is dealing with differences in student achievement and persistence along race and gender lines.

Reyes & Stanic (1988) produced one of the earliest studies that proved to be significant in the discussion of race, sex, socioeconomic status (SES), achievement and persistence. The authors attempted to explain why different groups of students seem to get different benefits from the school experience. They focused on the relationship between the *overt* and *hidden* curricula of schools. Overt and hidden curricula refer to the relationship between the stated and unstated, or explicit and implicit goals and meanings of the schooling process. The authors posit that students who differ in race and SES enter school with the potential to succeed in mathematics. Additionally, students from low-SES backgrounds may have certain skills that are superior to those of students from high-SES backgrounds. The authors claim, "A close examination of classroom processes appears to be important in understanding what happens to some students after they reach school to keep these abilities and skills from being fully tapped" (p. 29).

Figure 2.1 depicts a model of the theoretical framework used by Reyes & Stanic

(1998) to understand and explain these differences in achievement and persistence. Arrows indicate the direction of the influence of each factor. The model begins with *societal influences* outside of school that may send different messages to and about students of different race, sex, and SES regarding their aptitudes and the appropriateness of their achieving at a high level in mathematics. Examples of societal influences are the family, the community in which the child lives, religious institutions, the mass media, and the implicit messages that result from the pattern of prevailing occupational and other societal roles held by members of particular groups. In the model, societal influences are posited to have a direct effect on *teacher attitudes*, *school mathematics curricula*, and *student attitudes and achievement-related behavior* and an indirect effect, through these factors, on *classroom processes* and *student achievement*. Reyes & Stanic (1988) state:

> In the field of mathematics education, there is little, if any, research documentation of the effect of societal influences on the other factors in the model. Documenting these connections is both the most difficult and the most necessary direction for future research on differential achievement in mathematics. (p. 33)

The model also depicts classroom processes as mechanisms through which teacher attitudes affect student achievement. Hence, there is a general causal connection from teacher expectations through classroom processes to student achievement. Teacher attitudes may affect school mathematics curricula in that teachers may decide that certain courses, topics, and activities are appropriate only for certain groups of students. School mathematics curricula consist of the courses available to students, the topics covered in these courses, and the activities used to teach those topics. School mathematics curricula may also affect teacher attitudes in that the kinds of mathematics courses offered in a particular school may affect a teacher's beliefs about the general ability of the students.

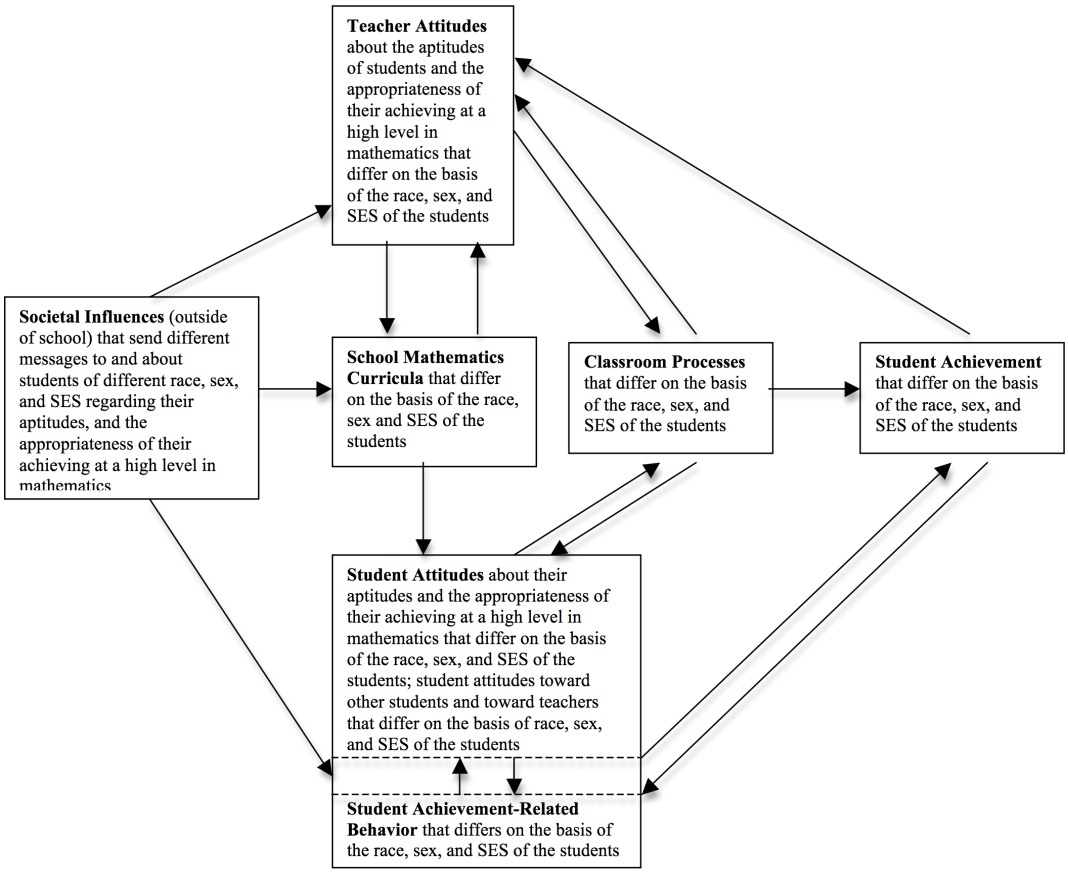


Figure 2.1. A Model to Explain Differences in Mathematics Achievement Based on Race, Sex and SES Status of Students (Reyes & Stanic, 1988)

Moreover, classroom processes serve as a mechanism through which teacher attitudes, student attitudes, and student achievement-related behavior can affect student achievement. Similarly, teacher attitudes, student attitudes, and student achievement-related behavior may change as teachers and students interact in the classroom. Finally, student achievement refers not only to scores on standardized achievement tests but also to measures of student performance on non-routine mathematical problems (Reyes & Stanic, 1988, p. 39).

Equity in Mathematics Education

In an attempt to advance understanding of equity in mathematics education, Allexsaht-Snider & Hart (2001) conducted a review of research and concluded that important findings and perspectives related to achieving equity are available in the current literature, but need to be more accessible to educators, researchers, and policy makers (p.95). The authors indicate that having a definition of equity is an essential starting point, and their definition of equity in mathematics education includes: (a) equitable distribution of resources to schools, students, and teachers, (b) equitable quality of instruction, and (c) equitable outcomes for students. Equity is achieved when differences among subgroups of students in these three areas are decreasing or disappearing**.** The authors also contend that structural aspects of school districts, beliefs about diverse students, and the learning of mathematics and classroom processes including teaching practices are three interrelated aspects of education that affect underrepresented students' success in mathematics.

First, the structural aspects are centered on the financial, human, curricular, and evaluative resources critical to accomplishing equitable mathematics for all students. Second, promising strategies for supporting teacher's exploration of beliefs, and their influences on teaching and learning for underrepresented students in mathematics are needed to create equitable environments. Finally, integrating the concepts of *engagement* and *a sense of belonging* for underrepresented students in the mathematics classroom is an important skill for mathematics educators to develop and use.

A sense of belonging focuses on the extent to which each student senses that she or he belongs "as an important and active participant in all aspects of the learning

process" (Ames, 1992, p. 263) in mathematics. This sense of belongingness is fostered by classroom processes directed by teachers, and becomes evident in students' sense of confidence about learning mathematics and their attitudes about participating in the community of mathematics learners (Hart & Allexsaht-Snider, 1996).

The *Principles and Standards for School Mathematics'* (*PSSM*) vision of engagement includes the expectation that "students confidently engage in complex mathematical tasks ... work productively and reflectively ... communicate their ideas and results effectively ... [and] value mathematics (NCTM, 2000, p. 3). Contrary to this vision, the standards assert, "too many students disengage from school mathematics" (NCTM, 2000, p. 371). A number of reasons for student disengagement related to motivation and confidence in learning mathematics are outlined in the *PSSM*. Students may find parts of the content difficult and abstract or they may not find it interesting or relevant. Based on beliefs communicated by parents, teachers, peers, and the media that high achievement in mathematics is only necessary and valuable for certain groups, students may have developed low expectations for themselves.

Allexsaht-Snider & Hart (2001) argue that the concept of belongingness is an important complement to the concept of engagement as defined in the *PSSM*. The extent to which students feel they belong as members of the community in the mathematics classroom is related to how deeply and completely they engage in efforts to learn mathematics and the degree to which they find the cultural patterns embedded in classroom processes accessible. Reference to a student's sense of belongingness highlights the relationship between students' confidence and motivation in mathematics and their active participation in mathematics classroom processes (p. 98).

Improving curriculum, standards, and assessment have long been the tenets of academic reform. The authors, notwithstanding their extensive research in the area of equity, conclude:

> It is clear, from review of policy documents and research literature in mathematics education, that a combination of high quality curriculum materials, professional development, pedagogical strategies, and assessment, all based on the 1989, 1991, 1995, and 2000 standards documents is necessary but not sufficient for accomplishing the goal of "mathematics for all." (p. 99)

Despite efforts over the past 20 years to address equity, Martin (2003) concludes:

> Despite strong equity discourse in the *Curriculum and Evaluation Standards* (NCTM, 1989), the development of equity-based frameworks such as those outlined by Reyes & Stanic (1988), and despite increased understandings of how students learn, how teachers teach, and improved methods of assessing teachers and students–math educators have yet to produce adequate solutions to differential achievement and persistence along ethnic lines. (p. 9)

Martin (2003) argues that current reform efforts and standards such as *Principles and Standards for School Mathematics* (*PSSM*) (NCTM, 2000) have noticeably more subdued language about equity than found in earlier reform efforts such as the *Curriculum and Evaluation Standards* (NCTM, 1989). He worries that the mathematics education community has taken a step backwards by making blanket statements about *all* students. He senses an "uneasiness to grapple with the complexities and particularities of race, minority/marginalized status, differential treatment, [and] underachievement in deference to the assumption that teaching, learning, curriculum, and assessment are all that matter" (p. 10). Martin (2003) suggests a renewal of efforts to ensure all children receive a valued mathematics education.

Martin asserts that rather than restricting our definitions of and goals for equity to the ideas of equal access, equal opportunity to learn, and equal outcomes, mathematics educators working to eliminate inequities should seek to extend Allexsaht-Snider &

Hart's (2001) three areas of focus. Martin (2003) states:

> A focus on structural aspects of school districts, teacher beliefs about diverse students, and classroom practices is important, but in many ways, this focus does not allow us to situate disproportionate achievement and persistence patterns within a broader conceptual framework of sociohistorical, structural, community, school, and intrapersonal factors. (p. 13)

Martin (2003) suggests that a *fourth* goal of equity should be to empower students and communities with mathematics knowledge and literacy as a powerful act of working for social justice and addressing issues of unequal power relations among dominant and marginalized groups. The author asserts that considerations of social justice force mathematics educators to think beyond curriculum and classrooms so as to situate mathematics learning for marginalized students within the larger contexts that impact their lives. Without attention to the ways in which the arrangement of mathematical, and other, opportunities outside of school further contributes to the marginalization of African American, Latino, Native American, and poor students, equity based efforts in mathematics education will continue to fall short (see, Frankenstein, 1990, 1994; Gutstein, 2002, 2003; Ladson-Billings & Tate, 1995; Tate, 1995). Ensuring that marginalized students gain access to quality curriculum and teaching, experience equitable treatment, and achieve at high levels marks the beginning of equity efforts, not the end.

The Trend Towards A Common Curriculum

There has been an interest in creating common curriculum standards for at least half a century. In 1959, President Dwight D. Eisenhower called for "national goals" in education, including "standards." A decade later, President Richard M. Nixon called "the fear of national standards" one of the "bugaboos of education." In 1983, President Ronald

W. Reagan accepted from his first education secretary *A Nation at Risk* (NCEE, 1983), which sounded an alarm about the perilous condition of U.S. academic standards and arguably catalyzed 25 years of standards-based reform. In 1988, with the collaboration of the late Senator Edward M. Kennedy, President Reagan presided over the reinvention of the National Assessment of Educational Progress (NAEP), including state-by-state comparisons of student achievement and what became known as *achievement levels* by which NAEP data are now reported.

In 1989, President George H.W. Bush met with the governors in Charlottesville, Virginia where they agreed to the first national education goals in U.S. history. He also supported the development of voluntary national standards in core subject areas, only to see the Senate vehemently denounce the draft U.S. history standards. President Bill Clinton later pushed for voluntary national testing, but a disgruntled House pulled the plug on funding for the initiative. Then, in 2001, President George W. Bush and Congress enacted NCLB, which embraced standards-based reform and testing. In September of 2009, President Obama's Secretary of Education, Arne Duncan, faulted NCLB for discouraging high learning standards and even "inadvertently encouraging states to lower them."

The Prominence of Mathematics

The school topic of mathematics holds a prominent place among courses offered in American secondary schools. The demand for mathematical competency is desired in the workplace as well as in post secondary institutions. Most 4-year top tier universities require prospective incoming freshmen to complete four credits of mathematics in high school, and achieve an ACT (or equivalent) mathematics minimum sub score. In

addition, students are often required to complete a mathematics placement test at the enrolling institution to determine if they can begin a credit-bearing mathematics course. This amount of testing is atypical of other subjects at the university level. That is, students are rarely expected to demonstrate proficiency in English or history via a placement test or before enrolling in the first credit bearing science course.

College and career readiness became a priority focus in the states in 2005 with the launch of the American Diploma Project (ADP) Network by Achieve, Inc. Starting with only a handful of states, the Network has now grown to include 35 states educating nearly 85 percent of all U.S. public school students.

High schools have also given prominence to mathematics as a subject. In 2007, Thirty-nine states required their students to earn 3 or more credits in mathematics to qualify for graduation and twenty-five states required students to complete at least Algebra 1 for high school graduation (Tuescher, Dingman, Nevels, & Reys, 2008).

The federal government encouraged states' efforts to establish content standards in the 1990s. For example, two pieces of federal legislation enacted in 1994—Goals 2000 and the Improving America's Schools Act, the precursor to the No Child Left Behind Act— encouraged states to develop content standards and help students master them. In addition, the Clinton administration proposed voluntary national tests. However, this proposal met serious political resistance partly because it appeared to some as excessive federal intrusion into education, and Congress ultimately rejected the idea.

Another controversial federal effort was the U.S. Department of Education's funding of groups to develop voluntary standards in English Language Arts, science, history, civics, geography, foreign languages, and the arts. The goal was the development

of documents similar to the *Curriculum and Evaluation Standards*, which NCTM had published in the late 1980s to define an educational philosophy and curricular direction for mathematics (Edwards & Leichty, 2010). The work of these groups did not garner consensus because of disagreements over: (a) the standards' level of prescriptiveness; (b) views of teaching and learning, with some emphasizing the mastery of discrete content incrementally and others believing that knowledge cannot be easily assessed outside a specific context or be broken into separate pieces; (c) the subjects that standards should be based on—e.g., social studies broadly versus sub disciplines such as history and civics; and (d) specific issues within disciplines—e.g., the teaching of evolution in science.

Although the failure of these national efforts did not eliminate some education stakeholders' desire to establish a set of common standards and assessments across states, they influenced federal policymakers' approach to content standards. For example, the current version of the federal Elementary and Secondary Education Act (ESEA), enacted as the No Child Left Behind Act (NCLB) in 2002, conditioned states' receipt of substantial federal funding on establishing rigorous standards, annually assessing students' proficiency on those standards, and holding schools accountable for helping an increasing percentage of students demonstrate proficiency each year. The federal legislation left it to individual states to determine the focus, content, and rigor of their K–12 academic content standards. NCLB also allowed states to define the level of performance a student must demonstrate to be considered proficient.

The Common Core State Standards Initiative

In 2009, the National Governor's Association (NGA) and the Council of Chief State School Officers (CCSSO), in partnership with Achieve, Inc., ACT, and the College Board, initiated a state-led process of developing and adopting a common core of state standards called the Common Core State Standards Initiative (CCSSI). These standards include both Algebra 1 and Algebra 2 as core topics. Currently, 45 states have adopted the Common Core State Standards and the U.S. Department of Education is promoting the initiative through its Race to the Top (RTT) grant program, which gives points to states that adopt common standards (not necessarily the CCSSI).

An explanation of the purpose for common standards in core curriculum topics is found on the CCSSI website homepage (¶ 1):

> The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.

Initial college and career ready standards were released for public comment in the fall of 2009. The K-12 common core standards in English Language Arts (ELA) and mathematics were developed by the end of January 2010. Members of the validation committee approved both sets of standards simultaneously in February 2010. The college and career ready standards can be viewed online at www.corestandards.org. As of March 2012, 45 states had adopted the Common Core State Standards for Mathematics (CCSSM). Current work includes collaboration on common assessments aligned to the CCSSM.

Large Scale Assessment and Accountability

Standards and aligned assessments are key accountability components of standards-based reform efforts. The standards outline the expectations held for all students, assessments provide a way to evaluate student performance against these standards, and the accountability system provides an incentive – in the form of stakes attached to the assessment results – for those involved to make the necessary changes in order to meet performance expectations.

Impact on Classroom Practices

An 80-item survey conducted by the National Board on Educational Testing and Public Policy (NBETPP) (Pedulla et al., 2003) sought to ascertain teachers' attitudes and opinions about state-mandated testing programs. These items presented teachers with a series of statements about their state testing program, classroom practice, and student learning. The survey concluded that state mandated tests are leading teachers to change both what they teach and how they teach. This finding, however, is highly dependent upon the level of stakes associated with the state test.

Stakes associated with state testing fall into two categories: (a) consequences for districts, schools and/or educators and (b) consequences for students. Within these two categories, the severity of the stakes attached to the test results were classified as *high, moderate,* or *low* for the district, school and/or educator level and student level of accountability.

Curriculum standards developed by each state are intended to articulate high expectations for achievement and clear outcomes for students. Consequently, curriculum standards establish homogeneity of course content, thus focusing classroom instruction

(Goertz, 2000). In a report of the NBETPP survey results, Abrams, Pedulla, & Madaus (2003) found that regardless of stakes levels, the majority of teachers were positive about their state's content standards or frameworks. Fifty-eight percent of all responding teachers reported that their state-mandated test is based on a curriculum that all teachers should follow. Similarly, more than half of all teachers (55%) reported that if they teach to the state standards or frameworks, students would do well on the state test.

Abrams, et al. (2003), also found that, depending on the stakes level state tests have a differential impact on what content gets emphasized and how students are assessed. Forty-three percent of teachers in high-stakes states, compared to only 17% of teachers in low-stakes states indicated an increase in time spent on instruction in tested topic areas. Additionally, teachers in high-stakes states reported significant decreases in time spent on instruction in the fine arts, industrial/vocational education, field trips, class trips, enrichment assemblies, and class enrichment activities. Teachers in low-stakes states did not report decreases in these areas.

The most revealing finding by the researchers indicated that teachers in both types of testing programs (76% of high-stakes teachers and 63% of low-stakes teachers) reported that their state testing program has lead them to teach in ways that contradict their own notions of sound educational practice such as teaching to the test and omitting topics that they new would not be covered by a state assessment. These results suggest that regardless of the rewards and/or sanctions associated with test results, the implementation of state testing programs has changed teaching in ways that many teachers feel negatively impacts the quality of instruction students receive.

Clarke et al (2003) conducted a NBETPP study to identify the effects of state-

level standards-based reform on teaching and learning, paying particular attention to the state test and associated stakes. On-site interviews were conducted with 360 educators in three states (120 in each state) attaching different stakes to the test results. In Kansas, state test results were one of several pieces of information used to determine school accreditation, but had no official stakes for students. In Michigan, school accreditation was determined by student participation in, and performance on, the state test, and students received an endorsed diploma and were eligible for college tuition credit if they scored above a certain level on the eleventh-grade tests. In Massachusetts, school ratings were based on the percentage of students in different performance categories on the state test, and students had to pass the tenth-grade test in order to graduate from high school. Thus, as one moves from Kansas to Michigan to Massachusetts, the stakes for educators remain fairly constant (from moderate/high in Kansas to high in Michigan and Massachusetts), but the stakes for students increase dramatically (from low in Kansas to moderate in Michigan to high in Massachusetts).

Interviewees in all three states reported that preparing for the state test had changed teachers' instructional and assessment strategies. Educators in Massachusetts reported about twice the number of changes as their peers in Kansas and Michigan. Perceived positive effects of these changes included a renewed emphasis on writing, critical thinking skills, discussion, and explanation. Perceived negative effects included reduced instructional creativity, increased preparation for tests, a focus on breadth rather than depth of content coverage, and a curricular sequence and pace that were inappropriate for some students. In all three states, a minority of interviewees (14% in Kansas, 20% in Michigan, and 10% in Massachusetts) felt that the state test did not affect

instructional or assessment strategies.

Miyasaka (2000) examined the validity of test preparation practices in the context of large-scale, norm referenced and criterion referenced tests. The author developed a framework for conceptualizing the various aspects of test preparation and provided guidelines for five areas of test preparation which are diagramed in Table 2.1

Table 2.1

The Five Areas and Guidelines of Test Preparation

Areas of Test Preparation	Guidelines
Curriculum and test content:	Test preparation should be embedded in and focus on teaching the entire curriculum domain which may include state content standards and appropriate norm-referenced test objectives.
Assessment and item formats:	Test preparation should involve a wide variety of assessment approaches, e.g. multiple choice, short answer, extended response, and performance task, especially those that are included in the test.
Test-taking strategies:	Test preparation should include instruction in and practice of test-taking strategies.
Timing of test preparation:	Test preparation should take place throughout the year.
Student motivation:	Test preparation should help students understand the importance of doing their best.

Miyasaka (2000) concluded that the difference between teaching to the content curriculum objectives and teaching to the test depends on the scope of the content domain taught, the focus of instruction, and the content focus of the test. Furthermore, focusing

regular classroom instruction and practice only on the test content objectives could artificially raise test scores and decrease the validity of the test results and resulting inferences and decisions made on the basis of these results (p. 12).

Shepard & Dougherty (1991) conducted a survey of middle grade teachers in two high-stakes school districts addressing test-preparation practices and the effects of testing on instruction. A four-page questionnaire was developed including questions in the following categories: Pressure to improve test scores, instructional effects, preparation for tests, controversial testing practices, uses of test data, positive and negative effects of standardized testing, and background information on teachers and schools. The authors also provided teachers with two open-ended questions asking them to report on specific examples of positive or negative influences of standardized tests on their teaching or on students in their classroom.

The researchers found that two-thirds to three-quarters of all teachers gave more emphasis to basic skills instruction, vocabulary lists, word recognition skills, and paper and pencil computation than they would if there were no mandated tests. Some teachers follow the predictable pattern of increasing practice on the basics at the expense of more divergent instructional experiences. However, a greater number of teachers appeared to have increased all activities, especially those pertaining to reading and mathematics instruction.

Regarding controversial or inappropriate testing practices the majority of teachers said that these practices never or rarely happened in their schools. For example, 49% of teachers said that "providing hints on correct answers" rarely or never happened; and "giving students more time than test directions call for" rarely or never happened

according to 58% of the teachers. The most frequently reported controversial testing practices were: "giving practice on highly similar passages," "rephrasing questions during test administration," 'providing hints on correct answers," and "giving students more time than test directions call for."

Impact on Motivation

With regard to teachers, researchers have cautioned that placing a premium on student test performance can reduce instruction to test preparation, thus limiting the range of educational experiences to which students are exposed and minimizing the skill that teachers bring to their craft. Abrams, et al. (2003) found that although high-stake test are intended to motivate teachers and students to achieve optimal performance levels, they can have quite the opposite effect. According to the researchers, “the implementation of the state test may, in effect, lead to a de-professionalization of teachers” (p. 20). Studies also indicate that high-stakes assessments increase stress and decrease morale among teachers. Abrams, et al. (2003) report that teachers reacted to the increased pressures created by high-stakes testing by teaching test-taking skills, modeling classroom assessments after the state test, and emphasizing content that is tested. These survey results suggest that teachers who reported feelings of pressure from either their district superintendent or building principal were also likely to work in schools with lower teacher morale.

Abrams, et al. (2003) report that not only can these highly pressured school environments have a negative impact on teachers, they can also affect students negatively. Students can experience stress, anxiety, loss of self-efficacy, decreased motivation, and frustration resulting from pressures associated with high-stakes testing.

According to the survey, over one third (35%) of teachers from high-stakes states and 20% of teachers from low-stakes states strongly agreed that students were extremely anxious about taking the state test. However, far greater percentages of teachers from high-stakes states (80% compared to 49% of teachers in low-stakes states) perceived students to be under intense pressure to perform well.

Clarke, et al. (2003) asked interviewees from three states (Kansas, Michigan, and Maryland) to describe the extent to which the state test affected student motivation, learning, stress levels, and morale. The researchers indicated as one moves from Kansas to Michigan to Massachusetts, the stakes for educators remain fairly constant, but the stakes for students increase dramatically from low, to moderate and to high respectively. In all three states, interviewees reported more negative than positive test-related effects on students. Perceived negative effects included test-related stress, unfairness to special populations, and too much testing.

In their study of high school students' science achievement, Haydel and Roeser (2002) identified three motivation patterns that affect student engagement and achievement: (a) intrinsic-mastery, (b) ego-success, and (c) helpless. Intrinsic-mastery engages students in improving their skills, competencies, and intelligence. Characteristics of students who display this pattern enjoy learning, seek out challenges, and persist during difficulties. Ego-success patterns exist when students either attempt to prove one's fixed ability or hide one's fixed inability. Characteristics of ego-success learners include viewing achievement situations as opportunities to prove superiority and not necessarily to improve skills and competencies. Students who exhibit a lack of confidence in their abilities and are occupied with the goal of hiding their perceived sense of incompetence

are characteristics of the helpless motivation pattern. These students also fail to persist in challenging situations, and have performance deficits.

Haydel and Roeser (2002) found that girls were more likely to exhibit the helpless pattern and boys were overrepresented in the ego-success motivation pattern. However, gender was not a significant predictor of perceptions of efficacy. Findings from this study suggest that school practitioners need to understand the motivation patterns of students and use this understanding to help students prepare for the types of high-stakes tests they are required to take.

Views of Accountability

Gulek (2003) posits, that apart from the dangers involved in using results from a single test to make consequential decisions about students or programs, alignment studies in various states show that norm-referenced tests are limited in covering state-adopted standards. Where there is misalignment of this sort, using test results to make decisions about student learning in relation to the standards could be misleading.

Abrams et al (2003) report that teachers in both high- and low-stakes states rejected the notion that test scores should be used to hold schools and teachers accountable, but responded more favorably when asked about student accountability. The researchers indicate that 66% of teachers from high-stakes states and 77% of teachers from low-stakes states felt awarding school accreditation based on test results was inappropriate. Similarly, 82% of teachers from high-stakes states and 90% of teachers from low-stakes states felt it was inappropriate to evaluate teachers/administrators on the basis of student test results. Teachers in both types of testing programs overwhelmingly opposed using test results to award teachers/administrators financial bonuses.

In summary, high stakes testing influences classroom practices, student motivation

and has the potential to be misused or misinterpreted by stakeholders. The following section reviews research on some effects of tracking students into particular sequences for mathematics.

Course Enrollment Patterns Related to School Algebra

Lee, Smith, and Croninger (1997) conducted a longitudinal follow-up study to Lee and Smith (1995), which was referred to as the Early Restructuring Study (ERS). The study's major purpose was to identify the organizational characteristics of high schools that make them better places for students to learn. The researchers found that students' academic experiences are compartmentalized, differentiated, and socially stratified in most high schools, because the curriculum is divided into discrete subjects grouped by departments. These units organize subject matter into course sequences (tracks), access to which is determined by students' aspirations and interests, prior performance, or evidence of ability.

The typical high school offers students a range of courses and/or course sequences in each department. Lee et al (1997) posit that disadvantaged students are especially harmed by a highly differentiated curriculum. They tend to be enrolled disproportionally in low-track course offerings that require less academic effort, expectations for their achievement are lower, and the academic content is less challenging. A growing body of research has established that low-income and minority students are especially advantaged in schools with a narrow curriculum and a strong academic focus (Lee, Bryk, & Smith., 1993).

Gamoran (1987) examined differences between and within schools in the allocation of opportunities for learning and found that few school-level conditions contribute to achievement. But variation in student experiences within schools has

important effects on achievement. Most of the significant within-school differences are tied to differential course taking. The authors concluded that, especially in mathematics and science, curriculum tracking is closely tied to students' academic experiences, as revealed by their patterns of course taking. Tracking and course taking together account for significant differences in student achievement.

In a Brown Center study report, Loveless (2008) found that between 2000 and 2005 eighth graders shifted towards tougher courses. The percentage of students taking advanced courses increased while basic mathematics courses experienced enrollment declines. Enrollment in advanced courses increased by about 10 percentage points, from 26.7% to 36.6%, and student enrollment in basic courses fell by about 16 percentage points, from 66.6 %to 50.8 %. It appears that many students who would have taken lower level mathematics courses were taking algebra, geometry, or advanced Algebra 1n 2005.

Smith (1996) analyzed a transcript file from a National Educational Longitudinal Studies (NELS) program of the National Center of Education Statistics (NCES) name High School and Beyond (HS&B). This survey studied the educational, vocational, and personal development of young people beginning with their elementary or high school years, and followed them over time as they began to take on adult roles and responsibilities. In particular, the HS&B survey included two cohorts: the 1980 senior class, and the 1980 sophomore class. Both cohorts were surveyed every two years through 1986, and the 1980 sophomore class was also surveyed again in 1992. From this study Smith (1996) posited that regardless of social background characteristics, mathematics outcomes measured at the end of high school are most directly related to the characteristics, attitudes, and behaviors of students measured during high school. The

author argued mathematics achievement in the early part of high school is the single strongest predictor of whether a student will continue to take advanced courses and of later achievement in high school. However, the author warned that while early access to algebra had a positive impact on students' mathematics attainment, students' access to this learning opportunity is not evenly available. In particular, students who come from lower socioeconomic levels are disproportionately absent in these courses. Smith (1996) concluded that although differences between ethnic groups do not persist past adjustments for social class, the overall levels of distribution are unequal.

Policies and Practices Developed to Increase Student Performance in Mathematics

Improving Algebra 1 EOC Exam Scores

Yañez & Wenrick (2000) conducted research concerning instructional strategies and policy decisions that are proven to be critical for improvement on the Texas Algebra EOC exam. In particular, researchers examined schools across Texas that had the largest improvements and largest declines in the percentage of students passing the Algebra 1 EOC exam from 1997 to 1998. The quantitative data reviewed in this study were taken from data reported by the Texas Education Agency. The qualitative data were culled from telephone interviews with participating schools. The schools selected for the study were located around the state and included examples from every education service center region.

The researchers identified six indicators critical to whether a given school's Algebra 1 EOC exam scores declined or improved. The indicators are: (a) a sense of urgency about improving Algebra 1nstruction, (b) an "Algebra for All" vision, (c) teamwork and collaboration, (d) professional development, (e) textbook selection and use

of supplemental resources, and (f) class schedules and time in the classroom. The researchers contend that teachers at schools with improving scores speak of a sense of urgency to do whatever it takes to assure that their students performed successfully on the Algebra 1 EOC exam. This sense of urgency was shared by the whole school community—not just teachers, but also by principals, students, and parents. Where this priority originated was not significant. In contrast, those teachers from schools with declining scores who identified the Algebra 1 EOC exam as a priority reported that the exam was a priority for the teacher but not for the students. Other algebra teachers at the schools with declining scores reported that the Texas Assessment of Academic Skills (TAAS) was the first priority and the Algebra 1 EOC exam was an add-on activity at the end of the year.

Teachers in improving schools maintained an algebra for all vision and believed they can help all of their students—even those who had previously struggled in mathematics courses—develop skills and conceptual understanding in algebra. In comparison, teachers interviewed from schools with declining scores made statements such as students "were doing dismally" and did not express that the Algebra 1 EOC exam was a priority in their classes or on their campuses. The teachers from the schools with declining scores often said that their students were not ready for algebra and that these students needed additional time to improve their basic mathematics skills.

Yañez & Wenrick (2000) contend that teachers at schools with improving scores met at regularly scheduled times to collaborate on curriculum and lesson plans, while sharing ideas, strategies, and materials for teaching Algebra. Several teachers talked about participating in vertical team activities with the middle and high school teachers. In

contrast, teachers at the schools with declining scores reported fewer opportunities for collaboration. Many of the teachers at these schools did not have the opportunity to share common planning periods or common professional development experiences. They often reported feeling isolated. In many cases, teachers at the schools with declining scores reported that collaboration was made more difficult by turnover in mathematics teaching personnel.

The teachers at schools with improving scores indicated that participation in purposeful, well designed, and comprehensive professional development activities supported their efforts to improve student achievement on the Algebra 1 EOC exam. In contrast, few of the teachers from schools with declining scores reported participating in professional development experiences. Teachers at some of these schools stated that only one or two teachers had been sent to mathematics professional development workshops, and that it was therefore difficult for them to implement new teaching strategies because there was little peer support at the campus.

Teachers from both groups reported using state-and/or district-adopted textbooks in the classroom, with no one textbook being used more or less by either group. The differences found between the two groups were instead related to how the textbooks–and supplemental resources–were used. The supplemental resources used by schools with improving scores included graphing calculators and previously released Algebra 1 EOC exam items. In contrast, teachers at the schools with declining scores often reported relying exclusively on textbooks to cover concepts for the Algebra 1 EOC exam and the supplementary materials consisted primarily of drill-and-skill worksheets.

At the schools with improving scores and at those with declining scores, the

number of minutes that students spent in algebra class varied widely. Most teachers interviewed reported that Algebra 1 was completed in a single year, with a schedule that allotted it anywhere from 40 to 90 minutes a day. Further, schedule configurations varied widely at the schools with improving scores and at those with declining scores. Teachers at both these groups of schools described schedule combinations including traditional, regular block, accelerated block, extended block, modified block, or combination.

In summary, Yañez & Wenrick (2000) found that no particular schedule structure could be linked to improving or declining Algebra 1 EOC exam scores. Analysis of both the data and the interviews on schedules shows that more important than a specific schedule configuration is *how* the time is spent to help students develop algebraic thinking.

Similar Students, Different Results

It is often reported that you can predict the performance of a school based on its zip code. It is true that parent education and socioeconomic level are related to students' academic success. But school and district practices and policies contribute as well (see Coleman et al., 1966). Williams, Kirst, Heartel, et al. (2005) conducted a two-year collaborative research project overseen by EdSource and found that among schools that serve roughly the same kinds of students in California, a large and consistent gap in academic performance exists. This gap can be as much as 250 points on the 200-to-1000 scale of the Academic Performance Index (API), the state's primary accountability measure. The study looked at factors that might explain the gap in API scores, focusing on a subset of California elementary schools serving largely low-income students. The goal was to determine which current K–5 practices and policies are most strongly

associated with the higher levels of student performance some schools achieve.

The study looked at a relatively narrow band of elementary schools to control for student characteristics. The researchers selected schools that fell between the 25th and 35th percentile on the School Characteristics Index (SCI). As a group, those schools tended to have higher-than average percentages of students who are English language learners, who are from low-income families, and have parents that are not high school graduates. In 2005, principals from 257 California elementary schools completed surveys that asked about classroom, school, and district practices. The survey included 350-to-400 items that were grouped into broader domains and reflected existing research about effective schools and districts. Each represented a group of specific behaviors thought to affect student performance. The schools in turn were grouped into high-, medium-, and low-scoring categories based on their Academic Performance Index (API). Survey responses were compared using a statistical method designed to isolate the effect of the various domains of teacher, principal, and school district practice.

The study found that four specific domains, or clusters of practices, were most strongly correlated with higher school API scores: (a) prioritizing student achievement; (b) implementing a coherent, standards-based instructional program; (c) using assessment data to improve student achievement and instruction; and (d) ensuring the availability of instructional resources. The remaining three domains examined—involving and supporting parents, encouraging teacher collaboration and professional development, and enforcing high expectations for student behavior—had much weaker but still positive correlations with school performance. The study suggests that performance is higher in schools in which the actions of teachers, principals, and school district officials are all

closely aligned and tightly focused on student achievement.

"Prioritizing student achievement" refers to the importance schools and districts place on setting clear, high, and measurable expectations for student achievement. Common characteristics among successful schools generally include high expectations communicated in concrete ways and established systems to assess regularly the progress of individual students. Both teachers and principals at higher-performing schools reported that they had well-defined plans for instructional improvement and that they make meeting the state's API goals and the No Child Left Behind AYP goals a priority. They also reported that their schools set measurable goals for exceeding API growth targets for student subgroups

"Implementing a coherent, standards based instructional program" refers to the extent to which a school's curriculum and instruction are both coherent and aligned with state standards. The survey focused on the core areas of mathematics and English Language Arts. Teachers responded to questions about the amount of time spent on each subject, the extent to which the two core subjects are protected from interruption, and whether mathematics and language arts are integrated with other subjects. Respondents also indicated which English and mathematics curriculum packages they used in their own classrooms and how frequently they used those packages.

The use of data by teachers, principals, and districts was perhaps the most intensively examined domain in the study, at least in terms of the number of survey questions. Under the general topic of data and assessment, questions addressed the types of assessment data teachers and principals received, as well as how they used these data. Principals from better-performing schools more often reported that they and the district

use assessment data from multiple sources—curriculum program and other commercial assessments, district-developed assessments, and the California Standards Tests (CSTs) and CAT/6—to evaluate teachers' practices and to identify teachers who need instructional improvement. Principals also reported frequently and personally using assessment data to address the academic needs of students in their schools, including using these data to develop strategies to help selected students reach goals and to follow up on their progress.

The researchers defined "resources" broadly to include personnel, their qualifications, and the availability of decent facilities and adequate textbooks. This research included survey data on the credentials and experience of educators plus teachers' responses on the availability of classroom materials. Also considered were principals' perceptions of a number of different types of resources, including most notably the skills, knowledge, and attitudes of the teaching staff at the school. Principals were also asked about the extent to which the district provides support for facilities and instructional materials, any provision of longer school day or year, and the school's access to qualified support personnel.

A central finding of the study is that, "no single action, or even category of actions, can alone provide a clear advantage related to student performance" (Williams et al., 2005, p. 4). Rather, schools that have, on average, higher API scores also report more strongly that they implement these multiple, related practices.

Why Some Schools do Better

In the 2008-09 school year Williams, Kirst, Heartel, et al. (2010) conducted a large-scale study of middle grades schools in California. The research team obtained

completed surveys from 303 principals of middle grades schools; 3,752 of their ELA and mathematics teachers; and 157 of their district or charter management organization (CMO) superintendents. The surveys included more than 900 items focused on concrete, actionable educational practices and policies in place at the school and in its district regarding the middle grades. Survey questions were neutrally phrased and most questions allowed responses along a range of 1 to 5 to indicate level of agreement or intensity of implementation.

The survey questions covered 10 broad domains or areas of effective middle grades practices. The research team generated these 10 domains from a review of middle grades research and reports over the past two decades, plus related state and federal policies. The 900+ survey questions were clustered together by topic into sub domains under each of the 10 domains. The 10 domains are: (a) Intense Focus on Academic Outcomes, (b) Standards-Aligned Instruction & Curriculum, (c) Use of Data to Improve Instruction & Learning, (d) Proactive Academic Interventions, (e) Teacher Competencies, Evaluation, & Support, (f) Principal Leadership, (g) Superintendent Leadership & District Support, (h) School Environment, (i) Organization of Teaching & Instruction, and (j) Attention to Student Transitions

The ten research domains fell into three groupings with respect to their relative predictive strength in differentiating higher-performing middle grade schools in the sample:

1. The *domain with the greatest predictive strength* across most of the cross-sectional and longitudinal analyses was "An intense, school-wide focus on improving academic outcomes."

2. *Six domains* consistently followed this domain in terms of predictive strength. Relative to one another, their predictive strength varied depending on the analysis, and there were relatively few statistically significant differences between them. These domains pertain to standards-based instruction and curricula; extensive use of data; proactive academic interventions; teacher competencies; principal leadership; and superintendent leadership/district support.
3. *Three domains*, although they did differentiate schools with higher CST scores and higher gains in CST scores, did so with less predictive strength than the other seven domains in almost every analysis conducted. These three domains pertain to school environment; the organization of time and instruction; and attention to student transitions.

After accounting for specific school policies and practices, no single grade configuration was consistently associated with higher performance on California's standards-based tests in English language arts and mathematics in this study. Both more effective and less effective policies and practices were found in schools with every grade configuration studied. Finally, although identifying the relative predictive strength of these three domain groupings is an important finding, equally important are the specific district- and school-level practices *under* each domain that distinguished higher-performing middle grade schools.

Conceptual Framework

The conceptual framework for this study was based on Yañez & Wenrick (2000) and Williams et al. (2005; 2010) research on the domains of effective practices and

differences in approaches to instruction between schools with improving scores and schools with declining scores. The framework includes five areas that were found to be most critical to improving students' performance on standardized measures of achievement. By examining these five areas, I intend to gain insight on how schools implement changes with the goal to improve Algebra 1 EOC assessment scores.

Focus on Improving Academic Outcomes

This area is characterized by the decisions made by the school district, principals, parents, and students to support a shared sense of urgency. Districts can prioritize and set explicit goals for student achievement (e.g., Bottoms, Cooney, & et al., 2007). Principals can cultivate collective responsibility for school improvement and a shared vision for academic achievement (Cotton, 2003; Leithwood & Riehl, 2003; Leithwood, Steinbach, & et al., 2002; National Association of Secondary School Principals, 2006). Parents can play a key role in socializing students into future goals and aspirations that place a high value on educational achievement (e.g., Hill & Tyson, 2009; Juvonen, Le, & et al., 2004). Students can also take responsibility for academic achievement. For example, one recent study found that academic behaviors such as "academic discipline"—student planning and organization, follow-through, and sustained effort—are important for course success in grade 8 and grade point average in grade 9, and can provide educators with important indications of which students need intervention (ACT, 2008).

Coherent and Aligned Standards Based Instruction & Curricula

In this area it is important that the district leads the adoption of district wide curricula aligned with state academic standards, teachers report that the district communicates high expectations that instruction will closely align with those standards,

and the principal follows through by communicating expectations that the school's mathematics teachers will use the school's adopted curriculum programs daily. Additionally, teachers report the school considers a wide range of factors in placing students into mathematics classes in high school including: explicit criteria set by the school; scores on a placement or basic skills test; teacher recommendation; prior student academic performance; student MAP scores; a review by the schools' lead mathematics teachers; and a review by an administrative team to ensure the widest appropriate access for all students.

Use of Assessment Data to Improve Instruction & Student Learning

Use of assessment and other data to reflect on and hold schools accountable for student progress is a core feature of standards-based education. This means schools must be effective learning organizations, capable of reflecting continuously on what is working, what is not, and how educators might change course.

Effective practices that distinguish higher-performing schools include the district playing a strong leadership role regarding the provision and use of student assessment data, facility with and frequent use of assessment data indicates a changing role for principals in higher performing schools, and the extensive use of assessment data by teachers in higher-performing schools signals a culture shift with student outcomes as the focus. Additionally, teachers and principals strongly concur that the school has an instructional improvement plan in place and assesses the effectiveness of the plan on an ongoing basis.

Teacher Competence, Evaluation & Support

Credentialing and preparation to teach mathematics is widely recognized to be

insufficient without useful and ongoing opportunities for teachers' professional development and growth. Practices and policies that support ongoing teacher collaboration and growth are central aspects of major reform and policy recommendations.

In high performing schools the principal and teachers are likely to report that the district provides useful professional development for teachers, the school allocates a considerable amount of common planning time per month for mathematics teachers, and teachers report working together collectively as well as individually in their classrooms to improve practice with the goal of improved student outcomes.

District Leadership, Accountability & Support

School districts play an important role in guiding and supporting local capacity for continuous evaluation and instructional improvement. Districts also play a crucial role in making ongoing reflection on progress possible at the school level (e.g., Augustine, Gonzalez, & et al., 2009). Districts do this by enabling schools to access student assessment data quickly and in a usable form, and by providing for reflection on common benchmarks for student learning. The district has the responsibility of setting clear expectations that schools meet AYP growth targets, including subgroups. The district is also responsible for ensuring that mathematics curricula are aligned with state standards, instruction is focused on achievement, and schools have adequate facilities and textbooks as well as resources for struggling students.

Summary

In the early years of administering the Missouri Algebra 1 EOC, most high schools did not record high levels of student performance. However, the early low

performance was, in part, due to the fact that the highest performing students on the assessment were not yet in high school.

It is a widely held belief that success in mathematics is a "critical filter" for advanced mathematics study and subsequent economic earning potential. In describing the history of mathematics as a "gatekeeper", Stanic (1986) writes:

> The concept of mathematics as providing the key for passing through the gates to economic access, full citizenship, and higher education is located in the core of Western philosophy. In the United States, school mathematics evolved from a discipline in "crisis" into one that would provide the means of "sorting" students. As student enrollment in public schools increased, the opportunity to enroll in advanced mathematics courses (the key) was limited because some students were characterized as "incapable." Female students, poor students, and students of color were offered a limited access to quality advanced mathematics education. This limited access was a motivating factor behind the Standards, and the subsequent NCTM documents (p. 12).

Robert Moses, a voting rights organizer and civil rights activist, sees mathematics literacy as more than a prominent gatekeeper. Moses (2001) sees it as a civil rights issue and argues that those who are technologically literate will have access to jobs and economic enfranchisement, while those without such skills will not:

> Today . . . the most urgent social issue affecting poor people and people of color is economic access. In today's world, economic access and full citizenship depend crucially on math and science literacy. I believe that the absence of math literacy in urban and rural communities throughout this country is an issue as urgent as the lack of Black voters in Mississippi was in 1961. (p. 5)

Moses' argument is about economics and technology. Factory jobs, once "pure" physical labor, now have technological components; even forklifts in warehouses have computer modules, and the people who use the machines must be able to use the computer controls. Moreover, the technological divide is going to widen over the coming years.

These two author's views point towards the need for an increased effort to raise the performance of Missouri secondary schools on the Algebra 1 EOC assessment. The cycle of increased sanctions for underperforming schools tend to punish rather than help the very schools that need the most help. This situation leaves students who have no means to abandon these schools, trapped to reap the consequences of these sanctions. These students typically are minority.

This study examines district and school decisions and practices designed to have significant impact on student performance as measured by the Missouri Algebra 1 End-of-Course (EOC) assessment. More specifically, this study investigates what actions and decisions schools & school districts participating in the Missouri Algebra 1 EOC assessment implement to support student learning and performance. This study aims to identify policies and practices associated with high district performance on the Algebra 1 EOC assessment.

3. METHODOLOGY

The design of this study uses qualitative methods to examine secondary mathematics teachers' and mathematics supervisor's understanding and implementation of strategies and policies designed to increase student performance on the Missouri Algebra 1 End-of-course (EOC) test. In this chapter, I describe the design of the study, the cases selected, data collection methods, and data analysis methods. Teachers and mathematics supervisors representing six schools participated in the study. The selection of participants and the relevant information about them is discussed in detail. The data sources include surveys, interviews, and information obtained from MODESE's FTP data downloading site as well as the 2009-2010 Missouri School Directory. The data sources and instruments presented in this chapter address the following research questions:

1. What policies and strategies have districts and schools implemented in response to the Missouri Algebra 1 EOC assessment?
    a. Who was involved in making these decisions?
    b. Why were these decisions made?
    c. How and when were these decisions implemented?
2. What are the perceptions of teachers regarding the impact of the new policies and strategies on student performance?

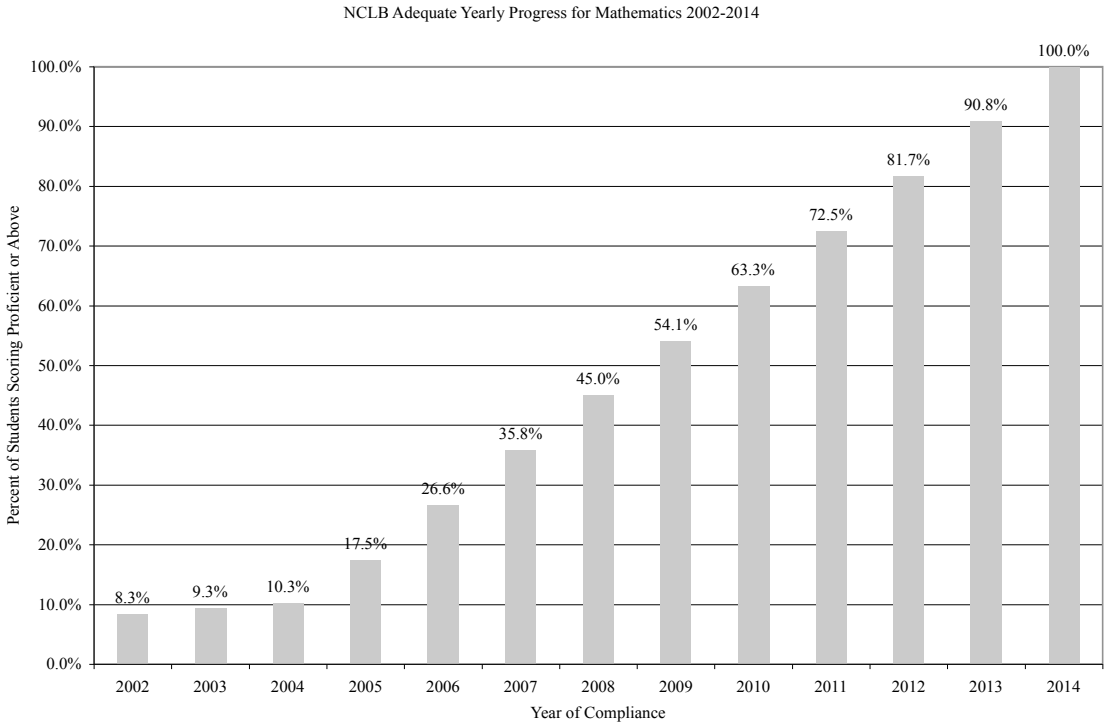
Selection of Missouri Secondary Schools

The two major criteria used for the selection of schools were: (a) level of performance on the 2009 Missouri Algebra 1 EOC assessment and, (b) percentage of students eligible for free or reduced lunch (FRL). The performance levels were determined by using the 2008 AYP target of 45% as the low indicator and the 2010 AYP

target of 63.3% as the high indicator. The upper and lower quartiles for the percentage of Missouri students receiving free or reduced lunch served as the indicators of low and high FRL levels respectively.

MODESE officials set the AYP target for the 2009 Missouri mathematics assessments at 54.1%. That is, to achieve AYP status, at least 54.1% of students needed to perform at the proficient or above levels on the Missouri Algebra 1 EOC assessment. Figure 3.1 provides the AYP targets for each year from 2002 until 2014 when all Missouri students are expected to meet or exceed proficient levels.

Figure 3.1. Adequate Yearly Progress for Missouri School Mathematics

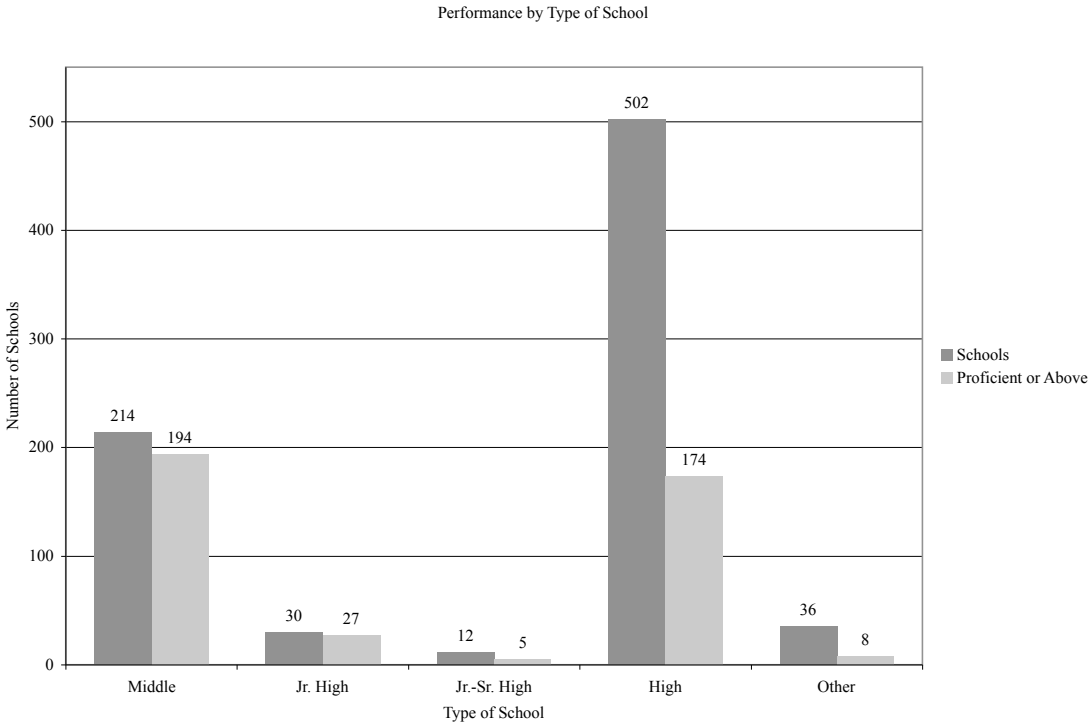


NCLB requires each state to test student's mathematical ability in grades 3-8 and one year in secondary school. Prior to 2009, Missouri schools administered the MAP assessment to all 10th grade students as the required secondary test to meet NCLB requirements. Currently, the Missouri Algebra 1 EOC assessment is administered as the secondary test, however it is based on course-level and not on grade-level learning

goals/standards. This presents a challenge to identifying the population of schools for this study in that: (a) students may take the Algebra 1 course prior to high school. In fact, students in grades 6-12 are eligible to take the exam, and (b) districts in Missouri have a variety of school structures, so that the name of the school is frequently not a clear indicator of the grade level structure of students within the school. For example, during the 2008-2009 academic year, 794 schools reported administering the Missouri Algebra 1 EOC assessment to 62,907 students. Some of these schools have a grade 5-6 structure, while others include grades K-8, 5-8, 6-7, 6-8, 7-8, 8th only, 9th only, 5-12, 6-12, 7-12, 9-12, or 10-12. These schools have names such as: junior high, middle, elementary, traditional, school, academy, middle-high, junior-senior high, and 9th grade center. Even within shared nomenclature, grade spans may vary widely. For example, a junior high school in Missouri may include students in grades 6-8, 7-8, 7-9, 8th only, or 8-9.

The most common names used by Missouri schools administering the Algebra 1 EOC assessments are middle school, junior high school, junior-senior high school, and high school. Figure 3.2 provides an overview of performance on the Algebra 1 EOC assessment based on the most common names used by the schools administering the assessment.

Figure 3.2. Number of Missouri schools by name types and number meeting 2009 AYP target (proficient or above).



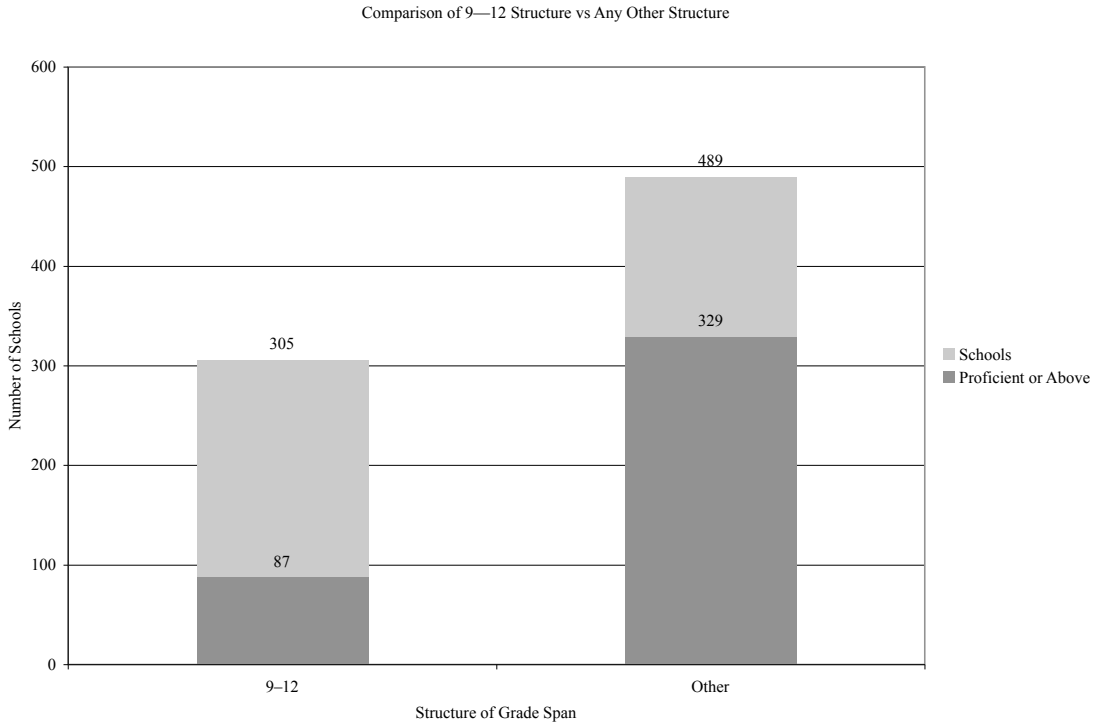
Students are allowed to take the Algebra 1 EOC assessment prior to high school with their performance counting toward their future high school building AYP. Unfortunately, districts are not required to indicate the grade of a testing student, or any previous or current mathematics course taken by a tested student.

For the purposes of this study, the focus is on the 305 Missouri schools having a 9-12 grade span structure. Choosing the 9-12 grade span eliminates the possibility that the majority of tested students are in a grade not typically considered as high school, such as the 7th grade. Figure 3.3 shows a comparison of schools with a grade 9-12 structure with all other grade span structures administering the Missouri Algebra 1 EOC assessment.

The National Center for Educational Statistics (NCES) indicates that the most common (62.1%) grade span for high school is the 9-12 configuration (NCES, 2009b). In

Missouri, 28.5% of 9-12 grade span schools met the 2009 AYP target compared to 67.3% of all remaining schools.

Figure 3.3. Comparison of grade 9-12 configuration to all other schools administering the Missouri Algebra 1 EOC assessment



Selection of Participating Schools

This study used a systematic approach to identify schools for the selection of cases. In addition to performance on Algebra 1 EOC exam and proportion of FRL, additional criteria included school population. To control for the anomaly of a school with small student-teacher ratios, I identified only larger schools. Therefore to be included in this study, schools must have had at least 400 students and at least 50 of these students must have taken the Algebra 1 EOC assessment. This reduced the 305 (9-12 grade span) schools participating in the Missouri Algebra 1 EOC assessment to 180 schools. To maximize accessibility to the schools, I focused on schools located in either St. Louis County or St. Louis City school districts. This criterion resulted in 38 schools.

The proficiency level criterion for the purposes of this study were based on the 2008 and 2010 AYP targets of 45% and 63.3% respectively. Schools with high performance (HP) were defined as those with at least 63.3% of students passing the EOC Algebra 1 exam. Schools defined as low performance (LP) had fewer than 45% of students passing the EOC Algebra 1 exam. Schools with performance levels between these two targets were classified as mid performance (MP).

Similar to performance levels, three levels of socioeconomic status were established using the top and bottom quartiles for Missouri state FRL eligibility. Schools having 62.7% (top quartile) or more of their students receiving free or reduced lunch are indicated as High FRL (HFRL), whereas schools with 31.1% (bottom quartile) or less as Low FRL (LFRL). Any percentage in between is indicated as Mid FRL (MFRL).

The combination of performance levels and socioeconomic status criteria created nine cells used to code the sample selection. The cells, and number of respective schools for each code (including the student population criteria), are indicated in Table 3.1.

Table 3.1

Number of schools meeting criteria among St. Louis area schools

	LFRL	MFRL	HFRL
	x* ≤ 31.1%	31.1% < x < 62.7%	x ≥ 62.7%
LP	LP/LFRL	LP/MFRL	LP/HFRL
y** < 45%	6	11	9
MP	MP/LFRL	MP/MFRL	MP/HFRL
45% ≤ y < 63.3%	8	0	1
HP	HP/LFRL	HP/MFRL	HP/HFRL
y ≥ 63.3%	3	0	0

* x represents the school percent of students eligible for free or reduced lunch.

** y represents the school percentage of students scoring proficient or above on MO EOC

Approximately 59% of the 27 survey respondents were female, comparable to the nationwide female secondary average of 59.3% as reported on the 2007-2008 Schools and Staffing Survey (SASS) conducted by the National Center for Education Statistics (NCES, 2009a). In United States secondary schools, 83.5% of all teachers identify themselves as White/Caucasian non-Hispanic, whereas 89% of the survey respondents indicated that their race was White. The mean age for all respondents was nearly 35 years old compared to the national average of nearly 43 years old. The majority of respondents (74%) have attained at least a Master's degree, with one achieving a doctorate. In comparison, SASS reports that 53.8% of secondary teachers have at least a Master's degree. Finally, the average length of time for the survey respondents serving as full-time teachers is 9.6 years compared to the national average of 13.1 years.

Table 3.2 summarizes key demographics of the six schools [Allister North (AN), Dandrige (D), Lamar (L), Millwood Prep (MP), Rowan (R), and Zapata (Z)] including: (a) the schools 2009 AYP status, (b) percentage of female teachers, (c) percentage of Caucasian teachers, (d) mean age of teachers, (e) percentage of teacher's attaining a Master's degree or higher, (f) and average years of full-time teaching experience.

Table 3.2

Comparison of Algebra 1 teachers in participating schools (N=27)

	AN (n=4)	D (n=5)	L (n=1)	MP (n=3)	R (n=10)	Z (n=4)
Made AYP in 2009	Yes	No	Yes	No	Yes	No
Percentage of female teachers	75%	60%	0%	66.7%	50%	75%
Percentage of Caucasian teachers	100%	80%	100%	33%	100%	100%
The mean age for Algebra 1 teachers	30	38	47	41	32	34
Percentage of teachers attaining a Master's degree or higher	50%	80%	100%	66.7%	80%	75%
Average years of full-time teaching experience	8.5	10	15	17.3	8	7

Merriam (1988) and Patton (1990, 2002) describe purposeful sampling as selecting information-rich cases from which one can learn the most. Even in a collective case study, it is difficult to choose representative or typical cases (Stake, 1995). The method used to select the cases for this study was to identify information-rich schools as well as to maximize the differences, following a maximum variation sampling strategy for purposeful sampling (Patton, 1990). Often, researchers want to understand how a phenomenon is seen and understood among different people, in different settings and at different times. When using a maximum variation sampling method the researcher selects a small number of units or cases that maximize the diversity relevant to the research question. Accordingly, I narrowed the final six schools using the maximum variation method. Table 3.3 summarizes the information about the schools selected to participate.

Table 3.3

Description of participating schools

	ENRL[a]	RPRT[b]	PRF[c]	FRL[d]	CATEGORY
ROWAN*	1291	183	71.6	13.3	HP/LFRL
ALLISTER N.*	868	82	52.4	11.9	MP/LFRL
LAMAR	648	171	49.7	69.0	MP/HFRL
ZAPATA	2466	523	33.1	36.5	LP/MFRL
DANDRIGE*	1185	60	15.0	7.0	LP/LFRL
MILLWOOD PREP	1363	204	3.4	81.0	LP/HFRL

Note. Schools are ordered by level of performance on the 2009 Missouri Algebra 1 EOC assessment.

*Indicates the school was located in a district that met 2009 AYP Target of 54.1%

[a]Total school enrollment

[b]Number of students reported taking EOC assessment

[c]Percent of students scoring proficient or above

[d]Percent of students receiving free or reduced lunch

Research Design

An instrumental collective case study (Creswell, 2003; Stake, 1995) was conducted involving the appropriate teachers–those who teach Algebra 1, department chair, and district supervisor of each participating school. These case studies focus on strategies and practices used by the instructional staff and on the testing policies implemented by administrators with the aim to increase student achievement on the Missouri Algebra 1 EOC assessment.

According to Stake (1994), "Case study is not a methodological choice, but a choice of object to be studied. Case study defines the approach taken towards the inquiry, which in this case was of an interpretive nature. In this study, patterns were looked for

more than correlation (Stake, 1995). According to the instrumental approach, understanding the cases is the first priority. This is accomplished by focusing on strategies and practices teachers used and how they were used, and proceeding to explaining and sense making (Huberman & Miles, 1994). Both of these were applied for the within-case analysis and the cross-case analysis.

Summary of Selected Schools

Rowan

Rowan High is one of five high schools in the Rowan School District. The student population at Rowan High is 75.8% White, 15.3% Black, 7.8% Asian, 0.9% Hispanic, 0.2% Native American, with 13.3% of students eligible to receive a free or reduced lunch. Rowan High met the 2009 AYP target and had the highest level of performance (71.6%) of any St. Louis area high school, including schools that did not meet any of my previous criteria. Rowan High is in the high performance/low free and reduced lunch (HP/LFRL) category.

Rowan has 13 mathematics teachers and offers 17 courses that cover five mathematics sequences (or tracks) to help each student develop a four-year program that is most comparable to their needs. Rowan High offers Pre-Algebra, Algebra 1B, and Algebra 1A, but only administers the EOC assessment to students enrolled in Algebra 1A or Algebra 1B. The textbooks used are published by McDougal-Littell.

Allister North

Allister North High is the sole high school in the Allister School District. The student population at Allister North is 68.1% White, 22.5% Black, 7.7% Asian, 1.7% Hispanic, while 11.9% of students were eligible to receive a free or reduced lunch.

Allister North consistently ranks among the nation's top high schools (see, U. S. News & World Report, 2010), but failed to meet the 2009 AYP Target. Allister North did, however, make AYP due to the Missouri provision of scoring within the AYP confidence interval (CI). Allister North is in the mid performance/low free and reduced lunch (MP/LFRL) category.

Allister North has 13 mathematics teachers and offers 19 courses covering four sequences. The majority of students are recommended to take the integrated mathematics sequence, but there is an alternate option for students to take a traditional course sequence. Allister North High does not teach a course named Algebra, so the traditional sequence begins with Geometry. Allister North uses *Core-Plus Mathematics: Contemporary Mathematics in Context* for their integrated mathematics sequence.

Allister North offers 4 tracks and students are tested only after all core objectives are covered. Therefore, students may be scheduled to take the EOC assessment in 9^{th}, 10^{th}, or 11^{th} grades.

Lamar

Lamar High School is a magnet school in the Lamar School District (LSD). LSD is unaccredited as a school district in the state of Missouri. The student population at Lamar High is 69% Black, 16.5% White, 9% Hispanic, 5.2% Asian, 0.3% American Indian, with 69% FRL. Lamar was the only high school in the MP/HFRL category and also represents a school that made AYP (CI) while being in a district that failed to make AYP.

Lamar has 4 mathematics teachers and offers 10 courses that cover 2 pathways (or tracks). Although the LSD mandates that all grade 8 students take a course in Algebra,

only a very small percentage (less than 3%) take the Algebra 1 EOC assessment prior to high school. The vast majority of freshmen are enrolled into Algebra 150 where the traditional McDougal Littell *Algebra 1* textbook is primarily used.

Zapata

Zapata High is one of three large high schools in the Zapata School District. The student population at Zapata is 59.3% White, 36.3% Black, 2.4% Hispanic, 1.9% Asian, 0.1% American Indian, while 36.5% of students were eligible to receive a free or reduced lunch. Zapata is the largest school and tested the most number of students in the St. Louis area. Zapata did not meet AYP in 2009 and is categorized as low performance/mid free and reduced lunch (LP/MFRL).

Zapata offers 13 mathematics courses, five of which may be taken for honors credit, and one of which serves as a foundations of Algebra course. Only students enrolled in Algebra 1 are eligible to take the EOC assessment. The district has recently converted from a traditional mathematics textbook to the more inquiry-based *Discovering Algebra* textbook published by Key Curriculum Press.

Dandrige

Dandrige is the only high school in the affluent Dandrige School District. The student population at Dandrige is 71.1% White, 18% Black, 7.9% Asian, 2% Hispanic, and 0.3% American Indian. A mere 7% of Dandrige students were eligible to receive a FRL, however this seemed to contradict the common assumption that socioeconomic status is an indicator of student performance, as Dandrige failed to make AYP and recorded a poor (15%) Algebra 1 EOC assessment performance. Dandrige High is categorized as LP/LFRL.

Dandrige offers 18 mathematics courses instructed by 14 teachers. There are four pathways that were created to support students' needs. A first course in Algebra may be taken as a one-year course that meets on a block schedule (Algebra 1), or as a one-year course that meets daily (Algebra 1 AB). Dandrige uses the Glencoe *Algebra 1* textbook.

Millwood

Millwood Prep is the only high school in the Millwood School District. The student population at Millwood is 99.3% Black, 0.5% White, 0.1% Hispanic, with 81% of students eligible to receive a free or reduced lunch. Millwood is the lowest performing school (3.4% proficient or above) meeting all previous criteria and is categorized as LP/HFRL. The Millwood School District did not meet AYP in 2009 and is among the lowest performing school districts in the entire state of Missouri.

Millwood has 9 mathematics teachers and offers 14 mathematics courses. Three tracks (normal, modified, and honors) are offered to accommodate all students, and all three tracks are tested on the Algebra 1 EOC assessment. Students are tested in Algebra 1, Algebra 1 Modified, or Honors Algebra 1. The primary mathematics textbooks used are Glencoe *Algebra 1*, while McDougal-Littell *Algebra 1 Concepts* textbooks are used for the modified courses.

Data Collection

This study utilized four instruments to collect data to inform the research questions: School Demographic Summary (collected from school and district web sites and the 2009-2010 Missouri School Directory), two Interview Protocols (used with department chairs and district mathematics supervisors), and a Teacher Survey (administered to all teachers responsible for preparing students to take the Algebra 1

EOC assessment). Additional information on each instrument follows.

School Demographic Summary

School and district web sites were searched to provide preliminary information on the number and types of mathematics courses offered, textbooks and other curricular materials used, and the size of the mathematics department (number of teachers assigned to mathematics courses). Additionally, the 2009-2010 Missouri School Directory provided detailed information on the name, type, enrollment, and grade span of each school. An electronic link to each district's planning profile provided: student demographics, educational process data, summary reports, educational resources, and educational performance data. The final component is the Annual Reporting of School District Data FTP Downloading Site. This site provided information in categories including: accreditation status, demographics, students staff ratios, average faculty salary, teacher certification, attendance data, discipline incidents, dropouts, graduation rates, graduation follow-up, EOC disaggregate scores, and AYP for both schools and districts (see Appendix A).

Mathematics Teacher Survey

The survey was designed to document teachers' background, beliefs, practices, professional development opportunities, knowledge of standards, curriculum & assessment, knowledge of district policies, focus on improving outcomes, and use of textbook as it pertains to the Missouri Algebra 1 EOC assessment (see Appendix B). The survey was administered to all instructors of Algebra 1 (or equivalent course) in the targeted school year at each school.

To achieve a high response rate, the department chair at each school was asked to

identify and inform eligible teachers to complete the survey. Additionally, the survey was web-based to avoid the logistics of paper-based surveys, and to assist with providing anonymity. Finally, periodic reminders were sent to each department chairperson yielding a response rate of 93%.

An adapted version of the *2000 National Board on Educational Testing Policy: Teacher Survey on the Impact of Sate-Mandated Testing Programs* (Pedulla et al., 2003) and *Improving Achievement for Low-Income Students: What Makes a Difference?* Teacher Survey (Williams et al., 2005) were used as the foundation of the study survey instrument. I selected and examined survey items and my dissertation committee chairperson, Dr. Barbara Reys, vetted them. Because these items were taken from two national surveys, the validity of the each item was inherent. After the survey was developed, one district mathematics supervisor piloted the items and provided feedback to improve reliability. The University of Missouri Campus Institutional Review Board requested that I remove one item that identified the respondent by school district. All other questions were kept as originally prepared.

Department Chair Interview

All of the questions on this instrument were taken from the interview portion of *Improving Algebra 1 End-of-Course Exam Scores: Evidence from the Field* (Yañez & Wenrick, 2000). My dissertation committee chairperson, Dr. Barbara Reys, determined the final question selections. The validity of each item was inherent from the original source. After the survey was developed, one former mathematics department chairperson completed the interview and provided feedback for reliability. This interview served the purpose of providing data about how teachers prepared their students for the Missouri

Algebra 1 EOC assessment. The interview addressed specifics of district and school testing policies and practices, collected details about the school's curriculum, and provided an opportunity to identify participants for the teacher surveys (see Appendix C). All interviews were less than one hour long and were audio-recorded and transcribed. Periodic follow-up conversations with teacher supervisors helped clarify the context and enrich the researcher's perspective on the data and served to corroborate findings across the cases and provided an opportunity to clarify findings from the teacher surveys.

District Mathematics Supervisor Interview

All of the questions on this instrument were also taken from the interview portion of *Improving Algebra 1 End-of-Course Exam Scores: Evidence from the Field* (Yañez & Wenrick, 2000). My dissertation committee chairperson, Dr. Barbara Reys, determined the final question selections. The validity of each item was inherent from the original source. After the survey was developed, one district mathematics supervisor completed the interview and provided feedback for reliability. The District Mathematics Supervisor interview served the purpose of providing data about how each district coordinated policies and implemented practices across multiple schools. The interview addressed specifics of school and district testing policies, and provided details about district initiatives and implemented curriculum (see Appendix D).

Data Analysis

School Demographic Summary

To accurately describe the participating schools in the study, I analyzed the MAP and Algebra 1 EOC data file and identified all 794 schools administering the Algebra 1 EOC assessment. This file listed the number of students reported taking the assessment as

well as the percent of students scoring at the Below Basic, Basic, Proficient, and Advanced levels. I created an additional column that combined the percentage of students scoring proficient with the percentage of students scoring advanced. This new column allowed me to rank each school by percent of students scoring proficient or above. Additionally, this data file was matched and combined with the Student Demographics file to add the school enrollment, students receiving FRL, and student ethnicity of each school. These two files were combined and filtered to create one database used to sort schools by performance level and percentage of students eligible for free or reduced lunch.

2009-2010 Missouri School Directory

The Missouri School Directory provided information about the official name, location, and grade span structure of each school in the state of Missouri. The course-specific Algebra 1 EOC assessment replaces the 10th grade MAP exam as the NCLB required high school assessment. However, in Missouri, Algebra may be offered to students ranging anywhere from grades 6-12. Selecting schools that contain this grade range would be both cumbersome and misleading. This directory allowed the data to be organized by grade-span in order to create a more homogenous and appropriate sample for this study. The information obtained from these sources and the district FTP data downloading site, allowed the purposeful sampling of 6 information-rich schools selected for this study.

Department Chair and Mathematics Supervisor Interviews

The two Department Chair/Mathematics Supervisors Interviews were transcribed. During the process of checking the transcriptions, a first identification of the main issues

was completed. Analytic notes were made from these data in relation to the conceptual framework. Relevant excerpts from the interviews were identified and organized to be part of the narrative of each case.

Case narratives were developed, looking for holistic themes of the schools, but at the same time organizing these narratives according to the conceptual framework described in the previous chapter. A cross-case analysis was performed by looking for commonalities and contrasts in the descriptions and then returning to the cases to check the validity of the claims.

Mathematics Teacher Survey

The Mathematics Teacher Survey data were compiled, organized and summarized. A database was created in order to sort and group the schools according to different categories, such as course taught during assessment year, district delay policy, teacher experience, type of curriculum used, etc. Based on responses, frequencies of different variables were calculated. These frequencies were used to collect and interpret common themes found throughout all responses and used to provide indications of teacher's practices and beliefs.

All current Algebra 1 (or equivalent) teachers were invited by their departmental chairperson to complete the survey. The surveys were available online via Survey Monkey© to assist in achieving a high response rate. In fact, the response rate ranged from 84% to 100% across districts with an overall response rate of 93%.

Summary

Surveys and interview data from approximately 5 high school mathematics teachers at each of 6 different schools was used to document the policies and practices

used to improve student achievement on the Missouri Algebra 1 EOC assessment. For a more in-depth view of the factors associated with student performance, an additional interview was conducted with the district mathematics supervisor. Six case studies were constructed. Based on these different sources of data, inferences were made regarding the interaction between policies and practices and student performance. The data gathered from this study are presented in the next chapter.

4. RESULTS AND ANALYSIS

This chapter presents the data collected to address the stated research questions. The following sections organize the chapter: (a) Introduction, (b) Context Related to Data Collection, (c) Overview of Strategies and Policies, (d) Presentation of Data and Analysis, and (e) Summary.

Introduction

The purpose of this study is to examine district and school policies and practices that are intended to support student learning and performance as measured by the Missouri Algebra 1 End-of-Course (EOC) assessment. More specifically, it describes the decisions and actions particular schools and school districts made in response to the requirement to participate in the Missouri Algebra 1 EOC assessment. The research questions are as follows:

1. What policies and strategies have districts and schools implemented in response to the Missouri Algebra 1 EOC assessment?
    a. Who was involved in making these decisions?
    b. Why were these decisions made?
    c. How and when were these decisions implemented?
2. What are the perceptions of teachers regarding the impact of the new policies and strategies on student performance?

This study aims to identify factors associated with the desire to raise district performance on the Algebra 1 EOC assessment. Additionally, this study describes key features of the school environment including:

(1) Environment for learning in the schools,

(2) School focus on improving academic outcomes,

(3) Nature of mathematics instruction and curricula,

(4) Use of assessment data by schools and school districts,

(5) Teacher competence and professional development, and

(6) Administrative accountability and support.

A survey instrument (Appendix B) and interview protocols (Appendices C & D) were developed and used to collect data to address the research questions. Responses from the survey and interviews were inventoried based on the categories noted above.

Context Related to Data Collection

Selection of Schools

For the purposes of this study, the focus is on 305 Missouri schools having a 9-12 grade span structure. Choosing the sample from this group of schools eliminated the possibility that the majority of tested students were in a grade not typically considered as high school, such as the 7th grade. The two major criteria used for the selection of cases (schools) for this study were: (a) level of performance on the 2009 Missouri Algebra 1 EOC assessment and, (b) percentage of students eligible for free or reduced lunch (FRL). In addition to performance on Algebra 1 EOC exam and proportion of FRL, additional criteria included school population. That is, to be included in this study, schools must have at least 400 students and at least 50 of these students must have taken the Algebra 1 EOC assessment. This reduced the 305 (9-12 grade span) schools participating in the Missouri Algebra 1 EOC assessment to 180 schools. To maximize accessibility to the schools, I focused on schools located in either St. Louis County or St. Louis City school districts. This condition resulted in 38 schools meeting all criteria.

Categorization of Schools

Each of the 38 schools meeting the criteria were then categorized according to level of proficiency on the EOC and percentage of students eligible for FRL. For the purposes of this study, proficiency level was based on the 2008 and 2010 AYP targets of 45% and 63.3% respectively. Schools with high performance (HP) were defined as those with at least 63.3% of students passing the EOC Algebra 1 exam. Schools defined as low performance (LP) had fewer than 45% of students passing the EOC Algebra 1 exam. Schools with performance levels between these two targets were classified as mid performance (MP).

Similar to performance levels, three levels of socioeconomic status were established using the top and bottom quartiles for Missouri state FRL eligibility. Schools having 62.7% (top quartile) or more of their students receiving free or reduced lunch are indicated as High FRL (HFRL), whereas schools with 31.1% (bottom quartile) or less as Low FRL (LFRL). Schools with a percentage of students between these two levels were coded Mid FRL (MFRL).

The combination of performance levels and socioeconomic status criteria created nine categories used to code the 38 schools. The selection of cases for this research were chosen by selecting a simple random sample of size $n = 1$ from each category except for MP/HFRL, which only had one case. Three categories (HP/MFRL, HP/HFRL, and MP/MFRL) did not have any cases in the metropolitan area. The categories, and number of respective schools for each code are indicated in Table 4.1 along with one randomly selected school from each category, when available. As noted, the process described resulted in six schools identified for the study reported here.

Table 4.1

Number of schools in each of nine categories of eligible St. Louis schools and identification of randomly selected school for the study

CATEGORY	NUMBER	SELECTION
HP/LFRL	3	ROWAN (R)
MP/LFRL	8	ALLISTER NORTH (AN)
MP/HFRL	1	LAMAR (L)
LP/MFRL	11	ZAPATA (Z)
LP/LFRL	6	DANDRIGE (D)
LP/HFRL	9	MILLWOOD PREP (MP)
HP/MFRL	0	
HP/HFRL	0	
MP/MFRL	0	

Overview of Strategies and Policies

Table 4.2 and Table 4.3 provide an overview of strategies and policies gleaned from the data collected for this study. Four common strategies for improving performance on the Missouri Algebra 1 EOC were: choice of mathematics curriculum; assignment of Algebra 1 teachers; the use of an additional course(s); and increasing the number of 8th graders tested. Four typical policies included: implementing vertical teaming; mathematics specialist in elementary and middle schools; supplemental instruction; and providing Algebra teachers with mathematics-specific professional development.

Table 4.2

Summary of Strategies Related to Algebra 1 EOC.

School	Strategy: Curriculum	Strategy: Teacher Selection	Strategy: Additional Course	Strategy: Percent Tested in 8th Grade
Allister North	Glencoe: *Core Plus*	All teachers	No additional course	38%
Dandrige	Glencoe: *Algebra 1*	All teachers	No additional course	71%
Lamar	McDougal Littell: *Algebra 1*	Principal appointment	Double dose of Algebra 1	6%
Millwood Prep	Glencoe: *Algebra 1*	Principal appointment	No additional course	None
Rowan	McDougal Littell: *Algebra 1*	Teacher request to department chairperson	Algebra lab	29%
Zapata	Kendall Hunt: *Discovering Algebra*	Assistant principal appointment	No additional course	12%

Table 4.3

Summary of Policies Related to Algebra 1 EOC

School	Policy: Vertical Teams	Policy: Math Specialists	Policy: Additional Instruction	Policy: Math Specific PD
Allister North	8-9	All elementary & Middle	None	Yes
Dandrige	8-9	All elementary & Middle	Athletic Study Hall	Yes
Lamar	None	Select elementary & Middle	None	No
Millwood Prep	None	None	None	No
Rowan	8-9	All elementary & Middle	Academic Success Center	Yes
Zapata	8-9	None	None	Yes

Presentation of Data Analysis

Results based on responses from the teacher surveys and school/district administrators are presented in this section and are organized into two main parts: the survey results and the case studies. For the first section, the results of the teacher survey are presented to provide a general picture of participating schools. The survey provided data that describe both the group of teachers and their background, and the extent and nature of preparing students for the Algebra 1 EOC assessment. The cases are described in the second section. For each case, a more specific description of each school's climate,

policies, and practices is provided.

The data collected for this study includes survey responses from 30 of 32 mathematics teachers in the six schools, which represents all the teachers that taught Algebra 1 during 2008-2010. The Allister North school district teaches Algebra to a large number of students in the middle grades and administers the Algebra 1 EOC to significant number (45% in 2009) of all tested students. Survey invitations were primarily delivered through the district mathematics supervisor who may not have been clear about the requirement that all participants are to be secondary school teachers; therefore, at Allister North, 3 teacher respondents were inadvertently middle school Algebra 1 teachers. These middle school teachers were summarily omitted form the analysis. As a result, 27 of 30 survey responses were used as valid high school teacher responses for the purpose of this study. In addition, the data includes interview responses from 10 of 12 school or district administrators, with each school represented by at least one administrator. The mathematics department chairperson and the district mathematics supervisor represented each school/district as interviewees except for the Zapata and Millwood schools. Zapata does not have the traditional administrative structure and has discontinued the use of department chairs and mathematics supervisors, instead delegating departmental responsibilities to the assistant principals. In the Millwood district, the department chair was the only administrator available to be interviewed since the district does not have subject-specific curriculum supervisors.

Administrator Interviews

In this section, the policies and strategies of each of the six schools are presented. Each district's philosophy and process of administering the Missouri Algebra 1 EOC

assessment was culled from the department chair and math supervisor interviews and is described in terms of: (a) focusing on improving academic outcomes; (b) coherent and aligned standards based curriculum; (c) use of assessment data to improve instruction and student learning; (d) teacher competence, evaluation, and support; and (e) district leadership and accountability.

Focus on Outcomes

Allister North attributes meeting 2009 AYP to their alignment of Algebra 1 EOC assessment to their daily instruction. This has been attributed to their adoption of the *Core-Plus* textbook series. Their department chairperson states, "When our kids walk in to take the EOC, the assessment looks like what they do everyday." There is no special preparation done for this assessment. The faculty and staff at Allister North strive to make all testing (state, district, local, etc.) feel as close to a normal day as possible. According to their mathematics department chairperson, Allister North's high level of student comfort and performance on the Algebra 1 EOC assessment is primarily accomplished through a strong curriculum supported with common, aligned assessments and not through preparing to take any test.

A team of teachers assigned to teach the same course is charged with writing the common school/district assessments for that course. For example, every Integrated Math 1 instructor collaborates to create chapter tests, quizzes, quick-checks, etc. These common assessments are administered and graded by all Integrated Math 1 teachers. It is normal for teachers with common preps to grade each other's assessments. This level of collaboration allows teachers to provide feedback pertaining to student comprehension or to specific teaching strategies over a particular topic. This information is communicated

during their professional learning community (PLC) meetings. During PLC meetings teachers have the opportunity to share strategies and best practices to teach a particular topic. Benchmark assessments are also created by teachers and administered to students; however, they are not aimed at the Missouri EOC assessment, but at the school's unit objectives as dictated by the district-adopted curriculum the *Core-Plus Mathematics Program*.

Mathematics teachers at Allister North are strong supporters of the philosophy of standards-based, integrated, and inquiry-based curricula. The department chairperson indicated, "There is strength in *Core-Plus*. Consistently tying in the graphical, numerical and algebraic representations provides students with the tools necessary to interpret the world around them." Additionally, The mathematics curriculum supervisor indicated that standardized testing is not a major focus in the district and said, "If you really teach the curriculum for understanding, then you kind of let the test do its thing." This means that providing students with sound instructional practices along with a coherent and aligned curriculum will prepare them for any assessment.

Zapata attributes their failure to meet 2009 AYP on the Missouri Algebra 1 EOC to the consistently low performance of its IEP subgroup. One assistant principal indicated, "When I pass through the modified algebra classes and witness students having difficulty with basic operations on integers, I think to myself, how can this deficit be overcome in less than a year?" To increase the amount of instructional attention to mathematics, the Zapata school district moved to a unique organizational structure. The position of district mathematics supervisor has been eliminated and these duties have been divided between an assessment specialist and, at the secondary level, an assistant

principal. Additionally, there are no departmental chairpersons in the high schools in the district. These duties and responsibilities have also been passed to the assistant principal. These administrative changes have been made in order to allow teachers (e.g., the person previously noted as Department Chair) to concentrate on instructional rather than administrative activities.

Another indicator of focus on outcomes is demonstrated by an increase in the amount of time spent with vertical teams. Middle school teachers spend more planning time with Algebra 1 teachers, and likewise Algebra 1 teachers are spending more planning time with Geometry teachers. These vertical teams are expected to identify and focus on developmental progressions of mathematical content such as fractions and proportional reasoning.

The principal at Dandrige is highly focused on eliminating the achievement gap between white and black students. The principal understands the importance of learning trajectories for fundamental mathematical concepts. Her familiarity with learning trajectories allows her to provide pedagogical support to her teachers. Moreover, she is able to work closely with the African American parents' group on strategies and accommodations for students. The building principal studies student performance data and uses it to make informed decisions about instruction and student learning. Her ability to work with disaggregated data provides another dimension of support to mathematics department faculty.

Dandrige volunteered as a field-test site for the Algebra 1 EOC assessment in 2007. This assisted the school in focusing on learning objectives with the intention of organizing test preparation. In fact, Dandrige teachers include a daily review of released

Algebra 1 EOC items, focusing on language and the format of the items.

The district implemented a web based benchmarking program (a service of Discovery Education) that allows schools to predict in advance how students may perform on the Algebra 1 EOC. The program includes a method of providing students several EOC type questions to prepare them for the exam. Administrators at Dandrige believe their percentage of proficient students doubled primarily due to students being more comfortable with the language and format of the test as experienced on the web based program.

The administrators at Dandrige indicate they are progressive in their approach to the mathematics education of students. The mathematics teachers are allowed to try a variety of teaching methods. Additionally, they are supported by the school to pilot recent teaching method s and new curricula. The school principal at Dandrige actively participates in department meetings, and offers feedback and suggestions on ways to improve instruction and learning. The district mathematics supervisor was quoted as saying, " We also plan on reevaluating our curriculum especially in lieu of the Common Core standards. We see test-prep as not teaching to the test, but teaching students an additional way of looking at the material to do better on a test that typically focuses on language."

Administrators in the Dandrige district do not support the use of graphing calculators, but encourage the use scientific calculators for Algebra 1 students. All Dandrige teachers have Smart Boards in their classrooms and computers available for student use. The district uses Assessment and Learning in Knowledge Spaces[1] (ALEKS)

[1] A web based artificially intelligent assessment learning system. http://www.aleks.com

online software to assist teachers in establishing what objective students have mastered and they need to learn. Prior to using Aleks, most attempts at understanding student performance were driven by anecdotal evidence.

Dandrige teachers believe that struggling Algebra 1 students need practice problems and regular homework assignments. Math XL by Pearson is used for homework intervention. The software intervention is intended to encourage students to fully complete practice problems and homework assignments. Algebra 1 classes rarely exceed 20 students and students in these courses have access to laptops everyday.

Another area of school focus is on the performance of AYP subgroups. The overall performance of students is typically at or above anticipated proficiency levels. However, the performances of most subgroups at Dandrige High School are noticeably lower than anticipated proficiency levels. In response to low subgroup performance, Dandrige has specific programs that focus on low performing students but are also organized to support all students. One example is the after school athletic study hall. The athletic study hall was created to assist student-athletes though tutoring and extra instruction due to their increase time demands. The athletic study hall is open to all students attending Dandrige high school. Although teachers at Dandrige target all students in this program, they encourage struggling students to take advantage of the services offered during the athletic study hall.

Teachers at Millwood Prep attribute not meeting 2009 AYP to their belief that the EOC assessment has no relevance to the students. They also believe that the current structure of the assessment does not encourage any accountability from the students. Millwood's department chair comments:

> The students all say, "It's a teacher's test. It's not for us." In order to see progress at Millwood Prep, there will need to be some [student] stakes associated with the EOC assessment, just as there is in states likes Indiana or Texas. Until there is some accountability placed on the students, they will not put forth the necessary effort needed for improvement.

While Millwood Prep teachers and administrators were disappointed with student performance on the Algebra 1 EOC assessment, the district made public announcements and commended teachers for the increase from 2009 to 2010 in the percentage of students scoring at or above proficient (6.5%).

The district routinely provides students with basic school items such as pencils and paper. This provision is based on the socioeconomic status of the majority of students and the general belief that they are not able to afford these items. Most Millwood Prep students are unable or unwilling to purchase graphing calculators or computers solely for educational purposes.

The district has funded a Saturday program for students through Pearson Publishing Company. The program focuses on misconceptions students typically develop in mathematics with particular attention to algebra topics. The students work in groups of two on prescribed activities, as the instructor facilitates student-centered learning. The instructor for this program is one of the regular mathematics teachers who receives extra-service pay. The program is based on a credit recovery model and is only available to students who have failed Algebra 1 in either the first and/or second semester. Teachers and administrators reported that this program would most likely have more impact if it were available to all Algebra 1 students.

At Millwood Prep, each subject area faculty group (i.e. mathematics, English, science, etc.) maintains a binder summarizing data on common assessment and

benchmark assessments for every student. The common assessments are typically administered three times per year and the benchmark assessments occur about once per quarter. In addition, Millwood Prep uses the *Missouri Buckle Down* series as a supplement to the regular textbook. The *Missouri Buckle Down* series is used as a benchmarking tool and is given on a quarterly basis.

The mathematics department chair at Millwood Prep typically does not have input about course instructor assignments. However, for the first time in several years the department chair and faculty members were involved in instructor assignment for the 2010 school year. Almost all teachers were assigned at least one Algebra 1 course. The few teachers that were not assigned to Algebra 1 were teachers that had difficulty in prior years instructing this course.

Rowan faculty and administrators have examined their EOC data and found that scores of students from the two Algebra courses (Algebra 1A and Algebra 1B) are not similar as intended when the courses were created. Instead, Algebra 1B had become a remedial course with students with Individualized Education Programs (IEP) and African American students more abundant than in Algebra 1A. As a result, beginning in 2011-2012, the school will drop Pre-Algebra and will combine Algebra 1A and Algebra 1B into one course. To accommodate for differences in student entry-level knowledge, the new Algebra 1 course will be taught over either two or three semesters depending on the previous performance of the students. Rowan's department chair states, "If you look at the academic system, learning is the variable and time is the constant. We are trying to turn that around to where learning is the constant and time should be the variable."

Rowan has moved away from advancing students to the second semester of

Algebra 1 if they fail the first semester of the course. In the past, these students would be required to make up the half credit failed in summer school. Rowan realized that in this scenario the summer school class could consist of some students missing first semester credit, while others would be missing second semester credit. This would create a situation where no one would be getting the help they needed. Currently, Rowan has arranged for their scheduling to accommodate students to retake the first semester during the second semester and finish the second semester over the summer. These students are administered the Algebra 1 EOC at the conclusion of the summer course.

Although Rowan did well on the Algebra 1 EOC and all subgroups made AYP, school administrators and teachers see room for improvement. The school administrators and teachers envision constructing a rigorous Algebra 1 curriculum that is not focused solely on improving student Algebra 1 EOC assessment scores. This course would be based on standards of excellence and would have learning goals as a priority. Ideally, this Algebra 1 curriculum would enable all students to understand and apply algebraic concepts in the workplace and in subsequent educational experiences. Rowan teachers and students have constant access to graphing calculators and computers. Rowan also piloted the concept of an Algebra Lab, which provides an additional 50 minutes of teacher support for learning Algebra. The Algebra Lab allows students additional opportunity to increase their mathematical understanding by providing an additional course that presents the material using alternate methods.

Presently, Rowan Algebra 1 teachers do not use common unit or quarterly assessments. They are considering this strategy but want to maintain teacher autonomy. The staff indicates a desire to share common strategies related to teaching and

assessment, and intends to move towards common assessments in the next 3 to 4 years.

Diversity in Action is a Rowan program focused on increasing the number of African American students enrolled in honor classes. In addition, a mentoring group has been established to provide guidance to freshman African American students. Rowan is seeking ways to ensure that IEP students are receiving as much support as possible. They actively seek equal opportunities for all students. For example, if a higher percentage of African American students are enrolled in Algebra 1B, and this course consistently underperforms on the Algebra 1 EOC assessment, then they believe eliminating that course is a legitimate strategy for supporting equal opportunities.

Currently about half of the mathematics department staff teaches Algebra 1. All teachers' assignments are determined by filling out a departmental form that records teacher preferences for a 5-year period. These preferences are utilized in making teaching assignments. Rowans philosophy is that their best teachers should be teaching the courses with the most stakes attached, including Algebra 1.

Rowan teachers do not focus on reviewing for the Algebra 1 EOC Assessment. A week or two before the test, teachers may review test-taking strategies or may acclimate students regarding language or structural considerations of the test, but there is no direct focus on test preparation.

Lamar attributes meeting 2009 AYP on the Algebra 1 EOC assessment to having dynamic teachers that are adept at encouraging and engaging students. Unfortunately, in 2010 one of these same teachers missed several days of instruction, the other missed the entire year. Both teachers were replaced with substitutes for the duration of their absences. The results were a loss of learning opportunities.

The Lamar school district has implemented "double dosing" of Algebra 1 for all freshmen. That is, every freshman student enrolled in Algebra 1 is also enrolled in an additional course in Algebra to support learning. Two Renaissance Learning online web-based programs, *Accelerated Math* and *Star Math*, are used in the double dose algebra course. In these programs, students take a series of brief tests that determine the pace at which they study and progress through the materials. Because there is disparity among schools in the district with regard to access to technology, the *Accelerated Math* program has become paper intensive. That is, what was typically expected to be on computer now has to be printed and distributed to students.

In addition to the Renaissance Learning materials, the district requires up to four benchmark exams during the year that are created by Kaplan. The benchmark exams are aligned to the state course level expectations (CLE) and were created to monitor progress in areas associated with the Missouri Algebra EOC assessment. These benchmark exams are administered throughout the district and graded by district personnel.

In 2010, the mathematics department chairperson noticed discrepancies between the *Star Math* scores and the benchmark exam results for the same group of tested students. He believes that one issue may be the implementation of *Accelerated Math*. The program is not used as intended by its developers. A large component of the program is predicated upon the student accessing activities over the Internet from home. Most of the students using this program do not have access to the required technology and are regulated to teacher printouts when they return to school. Moreover, this program is typically used to monitor teacher engagement and activity with the program, and intermittently used to gauge student performance.

Lamar implements cross-curricular instruction to help reinforce the comprehension and retention of mathematical concepts. That is, the mathematics and science departments work together to help students see that their learning is not isolated according to particular subjects but is inter-connected. During Algebra 1, the 9th grade science course simultaneously emphasizes topics such as significant digits, scientific notation, unit conversions, and dimensional analysis. Administrators and teachers believe the cross-curricular approach benefits students as they prepare for subsequent courses as well as for large-scale assessments.

Lamar High employs peer tutoring in mathematics. This is, in part, based on the need to fulfill requirements of student programs housed in the building such as the A+ Program, and in part to increase student understanding in mathematics.

In 2010, a pair of Teach for America (TFA) teachers was assigned as instructors for Algebra 1. Both TFA teachers were in their second year as probationary teachers and neither planned to complete full certification or continue teaching at the school beyond their commitment of two years.

Curriculum

Allister North offers 4 tracks and students are tested on the Missouri Algebra 1 EOC assessment only after students have an opportunity to learn all core objectives (CLE). The tracks are labeled: (a) informal, (b) college prep, (c) college prep alternate, and (d) honors. The informal and college prep tracks both use an integrated curriculum textbook series. College prep alternate and honors tracks use a traditional textbook series. Students in the informal track are enrolled in the integrated sequence and study the content at two-thirds the pace of the college prep students. The integrated series is a

sequence of 4 one-year courses typically taught each semester as 1A, 1B, 2A, 2B, etc. The informal track spreads the first two courses over a period of three years, causing the sequence to be relabeled as 1A, 1B, 1C, 2A, 2B, 2C, etc.

Allister North tests students only after instruction has focused on all objectives and course level expectations; therefore, students may be scheduled to take the EOC assessment in 9th, 10th, or 11th grades depending on their placement in the tracked sequence. The vast majority of secondary students (79%) are tested on the Algebra 1 EOC in grade 9. Allister North also administers the Missouri Algebra 1 EOC assessment to nearly 40% of students in the eighth grade.

Zapata offers 13 mathematics courses (see Appendix E), five of which may be taken for honors credit, and one of which serves as a "Foundations of Algebra" course. The district has recently converted from the McGraw Hill Algebra 1 textbook to the more inquiry-based *Discovering Algebra: An Investigative Approach* (2nd edition) textbook published by Key Curriculum Press. This textbook is a natural transition from the elementary program used in the district (*Investigations in Numbers, data & Space)*, however, it has been a difficult transition for the secondary teachers, as they have little or no experience with this textbook or the philosophy upon which it was developed.

Students enrolled in and passing Algebra 1 at Zapata high school are eligible to take the Missouri Algebra 1 EOC assessment. An additional avenue to testing eligibility is through taking a modified Algebra 1 course that is directed towards students having individualized education programs (IEP). The majority of test takers are 9th grade students, with the exception of the few modified algebra students that typically test at the 10th grade. Additionally, Zapata benefits from banked scores from 8th grade students in

the district. The 8th grade test takers represent nearly 25% of all test takers in the Zapata school district.

Dandrige offers 18 mathematics courses (see Appendix E) instructed by 14 teachers. There are four pathways to support students' needs. The current curriculum offers courses ranging from Algebra 1 to Calculus III. This is primarily due to a growing number of students completing AP Calculus AB and BC by their junior year in high school. Dandrige offered Pre-Algebra prior to 2009, but has moved away from offering courses lower than Algebra 1 in recent years. The math department chair believes that eliminating pre-algebra options in high school allows the student greater opportunity to matriculate into higher-level math courses while in high school. He also commented, "Our focus is developing a strong foundation for most of our students for College Algebra, not Calculus. This is easily done when students begin high school with at least Algebra 1 as a first course."

A first course in Algebra may be taken as a one-year course that meets on a block schedule (Algebra 1), or as a one-year course that meets daily (Algebra 1 AB). Both of these courses were established primarily for freshmen, however most of the freshmen are enrolled in the Algebra 1 course. Dandrige uses the Glencoe *Algebra 1* textbook.

At Dandrige, there is no seniority policy that assigns experienced teachers to the higher-level mathematics courses while indiscriminately placing newer teachers in lower-level mathematics courses. In this district, all teachers are encouraged to teach at least one lower level course of struggling students. This ideology helps to ensure that the mathematics teachers do not develop a skewed view of the needs and performance of students. Generally, teachers who want to teach Algebra 1, and are adept at teaching

struggling students, are typically assigned to teach Algebra 1.

Millwood has 9 mathematics teachers and offers 14 mathematics courses (see Appendix E). Three tracks (normal, modified, and honors) are offered to accommodate all students, and students in all three tracks are tested on the Algebra 1 EOC assessment. All 9th grade students are tested in Algebra 1, Algebra 1 Modified, and Honors Algebra 1. All students enrolled in Algebra 1 Modified have an Individualized Education Plan (IEP), and complete the MAP-Alternative test in lieu of the EOC assessment. The MAP-Alternate (MAP-A) is a portfolio-based assessment that measures student performance based on alternate achievement standards. The MAP-A is aligned with Missouri's Show-Me Standards. The MAP-A assessment relies on the involvement of teachers to customize the assessment for each student. The MAP-A is designed only for students with significant cognitive disabilities who meet grade level and eligibility criteria.

The district does not benefit from banked scores (scores of students who took Algebra 1 in middle school), as there is no offering of an Algebra 1 course prior to high school. Additionally, there is no administration of the Algebra 1 EOC assessment prior to high school. The primary mathematics textbook series used in the high school are Glencoe *Algebra 1* (McDougal-Littell *Algebra 1 Concepts* are used for the modified courses). The department chair feels that the textbooks are old and are not aligned with the curriculum or the Missouri mathematics course-level expectations.

Two online resources used in the Millwood school district are Study Island and Educosoft. Both of these resources provide online practice and test preparation and are available for student use off-site through an Internet connection. However, the school does not have adequate computer labs to support use of these resources by all students.

Lamar has 4 mathematics teachers and offers 10 courses (see Appendix E) that cover 2 pathways (or tracks). Although the Lamar school district mandates that all grade 8 students take a course in Algebra, only a very small percentage (less than 3%) take the Algebra 1 EOC assessment prior to high school. The small number of students taking the Algebra 1 EOC in the middle grades has implications for Lamar High School AYP in that these scores would likely increase the percentage of proficient students. Other high schools with similar demographics may have similar grade 9 performance, however when their feeder school 8th grade scores are incorporated (after being banked for a year), they receive a major boost in scoring. The majority of freshmen at Lamar High School are enrolled into Algebra 1 using the McDougal-Littell *Algebra 1* textbook.

Rowan has 13 mathematics teachers and offers 17 courses that cover five mathematics sequences (see Appendix E) to help students develop a four-year program that addresses their needs. Courses are offered up to AP Statistics, AP Calculus AB and AP Calculus BC. Rowan High offers Pre-Algebra, Algebra 1B, and Algebra 1A. The Pre-Algebra course is typically one section of approximately 30 students. Students enrolled in this class typically have not passed a math class over the previous three years. Algebra 1A is the primary Algebra course for entering freshmen, and Algebra 1B is the same course as 1A, but is taught at a slower pace over the same time period. The EOC is administered to students who have completed Algebra 1A or Algebra 1B. The textbooks are *Algebra 1* published by McDougal-Littell.

Use of Assessment Data

At Allister North, there is a greater focus on preparation for the ACT than on the EOC assessment. This is primarily due to the Algebra 1 EOC changing every year since

its inception. There have been changes in the length, types of questions and scoring methods and these changes do not support the ability to identify trends in the data. The mathematics administrative team decided that the use of longitudinal data would be helpful in preparing students and informing instruction. Because the Algebra 1 EOC is a new assessment (first administered in 2009) and has no history of performance trajectory, Allister North has looked toward the Explore®, Plan®, and the ACT assessments as a means to monitor mathematics progress over the years.

Zapata, Dandrige, Millwood Prep, Rowan and Lamar high schools have all indicated they are focused on improving student achievement on the Missouri Algebra 1 EOC assessment through the use of data. None of these schools make use of longitudinal data; however, their teachers are trained to use Crystal Reports as a method of analyzing Algebra 1 EOC assessment data at the end of each testing round. Crystal Reports was the Missouri state authorized data analysis software until 2011. Schools primarily use these reports to identify goals and learning expectations that the previous year's students struggled with. Allister North does not use Crystal Reports or perform any other analysis on EOC data. In 2012, MODESE switched to the Missouri Comprehensive Data System Portal for the analysis of state testing.

Professional Development

The school district associated with Allister North has a multifaceted approach to mathematics teacher professional development. As part of the district's strategic plan to address mathematics, there is one mathematics specialist in each of its elementary and middle schools. At the elementary level, the specialist is charged with identifying weaker students and supporting their development, as well as identifying gifted mathematics

students and keeping them challenged. There is quite a bit of fluidity at the elementary level with regard to grouping students for instruction with an emphasis on addressing student needs. Specialists at the middle school level provide remediation for low-performing students.

Teachers of the *CPMP* curricula are provided on-going, focused training. This is accomplished by the trade off in the number of preps and instruction time given to teachers. At Allister North there are eight instructional periods each day. No teacher, regardless of rank or tenure, is assigned more the 4 hours of instruction per day. The remaining time is focused on common prep planning, the creation and grading of common assessments, and on-going professional development.

Zapata sent all Algebra 1 EOC teachers to the Best Practices for EOC professional development (PD) seminar sponsored by the Missouri Department of Elementary and Secondary Education. This PD was a two-day event and featured the *Missouri Buckle Down* EOC materials. When teachers are supported to attend this type of PD, they are expected to return to their schools and share the information with their colleagues.

The Zapata school district also has PD days built into the school calendar to support mathematics professional development. These PD days are based upon a menu system where a teacher may have 6 to 8 options, one of which may be Best Practices for EOC or Data Team Process and Protocol.

The effectiveness of professional development is measured primarily by student performance on district and classroom formative assessments tasks. The expectations are that by using the formative assessments, information is gathered by data teams to glean

best classroom practices and instructional strategies for the EOC assessment. The expectation is that teachers begin to implement the most successful practices of teachers whose students do well on the formative assessments.

The primary professional development activities at Dandrige are focused on, (a) technology-based programs to support student learning, and (b) common assessments that can assist instructional decisions.

Dandrige has established the use of professional learning communities and district professional development days. Tracking of students into math courses based on prior performance is typical and one of the biggest questions currently under consideration by the staff is whether to eliminate the lowest level course (Algebra 1 Part A & Part B). Dandrige has been working on vertical teaming with the middle school to help address the question of eliminating the lowest track. Through vertical teaming, Dandrige expects to improve communication with teachers of younger students about what their students need to know and be able to do to prior to enrolling into Algebra 1.

Millwood Prep conducts very few specialized mathematics professional development activities. The only specific mathematics PD was focused on the Pearson Saturday program and the Educosoft online resources. Both of these activities were very specific to each particular product. There has not been professional development focusing on mathematical content knowledge, pedagogical knowledge, or pedagogical content knowledge in the district for quite some time. However, at Millwood Prep there are several opportunities for general professional development. These sessions include topics such as general teaching strategies and classroom management.

Individual teachers who attend a conference or participate in professional

development outside the district are typically required to return to the school to present findings from the PD to their colleagues. The district provides support for conference attendance fees, but has limited support for travel expenses or lodging. This results in teachers primarily attending local PD or activities within a short driving distance that does not require an overnight stay. The department chair of 14 years cannot remember the last time a teacher attended an NCTM national or regional conference. Teachers at Millwood Prep believe they would benefit from focused and sustained mathematics professional development.

Rowan dedicates professional development time to learning about creating common assessments for courses and having in depth conversations about the curriculum and standards associated with particular courses. Rowan is also moving towards establishing professional learning communities. In previous years the mathematics department was more fragmented with individual teachers doing their own planning. Since the implementation of EOC testing, the focus has shifted to mathematics faculty working together to develop common unit assessments. Rowan teachers believe that professional development is meaningless if there is not time to implement what is learned. The Rowan staff believes the greatest resource available to teachers is time.

Rowan was deliberate about preparation for the EOC assessment, beginning with deciding early who would teach Algebra and continuing with more intense collaboration throughout the academic year with those teachers.

The Lamar school district has on-going professional development housed and implemented at the administrative building. Most of the offerings are general in nature, focusing on topics such as classroom management and differentiated instruction. The

Lamar High mathematics department chairperson serves as the PD representative for the building.

In previous years, Lamar School Dsitrict was known for sending multiple teachers to the core subject's major conferences and to national professional development. However, in recent years funding for teachers to attend conferences, including those who present at the national level, has been sparse.

District Support

Allister North is the sole high school in the Allister school district and has the ability to support Algebra 1 instruction on its own, however, the school district has dedicated itself to become one of the premiere academic centers in the region. The district mathematics supervisor indicated, "Allister North teachers know they are in a district that is willing to try new ideas, supports them, including piloting programs that other school districts may not be in a position to try." Allister North is willing to engage in research to identify best practices to support their district and to support other school districts.

The district depends on textbook publishers of *CPMP* to provide curriculum-specific professional development. The curriculum supervisor states, "If you are teaching a curriculum and that textbook publisher provides training, even if it is out of town, then we will send you for training." Every other year Texas Instruments comes in as part of training initiatives sponsored by Math Educators of Greater Saint Louis (MEGSL), and the district funds Allister North teachers attending this training. In addition, lead teachers are sent to Teachers Teaching with Technology (T^3) conference each year and in-house training is used to build capacity so that lead teachers can train-the-trainers.

The Allister school district arranged for Dr. Andrew Chen, president of EduTron Corporation, to provide his Intensive Immersion Institute $\left(I^3\right)$ with Allister North teachers on best practices for teaching mathematics. This institute provides an intensive mathematics immersion experience by zooming into, and out of, various areas (algebra, geometry, trigonometry, linear algebra, modeling, etc.) to develop an in-depth and coherent understanding of high school mathematics. This course is taught by active research scientists and is ideal for teachers teaching, or preparing students for, Algebra 1I, Geometry, Pre-calculus, AP Calculus and beyond. According to the department chairperson, the course models instruction to foster the habits of mind documented in the Mathematical Practice Standards in the Common Core, and explores the topics of ongoing formative assessments, instructional differentiation, multiple representations, a variety of grouping strategies, student misconceptions, and remediation.

Dr. Chen also served on the advisory committee for the Common Core State Standards Initiative K-12 Standards Development Team in Mathematics. His advice and direction synergizes well with the districts forward thinking and focus on the Common Core standards.

In summary, Allister North uses four tracks to expose students to all learning goals at different paces to ensure high student performance on the Algebra 1 EOC. This policy allows students to be administered the Algebra 1 EOC assessment at four predetermined grade levels: 8^{th}, 9^{th}, 10^{th}, and 11^{th}. Allister North also relies on standard practices, an integrated curriculum and strong support for teachers to ensure that students succeed. Finally, other than the aforementioned tracks, Allister North does not delay students from testing for any other reason including failing a course.

Zapata School District supports each school by purchasing materials for formative testing, and by allocating funds for site-based purchases. All high schools in the Zapata district have purchased the same brand of graphing calculators and online test prep software (USA Test Prep) with their district allocation. Outside of the goal of exceeding all state targets by 10 to 15 percent, there is little else mandated by the district.

In summary, Zapata has altered its administrative structure to allow teachers to increase focus on instruction. There are no district curriculum coordinators or no departmental chairpersons at the schools. Zapata also uses vertical teaming between 8th and 9th grades and formative assessments across grade 9 to help identify best instructional practices. Additionally, Zapata has recently switched to an inquiry-based curriculum in an effort to increase student understanding, and subsequently, student performance in algebra. Finally, Zapata will delay any student failing the second semester of Algebra 1, until the student passes it.

The assistant superintendent of instruction is committed to vertically aligning all grades in mathematics with the goal of providing the opportunity for all students to take Algebra 1 by 8th grade. The district supports improvement in algebra by providing intervention personnel at the elementary and middle school levels.

At the building level the district provides support to teachers by supplying what is needed to teach a particular course. At the district level there is a more global approach that is focused on what is needed for students to be successful over the next 5 years. The district typically brings ideas for improvement to the attention of teachers, and then teachers are free to decide to implement the opportunity or not. One example of this approach was implementation of the Discovery Education interactive digital textbooks

and assessment services. Discovery Education offers a breadth and depth of digital media content that is immersive, engaging and brings the world into the classroom to give every student a chance to experience fascinating people, places, and events. The department chairperson indicates, "All content is aligned to state standards, can be aligned to custom curriculum, and supports classroom instruction regardless of the technology platform."

The mathematics department chairperson stated, "the district also trusts teachers to be the experts concerning decisions to delay students from taking the Algebra 1 EOC assessment." Overall, there are not many requests to delay students from testing, other than the typical illness or excessive absence related issues. Teachers at Dandrige believe that arbitrarily delaying students may skew the data they use to make informed decisions. Typically, delayed students will be tested while enrolled in subsequent courses like Algebra 2 or Geometry. Therefore, delaying students may cosmetically inflate scores.

In summary, Dandrige relies on a heavy use of educative technologies to assess students' mathematical understandings, provide opportunities for practice, and to prepare students for the Algebra 1 EOC assessment. The Dandrige school district places mathematics specialist in every elementary and middle school in the district and uses vertical teams to help move the district towards placing all 8^{th} grade students into Algebra 1. In general, teachers at Dandrige do not rely on a standard policy to delay students from testing, but instead they are trusted to use their professional judgment concerning the delay of a student.

At Millwood Prep each mathematics teacher has a class set of calculators. As noted earlier, various supplemental materials such as Eudcosoft, Study Island, Missouri Buckle Down, and the district provides Pearson programs.

Mathematics textbooks are provided by the district, however due to the increasing cost of purchasing textbooks and subsequent book replacement, the district has been considering the use of electronic-based books. The mathematics department chair at Millwood Prep is not in support of this idea and is skeptical of how e-textbooks could be implemented given the socioeconomic status of the Millwood Prep students.

The district delay policy (decision about when students should take the Algebra 1 EOC assessment) is primarily based on teacher recommendation. Only a few students are delayed from taking the Algebra 1 EOC assessment once they have completed the course, even though they may have failed Algebra 1.

In summary, Millwood Prep does not have a district structure supporting mathematical alignment between schools. There are no vertical teams, nor are there mathematics specialists in the elementary of middle schools. Algebra 1s not offered as a course prior to secondary school. As a result, Millwood Prep does not receive any benefit resulting from banked EOC assessment scores. The professional development offered to teachers in the Millwood district tends to more general and less focused on best practices in mathematics education. Millwood Prep uses both benchmark and common assessments; however, teachers create neither of these assessments. Finally, Millwood Prep does not delay any student from taking the Algebra 1 EOC assessment, including students that fail either or both semesters.

The district recently established the Academic Support Center. Teaching assistants are available every period in the Center to assist individual or groups of students with coursework. The academic support staff is composed of certified teachers, or students close to receiving their degree in mathematics or mathematics education.

The district provides release days to teachers to plan for the merger of the Algebra courses. For example, a team of faculty may work together during the summer and throughout the academic year to write curriculum and construct course outlines. This effort is a district-wide process, not exclusive to Rowan. The district also supports student learning by staffing the Academic Support Center. The class size of math classes has decreased because of the staffing support.

Rowan Public Schools typically send teachers to NCTM and AP conferences. Teachers also attend summer professional development where they learn to develop curriculum or write common assessments.

In an effort to strengthen mathematics instruction across the district, beginning in 2008-2009, Rowan Public Schools hired one mathematics intervention specialist (18 in all) in every elementary and middle school. This is a major change in the district considering the 54 reading specialist already established in the district. Mathematics specialists are intended to increase the quality of mathematics education. During the 2010 testing year, Rowan Public Schools made AYP in 7 of the 8 subgroups.

Rowan established the following district delay policy: If a student takes Algebra 1 and passes the first semester (even with a D-), then that student will take the Algebra 1 EOC regardless of what happens in the second semester. Students that fail the first semester take the EOC in the summer, following summer instruction.

In summary, Rowan implements an additional class called an Algebra lab to supplement instruction to all testing students. Also, the district provides support for an Academic Support Center (ASC) where additional mathematics instruction is offered to individual or groups of students both during and after school. Retired certified teachers

and college students majoring in mathematics or mathematics education are typically the staff of the ASC. The district has placed mathematics specialists in every elementary and middle school and uses vertical teams to prepare students for higher levels of mathematics. Rowan also has a program that deliberately funnels African American students into advanced placement courses. Finally, Rowan will delay any student that has not passed both semesters of Algebra 1.

The Lamar district requires quarterly benchmark assessments for every student in the district. These assessments are graded and reports of disaggregated data are posted on the Schoolnet website for school and teacher analysis. Schoolnet is the district's web-based assessment management program used to track and monitor district benchmark tests.

The district supplies each school with materials (e.g., scantron sheets and scanners) to operate the *Accelerated Math* and *Star Math* programs. The district also supports vertical teaming efforts with the goal of establishing and building AP courses.

The district delay policy is primarily controlled by the building administration. Teachers are allowed to make recommendations regarding which students take the Algebra 1 EOC exam, but building administrators have the final say. The district mathematics supervisor indicated that failing Algebra 1 normally disqualifies students from taking the Algebra 1 EOC assessment in the spring. However, the district defers to the school-level administrators to make their own decisions concerning which students take the exam.

In summary, the strategies and policies of Lamar High to support student performance on the Algebra 1 EOC included using web-based programs to monitor

student progress towards objectives, encourage cross-curricular integration between mathematics and science, and implementing double dosing in Algebra 1. Finally, Lamar typically does not delay students, however beginning in the spring of 2011 the district mandated that only students with passing grades at or above C during the second semester could be tested.

Algebra 1 Teacher Surveys

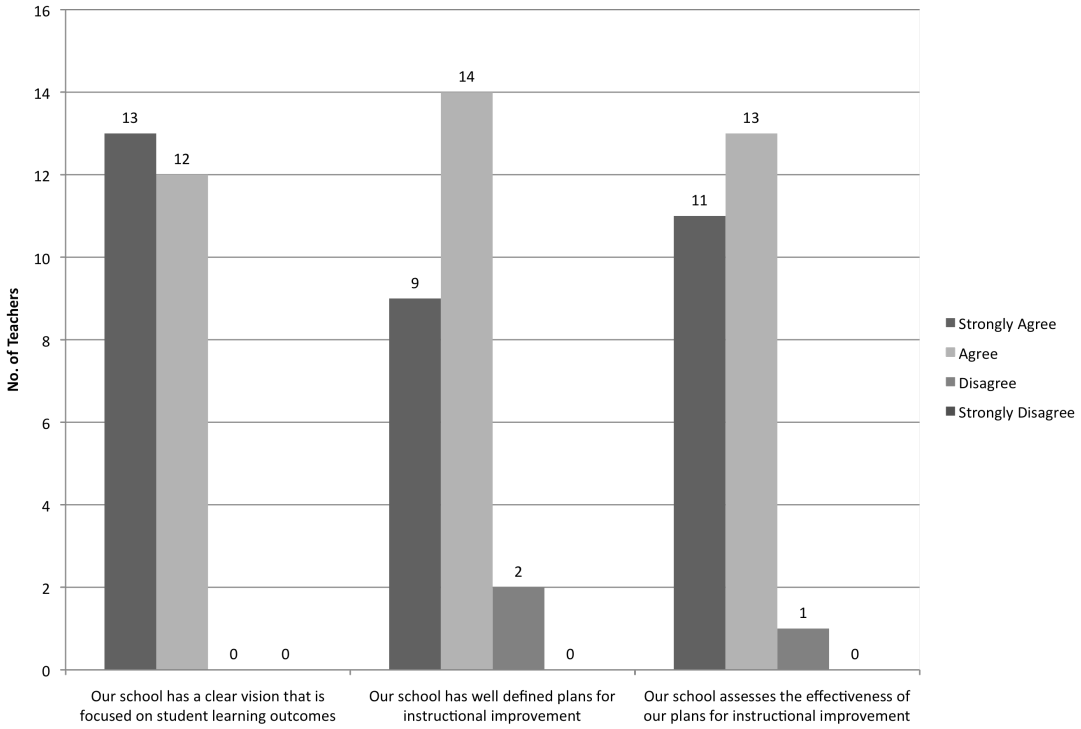
The order of data presentation in this section parallels the sequence of items in the questionnaire. Summary figures show descriptive statistics within the same selectivity status and the overall calculations. Interpretation of the data is also presented.

Focus on Improving Academic Outcomes

All the teachers of Algebra 1 across the six schools were invited to complete a survey that asked about the school's plans for instructional improvement and focus on student outcomes. Figure 4.1 summarizes teacher's responses to questions related to school plans for instructional improvement.

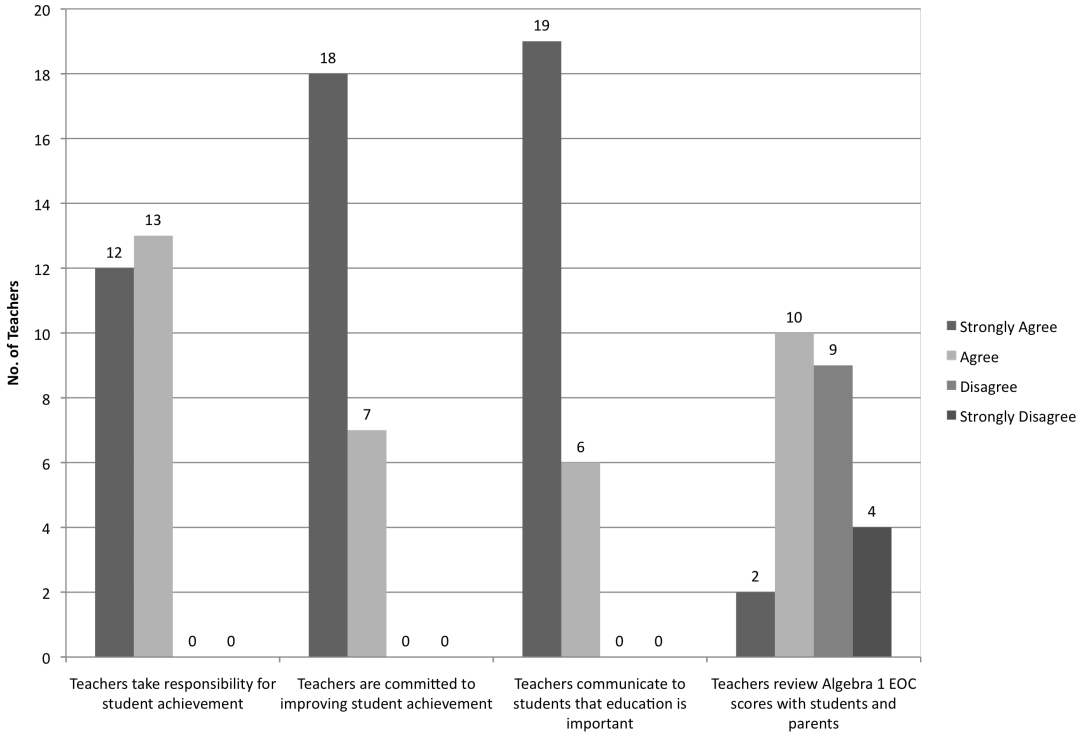
Respondents (N=25) were unanimous in agreeing that their school's focus was on student outcomes, However, when asked about well-defined plans for instructional improvement, or assessing the effectiveness of those plans, a few of the respondents indicated their school did not have well defined plans for instructional improvement. These teachers all represented schools that did not make AYP in 2009.

Figure 4.1: Participant Views on Their School's Instructional Improvement Plans



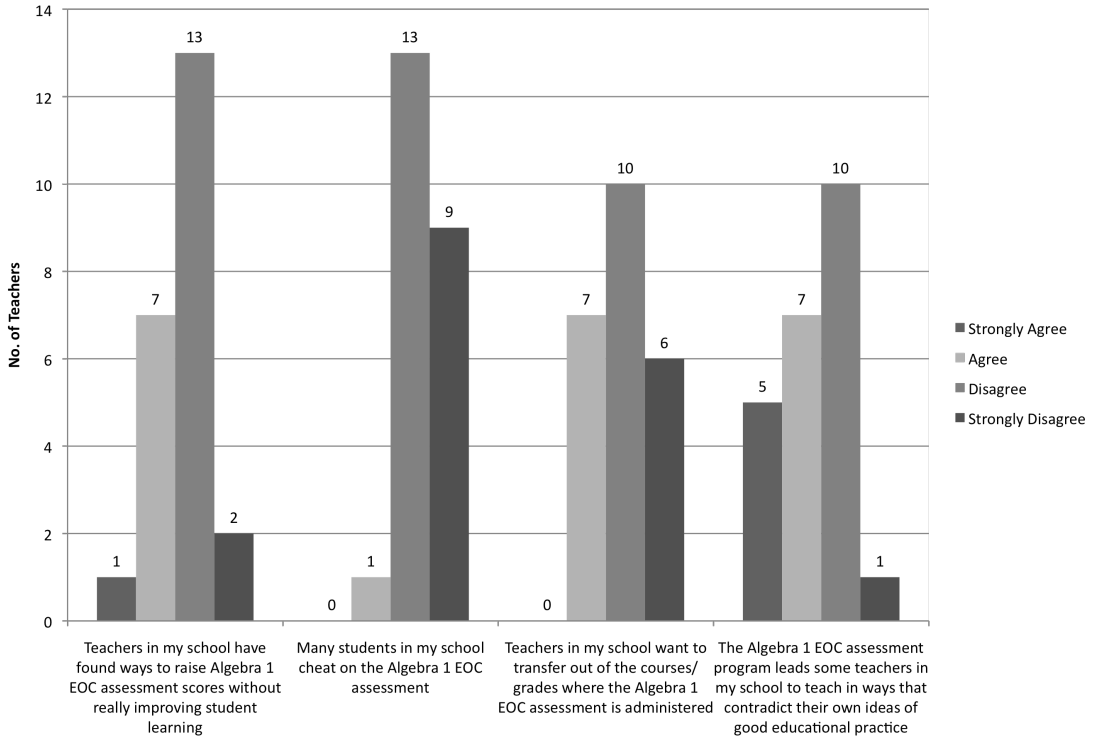
Teachers in all participating schools indicated that they take responsibility for and are committed to improving student achievement. Figure 4.2 illustrates that, although teachers typically communicate the importance of educational goals to students, many (52%) do not review results of the Algebra 1 EOC assessment with parents or students.

Figure 4.2: Participant Views on Student Improvement and Achievement



Algebra 1 teachers were asked about their beliefs related to the impact of the EOC assessment. Figure 4.3 summarizes responses that illustrate beliefs about the impact of the EOC assessment. For example, 8 of the 23 respondents indicate that teachers in their schools employ strategies that they believe will raise/improve scores without improving student learning.

Figure 4.3: Participant Beliefs about the Impact of the Algebra 1 EOC Assessment



Coherent and Aligned Standards-Based Instruction and Curricula

The participating schools used three different types of mathematics textbooks: (a) single-subject, where mathematics is presented as isolated topics focusing on presentation of concepts with many opportunities to practice skills; (b) integrated, where mathematics strands are woven together and presented over a period of at least three years; and finally (c) investigation, where mathematics is presented as a series of inquiry based activities.

In addition to the district-adopted textbook used in each school, Millwood Prep and Lamar had policies where teachers were expected to use the adopted materials in scripted fashion where the pacing of instruction, all activities and all assessments were dictated by the textbook. Dandrige, Rowan, and Zapata gave varying degrees of autonomy to teachers from slight variations in the curricular materials, to 100% teacher created assessments and lesson planning.

Allister North is an example of a school that encourages teacher autonomy. All levels of assessment, whether it is an informal quiz, a review assignment, or a unit test, are created by groups of teachers that teach the same course and are administered and graded as a common assessment across the same course. Students in schools where teachers were afforded autonomy regarding classroom pacing and assessment of instruction outperformed schools that had more restrictive guidelines. Figure 4.4 provides information about the nature of lesson planning and use of curriculum.

Teachers in schools that did not make AYP on the 2009 Missouri Algebra 1 EOC assessment indicated that there was poor alignment between their curricular materials, daily instruction, format of their tests and the EOC assessment. Figure 4.5 summarizes responses of teachers pertaining to curricular alignment with the Algebra 1 EOC assessment.

Figure 4.4: Participant Views on Nature of Lesson Planning

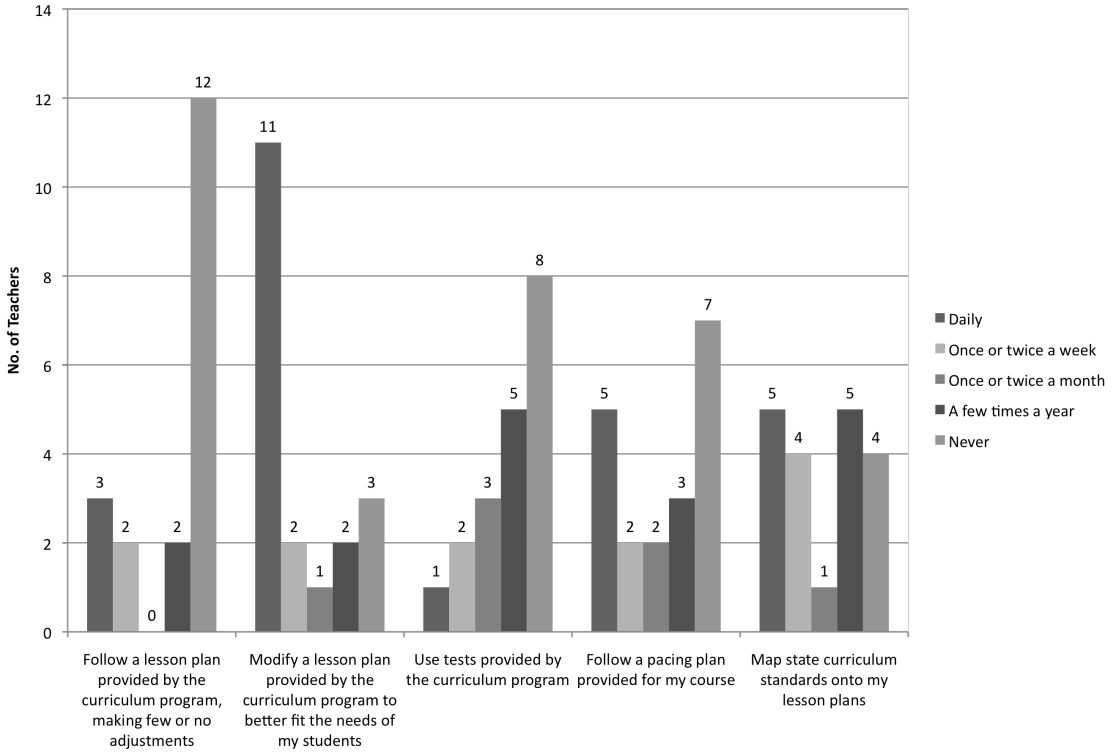
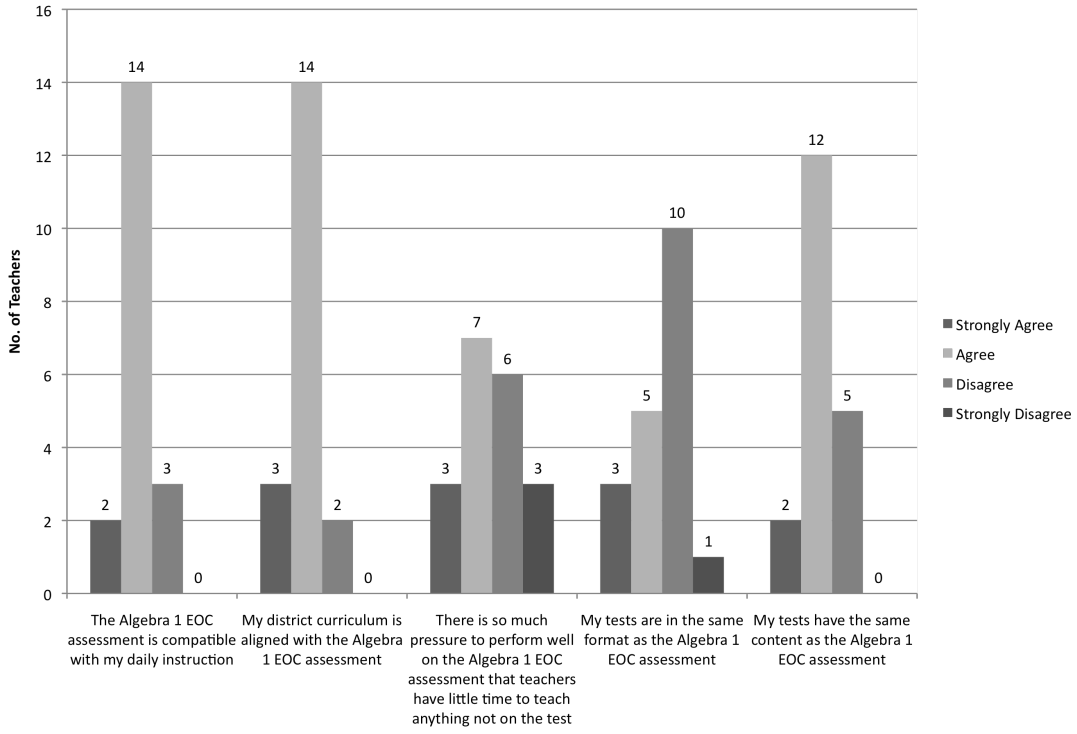


Figure 4.5: Participant Views on Curriculum Alignment

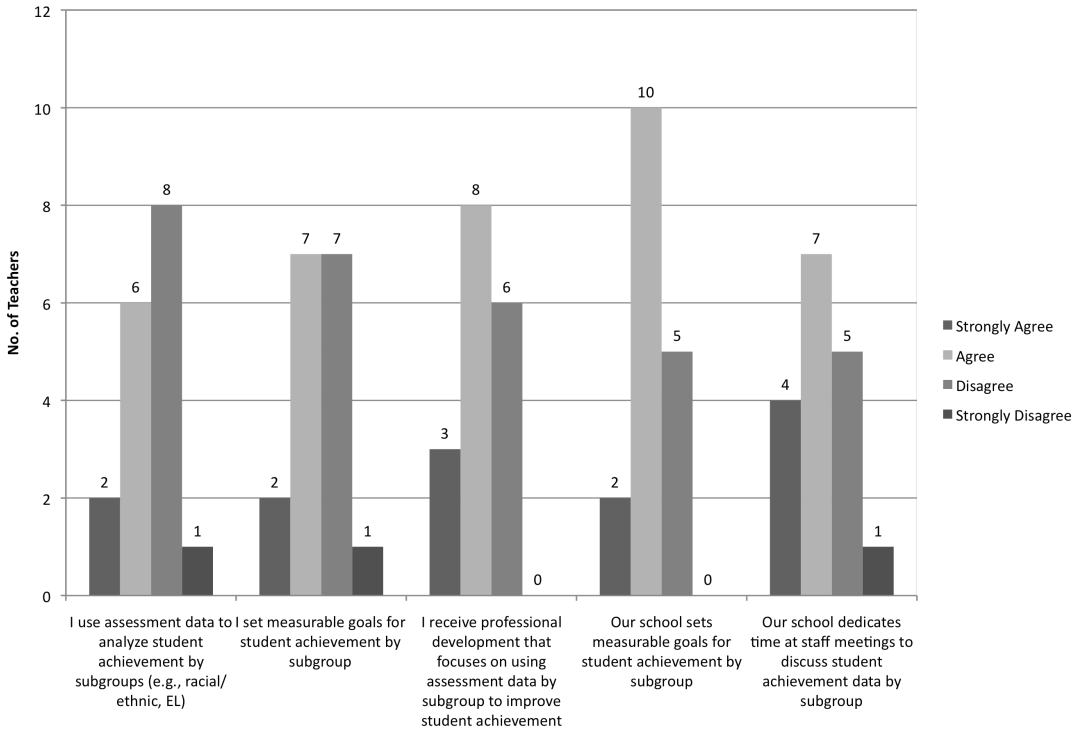


Use of Assessment Data by Schools and School Districts

Use of assessment data to reflect on student progress is a core feature of standards-based education. That is, schools are expected to have effective learning organizations, capable of reflecting continuously on what is working, what is not, and how educators might change course. In this study, some teachers (disproportionately from higher-performing schools) reported that they and the district use assessment data from multiple sources—curriculum program and teacher created assessments, district-developed assessments, and MAP grade 10 assessments—to evaluate teachers' practices and to identify teachers who need to make instructional improvements. Teachers also reported frequently using assessment data to address the academic needs of students in their schools, including using these data to develop strategies to help particular students reach goals and regularly monitor progress.

Although teachers in higher-performing schools indicated use of assessment data to develop plans for struggling students, the focus was on individuals versus groups of students. Teachers at Millwood Prep and Lamar often indicated the lack of direct attention to groups of students with common needs. Explanations for lack of direct intervention strategies for specific subgroups ranged from lack of district training or support to the perspective that "what is good for the subgroups is what is good for all students." Figure 4.6 summarizes teacher responses to using data to improve subgroup performance.

Figure 4.6: Participant Views on Use of Assessment Data to Support Subgroups



When teachers were asked specifically about their use of the Missouri Algebra 1 EOC assessment data, those in lower-performing schools indicated multiple uses such as evaluating student progress, assessing their teaching effectiveness or determining student's grades; whereas, teachers from higher-performing schools indicated fewer (in

some cases no) uses of the data. Teachers at Allister North and Rowan indicated no uses of EOC assessment data. Teachers at Dandrige indicated only using EOC assessment data to determine student course grades. Teachers at Lamar indicated using data only to group, evaluate and provide feedback to students. Teachers at Zapata indicated they did not use data to grouping students or determining grades. Teachers at Millwood Prep indicated using all suggested uses of EOC assessment data (see Figure 4.7)

Teachers were also asked about their district's use of assessment data. The majority of teachers indicated that holding schools (47.1%) and the school district (52.9%) accountable was the principal use of EOC assessment data. These responses were consistent regardless of the performance on the Missouri Algebra 1 EOC assessment. However, teachers from higher-performing schools were more likely to indicate that their district did not make use of the assessment data (see Figure 4.8).

Figure 4.7: Responses to use of Missouri Algebra 1 EOC Assessment Data

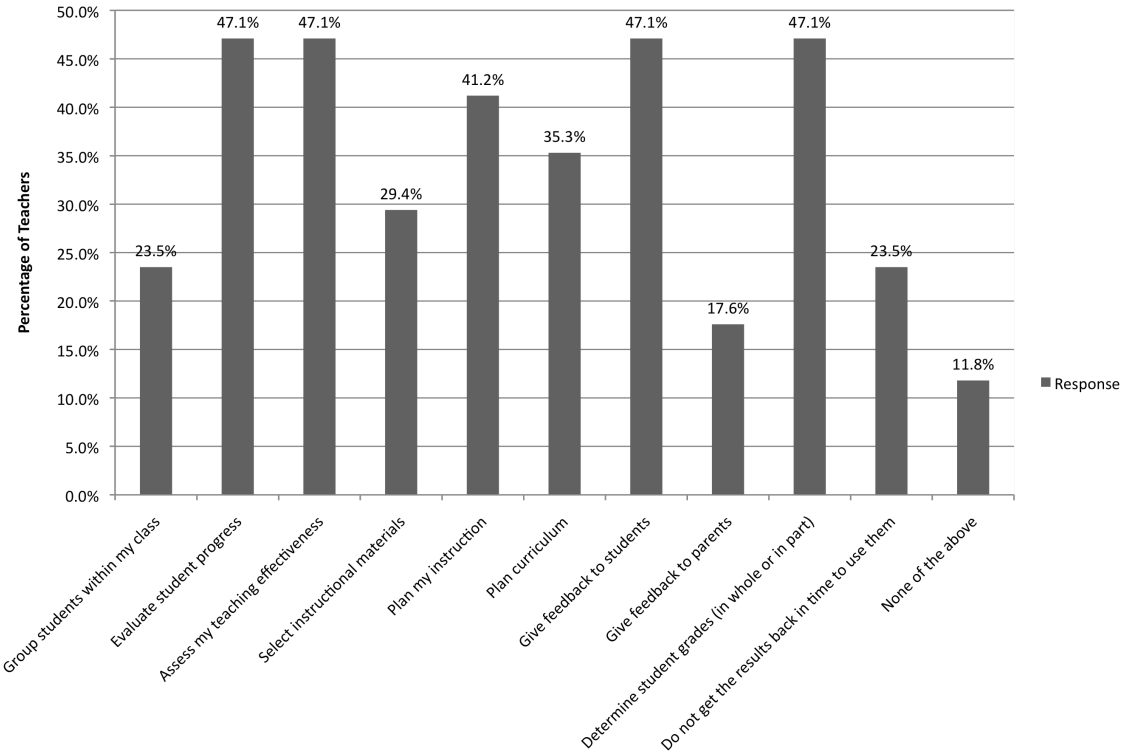
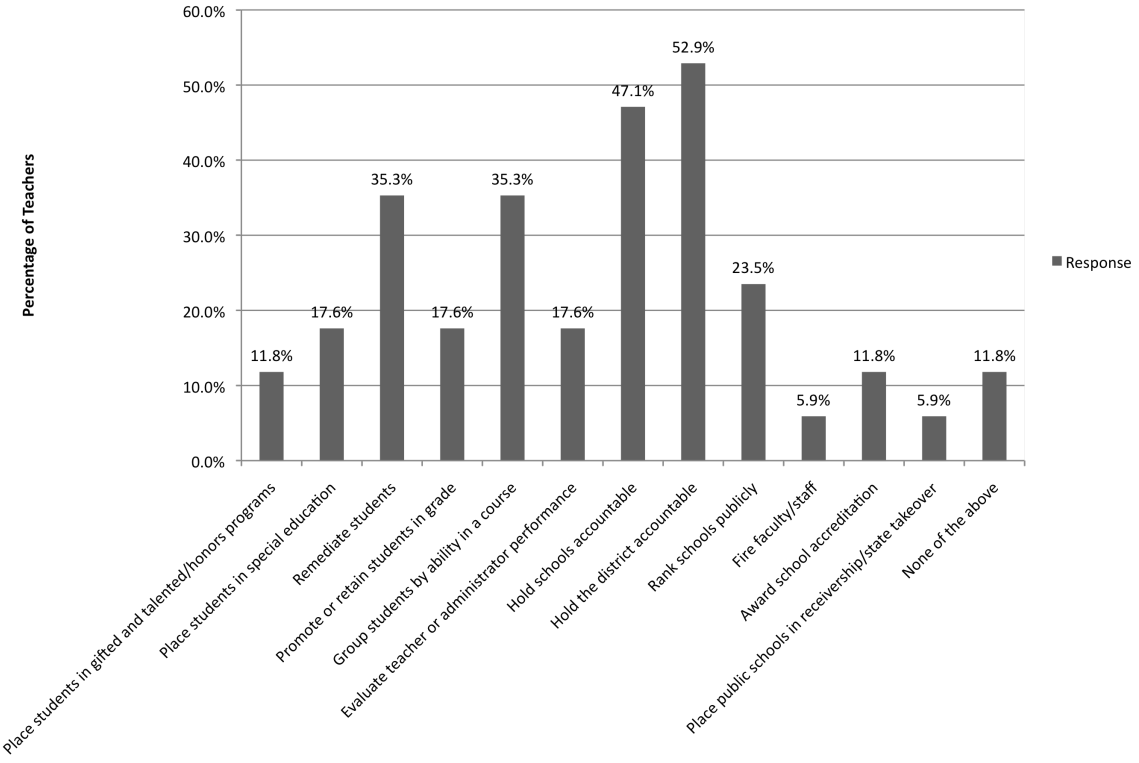


Figure 4.8: Responses to District use of Missouri Algebra 1 EOC Assessment Data



Teacher Competence and Professional Development

Figure 4.9 summarizes responses to questions regarding if specific professional development activities have influenced their teaching practices. Teachers from schools with integrated or investigative curriculums (Allister North and Zapata respectively) indicated that participation in professional development that focused on their mathematics curriculum had a great amount of influence on their teaching practices.

Several teachers from the schools with scores meeting the AYP target reported that all of the Algebra 1 teachers, and possibly entire mathematics departments, participated in common professional development. Based on the interviews, it seemed that participation in professional development activities by a team of teachers, or in some cases, an entire mathematics faculty, gave strength and momentum to Algebra 1 improvement efforts. In particular, the mathematics department chairs at Rowan and

Allister North both indicated that their districts supported intensive professional development opportunities and they believed that this was crucial to their success on the Algebra 1 EOC assessment. Teachers at schools that did not make AYP often pointed to a lack of focus of their professional development activities or the failure of the professional development to assist teachers in understanding student needs (see Figure 4.10).

Figure 4.9: Teacher Influence by Type of Professional Development

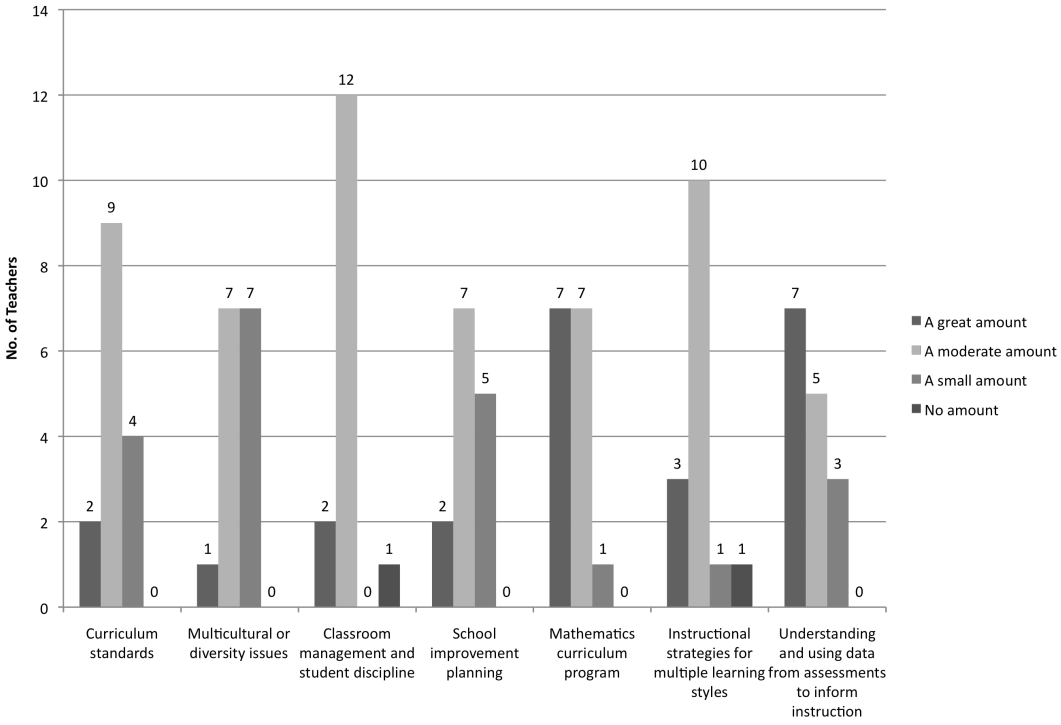
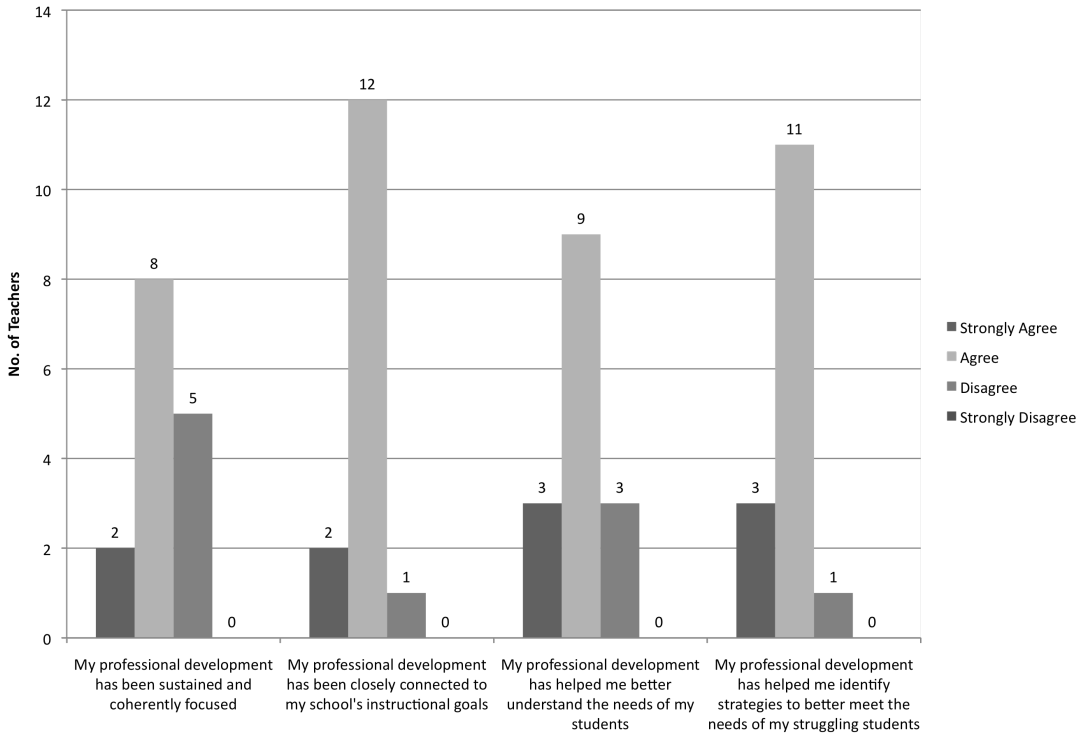
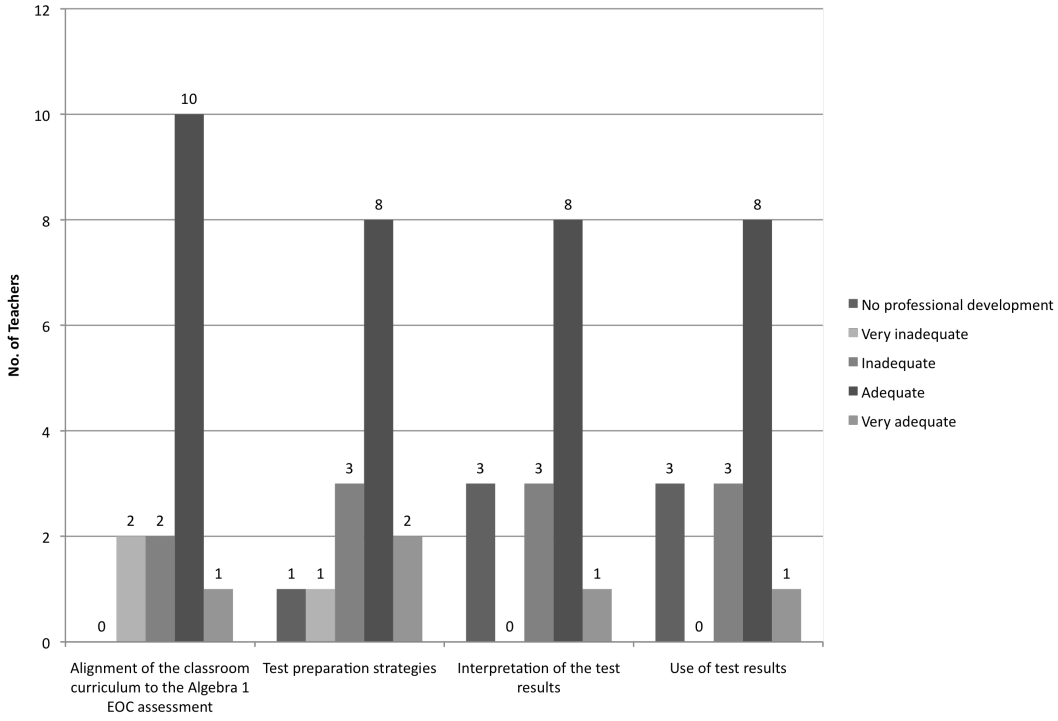


Figure 4.10: Teacher Beliefs about Professional Development



Regarding the adequacy of their professional development in relation to the Missouri Algebra 1 EOC assessment, teachers reported it as appropriate in terms of aligning curriculum to the objectives of the assessment. Teachers indicated that professional development focusing on test preparation strategies was relevant and supportive. Teachers from low-performing schools indicated that professional development opportunities related to the EOC lacked attention to interpretation of test results and to use of test results. Figure 4.11 summarizes professional development topics pertaining to the Algebra 1 EOC assessment offered by the schools or school districts participating in this study.

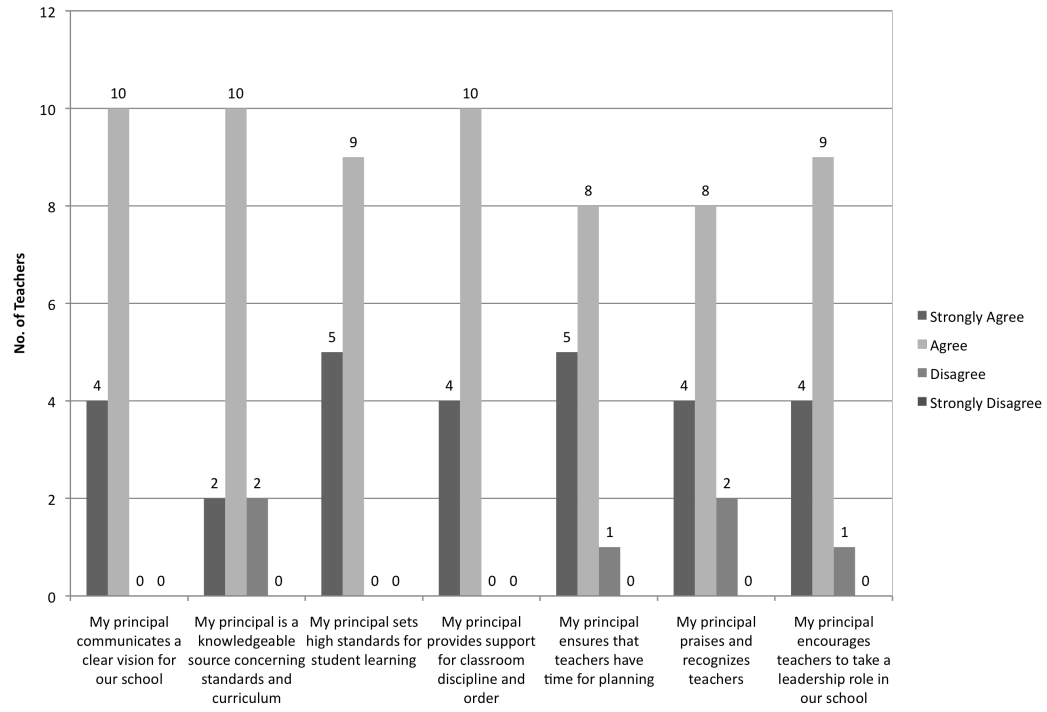
Figure 4.11: Professional Development on Missouri Algebra 1 EOC assessment



Administrative Accountability and Support

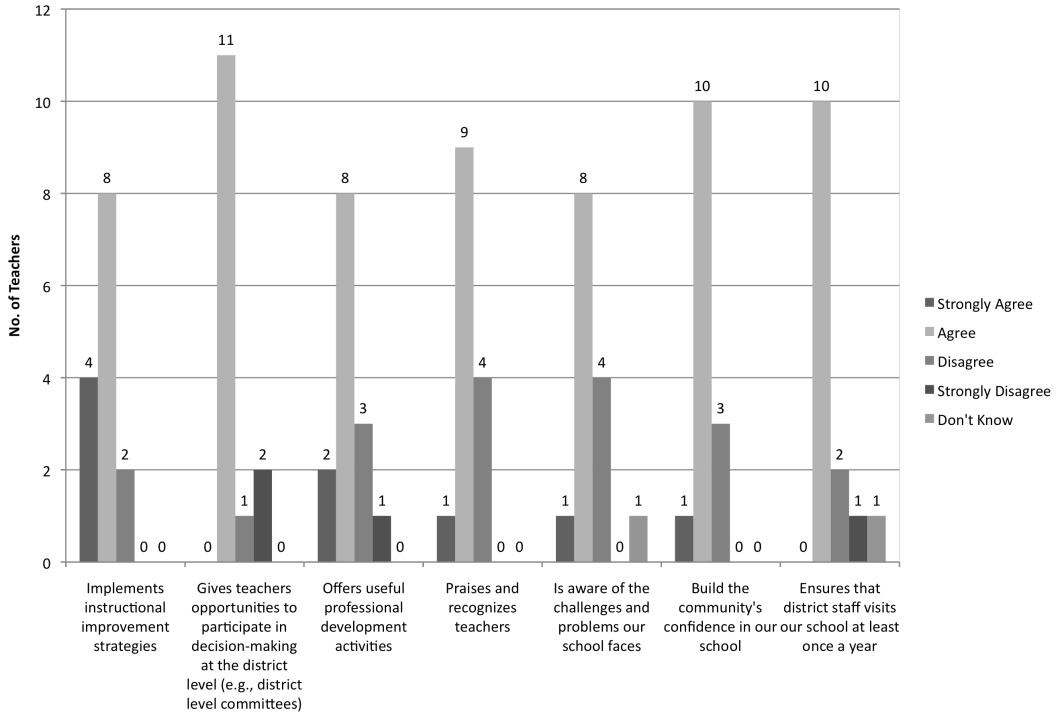
Teachers at higher-performing schools more often (89%) reported that they viewed their principal as someone who communicated a clear vision for the school. They also affirmed (92%) that their principal was a knowledgeable source concerning standards and curriculum, and someone who sets high standards for learning. Figure 4.12 summarizes responses from teachers regarding their perceptions of the school principal as it pertains to the Missouri Algebra 1 EOC assessment.

Figure 4.12: Teacher Perceptions of Principal



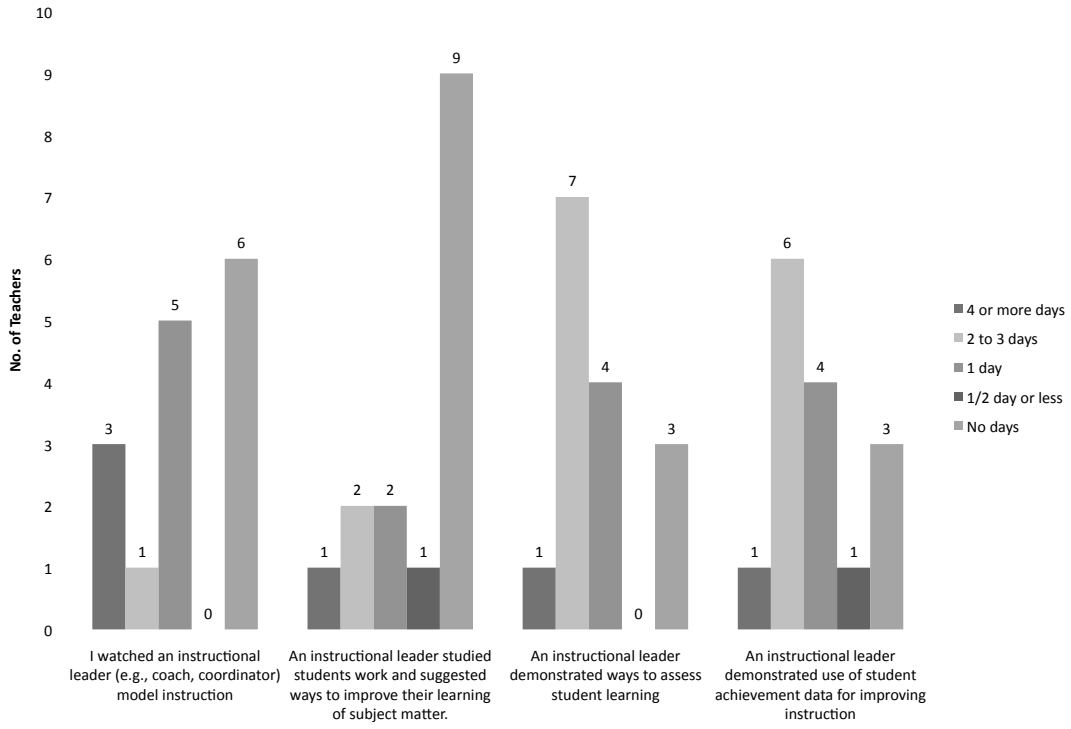
District accountability and support provides additional context for understanding how district policies and practices might foster conditions that support higher student achievement. Findings related to this domain include reported practices such as evaluation of the school principal by the district superintendent based in part on student outcomes; consideration of student outcomes when setting priorities; and availability of financial and human resources necessary for schools to meet their goals. Teachers have an overall positive view of their district's level of support, however 36% (N=14) believe that their district is not keenly aware of all the problems their school faces. Figure 4.13 summarizes the teachers' perceptions of district support for the administration of the Algebra 1 EOC assessment. Teachers at lower performing schools indicated that their was either none or very limited support from their district administrations.

Figure 4.13: Teacher Perceptions of District Support



The majority of teachers participating in this study (79%) indicated that they received some support for student learning from their school's instructional leaders. The support may have come in the form of providing educational resources or advising of appropriate professional development. Teachers from two schools (Rowan and Allister North) indicated that instructional leaders at their schools also studied student work and suggested ways to improve subject specific learning. Table 4.14 summarizes ways instructional leaders support teachers.

Figure 4.14: Instructional Leader Support



Summary

Interviews with 10 department chairs and district supervisors/administrators provided information related to the strategies and policies implemented in each school in preparation for the Algebra 1 EOC.

The interviews revealed four common strategies used by schools to improve student performance on the Algebra 1 EOC assessment. One common strategy was the choice of mathematics curriculum. School districts selecting investigative or integrated curricula also had to consider the frequency and quality of professional development to support and implement the curricula. Implementing investigative or integrated curriculum inherently enhances the mathematical understanding of teachers, which in turn benefits all students. Integrated curricular materials are coherent and aligned, and developed to be delivered to students over several years. Another common strategy involved the

assignment of Algebra 1 teachers. Strategies ranged from assigning the most effective teachers to teach Algebra 1 to assigning all teachers at least one section of Algebra 1 to promote a sense of shared responsibility. A third common strategy was the use of an additional course to support Algebra 1 students. This course took the form of an "Algebra lab", or double-dose course where all students enrolled in two Algebra courses each semester. Increasing the clock hours in mathematics is advantageous to students, especially if concepts are reinforced or if concepts are delivered in alternative form. The final common strategy involved increasing the number of students tested prior to high school. Early testing allows scores to be banked until the student reaches high school.

In addition to these strategies, four deliberate policies were noted among the participating schools. For example, implementation of vertical teams from K-12, but particularly between 8th and 9th grades was initiated in response to the Missouri Algebra 1 EOC. A second policy reported by participating schools was the use of mathematics specialists in elementary and middle schools in order to increase the mathematical expertise available to both teachers and students. A third policy involved the offering of supplemental instruction. Unlike an additional course, supplemental instruction is available on an as-needed basis. Schools had policies ranging from creating support centers staffed by retired teachers, to creative scheduling where all teachers have no more than half of a full course load. Teachers are then more likely to be available throughout the day to work together with other teachers and to assist students during their free periods. Still another policy involved districts providing Algebra teachers with mathematics specific professional development that is on going, systemic, and appropriate.

5. SUMMARY, DISCUSSION, AND RECOMMENDATIONS

This chapter is divided into five sections. The first section presents a brief overview of the study. The second section includes the key findings of the study. The third section outlines the implications of the study. The fourth section presents a discussion of the limitations of the study. Finally, the chapter concludes with recommendations for future research.

Overview of the Study

In 2001, the 43rd president of the United States, George W. Bush, ushered in legislation that would have far reaching implications for U.S. schools receiving federal Title I funding. The primary accountability portion of the legislation was the requirement that schools make Adequate Yearly Progress (AYP) towards achieving 100% proficiency in mathematics of students in grades 3-8 and one year in high school prior to the end of the 2014 academic year. Because the AYP targets increase each year (graduated each year until reaching 100% in 2014), schools and districts that do not meet AYP targets one year face difficulty in attaining higher AYP targets in subsequent years (see Figure 3.1). These schools are especially vulnerable to education fads and other "quick fixes" in efforts to achieve the high stakes goals.

Schools and districts that are vulnerable to quick fixes tend to make testing preparation a primary focus (Cimbricz, 2002; L. Shepard, 1990, 2002; L. A. Shepard & Dougherty, 1991). Over-emphasizing assessment and test results can have a negative effect on student motivation to learn. Shepard (2001), in reviewing the effects of high-stakes accountability pressures posits, "When teachers emphasize evaluation there is a corresponding decrease in students' intrinsic motivation and interest in the material for its

on sake" (p. 3). The author argues that when students focus on how they are doing or how they will be evaluated, they become only superficially involved in the learning tasks, and are less likely to persist in solving difficult tasks.

The Missouri NCLB assessment system has recently changed from a system that includes both constructed response (CR) items and performance events (PE), to a predominantly selected response (SR) test that is primarily skills oriented. This change in the assessment instrument conveys a message to teachers, which may result in them assigning fewer CR and PE items and subsequently depriving students of important learning opportunities.

If a Missouri school continues to perform below levels of proficiency on the EOC exam, it will continue to receive sanctions that may lead to reactionary thinking, and that typically results in the school not meeting required levels of proficiency. Districts must learn to support increased student learning in order to help break the cycle.

Purpose of the Study

The purpose of this study was to examine district and school policies and practices that are intended to raise student performance as measured by the Missouri state Algebra 1 End-of-Course (EOC) assessment. More specifically, what decisions and actions are schools and school districts making in response to participating in the Missouri Algebra 1 EOC assessment and what impact do these decisions and actions have on student performance? This study aims to identify factors associated with the attempts to raise school performance on the Algebra 1 EOC. It addresses the following research questions:

1. What policies and strategies have districts and schools implemented in response to the Missouri Algebra 1 EOC assessment?
    a. Who was involved in making these decisions?
    b. Why were these decisions made?
    c. How and when were these decisions implemented?
2. What are the perceptions of teachers regarding the impact of the new policies and strategies on student performance?

Methodology

This research is an ex post facto study examining school policies and practices designed to impact student performance on the Missouri End-of-Course Algebra 1 NCLB assessment. This study used a systematic approach to identify schools for the selection of cases: (1) EOC proficiency level, and (2) socioeconomic status.

The proficiency level criterion was based on the 2008 and 2010 AYP targets of 45% and 63.3% respectively. Data were collected from the Missouri Department of Elementary and Secondary Education's (MODESE) website and individual school websites, then sorted to find the top performing individual schools. Schools with high performance (HP) were defined as those with at least 63.3% of students passing the EOC Algebra 1 exam. Schools defined as low performance (LP) had fewer than 45% of students passing the EOC Algebra 1 exam. Schools with performance levels between these two targets were classified as mid performance (MP).

Similar to performance levels, three levels of socioeconomic status were established using the top and bottom quartiles for 2009 Missouri state FRL eligibility. Schools having 62.7% (top quartile) or more of their students eligible for free or reduced

lunch are indicated as High FRL (HFRL), whereas schools with 31.1% (bottom quartile) or less as Low FRL (LFRL). Schools with a percentage of students in between HFRL and LFRL are indicated as Mid FRL (MFRL).

In addition to Algebra 1 EOC performance and proportion of students receiving FRL, an additional criterion included both school type and school population. That is, to be included in this study, schools must have a 9-12 structure, and must service at least 400 students with a minimum of 50 students reported as taking the Algebra 1 EOC assessment. These criteria reduced the original 794 schools administering the Missouri Algebra 1 EOC assessment to 180 schools. To maximize accessibility to these schools, I focused on schools located in either St. Louis County or St. Louis City school districts. This decision resulted in 38 remaining schools.

The combination of performance levels and socioeconomic status criteria created nine categories used to code the sample selection. To reduce the remaining 38 schools to a manageable sample, one school was randomly selected to represent each of the nine cells composed of performance level and socioeconomic status. Three categories (HP/MFRL, HP/HFRL, and MP/MFRL) did not have any cases in the metropolitan area.

The six identified schools were used to establish cases of policies and practices designed to improve student performance on the Missouri Algebra 1 EOC assessment. Qualitative data were collected using three tools developed by the author: (a) a district mathematics coordinator interview protocol, (b) a school mathematics department chairperson interview protocol, and (c) an Algebra 1 teacher online survey.

An instrumental collective case study (Creswell, 2003; Stake, 1995) was conducted involving the appropriate teachers–those who teach Algebra 1, department

chair, and district supervisor of each participating school. These case studies focused on strategies and practices used by the instructional staff and on the testing policies implemented by administrators with the aim to increase student achievement on the Missouri Algebra 1 EOC assessment.

All districts except for two had a typical administrative structure consisting of a district mathematics coordinator and a school mathematics department chairperson. Neither Zapata nor Millwood Prep school districts had a position titled Mathematics Supervisor, but instead had an instructional coordinator to support all content-specific areas. In addition, the Zapata school district does not have departmental chairs in any high school. These duties are carried out by one of the school's assistant principals. Therefore, all six schools completed the department chair interview protocol, and five of the six schools completed the district supervisor interview protocol (the assistant principal at Zapata completed both interviews). Algebra 1 teachers in all six schools participated in the teacher survey.

Findings

The research questions are presented here with a discussion of the findings from the study.

The first research question is: *What policies and strategies have districts and schools implemented in response to the Missouri Algebra 1 EOC assessment? Who was involved in making these decisions? Why were these decisions made? How and when were these decisions implemented?*

Policies and Strategies

The Missouri Department of Elementary and Secondary Education (MODESE) has set provisions for school districts to determine criteria for administering the Missouri Algebra 1 EOC assessment to students. This provision is called the *district delay* policy. All Missouri schools administering the EOC assessment enact their own district delay policy, however, this enactment typically looks different between, and sometimes within, school districts.

In 2009, nearly every 9-12 school structure testing site administering the Algebra 1 EOC tested every student enrolled in Algebra 1, whether the student was passing the course at the time of testing or not. The only exceptions were students enrolled in an Integrated Mathematics course series. Typically, schools offering the Integrated Mathematics course series delayed Algebra 1 EOC testing of students until Integrated Mathematics 2 was completed to ensure that the Algebra 1 course learning expectations had been addressed.

Missouri schools having a 9-12 school structure generally administer the Missouri Algebra 1 EOC assessment to freshmen taking Algebra 1 during the same year as testing. This finding was true for schools participating in this study. However, each district can define its own "district delay" policy – designed to address when students who take Algebra 1 prior to high school or after their freshman year – should take the exam and when their scores will be reported as part of school performance. In some cases, students who complete the Algebra 1 EOC prior to high school have their scores "banked" (saved) until they complete their freshman year in the 9-12 building. Therefore, depending on the school district delay policy, the difference between high and low performing high schools

may relate to the number of freshman taking the EOC assessment rather than the achievement of all freshman. During the administration of the 2010 and 2011 Algebra 1 EOC assessments, some schools continued delay policies in order to benefit from banked scores. For example, Lamar high school used a strategy to maximize the Algebra 1 EOC performance levels of students. The strategy was to institute a policy to test only students having an average grade of C or above in the quarter prior to testing. This policy required Lamar to create new policies for "untested" students who passed the Algebra 1 course but had not taken the EOC in the year they studied the content of Algebra 1. These untested students were automatically enrolled in summer school and administered the Algebra 1 EOC during the summer. Table 5.1 is an overview of the district delay policies for all participating schools.

Table 5.1

District Delay Policies of Participating Schools

Allister North	Does not delay any student, however, students are tested at 8th, 9th, 10th, and 11th grades depending on predetermined tracks.
Zapata	Delays all students failing 2nd semester of Algebra 1 until it is passed.
Dandrige	Delays all students based on teacher professional judgment.
Millwood Prep	Does not delay any student including those failing either semester of Algebra 1.
Rowan	Delays all students failing either semester of Algebra 1 until both semesters are passed.
Lamar	Delays all students receiving grades D or F in 2nd semester of Algebra 1.

Use of Mathematics Specialists

The state of Missouri does not currently offer mathematics specialist certification; therefore, individuals holding this position have different backgrounds, experience, and qualifications across different school districts. In this study, only Allister North, Rowan, and Dandrige placed mathematics specialist in every elementary and middle school. It should be noted that each of these schools has a low number of students receiving free or

reduced lunch and each are affluent enough to afford a mathematics specialist. The common characteristics of the specialists serving in this role across these districts are: elementary certification, demonstration of a strong mathematics background, and active in state and national professional organizations. Specific duties of mathematics specialists differed across districts and included such things as: a) support mathematics instruction K-12, b) support and encourage vertical teaming especially related to preparation for the content of Algebra 1, c) modify the grades 6-12 curriculum flow chart for mathematics to highlight pathways of instruction and learning, d) plan, implement, and supervise summer training of elementary math teachers, e) plan and implement math meeting/training at least 3 times per year, per grade level K-5, f) coordinate the ordering and delivery of materials each year, and g) create supplementary materials and documents for elementary mathematics

All participating schools in the case studies having a low number of students who qualify for free or reduced lunch (LFRL) have placed mathematics specialists in elementary and middle schools in the district. Whereas the remaining schools with medium (MFRL) or high free or reduced lunch (HFRL) do not use mathematics specialists at the elementary or middle grades. All participating school districts placing mathematics specialists in the early grades have consistently made AYP since 2009 with the exception of Dandrige. However, after 2009, Dandrige's banked scores engaged and they have made AYP each year thereafter. The addition of a mathematics specialist seems to impact students' performance prior to high school. All other participating school that has not placed mathematics specialists in their district has consistently not made AYP since 2009.

Vertical Team Planning

Regular communication across elementary, middle and secondary level teachers regarding curriculum issues is common in the high performing school districts. Access and early entry to Algebra 1 is common among all participating school districts. Additionally, support and refinement of topic progressions or learning trajectories is a primary goal of vertical teams. The grade-span combinations vary between school districts, but vertical planning is well established and prevalent in higher performing schools. The use of vertical teams is not common within the districts of the lower performing schools.

Algebra Course Options and Organization

All of the high performing schools (Allister North, Dandrige, and Rowan) have eliminated, or have committed to eliminating, multiple Algebra courses for the purposes of tracking. These schools have found that offering these courses eventually lead to inequitable practices. Incidentally, the course called Pre-Algebra is being eliminated from all participating school districts, but all higher performing districts have already condensed, or are in the process of condensing, all tracked Algebra courses into one course. The schools that are offering or proposing to offer only one Algebra 1 course, contend that offering multiple Algebra courses initially seemed fair and equitable, but soon turned into courses covering different curriculum goals. The department chairperson at Rowan collected data since 2009, and noticed considerable differences in performance on the Missouri Algebra 1 EOC assessment between Algebra 1 B and Algebra 1 A. Teachers at Rowan have agreed to eliminate Pre-Algebra and Algebra 1 B.

One predominant trend in lower performing schools is the use of "double dosing"

students in the Algebra course. Double dosing typically means that all students eligible for testing will be enrolled in two yearlong Algebra 1 courses. The structure and content of the multiple courses varies widely, but the idea is primarily the same, namely to provide more time for students to learn the content assessed on the Algebra 1 EOC. On the other hand, higher performing districts such as Dandrige, tended to enroll students in a single Algebra 1 course. In addition, students in these schools have other support structures such as a mathematics lab that is manned by retired teachers, college students, and volunteers who are available to assist students during all periods. Alternatively, some of these schools tend to offer Algebra 1 teachers a lighter teaching load. In one school district, no teacher has more than half of the available teaching load. This allows students to have access to their mathematics instructor over multiple periods during the day.

Meeting the annual proficiency targets is only part of making AYP. Participation rate, graduation/attendance rate and similar requirements for all subgroups are additional criteria in determining if AYP is met. All participating schools that use an integrated mathematics curriculum or a mathematics curriculum that is investigative, discovery or inquiry based, have consistently reached proficiency targets outright, or through confidence intervals or safe harbor allowances. This is not to say that their choice of curriculum is the cause of their success, but that these curricula are correlated to successful student performance. Additionally, teachers at schools with these curricula report that they do not directly prepare for the Algebra 1 EOC assessment because they believe their curriculum is sufficient in preparing students for multiple types of assessments without having to directly focus on any particular test preparation.

Use of Common Interim Assessments

The Allister school district has created and administers common assessments (quizzes, tests, checks, warm-ups, and exit slips). All assessments are created by teachers and used to align instruction. Rowan high school has committed to implementing common assessments next school year. To ensure a smooth transition, the majority of professional development in Rowan has been allotted to research common assessments. The remaining top performing schools have committed to implementing common assessments for the 2013-2014 school year.

Allister North's mathematics department chairperson describes the use of common assessments as being vital to informing instructional practices that improve student learning and states, "the process of developing, implementing, grading, discussion, and revising is cyclic in nature and serves as constant source of professional development."

Use of Assessment Data to Make Decisions

All participating schools report the use of assessment data to make instructional decisions; however, the specific type of data and ways in which it is used differ significantly between underperforming and high performing schools. Underperforming schools typically rely on state assessment data and rely predominantly on the previous year results to make adjustments to instruction. Higher performing schools use longitudinal assessment data that are internally consistent such as administering the Explore®, Plan®, and paying for all juniors to take the ACT solely for data gathering purposes.

Professional Development

Teachers from low performing schools reported being offered very limited professional development opportunities. Teachers in these schools typically do not experience mathematics-specific professional development. These same teachers indicated limited opportunities to work with other teachers within the school, although they typically share a common planning period which doubles as professional learning communities (PLCs). Teachers at low performing schools report having sporadic, content-neutral, professional development that is typically not evaluated. On the other hand, teachers at high performing schools share multiple planning periods to facilitate PLCs and to allow time for in-school departmental professional development. Teachers at high performing schools have district sponsored professional development at regular intervals throughout the year and receive sponsorship to regularly attend local, state and national mathematics education conferences. Additionally, teachers at high performing schools report having professional development that is course specific, relevant, and systemic.

Decision Makers & Implementation

The responsibility for making policy decisions and planning strategies to improve student performance on the Algebra 1 EOC cannot be attributed to a sole party (teacher, administrator) in any of the schools. In high performing districts, decisions are typically a symbiotic relationship between district administration, building administration and mathematics teachers. In low performing districts, decisions are often weighted towards district administrators although some decisions enacted by district administration may have origins from teachers or building administrators ideas. Finally, some decisions such

as vertical teaming or use of mathematics specialists were enacted well before the Algebra 1 EOC assessment, while others like district delay policies were made in response to the EOC assessment.

The placement of a mathematics specialist in every elementary and middle school was a decision made by district administrators and sanctioned by the board of education. All participating districts having mathematics specialists began implementation well before the advent of the Algebra 1 EOC assessment. Other decisions primarily made by district administrators are: providing dedicated mathematics support to every student, vertical teaming across grade spans, and setting the district delay policy.

The implementation of dedicated mathematics support is different across schools; however, this support was in place prior to the Algebra 1 EOC, mostly in response to the Missouri Mathematics Assessment Program (MAP). Vertical teaming was also implemented prior to the EOC to assist with identifying students for Honors and Advanced Placement courses. Finally, the district delay policy was implemented with the first administering of the Algebra 1 EOC and has been altered by every participating district from its inception in all but one school district.

Building administrators facilitate the use of longitudinal data by purchasing testing materials and providing support for teachers to analyze the data. The Missouri Algebra 1 EOC assessment has been altered every year since its implementation in 2009, therefore longitudinal data had to be captured through alternative sources. Building administrators also provide support for the creation and implementation of common assessments, and proper planning for dedicated mathematics support.

According to the survey data, teachers are instrumental in deciding what

curriculum materials are used within the school. Textbook adoptions are heavily influenced by teacher expertise and suggestions. All but one of the participating schools chose their curriculum independently from any influence of the Algebra 1 EOC assessment, however Zapata selected an investigative curricula to assist with student test performance and mathematical comprehension. Teachers have also been influential in planning course organization and reducing the number of Algebra courses offered within the school.

The second research question was: *What are the perceptions of teachers regarding the impact of the new policies and strategies on student performance?*

Teachers in high performing schools are generally more supportive of their school/district policies and strategies than teachers at low performing schools. This may be due to teachers in low performing schools playing a minimal (or no) role in the development of strategies and policies. For example, when asked if teachers in their school, "are involved in important decisions at this school," 36% (N=25) of all respondents disagreed. The majority (89%) of these respondents were from schools that consistently failed to make AYP, whereas teachers from higher performing schools viewed themselves as playing an integral part in helping to make school decisions.

When respondents were asked to respond to the statement, "Teachers feel pressure from the district to raise scores on the Algebra 1 EOC assessment." 91% (N=23) responded in the affirmative. Unfortunately, this pressure typically results in unproductive strategies and policies to support student achievement. Some of these strategies include teaching to the test, which was listed by some respondents as being the most effective strategies to improve student performance.

When respondents were asked about students' perceptions on how they feel about the statement, "no matter how hard they try, they will still do poorly on the Algebra 1 EOC assessment," 43% (N=23) were in agreement with this student perception. In addition, 52% of these same respondents do not believe that the Algebra 1 EOC assessment measures high standards of achievement. These two items coupled together provide insight on how low performing schools tend to continue to underperform. The idea that students will perform poorly no matter how hard they try, and the belief that the Missouri Algebra 1 EOC assessment does not measure high standards of achievement is prevalent among low performing schools and has led teachers at these schools to become susceptible to poor practices. Reorganizing the curriculum to address only the material to be tested is common among low performing schools. However, this practice severely limits student's opportunity to learn mathematics and detracts from the purpose of the EOC assessment.

Another practice identified by survey respondents was the idea of separating students into classes according to previous levels of mathematics performance. This practice has a tendency to promote disproportionate opportunities to learn for students classified in different categories (below basic, basic, proficient, and advanced). Students that are labeled below basic are not afforded the same opportunities as students labeled closer to being proficient (or higher). The thinking is that below basic students are too far from proficient and too limited in ability to make a difference, and efforts would be better spent on moving students from basic to proficient. The idea of teaching all students mathematics versus moving some students to different levels changes the type of mathematics taught to students, and sends a detrimental message to students about

mathematics.

Many of the respondents (74%, N=23) believe that students will perform better on the Missouri Algebra 1 EOC assessment if they receive special preparation for it and the same percentage of respondents (74%) also attribute year-to-year differences in levels of performance to changes in the characteristics of the students rather than changes in school effectiveness. When teachers at Millwood Prep were asked to identify factors that contribute to their low performance on the Missouri Algebra 1 EOC assessment, teachers consistently made references to students not bringing materials to class, students not caring, students being economically disadvantaged, students not being prepared by elementary and middle schools, or something else centered on the students. The school's curriculum, or the preparation of teachers, or the quality of professional development, or the level of district participation and support were never mentioned, although Teacher Survey and interview protocols indicated deficiencies in these areas. When teachers believe that the problems lie within the student, they must also believe the students hold their own solutions which means there is little teachers can do to adjust the situation.

Additionally, Shepard and Dougherty (1991) identify eight major effects of high-stakes testing on instruction, as reported by teachers: 1) teachers feel pressure from administrators and the media, 2) teachers give greater emphasis to basic skills instruction, 3) non-tested content suffers, 4) instruction is distorted due to extensive test preparation time, 5) test preparation does not include time spent giving the test, 6) flagrant instances of cheating are rare, but other controversial practices that clearly boost scores happen more frequently, 7) teachers reported extensive use of test results for ranking and comparing schools, and 8) teachers believe that the benefits of standardized testing are

offset or greatly outweighed by negative effects.

In the metropolitan St. Louis area of the state of Missouri, the local news and newspaper media make annual reports on school performance based on Algebra 1 EOC results. The news media dedicates several evenings to comparing and ranking schools, while also insinuating which schools are better and which school are worse. The newspaper print media also displays various lists of school performance that are typically posted in the hallways of schools by school and district administrators. In response to these actions, teachers at Lamar and Millwood Prep have indicated that they feel an enormous amount of pressure.

At Lamar, the department chairperson stated that schools within the district are rewarded and reprimanded according to their Missouri Algebra 1 EOC performance. The reprimand typically comes in the form of pressure to increase student scores and is exerted on the principals and mathematics faculty by the assistant superintendent of secondary schools. During academic team meetings, teachers and principals are put on the spot and must defend their daily instructional activities and additional interventions to increase students' performance.

The Millwood Prep mathematics department chairperson also reported feeling pressured by district administrators to increase student performance. Most of this pressure came in the form of lack of ability to make decisions or implement strategies that may enhance student performance. At Millwood Prep, low performance is rewarded with district-mandated reform measures that often are not believed to be effective strategies by teachers of Algebra.

Teachers at Zapata, Dandrige, Lamar, and Millwood Prep agreed (93%) that their

school's level of focus on tested areas (English and mathematics) has created deficiencies in non-tested areas such as history, social studies, and especially performing arts. All of these schools have some level of support for Algebra ranging from afterschool programs, in school instruction, or additional required courses. However, none of these four schools offer additional support for non-tested areas.

Another effect of high-stakes testing reported by Shepard and Dougherty (1991), was the occurrence of controversial practices that fall short of cheating, but may boost scores. The teacher survey administered to participating schools had affirmative responses to three questions: 1) Have any teachers at your school given students hints about answers? 2) Have any teachers at your school pointed out mismarked items to students? And 3) Have any teachers at your school given some students more than the allowed time? Teachers at Zapata and Rowan answered yes to the first and second questions, whereas teachers at Zapata, Rowan, and Allister North answered 'yes' to the third question. Strikingly, all of these schools performed well on the 2010 Algebra 1 EOC assessment. All teachers at Lamar, Dandrige, and Millwood Prep responded 'no' to both questions above as well as the following two questions: 4) Have any teachers at your school provided instruction during the test? And 5) Have any teachers at your school changed students' answers on the test?

One additional effect of high-stakes testing is the use of data to compare and rank schools. Zapata, Rowan, and Lamar are schools within districts having more than one high school. Both department chairperson and mathematics supervisor interviews revealed that schools in the same district are consistently compared to each other using EOC assessment data. Furthermore, Zapata and Lamar administer common benchmark

assessments to all district schools and have at least one additional district administered indicator of student progress towards meeting course-level expectations. These additional assessments are used to rank and compare schools as well.

Implications

Currently 45 states have signed on to implement the Common Core State Standards (CCSS) by 2014. Accompanying this is the acknowledgment of subsequent large scale testing from grades 3 – 8 and one year in secondary school. This is evidenced by all participating states belonging to at least one of the two assessment consortiums: Partnership for Assessment of Readiness for College and Careers (PARCC) or Smarter-Balanced Assessment Consortia (SBAC). It will be imperative that teacher education programs begin to instruct pre-service teachers on the implementation of CCSS, as it will become the focus of a new round of assessments at the secondary level.

Teacher education programs are limited in their ability to influence teacher beliefs and practices (Battista, 1994). It is typically left up to a school district's professional development of in-service teachers to challenge teacher beliefs and practices and provide a mechanism for professional growth. As teachers begin to prepare students for the Smarter-Balanced assessments, the district will need to support teachers in meaningful ways.

The NCLB Act is based on the premise that all students will be proficient in mathematics by the year 2014. To ensure that all means all, schools and districts are required to have all subgroups to be proficient as well. Schools participating in this study that did not AYP overall, also consistently failed to have proficient subgroups. Districts need to develop direct intervention strategies for specific subgroups in order to ensure

adequate yearly progress.

The Missouri Algebra 1 EOC assessment has been altered each year it has been administered. Additionally in 2012, the state sanctioned Crystal Reports system used for data analysis has been replaced with the Missouri Comprehensive Data System Portal. In lieu of this, teachers in Missouri will require professional development focusing on interpretation of test results and use of test results.

Limitations of the Study

The evidence of teacher practices was limited to self-reported data collected on a survey. It would have been more ideal to interview and observe teachers in action in order to create a stronger triangulation of the data and form a deeper understanding of the impact of these practices. In addition, more interviews occurring over a longer period of time would have help to cull out common themes between and across participating schools.

This study also had a limited geographical focus on one portion of the state of Missouri. This led to the exclusion of a rare (only 3 schools) category of a high performing secondary school with high percentage of students receiving a free or reduced lunch. The inclusion of the entire state would have allowed for all performance and SES types to be included in the study or would have allowed the study to focus on atypical cases, such as HP/HFRL or LP/LFRL schools.

In the short existence of the Missouri Algebra 1 EOC assessment, the test has undergone revisions in every year. This does not allow for performance comparisons to be meaningful because teachers are preparing a different set of students for a different assessment each year. Furthermore, the ensuing Smarter-Balanced assessment will be yet

another alteration of the Algebra 1 EOC. Until the EOC assessment remains consistent, the ability to track and trend longitudinal data will be limited.

Future Research

One of the goals of this study was to use the Yañez & Wenrick (2000) conceptual framework to examine policies and practices that supported student achievement. This tool was primarily developed to identify schools that continued to achieve or continued to do poorly on an Algebra 1 EOC assessment. Future research is needed to look at within school variances versus between school variances.

Districts that administer the Algebra 1 EOC to the majority of their students prior to 9th grade consistently outperform districts that administer the assessment to primarily secondary students. Further work is needed to examine what supports are needed to provide students access to the content of Algebra 1 earlier than ninth grade and to examine the impact on student motivation to learn in these settings.

Summary

This study examined the practices and policies of schools and school districts that impacted student performance on the Missouri Algebra 1 EOC assessment. Several of the findings were consistent and complement other studies (see Williams, et al, 2005, 2010; Yañez & Wenrick, 2000) done on Algebra 1 EOC assessments.

The practiced belief that all students can learn and perform well in Algebra (NCTM, 2000) is a crucial part of realizing student success on EOC testing. The growing number of schools administering the Algebra 1 EOC primarily in the middle grades provides evidence of this shift. Currently, Missouri schools administer the Algebra 1 EOC to the majority of secondary students; however, these secondary students also have

the highest failure rates.

Districts whose students perform at the proficient level on the Algebra 1 EOC use a variety of strategies to support student learning including double dosing, common assessments, elimination of multiple algebra courses, use of longitudinal data, and ongoing, relevant, and systemic professional development. Additionally, districts whose students perform well implement the use of mathematics specialist in every elementary and middle school in their district. This is not to say mathematics specialists causes increased student performance, but that one characteristic of a high performing school is the inclusion of mathematics specialists. These specialists not only identify and assist struggling students, but also assist struggling teachers and are there to bring guidance and focus to accelerated students. Furthermore, these specialists help provide a foundation to strengthen vertical teaming and promote the alignment of K-12 mathematics in a school district. Finally, high performing districts have processes in place to support algebra being taught and tested in the middle grades.

Large scale testing is here to stay. The anticipated construction of new assessments aligned with the CCSS, has the interest of many constituencies ranging from the American Federation of Teachers to groups of concerned parents. For teachers, these new tests are likely to have implications for teacher evaluations. For parents, these new tests may have an impact on their child's high school graduation. Often, underperforming students hold certain beliefs or attitudes that may be detrimental to their mathematical performance on assessments. Teachers must realize that these beliefs, values, and attitudes can be changed, especially in school-aged students.

REFERENCES

Abrams, L. M., Pedulla, J. J., & Madaus, G. F. (2003). Views from the classroom: Teachers' opinions of statewide testing programs. *Theory into Practice, 42*(1), 18-29.

ACT. (2008). The forgotten middle: Ensuring that all students are on target for college and career readiness before high school. Iowa City, IA.

Allexsaht-Snider, M., & Hart, L. E. (2001). "Mathematics for all": How do we get there? *Theory into Practice, 40*(2), 93-101.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261-271.

Apple, M. W. (1992). Do the standards go far enough? Power, policy, and practice in mathematics education *Journal for Research in Mathematics Education, 23*(5), 412- 431.

Augustine, C. H., Gonzalez, G., & et al. (2009). Improving school leadership: The promise of cohesive leadership systems. Santa Monica, CA: RAND Corporation.

Battista, M. T. (1994). Teacher Beliefs and the Reform Movement in Mathematics Education. *The Phi Delta Kappan*, *75*(6), 462-463, 466-468, 470.

Bottoms, G., Cooney, S., & et al. (2007). *We know what works in the middle grades: Smart district leadership can make it happen*. Atlanta, GA: Southern Regional Education Board.

Center for the Study of Mathematics Curriculum. (2010). Curriculum research framework. from http://www.mathcurriculumcenter.org/research_framework.php

Cimbricz, S. (2002). State-mandated testing and teachers' beliefs and practice. *Education Policy Analysis Archives, 10*(2).

Clarke, M., Shore, A., Rhoades, K., Abrams, L., Miao, J., & Li, J. (2003). Perceived effects of state-mandated testing programs on teaching and learning: Findings from interviews with educators in low-, medium-, and high-stakes states. Boston, MA: Boston College.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, F., Mood, A. M., & Weinfeld, F. D. (1966). Equality of educational opportunity. Washington, DC: U.S. Government Printing Office.

Cotton, K. (2003). *Principals and student achievement: What the research says. .* Alexandria, VA: Association for Supervision and Curriculum Development.

Creswell, J. W. (2003). A framework for design. In C. D. Laughton (Ed.), *Research design: Qualitative, qauntitative, and mixed methods approaches* (2nd ed., pp. 3-26). Thousands Oaks, CA: Sage Publications.

Cuban, L. (1984). Transforming the frog into the prince: Effective schools research, policy, and practice at the district level. *Harvard Educational Review, 54*, 129-151.

Edwards, B., & Leichty, J. (2010). *California and the "common core": Will there be a new debate about k–12 standards?* Mountainview, CA: Edsource. Document Number)

Frankenstein, M. (1990). Incorporating race, gender, and class issues into a critical mathematical literacy curriculum. *Journal of Negro Education, 59*(3), 336-347.

Frankenstein, M. (1994). Understanding the politics of mathematical knowledge as an integral part of becoming critically numerate. *Radical Statistics, 56*, 22-40.
Gamoran, A. (1987). The stratification of high school learning opportunities. *Sociology of Education, 60*(3), 135-155.
Gamoran, A., & Hannigan, E. C. (2000). Algebra for everyone? Benefits of college-preparatory mathematics for students with diverse abilities in early secondary school. *Educational Evaluation and Policy Analysis, 22*(3), 241-254.
Goertz, M. E. (2000). *Local accountability: The role of the district and school in monitoring policy, practice, and achievement*. Paper presented at the annual meeting of the American Educational Research Association.
Gulek, C. (2003). Preparing for high-stakes testing *Theory into Practice, 42*(1), 42-50.
Gutstein, E. (2002). *Roads to equity in mathematics education*. Paper presented at the American Educational Research Association.
Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, latino school. *Journal for Research in Mathematics Education, 34*(1), 37-73.
Hart, L. E., & Allexsaht-Snider, M. (1996). Sociocultural and motivational contexts of mathematics learning for diverse students. In M. Carr (Ed.), *Motivation in mathematics* (pp. 1-23). Cresskill, NJ: Hampton.
Hawkins, W. A. (1995). *Constructing a secure mathematics pipeline for minority students* (No. RBDM 9504). Storrs, CT: National Research Center on the Gifted and Talented. Document Number)
Haydel, A. M., & Roeser, R. W. (2002). On the links between students' motivational patterns and their perceptions of, beliefs about, and performance on different types of science assessments: A multidimensional approach to achievement validation. Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing.
Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology, 45*(3), 740-763.
Huberman, A. M., & Miles, M. B. (1994). Data management and analysis methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 428–444). Thousand Oaks, CA: Sage Publications.
Juvonen, J., Le, V., & et al. (2004). Focus on the wonder years: Challenges facing the american middle school. Santa Monica, CA: Edna McConnell Clark Foundation.
Koretz, D. M., Linn, R. L., Dunbar, S. B., & Shepard, L. A. (1991). *The effects of high-stakes testing on achievement: Preliminary findings about generalization across tests.* Paper presented at the American Educational Research Association, Chicago, IL.
Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. *Teachers College Record, 97*, 47–68.
Lee, V. E., Bryk, A. S., & Smith., J. B. (1993). The effects of high school organization on teachers and students. In L. Darling-Hammond (Ed.), *Review of research in education*. Washington, DC: American Educational Research Association.
Lee, V. E., & Smith, J. B. (1995). Effects of high school restructuring and size on gains in achievement and engagement for early secondary school students. *Sociology of Education, 68*, 241-270.

Lee, V. E., Smith, J. B., & Croninger, R. G. (1997). How high school organization influences the equitable distribution of learning in mathematics and science. *Sociology of Education, 70*(2), 128-150.

Leithwood, K., & Riehl, C. (2003). *What do we know about successful school leadership?* Paper presented at the American Educational Research Association.

Leithwood, K., Steinbach, R., & et al. (2002). School leadership and teachers' motivation to implement accountability policies. . *Educational Administration Quarterly, 38*(1), 94-119.

Loveless, T. (2008). *The misplaced math student: Lost in eighth-grade algebra*. Washington, D.C.: Brown Center on Education Policy at the Brookings Institute. Document Number)

Martin, D. B. (2003). Hidden assumptions and unaddressed questions in mathematics for all rhetoric. *The Mathematics Educator 13*(2), 7-21.

Merriam, S. B. (1988). *Case study research in education: A qualititative approach*. San Francisco, CA: Jossey-Bass.

Missouri State Dept. of Elementary and Secondary Education. (1986). Core competencies and key skills for missouri schools: For grades 2 through 10. Jefferson City, MO.

Miyasaka, J. R. (2000). *A framework for evaluating the validity of test preparation practices.* Paper presented at the American Educational Research Association, New Orleans, LA.

Moses, R. (2001). *Radical equations: Civil rights from mississppi to the algebra project*. Boston, MA: Beacon Press.

National Association of Secondary School Principals. (2006). *Breaking ranks in the middle: Strategies for leading middle level reform*. Reston, VA.

National Center for Education Statistics. (2009a). Characteristics of public, private, and bureau of indian education elementary and secondary school teachers in the united states: Results from the 2007-08 schools and staffing survey (Publication.: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009324

National Center for Education Statistics. (2009b). Digest of education statistics: 2009. from http://nces.ed.gov/programs/digest/d09/index.asp

National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. Washington, DC: Author.

National Council of Teachers of Mathematics. (1980). An agenda for action: Reccomendations for school mathematics of the 1980s. Reston, VA: Author.

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Mathematics Advisory Panel. (2008). *Foundations for success: The final report of the national mathematics advisory panel*. Washington, DC: U.S. Department of Education. Document Number)

National Research Council. (1989). *Everybody counts: A report to the nation on the future of mathematics education*. Washington, DC: Author.

Patton, M. (1990). *Qualitative research and evaluation*. Thousand Oaks, CA: Sage Publications.

Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Pedulla, J., Abrams, L., Madaus, G., Russell, M., Ramos, M., & Miao, J. (2003). Perceived effects of statemandated testing programs on teaching and learning: Findings from a national survey of teachers. Chestnut Hill, MA: Center for the Study of Testing, Evaluation, and Educational Policy, Boston College.

Reyes, L. H., & Stanic, G. M. A. (1988). Race, sex, socioeconomic status, and mathematics. *Journal for Research in Mathematics Education, 19*(1), 26-43.

Shepard, L. (1990). *"Inflated test score gains": Is it old norms or teaching the test?* (No. 307). Los Angeles, CA: UCLA Center for Research on Evaluation, Standards, and Student Testing. Document Number)

Shepard, L. (2001). *Protecting learning from the harmful effects of high-stakes testing.* Paper presented at the 2001 annual meeting of the American Educational Research Association, Seattle, WA.

Shepard, L. (2002). The hazards of high-stakes testing *Issues in Science and Technology, 19*(2), 53-58.

Shepard, L. A., & Dougherty, K. C. (1991). *Effects of high-stakes testing on instruction.* Paper presented at the American Educational Research Association, Chicago, IL.

Smith, J. B. (1996). Does an extra year make any difference? The impact of early access to algebra on long-term gains in mathematics attainment. *Educational Evaluation and Policy Analysis, 18*(2), 141-153.

Southern Regional Education Board. (2009). *Keeping middle grades students on the path to success in high school: Increasing engagement and achievement in sreb states*. Atlanta, GA. Document Number)

Stake, R. (1994). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications.

Stanic, G. M. A. (1986). The growing crisis in mathematics education in the early twentieth century *Journal for Research in Mathematics Education, 17*(3), 190-205.

Tate, W. F. (1995). Economics, equity, and the national mathematics assessment: Are we creating a national toll road? In W. Secada, E. Fennema & L. B. Adajian (Eds.), *New directions for equity in mathematics in mathematics education* (pp. 191–206). Cambridge, MD: Cambridge University Press.

Tuescher, D., Dingman, S. W., Nevels, N. N., & Reys, B. J. (2008). Curriculum standards, coures requirements, and mandated assessments for high school mathematics: A status report of state policies. *NCSM Journal, 10*(2), 49-54.

U. S. News & World Report. (2010). America's best high schools. from http://www.usnews.com/sections/education/high-schools/

Watt, H. M. G., Eccles, J. S., & Durik, A. M. (2006). The leaky mathematics pipeline for girls: A motivational analysis of high school enrolments in australia and the USA. *Equal Opportunities International, 25*(8), 642-659.

Williams, T., Kirst, M., Haertel, E., & et al. (2005). *Similar students, different results: Why do some students do better? A large-scale survey of california elementary schools serving low-income students*. Mountain View, CA: EdSource.

Williams, T., Kirst, M. W., Haertel, E., & et al. (2010). *Gaining ground in the middle grades: Why some schools do better*. Mountain View, CA: EdSource.
Yañez, D. A., & Wenrick, M. (2000). Improving algebra 1 end-of-course exam scores: Evidence from the field. The University of Texas at Austin: Charles A. Dana Center.

APPENDICIES

A SCHOOL DEMOGRAPHIC SUMMARY

School Demographic Summary

School Name:

Grade Span:

District:

Algebra Textbook(s):

Algebra Supplements:

Mathematics Course Offerings:

Mathematics Course Sequencing:

IB/AP Courses:

Algebra Teacher's Certification(s) and Levels of Education:

_____

_____

_____

Special School Program(s) for Teaching and Learning Algebra:

_____

_____

Special District Program(s) for Teaching and Learning Algebra:

_____

_____

Professional Development:

School or District Algebra Benchmarks:

2009-2010 Missouri School Directory

Affton 101

Phone: 314-638-8770
Fax: 314-631-2548
E-mail: dfrancis@affton.k12.mo.us

8701 Mackenzie Rd
St Louis, MO 63123-3436

County-District Code: 096-098
County: St. Louis

Supervisory Area: A
MSIP:

Assessed Valuation: $409,568,290

Tax Levy:

District Planning Profile

			Enrollment (Prior Year)		
	Schools	**Certificated Staff**	**Residents**	**Non-residents**	**Total**
Elementary Schools	2	86	1031	0	1031
Middle Schools	1	57	572	0	572
Jr. High Schools	0	0	0	0	0
High Schools	1	70	852	0	852
Total	4	213	2455	0	2455

Name	**Title**	**Years in District**
Mr. Scott Sifton	Pres. of Bd.	
Mrs. Mary Ann Schiller	Secy. of Board	
Dr. Donald E Francis	Supt.	5
Mrs. Mary Ann Schiller	Admin. Asst. To Supt.	59
Mr. Kenneth G Weissflug	Asst. Supt.	17
Mr. John Brazeal	Dir. Bus. Affairs	4
Mrs. Alison Muehlhauser	Asst. Pers./Grants	14
Mr. Jeffrey Morris	Coord. Staff Dev.	8
Mr. Dave Walters	Mgr. Fac./Grnds.	10
Mrs. Joann Levering	Dir. Specl. Educ./Stu. Serv.	4

Mr. Ron Spicer	Coord. Tech.	7
Ms. Judy Dunn	Supvr. Trans.	8
Ms. Marilyn Allen	Coord. A+	2
Linda Hobbs	Prof. Dev. Chairperson	

School Name: Affton High (1050)
Enrollment: 852
Phone: 314-638-6330
Fax: 314-633-5990
E-mail: sjackson@affton.k12.mo.us
Prin.: Dr. Susan Jackson (1 years in district)

Grade Span: 09-12
Certificated Staff: 70
8309 Mackenzie Rd
St Louis, MO 63123-3455

School Name: Rogers Middle (3000)
Enrollment: 572
Phone: 314-351-9679
Fax: 314-351-6381
E-mail: jremelius@affton.k12.mo.us
Prin.: Mr. Jeff Remelius (17 years in district)

Grade Span: 06-08
Certificated Staff: 57
7550 Mackenzie Rd
St Louis, MO 63123-2746

School Name: Mesnier Primary Sch. (4040)
Enrollment: 496
Phone: 314-849-5566
Fax: 314-633-5992
E-mail: drenda@affton.k12.mo.us
Prin.: Ms. Diane Renda (17 years in district)

Grade Span: K-02
Certificated Staff: 43
6930 Weber Rd
St Louis, MO 63123-3002

School Name: Gotsch Intermediate Sch. (4080)
Enrollment: 535
Phone: 314-842-1238
Fax: 314-633-5991
E-mail: bsmith@affton.k12.mo.us
Prin.: Mr. Brian Smith (13 years in district)

Grade Span: 03-05
Certificated Staff: 43
8348 S Laclede Station Rd
St Louis, MO 63123-2147

Annual Reporting of School District Data
FTP Downloading Site

Topic	District Files				Building Files			
	Date Posted	*.xls	Sample	Def.	Date Posted	*.xls	Sample	Def.
District Accreditation Status	07/06/2009	X	X	X	NA	NA	NA	NA
Calendar Days and Hours	11/07/2009	X	X	X	NA	NA	NA	NA
Student Demographics	11/07/2009	X	X	X	11/07/2009	X	X	X
Student Staff Ratios	11/07/2009	X	X	X	11/07/2009	X	X	X
Faculty Salary	11/07/2009	X	X	X	11/07/2009	X	X	X
Teacher Certification	11/07/2009	X	X	X	11/07/2009	X	X	X
School Finance	12/04/2008	X	X	X	NA	NA	NA	NA
Attendance Data	11/07/2009	X	X	X	11/07/2009	X	X	X
Discipline Incidents	11/07/2009	X	X	X	11/07/2009	X	X	X
Dropouts	11/07/2009	X	X	X	11/07/2009	X	X	X
Graduation Rates	11/07/2009	X	X	X	11/07/2009	X	X	X
Graduate Follow-Up	11/07/2009	X	X	X	11/07/2009	X	X	X
ACT	11/25/2008	X	X	X	11/25/2008	X	X	X
MAP and End-of-Course (EOC)	08/10/2009	X	X	X	08/10/2009	X	X	X
MAP and EOC Disaggregate	08/10/2009	X	X	X	08/10/2009	X	X	X
AYP	08/10/2009	X	X	X	08/10/2009	X	X	X
AYP Summary Understanding AYP	08/10/2009	X	X	X	08/10/2009	X	X	X

Email: School Statistics
Last Revised: November 7, 2009

B ALGEBRA 1 TEACHER SURVEY

Improving Student Achievement on the Algebra 1 EOC Assessment

1. Background Information

1. What is the name of your district?

*** 2. How many years have you been teaching?**

Full-time

As a substitute

At your current school full-time

At your current school as a substitute

*** 3. What is the highest level of formal education you have completed?**

◯ Associate's Degree ◯ Bachelor's degree ◯ Master's degree ◯ Doctoral degree

*** 4. Which of the following teaching credentials do you have?**

◯ Substitute ◯ Provisional ◯ Temporary ◯ Initial ◯ Career Continuous ◯ Lifetime

5. What is your gender?

◯ Female

◯ Male

6. What is your age?

7. To which of the following groups do you belong? (Please check all that apply.)

☐ American Indian or Alaska Native

☐ Asian

☐ Black or African American

☐ Filipino

☐ Latino/Hispanic

☐ Native Hawaiian or Pacific Islander

☐ White

☐ Other

Page 1

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 8. At what grade level(s) are you currently teaching? (Please check all that apply.)**

☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12

*** 9. What is the name of the course you teach to students taking the Algebra 1 EOC assessment?**

*** 10. How many years have you taught this course (from question #9)?**

2. School Context

*** 1. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Our school has a clear vision that is focused on student learning outcomes	○	○	○	○
Our school has well defined plans for instructional improvement	○	○	○	○
Our school assesses the effectiveness of our plans for instructional improvement	○	○	○	○

*** 2. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
At our school, there is an enforced attendance policy	○	○	○	○
At our school, there is an enforced dress code for students	○	○	○	○
At our school, there is are enforced rules for student behavior	○	○	○	○
At our school, there is a zero tolerance policy toward bullying	○	○	○	○
At our school, students respect cultural differences	○	○	○	○

Page 2

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. How frequently do you do each of the following with other teachers in your school?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
Share and discuss teaching methods	○	○	○	○	○
Discuss particular lessons that were not successful	○	○	○	○	○
Examine the scope or sequence of curricular topics	○	○	○	○	○
Review a course-level pacing calendar	○	○	○	○	○
Share and discuss student work	○	○	○	○	○

*** 4. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Teachers take responsibility for student achievement	○	○	○	○
Teachers are committed to improving student achievement	○	○	○	○
Teachers communicate to students that education is important	○	○	○	○
Teachers provide support to struggling teachers	○	○	○	○
Teachers are involved in making important decisions at this school	○	○	○	○
Teachers discuss assumptions about race and student achievement	○	○	○	○
Teachers review Algebra 1 EOC scores with students and parents	○	○	○	○

*** 5. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
My classroom instruction is guided by state standards	○	○	○	○
Our school has identified essential/key standards	○	○	○	○
Our school uses a standards-based report card	○	○	○	○
Meeting our AYP growth target is a priority	○	○	○	○
Meeting our AYP subgroup (e.g., racial/ethnic, ELL) targets is a priority	○	○	○	○
Our school sets measurable goals for EXCEEDING the mandated AYP subgroup growth targets.	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 6. How frequently have you done the following during the school year?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
Informed parents about the academic standards their students will be expected to meet	○	○	○	○	○
Required students to have their parents sign off on homework	○	○	○	○	○
Assigned homework that involved direct parent involvement or participation	○	○	○	○	○
Sent home examples of excellent student work to serve as a model	○	○	○	○	○
Provided parents with specific activities they can do to improve their student's academic achievement	○	○	○	○	○
Contacted parents about student's academic progress	○	○	○	○	○

*** 7. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Teacher morale is high at my school	○	○	○	○
Student morale is high at my school	○	○	○	○
Teachers have high expectations for the in-class academic performance of students in my school	○	○	○	○
My school has an atmosphere conducive to learning	○	○	○	○

*** 8. How much influence do teachers at your school have in determining the following school policies?**

	Strong Influence	Moderate influence	Minor Influence	No Influence
Content of professional development	○	○	○	○
Use of discretionary school funds	○	○	○	○
Selection of curriculum and instructional programs	○	○	○	○
Selection of supplemental books and other materials	○	○	○	○
Hiring of new teachers	○	○	○	○
Hiring of new principal	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 9. In your opinion, what are the three most effective things your school has done to improve student achievement on the Algebra 1 EOC assessment?**

Strategy #1

Strategy #2

Strategy #3

10. Use this Comment Box for overflow from question #9, if necessary

3. Impact of State Testing

*** 1. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
The Algebra 1 EOC assessment is based on a curriculum framework that ALL teachers in my state should follow	○	○	○	○
What the Algebra 1 EOC assessment measures is about the same as what any commercially available standardized achievement test (e.g., Stanford 9, ITBS, TerraNova) measures	○	○	○	○
Scores on the Algebra 1 EOC assessment accurately reflect the quality of education students have received	○	○	○	○
The Algebra 1 EOC assessment is just another fad	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 2. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Teachers have high expectations for the performance of ALL students on the Algebra 1 EOC assessment	○	○	○	○
Performance differences between minority and non-minority students are smaller on the Algebra 1 EOC assessment than on commercially available standardized achievement tests (e.g., Stanford 9, ITBS, TerraNova)	○	○	○	○
The Algebra 1 EOC assessment motivates previously unmotivated students to learn	○	○	○	○
Teachers feel pressure from the district to raise scores on the Algebra 1 EOC assessment	○	○	○	○

*** 3. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Many low scoring students will do better on the Algebra 1 EOC assessment if they receive specific preparation for it	○	○	○	○
Score differences from year to year on the state-mandated test reflect changes in the characteristics of students rather than changes in school effectiveness	○	○	○	○
Many students in my classes feel that, no matter how hard they try, they will still do poorly on the Algebra 1 EOC assessment	○	○	○	○
The Algebra 1 EOC assessment measures high standards of achievement	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 4. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
The Algebra 1 EOC assessment is NOT an accurate measure of what students know and can do	○	○	○	○
The majority of my students try their best on the Algebra 1 EOC assessment	○	○	○	○
Many students are extremely anxious about taking the Algebra 1 EOC assessment	○	○	○	○
Differences among schools on the Algebra 1 EOC assessment are more of a reflection of students' background characteristics than of school effectiveness	○	○	○	○

*** 5. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Teachers feel pressure from parents to raise scores on the Algebra 1 EOC assessment	○	○	○	○
Students are under intense pressure to perform well on the Algebra 1 EOC assessment	○	○	○	○
Teachers in my school want to transfer out of the courses/grades where the Algebra 1 EOC assessment is administered	○	○	○	○
The Algebra 1 EOC assessment program leads some teachers in my school to teach in ways that contradict their own ideas of good educational practice	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 6. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Teachers in my school have found ways to raise Algebra 1 EOC assessment scores without really improving student learning	○	○	○	○
Teachers feel pressure from the building principal to raise scores on the Algebra 1 EOC assessment	○	○	○	○
Administrators in my school believe students' Algebra 1 EOC assessment scores reflect the quality of teachers' instruction	○	○	○	○
Many students in my school cheat on the Algebra 1 EOC assessment	○	○	○	○

4. Testing Strategies & Practices

*** 1. Approximately how many class hours PER YEAR do you spend preparing students specifically for the Algebra 1 EOC assessment (e.g., teaching test-taking skills)?**

- ○ None
- ○ 1-10
- ○ 11-20
- ○ 21-30
- ○ More than 30

*** 2. When were most of the test preparation activities you conducted specifically for the Algebra 1 EOC assessment carried out?**

- ○ No specific preparation
- ○ The day before
- ○ Throughout the week before
- ○ Throughout the two weeks before
- ○ Throughout the month before
- ○ Throughout the year

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. How similar is the content of the test preparation materials you use to the content of the Algebra 1 EOC assessment?**

- ◯ Very similar
- ◯ Somewhat similar
- ◯ Somewhat dissimilar
- ◯ Very dissimilar

*** 4. One test preparation strategy is to target specific groups of students. Please mark ALL that apply related to the Algebra 1 EOC assessment.**

- ☐ I do not target test preparation at specific groups of students
- ☐ I target test preparation at English Learner (EL) students
- ☐ I target test preparation at Special Education (SPED) students
- ☐ I target test preparation at students on the border of passing the Algebra 1 EOC assessment
- ☐ I target test preparation at students who are on the border of moving to the next performance level

Other (please specify)

*** 5. Have you heard of any of the following activities taking place during the Algebra 1 EOC assessment administration at your school?**

	Yes	No
Have any teachers at your school given students hints about answers?	☐	☐
Have any teachers at your school pointed out mismarked items to students?	☐	☐
Have any teachers at your school given some students more than the allowed time?	☐	☐
Have any teachers at your school provided instruction during the test?	☐	☐
Have any teachers at your school changed students answers on the test?	☐	☐

Improving Student Achievement on the Algebra 1 EOC Assessment

6. Does your school rely on any of the following strategies to influence students to do their best work on the Algebra 1 EOC assessment? (Please Mark ALL that apply.)

- ☐ Discussing the importance to the school of good performance on the test
- ☐ Holding student assemblies to motivate students
- ☐ Publicly recognizing students for good performance
- ☐ Scheduling special activities (e.g., pizza parties, field trips)
- ☐ Providing free time as a reward to students
- ☐ Linking performance to eligibility for participation in extra curricular activities (e.g., athletic clubs)
- ☐ Giving prizes to reward students
- ☐ Requiring/recommending summer school
- ☐ Retaining students in grade
- ☐ Using scores for assigning report card grades
- ☐ Placing students in classes (e.g., honors, remedial)
- ☐ Exempting students who do well from required course work

Other (please specify)

* **7. The Algebra 1 EOC assessment program influences the amount of time you spend on...**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Whole group instruction	◯	◯	◯	◯
Critical thinking skills	◯	◯	◯	◯
Individual seat work	◯	◯	◯	◯
Basic skills	◯	◯	◯	◯
Students working together in small groups (cooperative learning)	◯	◯	◯	◯
Concept development using manipulatives or experiments	◯	◯	◯	◯
Problems that are likely to appear on the Algebra 1 EOC assessment	◯	◯	◯	◯

5. Curriculum & Instruction

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 1. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
I have detailed knowledge of the content covered by other teachers at my school	○	○	○	○
I have detailed knowledge of the instructional methods used by other teachers at my school	○	○	○	○
There is consistency in curriculum and instruction at the same grade level	○	○	○	○
There is alignment in curriculum and instruction across different grade levels	○	○	○	○
When we start a new instructional program, we follow up to see how it is impacting student achievement	○	○	○	○

*** 2. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
My mathematics course(s) is protected from unnecessary interruptions	○	○	○	○
Mathematics is integrated with other subjects	○	○	○	○
The mathematics curriculum materials meet the needs of the majority of my students	○	○	○	○
The mathematics curriculum materials are aligned with state standards	○	○	○	○
I have opportunities to experiment with instructional strategies	○	○	○	○
I have opportunities to integrate culturally relevant materials	○	○	○	○
I have received adequate training in the current curriculum program	○	○	○	○
My classroom has the current version of the textbook	○	○	○	○
All students in my classes have a copy of the textbook	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. How frequently do you do each of the following?**

	Daily	Once or twice a week	Once or twice a month	A few times a year	Never
Follow a lesson plan provided by the curriculum program, making few or no adjustments	○	○	○	○	○
Modify a lesson plan provided by the curriculum program to better fit the needs of my students	○	○	○	○	○
Use tests provided by the curriculum program	○	○	○	○	○
Follow a pacing plan provided for my course	○	○	○	○	○
Map state curriculum standards onto my lesson plans	○	○	○	○	○

*** 4. How frequently does each of the following occur?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
I inform parents about my curriculum and instruction	○	○	○	○	○
I provide suggestions for activities that parents can do at home with their child	○	○	○	○	○
I create homework assignments that involve parents	○	○	○	○	○
I have parents who provide instructional support in my classroom	○	○	○	○	○

Page 12

*** 5. How frequently do you do the following to address the needs of students who are struggling academically?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
Adjust my pace in the unit for the entire class to address the needs of struggling students	○	○	○	○	○
Review key concepts in the unit for the entire class to address the needs of struggling students	○	○	○	○	○
Use same-level achievement grouping to address the needs of struggling students	○	○	○	○	○
Use mixed achievement grouping to address the needs of struggling students	○	○	○	○	○
Use individualized instruction during class to address the needs of struggling students	○	○	○	○	○
Provide individual assistance outside of class to address the needs of struggling students	○	○	○	○	○

*** 6. How frequently do you refer struggling students in your classroom to the following kinds of services?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
Diagnostic assessment	○	○	○	○	○
Individual tutoring from a specialist	○	○	○	○	○
Individual tutoring from an aide	○	○	○	○	○
Individual tutoring from a volunteer	○	○	○	○	○
Pull-out instruction in a small group	○	○	○	○	○
Additional instruction in a before-school, after-school, or Saturday program	○	○	○	○	○
Additional instruction in a summer-school/intersession program	○	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

7. How are your English Learners (EL) students taught mathematics? (Please mark ALL that apply.)

- ☐ I do NOT have any EL students
- ☐ In their native language
- ☐ In a mainstream classroom
- ☐ Using EL immersion techniques
- ☐ With primary language assistance from an instructional aide
- ☐ With primary language assistance from the teacher
- ☐ With primary language assistance from a resource teacher
- ☐ Using mathematics material designed for EL students
- ☐ Using primary language math materials

Other (please specify)

*** 8. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
The Algebra 1 EOC assessment is compatible with my daily instruction	○	○	○	○
My district curriculum is aligned with the Algebra 1 EOC assessment	○	○	○	○
The instructional text and materials that the district requires me to use are compatible with the Algebra 1 EOC assessment	○	○	○	○
There is so much pressure to perform well on the Algebra 1 EOC assessment that teachers have little time to teach anything not on the test	○	○	○	○
My tests are in the same format as the Algebra 1 EOC assessment	○	○	○	○
My tests have the same content as the Algebra 1 EOC assessment	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 9. How do you prepare your students for the Algebra 1 EOC assessment? (Please mark ALL that apply.)**

- [ ] I do no special test preparation
- [ ] I teach test-taking skills
- [ ] I encourage students to work hard and prepare
- [ ] I provide rewards fro test completion
- [ ] I teach the standards or frameworks known to be on the test
- [ ] I provide students with items similar to those on the test
- [ ] I provide students with released items from the Algebra 1 EOC assessment
- [ ] I provide test-specific preparation materials developed by the district
- [ ] I provide test-specific preparation materials developed by my school
- [ ] I provide test-specific preparation materials developed by myself

Other (please specify)

6. Use of Assessment Data

*** 1. How frequently do you administer the following assessments?**

	Weekly	Every 3-4 weeks	Every 6-8 weeks	A few times a year	Never
Assessments created by myself or others at school	○	○	○	○	○
Assessments from the curriculum program	○	○	○	○	○
Assessments developed by our district	○	○	○	○	○

Other commercial assessment (please specify)

*** 2. Do your students take the TerraNova?**

- ○ Yes
- ○ No

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. In what form do you receive TerraNova assessment data? (Please mark ALL that apply.)**

- ☐ Individually for all students in my classroom
- ☐ A summary of all students across my grade level
- ☐ Disaggregated by specific skill/academic content for all students in my classroom
- ☐ Disaggregated by students subgroup for all students in my classroom
- ☐ I do not receive data for my students
- ☐ N/A

*** 4. How do you use TerraNova assessment data? (Please mark ALL that apply.)**

- ☐ To evaluate the progress of students
- ☐ To adjust my curriculum in areas where students encountered problems
- ☐ To inform parents of student progress
- ☐ To place students into instructional groups by achievement level
- ☐ To identify struggling students
- ☐ To develop strategies to move students from below basic and basic into proficiency
- ☐ N/A

*** 5. Do your students take the 8th grade mathematics MAP test?**

- ○ Yes
- ○ No

*** 6. In what form do you receive MAP assessment data? (Please mark ALL that apply.)**

- ☐ Individually for all students in my classroom
- ☐ A summary of all students across my grade level
- ☐ Disaggregated by specific skill/academic content for all students in my classroom
- ☐ Disaggregated by students subgroup for all students in my classroom
- ☐ I do not receive data for my students
- ☐ N/A

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 7. How do you use MAP assessment data? (Please mark ALL that apply.)**

- ☐ To evaluate the progress of students
- ☐ To adjust my curriculum in areas where students encountered problems
- ☐ To inform parents of student progress
- ☐ To place students into instructional groups by achievement level
- ☐ To identify struggling students
- ☐ To develop strategies to move students from below basic and basic into proficiency
- ☐ N/A

*** 8. Do your students take curriculum program assessments?**

- ◯ Yes
- ◯ No

*** 9. In what form do you receive curriculum program assessment data? (Please mark ALL that apply.)**

- ☐ Individually for all students in my classroom
- ☐ A summary of all students across my grade level
- ☐ Disaggregated by specific skill/academic content for all students in my classroom
- ☐ Disaggregated by students subgroup for all students in my classroom
- ☐ I do not receive data for my students
- ☐ N/A

*** 10. How do you use curriculum program assessment data? (Please mark ALL that apply.)**

- ☐ To evaluate the progress of students
- ☐ To adjust my curriculum in areas where students encountered problems
- ☐ To inform parents of student progress
- ☐ To place students into instructional groups by achievement level
- ☐ To identify struggling students
- ☐ To develop strategies to move students from below basic and basic into proficiency
- ☐ N/A

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 11. Do your students take district developed assessments?**

- ◯ Yes
- ◯ No

*** 12. In what form do you receive data from district developed assessments? (Please mark ALL that apply.)**

- ☐ Individually for all students in my classroom
- ☐ A summary of all students across my grade level
- ☐ Disaggregated by specific skill/academic content for all students in my classroom
- ☐ Disaggregated by students subgroup for all students in my classroom
- ☐ I do not receive data for my students
- ☐ N/A

*** 13. How do you use data from district developed assessments? (Please mark ALL that apply.)**

- ☐ To evaluate the progress of students
- ☐ To adjust my curriculum in areas where students encountered problems
- ☐ To inform parents of student progress
- ☐ To place students into instructional groups by achievement level
- ☐ To identify struggling students
- ☐ To develop strategies to move students from below basic and basic into proficiency
- ☐ N/A

*** 14. How frequently do you review assessment data (of any type)?**

	Weekly	Every 3-4 weeks	Every 6-8 weeks	A few times a year	Once a year	Never
I review assessment data independently	◯	◯	◯	◯	◯	◯
I review assessment data with teachers in course level	◯	◯	◯	◯	◯	◯
I review assessment data with teaches across course levels	◯	◯	◯	◯	◯	◯
I review assessment data with my principal	◯	◯	◯	◯	◯	◯

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 15. How often do you do each of the following?**

	Weekly	Every 3-4 weeks	Every 6-8 weeks	A few times a year	Once a year	Never
Meet with principal to review assessment data for individual students	◯	◯	◯	◯	◯	◯
Use assessment data to set goals for individual student achievement	◯	◯	◯	◯	◯	◯
Use assessment data to develop strategies to help selected students reach goals	◯	◯	◯	◯	◯	◯
Use assessment data to determine what professional development I need to improve in a particular area	◯	◯	◯	◯	◯	◯

*** 16. How much do you agree or disagree with each of the following statements about student subgroups?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
I use assessment data to analyze student achievement by subgroups (e.g., racial/ethnic, EL)	◯	◯	◯	◯
I set measurable goals for student achievement by subgroup	◯	◯	◯	◯
I receive professional development that focuses on using assessment data by subgroup to improve student achievement	◯	◯	◯	◯
Our school sets measurable goals for student achievement by subgroup	◯	◯	◯	◯
Our school dedicates time at staff meetings to discuss student achievement data by subgroup	◯	◯	◯	◯

*** 17. About how often do you typically use assessments of the following types?**

	Once or more a week	Two to three times a month	Once a month	Three to six times a year	Once or twice a year	Never
Multiple-choice questions	◯	◯	◯	◯	◯	◯
Open response	◯	◯	◯	◯	◯	◯
Performance assessment	◯	◯	◯	◯	◯	◯
Group work yielding an individual product	◯	◯	◯	◯	◯	◯
Group work yielding a group product	◯	◯	◯	◯	◯	◯

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 18. How often do your STUDENT's results results on the Algebra 1 EOC assessment influence your own teaching? (Mark only ONE response.)**

- ◯ Daily
- ◯ A few times a week
- ◯ A few times a month
- ◯ A few times a year
- ◯ Never
- ◯ I did not receive students' test results in time to use them
- ◯ I teach a grade and/or subject that does not receive students' test results
- ◯ I teach a grade and/or subject that should get students' results but did not receive them

19. How often do your SCHOOL's results results on the Algebra 1 EOC assessment influence your own teaching? (Mark only ONE response.)

- ◯ Daily
- ◯ A few times a week
- ◯ A few times a month
- ◯ A few times a year
- ◯ Never
- ◯ I did not receive the school's test results in time to use them
- ◯ I teach a grade and/or subject that does not receive the school's test results
- ◯ I teach a grade and/or subject that should get the school's results but did not receive them

*** 20. Do YOU use the results of the Algebra 1 EOC assessment for any of the following activities? (Please mark ALL that apply.)**

- ☐ Group students within my class
- ☐ Evaluate student progress
- ☐ Assess my teaching effectiveness
- ☐ Select instructional materials
- ☐ Plan my instruction
- ☐ Plan curriculum
- ☐ Give feedback to students
- ☐ Give feedback to parents
- ☐ Determine student grades (in whole or in part)
- ☐ Do not get the results back in time to use them
- ☐ None of the above

Other (please specify)

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 21. Are the results from the Algebra 1 EOC assessment used in your DISTRICT to make decisions about the following? (Please mark ALL that apply.)**

- ☐ Place students in gifted and talented/honors programs
- ☐ Place students in special education
- ☐ Remediate students
- ☐ Promote or retain students in grade
- ☐ Group students by ability in a course
- ☐ Evaluate teacher or administrator performance
- ☐ Award teachers or administrators financial bonuses
- ☐ Reward schools financially
- ☐ Hold schools accountable
- ☐ Hold the district accountable
- ☐ Rank schools publicly
- ☐ Fire faculty/staff
- ☐ Award school accreditation
- ☐ Place public schools in receivership/state takeover
- ☐ None of the above

Other (please specify)

7. Teacher Competence, Evaluation, & Support

*** 1. Is there at least one person at your school that teachers can turn to for accurate information about the Algebra 1 EOC assessment?**

- ◯ Yes
- ◯ No

*** 2. In the last 12 months, how frequently did the following professional development activities occur?**

	4 or more days	2 to 3 days	1 day	1/2 day or less	No days
I watched an instrumental leader (e.g., coach, coordinator) model instruction	◯	◯	◯	◯	◯
An instructional leader studied students work and suggested ways to improve their learning of subject matter.	◯	◯	◯	◯	◯
An instructional leader demonstrated ways to assess student learning	◯	◯	◯	◯	◯
An instructional leader demonstrated use of student achievement data for improving instruction	◯	◯	◯	◯	◯
I observed another teacher	◯	◯	◯	◯	◯

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. How have the following professional development sessions influenced your teaching practices?**

	A great amount	A moderate amount	A small amount	No amount	N/A
Curriculum standards	○	○	○	○	○
Multicultural or diversity issues	○	○	○	○	○
Classroom management and student discipline	○	○	○	○	○
School improvement planning	○	○	○	○	○
Mathematics curriculum program	○	○	○	○	○
English Language Development curriculum program	○	○	○	○	○
Instructional strategies for English Learners	○	○	○	○	○
Instructional strategies for multiple learning styles	○	○	○	○	○
Understanding and using data from assessments to inform instruction	○	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 4. How much do you agree or disagree with each of the following statements?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
My professional development has been sustained and coherently focused	○	○	○	○
My professional development has been closely connected to my school's instructional goals	○	○	○	○
My professional development has included enough time to discuss how to apply new ideas/practices in my school	○	○	○	○
My professional development has helped me better understand the needs of my students	○	○	○	○
My professional development has helped me identify strategies to better meet the needs of my struggling students	○	○	○	○
My professional development has included opportunities to work with teachers in my school	○	○	○	○
My professional development has included opportunities to work with teachers in other schools	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 5. From the list below, please select your top THREE priorities for your own additional professional development.**

- ☐ Curriculum standards
- ☐ Multicultural or diversity issues
- ☐ Classroom management and student discipline
- ☐ School improvement planning
- ☐ Mathematics curriculum program
- ☐ English Language Development curriculum program
- ☐ Instructional strategies for English Learners
- ☐ Instructional strategies for multiple learning styles
- ☐ Understanding and using data from assessments to inform instruction

Other (please specify)

*** 6. How adequate has professional development in the following areas been in preparing teachers in your district to implement the Algebra 1 EOC assessment?**

	No professional development	Very inadequate	Inadequate	Adequate	Very adequate
Knowledge of state curriculum standards or frameworks	○	○	○	○	○
Alignment of the classroom curriculum to the state curriculum standards/frameworks	○	○	○	○	○
Alignment of the classroom curriculum to the Algebra 1 EOC assessment	○	○	○	○	○
Test preparation strategies	○	○	○	○	○
Administration of the Algebra 1 EOC assessment	○	○	○	○	○
Interpretation of the test results	○	○	○	○	○
Use of test results	○	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 7. How much do you agree or disagree with each of the following statements about your principal?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
Your school principal understands and acknowledges excellent teaching	○	○	○	○
Your school principal arranges for the evaluation of my teaching skills by teacher leaders	○	○	○	○
Your school principal ensures that evaluations of my teaching are substantive and meaningful	○	○	○	○
Your school principal uses student progress and achievement data as part of teacher evaluations	○	○	○	○
Your school principal ensures that teachers receive effective professional development to improve instruction	○	○	○	○
Your school principal builds strong relationships with teachers and staff	○	○	○	○

8. Administrative Accountability & Support

*** 1. How frequently does your principal do each of the following?**

	Once or more a week	Once or twice a month	A few times a year	Once a year	Never
My principal participates in a grade/course level meeting	○	○	○	○	○
My principal formally evaluates my teaching	○	○	○	○	○
My principal conducts a walkthrough of my classroom	○	○	○	○	○
My principal teaches a demonstration class	○	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 2. How much do you agree or disagree with each of the following statements about your principal?**

	Strongly Agree	Agree	Disagree	Strongly Disagree
My principal communicates a clear vision for our school	○	○	○	○
My principal makes expectations clear to teachers for meeting academic achievement goals	○	○	○	○
My principal is a knowledgeable source concerning standards and curriculum	○	○	○	○
My principal sets high standards for student learning	○	○	○	○
My principal provides support for classroom discipline and order	○	○	○	○
My principal ensures that teachers have time for planning	○	○	○	○
My principal praises and recognizes teachers	○	○	○	○
My principal encourages teachers to take a leadership role in our school	○	○	○	○
My principal provides teachers with adequate classroom materials	○	○	○	○
My principal ensures that teachers receive adequate professional development to improve instruction	○	○	○	○
My principal builds strong relationships with parents	○	○	○	○

Improving Student Achievement on the Algebra 1 EOC Assessment

*** 3. How much do you agree or disagree with each of the following statements about your DISTRICT?**

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Supports our school in achieving its mission	○	○	○	○	○
Prioritizes student learning and achievement	○	○	○	○	○
Provides information about curriculum standards	○	○	○	○	○
provides student achievement data	○	○	○	○	○
Implements instructional improvement strategies	○	○	○	○	○
Addresses the instructional needs of English Learner (EL) students at our school	○	○	○	○	○
Gives teachers opportunities to participate in decision-making at the district level (e.g., district level committees)	○	○	○	○	○
Offers useful professional development activities	○	○	○	○	○
Encourages teachers to take a leadership role in the district	○	○	○	○	○
Praises and recognizes teachers	○	○	○	○	○
Is aware of the challenges and problems our school faces	○	○	○	○	○
Build the community's confidence in our school	○	○	○	○	○
Ensures that district staff visits our school at least once a year	○	○	○	○	○

C DEPARTMENT CHAIR INTERVIEW

Department Chair Interview

Curriculum

What textbook is currently used in Algebra 1? How is it supplemented? How is it aligned to state and district standards?

What are the mathematics course offerings at your school and their prerequisites?

What mathematics course(s) do students take prior to the Algebra 1 EOC exam?

Who takes Algebra 1 (or appropriate course) at your school?

Focus on Improving Outcomes

Do you have any reflections about how your school is doing on the Algebra 1 EOC exam?

To what do you attribute meeting/not meeting AYP on the Algebra 1 EOC exam?

What resources do our students need to be successful in Algebra 1 and to perform at the highest levels on the Algebra 1 EOC exam?

Are resources such as graphing calculators, manipulatives, and curriculum supplements available to teachers at your school? If so, how do teachers use these resources to help all students develop an understanding of Algebra 1?

What kinds of benchmark indicators and periodic measures do teachers have to assess student progress in Algebra 1 prior to students taking the Algebra 1 EOC exam? How is this data used?

Professional Development & Teacher Competence

What does your professional development program for mathematics teachers look like? Who goes? How often? What kinds of follow-up support are available after professional development?

How effective are professional development experiences of mathematics teachers, and how is effectiveness measured?

When teachers return from professional development, how are they supported?

Who teaches Algebra 1 (or appropriate course) at your school? How is this determined?

District Support

What kinds of Algebra support does the district provide?

How is the district supporting professional development for algebra teachers?

What materials does the district provide for algebra?

Is there a district mathematics initiative?

Does the district have vertical teaming for grades 6-12? If so, how is algebra addressed?

Is there a district plan for raising Algebra 1 EOC exam scores?

What is your district delay policy?

D MATHEMATICS SUPERVISOR INTERVIEW

General

Do you have any reflections about how your district is doing on the Algebra 1 End-of-Course exam?

To what do you attribute the fact that some schools in your district have met AYP target scores on the Algebra 1 End-of-Course exam?

To what do you attribute the fact that some schools in your district have not met AYP target scores on the Algebra 1 End-of-Course exam?

What is your District Delay policy?

Focus on Outcomes

Is there a district mathematics initiative?

Is there a district Algebra 1nitiative? If yes, please describe it.

How does the district strategic plan address mathematics?

Does the district have vertical teaming for grades 6–12? If so, how is algebra addressed?

Is there a district plan for raising scores on the Algebra 1 End-of-Course exam? Please describe the plan.

District Support

What kinds of algebra support are provided to campuses by the district?

How is the district supporting professional development for algebra teachers?

What other resources for algebra are being provided by the district? Are there common benchmark assessments? How is the data used?

What materials are provided for the EOC assessment by the district?

Curriculum

How is Algebra 1 taught in your schools? Do you offer a two-year Algebra 1 course in the high school?

What textbook is currently being used for Algebra 1? Are all the schools in the district using this book? If not, what other books are being used? How are textbooks supplemented?

How are textbooks adopted?

E MATHEMATICS COURSE OFFERINGS AND SEQUENCE

ALLISTER NORTH COURSE OFFERINGS

Informal Integrated Math I

Informal Geometry

Informal Algebra II

Trigonometry/Discrete Mathematics

Integrated Mathematics I

Integrated Mathematics II

Integrated Mathematics III

Integrated Mathematics IV

Geometry

Algebra II

Functions, Statistics, and Trigonometry

Precalculus and Discrete Mathematics

Intermediate Algebra

AP Statistics

AP Calculus AB

AP Calculus BC

Honors Geometry

Honors Algebra/Trigonometry

Honors Precalculus

DANDRIGE COURSE OFFERINGS

Algebra 1 Part A

Algebra 1 Part B

Algebra 1

Geometry Concepts

Geometry

Algebra II

Algebra II Concepts

College Algebra/Trigonometry

Statistics

AP Statistics

Advanced Geometry

Advanced Algebra II

Math Analysis

Calculus AB

Calculus BC

LAMAR COURSE OFFERINGS

Algebra 150

Geometry 250

Advanced Algebra 350

Trigonometry/Analytic Geometry

Probability and Statistics

Calculus

College Algebra and Trigonometry

Mathematics Theories

AP Statistics

AP Calculus BC

MILLWOOD PREP COURSE OFFERINGS

Modified Algebra 1

Algebra 1

Honors Algebra 1

Modified Geometry

Geometry

Honors Geometry

Modified Algebra II

Algebra II

Honors Algebra II

Trigonometry

Math Analysis

Calculus

ROWAN COURSE OFFERINGS 2009

Pre-Algebra

Algebra 1 B

Algebra 1 A

Geometry B

Geometry A

Geometry Honors

Algebra 2

Algebra 2/Trigonometry

Algebra 2/Trigonometry Honors

Finite Math

Pre-Calculus

Pre-Calculus Honors

Intro Calculus

AP Statistics

AP Calculus AB

AP Calculus BC

Intermediate Algebra

College Algebra

Calculus 1

Calculus 2

Calculus 3

ZAPATA COURSE OFFERINGS 2009

Foundations of Algebra

Algebra 1

Geometry

Geometry Honors

Algebra 2

Algebra 2 Honors

College Preparatory Math

Statistics

AP Statistics

Pre-Calculus with Trigonometry

Pre-Calculus with Trigonometry Honors

Calculus

AP Calculus

VITA

Nevels Nevels was born in Columbia, Missouri and raised in Richmond Heights, Missouri. He studied mathematics at Knoxville College in Knoxville, Tennessee. From 1994 until 2006 he taught secondary school at Soldan International Studies and Vashon high schools in the St. Louis Public School District.

In 2006, Nevels moved to Columbia, Missouri to attend graduate school at the University of Missouri where he received a Ph. D. in mathematics education in 2012. He is currently serving as Learning Facilitator/Mathematics Curriculum K-12 in the Hazelwood School District in Florissant, Missouri. He lives with his wife Eulonda, and his daughters Rachel Elizabeth and Constance Marie Faye in the Old North neighborhood of St. Louis, Missouri.