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The Relationship Between Resource Allocation Patterns in Missouri K-12 Public School Districts and Student Performance

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THE RELATIONSHIP BETWEEN RESOURCE ALLOCATION PATTERNS IN MISSOURI K-12 PUBLIC SCHOOL DISTRICTS AND STUDENT PERFORMANCE

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Abstract

The link between school funding and student achievement has been a topic of debate for many years. School leaders and policy makers have sought ways to increase student achievement while using educational funding in an efficient manner. Previous initiatives to examine the relationship between funding and achievement have included education production functions, standards-based reforms, reallocation of resources, and minimum funding levels. This study was designed to examine the relationship between resource allocation patterns and student achievement in 447 Missouri K-12 public schools.

The relationship between school districts' resources and their achievement on the 10th grade mathematics and 11th grade communication arts portions of the Missouri Assessment Program (MAP) test were analyzed using a multiple linear regression analysis. The initial results of the study showed no relationship between district level expenditures and student achievement. However, the second part of the study showed that a district's PEER group, average teachers' experience, student-teacher ratio, and percent of teachers with a Masters degree were related to student achievement. This information will be useful to school leaders and policy makers as they work to increase levels of achievement while operating on budgets of varying size.

The third part of the study examined the relationship between student achievement and a proposed 65 percent minimum funding level for instruction related expenses. Despite the growing popularity that the 65 Percent Solution is receiving with education policy makers across the country, the results of this study do not provide evidence that meeting this expenditure level will result in high levels of achievement.

Dedication

I give praise to my Lord and Savior Jesus Christ. This paper is dedicated to my wife and my parents for their unconditional love and support.

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TABLE OF CONTENTS

ABSTRACT …… iii

DEDICATION …… iv

ACKNOWLEDGEMENTS …… v

CHAPTER 1: INTRODUCTION …… 1

Purpose of the Study …… 8

Significance of the Study …… 9

Research Questions …… 9

Delimitations …… 10

Definition of Terms …… 11

CHAPTER 2: REVIEW OF RELATED LITERATURE …… 14

The Birth of Free Public Education …… 14

The Progressive Era of Education …… 15

Equality of Resource Inputs …… 16

The Coleman Report …… 19

Educational Production Function Studies …… 19

Standards Based Reform …… 29

Financial Planning …… 32

Financial Resources for Professional Development …… 34

Current Research of Resource Allocation …… 35

A New School Finance Reporting Structure …… 40

The 65 Percent Solution …… 41

CHAPTER 3: METHODOLOGY 43

Participants 43

Data Collection 44

Quantitative Data Analysis 45

Null Hypothesis #1 47

Null Hypothesis #2 48

Null Hypothesis #3 48

Limitations 48

CHAPTER 4: RESULTS AND ANALYSIS 50

Question #1 52

Question #2 55

Question #3 59

CHAPTER 5: SUMMARY AND CONCLUSION 61

District Level Expenditure Funds 63

Non-Financial Variables 64

Minimum Funding Levels 67

Conclusion 68

Recommendations for Further Research 69

REFERENCES 72

APPENDIX A 77

APPENDIX B 126

CHAPTER 1 - INTRODUCTION

The Relationship between Resource Allocation Patterns in Missouri K-12 Public School Districts and Student Achievement

The expectations for student and school performance have been steadily increasing for decades. Each year, month, and day that passes brings exponentially more information to be taught and learned in the schools of this nation. Since the beginning of the 20^{th} century, simply covering the required information was all that was expected of teachers. This was the time when school performance was measured by system inputs. For example, a successful school could have been described as a school that had hundreds of books in the school library, textbooks for every student, and teachers with graduate degrees in a discipline that may or may not be connected to their current certification. The focus of education at this time was on the resource inputs provided to students, not the levels of academic achievement they were able to attain from those provisions.

Throughout much of the previous century, teachers and administrators worked to improve the quality of education, but might not have had to remain up to date on current educational trends and practices. Little or no mention was made of the need for a data driven school culture that allowed teachers and administrators to analyze student performance data in order to plan and develop curriculum and programs designed to increase student performance. Each new fiscal year, the district or school budget might have simply been the budget from the previous year with reasonable increases in each category. While these budgeting practices might not have been harmful to the academic development of all students, recent studies have shown that a system based on resource inputs is not the most effective method to improve student performance and focus educational spending on instruction (Miles, 1997; Picus, 1995; Odden, 2003).

Schools no longer have the option of simply covering the curriculum in a manner that allows only a certain type of student to excel while leaving the rest of the students to struggle to keep up or possibly repeat the course several times to prove their mastery. The current initiative driving the public schools of this country, the Elementary and Secondary Education Act of 2002 (ESEA, 2002), otherwise referred to as the No Child Left Behind Act (NCLB), is calling for schools to ensure that all students meet a minimum set of academic standards. Now, many schools are beginning to modify their approach to teaching and learning to ensure that all students are learning and able to perform to the new minimum standards. In order to meet the demands of NCLB, schools must rethink and reform their educational goals and practices to ensure that their students are consistently improving towards a proficient level of achievement on their state assessments, such as the Missouri Assessment Program (MAP) test. These new state and national standards have put school districts in a difficult situation as they are asked to improve student performance without the assistance of additional funding or, in some cases, while funding is being cut.

The increased focus on student achievement and school funding has led to many discussions that have been based on the need for both equitable and adequate funding for all schools to reach these academic standards. A recent study was conducted in Missouri to determine an adequate level of funding needed for a school to be expected to meet the minimum standards (Augenblick, 2003). Many critics of this controversial study, as well as its author, have admitted that reaching this proposed level of adequate funding cannot possibly be met with the current budget situation in the state of Missouri. It appears that schools are now left with at least two options: (a) wait until their state legislature can afford to amend the budget to meet the minimum funding levels needed for an adequate education or (b) find a more effective way to use their existing funds to raise student achievement.

Therefore, researchers, policy makers, and other interest groups have begun to look at the resource allocation practices of school districts. The latest topic that appears to be gaining popularity among education policy makers has been called the “65 percent solution” since a column written by George Will in *The Washington Post* (Will, 2005). The goal of this initiative, which is being heavily promoted by groups such as First Class Education (FCE), is for legislation to be passed in all 50 states and the District of Columbia requiring all public school districts to spend at least 65% of their operating budgets on expenditures directly related to classroom instruction. Supporters of this initiative believe that it would provide a number of benefits for school districts including reducing wasteful spending and freeing up money that could be used to increase teachers’ salaries without requiring school districts to ask for a tax increase (FCE, 2005). Whether this initiative is truly a solution to raising levels of academic achievement remains to be seen, but extensive analyses on the most effective uses of available resources will allow researchers to provide school leaders and policy makers with valuable information on the most effective way to maximize their budgets.

The School Budget

Before a thorough examination of how a school district is allocating its funds can be conducted, it is important to understand the different funds that exist in a typical school budget and their functions. There are nine federal fund types to which districts allocate their money: the general fund, special revenue fund, debt service fund, capital projects fund, permanent fund, enterprise fund, internal service fund, trust fund, and agency fund. These exact funds are not used by every state or school district as separate funds or even by the same name, but are often combined to reduce the number of reportable accounting funds. Also, many states and districts use smaller sub-categories to report financial data with greater detail and sophistication. Despite the different models used by states and districts, these federal fund types are only meant to be used as a guideline so that all states and districts will report comparable data (NCES, 2003).

According to the Missouri Financial Accounting Manual (DESE, 1997), the state of Missouri uses four of these funds, the general (incidental) fund, the special revenue (teachers) fund, the capital projects fund, and the debt service fund, to report receipts and expenditures. Each fund receives a pre-determined percentage of the total tax levy that will provide it with enough revenue to operate for that school year. The percent of the tax levy that each fund receives can be modified between years, but cannot combine to surpass the tax ceiling without a new tax levy being approved by voters.

The special revenue fund, called the teacher fund in Missouri, is traditionally the largest fund and therefore receives the largest percentage of the tax levy. The primary function of the teacher fund is to pay for teacher salaries and benefits. The general fund, referred to as the incidental fund in Missouri, is designed to provide money for non-certified staff salaries and benefits, instructional supplies, and department budgets for individual schools in the district. The money that is allocated to the debt service fund is used to pay off loan interest and bonds that were passed to provide funding for large-scale projects in the district such as new buildings. Finally, the capital projects fund provides money for small-scale equipment and supplies along with emergency money that might be needed for repairs to buildings or systems. The Missouri Financial Accounting Manual states that interfund transfers are possible but are limited to those set forth in Section 165.011(2), RsMo, and administrative policy. Otherwise, the funds must remain separate since each one is earmarked for a specific purpose (DESE, 1997).

Early Research on Funding and Achievement

The relationship between school funding and student achievement is not as easy to demonstrate as one might think. *Equality of Educational Opportunity* (1966), also known as the Coleman Report, was the first major study to look at the possible relationship between school resource inputs and student achievement. Coleman reported in this landmark study that school resource inputs were not responsible for differences that were measured in student achievement. According to this study, the differences in academic achievement of public school students could be explained primarily by the differences in socioeconomic status of the student body.

This controversial report led more researchers to examine the statistical relationship between funding and student achievement. Hanushek (1996) examined the relationship between per pupil expenditures and student achievement and stated that a strong statistical relationship cannot be found between school funding and achievement. Also, he stated that simply providing schools with more money would not necessarily lead to improvements in student achievement.

While the studies of Hanushek along with the Coleman Report have attempted to minimize any relationship between funding and achievement, others have begun to call for schools to re-examine the ways in which their current funding is being allocated (Miles, 2001b; Odden, 2001). This line of research states that student achievement can increase if schools would begin to allocate a larger percentage of their funds towards instruction and instruction-related programs. The research suggests that schools can increase student achievement by closely examining their achievement data, usually reported through state testing, and targeting their funds to improve academic programs that are not currently meeting state standards (Odden et. al, 2003). Since there has not been a dramatic increase in educational funding at the federal or state level, it appears that the recent increase in academic standards for students will have to be accomplished with funding remaining near current levels. Therefore, more research on the relationship between funding and student achievement is needed to help schools find ways to allocate their current funding more efficiently and effectively.

Current Resource Allocation Patterns

While the state of Missouri uses four main accounting funds to report receipts and expenditures, each of these funds has several layers of sub-funds to increase the level of financial detail that can be reported. For the purpose of this study, the expenditure sub-funds will be referred to as expenditure funds and the four main accounting funds will be referred to as accounting funds. The largest expenditure fund for public school districts in the state of Missouri is the regular instruction fund. In many districts this fund can comprise almost half of the district's total expenditures. Two other large expenditure funds are for support services and plant/buildings operation. While these two funds generally rank as the second and third largest funds, they typically do not combine to equal the size of the regular instruction fund. All other expenditure funds range from 1 percent to 10 percent of the total expenditures for each district. The fifteen largest expenditure sub-funds are reported in an expenditure profile of each district. *Table 1* shows a sample district expenditure profile.

Problems arise in comparing the spending patterns of public school districts due to the differences in student populations, teacher experience, number of teachers with advanced degrees, and local cost of living. In order to control for a variety of demographics factors in research studies, the Public Education Evaluation Report (PEER) has clustered public school districts in the state of Missouri into "PEER Groups" that have similar levels of a number of demographic factors. The three major factors include:

1. Free/Reduced Lunch Program
2. Per-pupil expenditures
3. District Enrollment

In addition to the three factors listed above, information is also included on the following factors:

1. Percent Minority Students
2. Student Mobility
3. Attendance Rate
4. Tax Levy

5. Assessed Valuation per student
6. Student-teacher ratio

Thus, the purpose for creating PEER Groups is that they will allow research to be conducted on school districts that have similar characteristics. This similarity is useful since districts of varying enrollment and levels of assessed valuation generally have different sized budgets as well as budget priorities. PEER Group reports also provide achievement information for each subject area of the MAP tests. School districts are able to quickly see how they compare to other districts from around the state that have similar characteristics. School districts no longer have to compare themselves only to neighboring districts that may or may not have a similar percentage of students on free/reduced lunch, per-pupil expenditure levels, or enrollment. The use of information provided in PEER Group reports will be valuable to this study as it examines potential relationships between achievement levels and resource allocation patterns (PEER, 2000).

Purpose of the Study

The purpose of this study is to examine the relationship between resource allocation patterns in school districts and student achievement. Within this geographically large state, current per-pupil expenditures range from $4,771 to $13,379 while providing achievement results that are mixed at best (DESE, 2005). This study will attempt to isolate and show distinguishable resource allocation patterns common to high achieving districts.

Significance of the Study

The results of this study will add to the current knowledge base on how schools can effectively allocate their resources to improve academic achievement. Also, the results of this study will serve as additional information for current school district leaders to consider during difficult times of budget cuts that lead to staff and program reductions. District and building leaders need to know more about increasing cost-savings without harming the academic mission of the district.

This study will provide data that enhances the knowledge base concerning adequate and minimum levels of educational funding. For example, some schools are currently receiving a level of funding that is adequate for them to meet minimum standard levels of achievement, but it might be more or less than the proposed minimum spending levels. Once compiled, the data from this study will enable other researchers as well as policy makers to examine why some successful schools are able to meet the minimum levels of achievement with budgets of varying size.

Research Questions

The three research questions guiding this study were designed to help explore how school districts in Missouri of various sizes and levels of performance on the state assessment spend their resources. These questions are:

1. What relationship exists between district level resource allocation patterns and levels of student achievement of K-12 public school districts in Missouri as measured by the MAP Index over the three academic years beginning in 2001 and ending in 2004?

2. What relationship exists between the non-financial resource variables including (a) PEER group classification, (b) student-teacher ratios, (c) percent of teachers with a Masters degree, and (d) teachers' average years of experience and levels of student achievement of K-12 public school districts in Missouri as measured by the MAP Index over the three academic years beginning in 2001 and ending in 2004?

3. What relationship exists between a predetermined minimum level of instructional expenditures and student achievement of K-12 public school districts in Missouri as measured by the MAP Index over the three academic years beginning in 2001 and ending in 2004?

Delimitations

Although many other studies have compiled data over several years from school districts in a three or four state area or region, this study will be limited to:

1. K-12 public school districts in the state of Missouri
2. Resource and achievement data from the three academic years from 2001 through 2004
3. Identifying resource allocation patterns from school district expenditure funds received from the Missouri Department of Elementary and Secondary Education and potential relationships to student achievement as measured by the Missouri Assessment Program

Definition of Terms

For the purposes of this study, the following definitions were modified for compatibility with data from the state of Missouri (Pan et. al., 2003):

Expenditures- The amount of educational funding money spent by school districts (including functions such as instruction, support services, and food services and objects such as salaries, benefits, and materials).

Resource Allocation- The ways in which fiscal resources, as a percent of the district budget, are divided between competing needs and expended for educational purposes.

Low-performing school districts- A school district with a combined MAP Performance Index point total for Mathematics and Communication Arts for grade span 9-11 less than or equal to 322.6.

Medium-performing school districts- A school district with a combined MAP Performance Index point total for Mathematics and Communication Arts for grade span 9-11 greater than or equal to 322.7 and less than or equal to 342.6

High-performing school districts- A school district with a combined MAP Performance Index point total for Mathematics and Communication Arts for grade span 9-11 greater than or equal to 342.7

Small K-12 Public School District – A K-12 public school district with a total enrollment less than or equal to 1,000 students.

Medium K-12 Public School District – A K-12 public school district with a total enrollment greater than 1000 students and less than or equal to 5000 students.

Large K-12 Public School District – A K-12 public school district with a total enrollment greater than 5000 students.

Missouri Assessment Program (MAP Test)- The state test given to all grade appropriate students to meet the assessment requirements for No Child Left Behind .

Adequacy- Providing sufficient resources for all students to achieve expected levels of performance.

Equity- The equal distribution of educational resources (including uniformity of facilities and environment, equal resource inputs, and equal access to educational opportunities) for all students.

Missouri K-12 School Districts – Public school districts in Missouri that enroll students from K-12.

Systemic Reform- Recreating an educational system in which all components (e.g. instruction, administration, support, and resources) of the system are aligned and addressed by multiple levels (e.g. state, district, school, and community) to produce more sustainable changes so all students can reach more challenging performance standards.

Core Subject Areas- K-12 subjects including mathematics, communication arts, science, and social studies.

CHAPTER 2 – REVIEW OF LITERATURE

The road to the current state of school finance has taken many turns since the infancy of public education in America. From the humble beginnings of a rural one-room school house to the modern urban districts with thousands of students, the question of how to pay for the education of public school students still persists. Differences in resources and quality of education can be traced back to 1647 when the General Court of Massachusetts passed the *Old Deluder Satan Act*. Towns with at least fifty families were required to have an elementary school house to educate the children of their community. This act served as the beginning for local tax bases to fund their schools and began a debate that is still going strong. (Odden & Picus, 2004).

Many small, rural towns knew of the importance of education for their children, but found it difficult to raise the necessary finances to pay for a schoolmaster. Larger, urban towns and cities of more than one hundred families were not only required to provide an elementary education, but also a high school education for their residents. The availability of resources and the ability to pay for the educators to operate these schools made the quality of education in urban areas far superior to that of poor rural towns and villages (Odden & Picus, 2004).

The Birth of Free Public Education

Even during the early era in public education, prominent leaders rose to question the issue of educational equity. Several leaders called for states to contribute more financial resources to assist poor rural communities in funding public education. However, the thought of wealthy urban residents providing additional funding to help educate their poor, rural neighbors was not quick to gain approval. In 1823, when

Thomas Jefferson was only three years from his death, he described as a failure his own *Bill for the Greater Diffusion of Knowledge* which had passed through the Virginia Legislature in 1777. It failed, said Jefferson, because the legislature would not implement state taxes to support the system. Instead, they insisted on raising funds for public education at the local levels. That would not work said Jefferson, "because the rich will not pay for the education of the poor" (Hickrod & Chaudhari, et. al., 1995).

The first major change in the financing of public education came during the mid-1800s when the work of Horace Mann and Henry Barnard helped enact a system of public school finance similar to what Thomas Jefferson had proposed but had not believed would ever come to fruition. These state superintendents of education were the driving forces behind the establishment of a system of public-supported schools. Although these "common schools" began in Massachusetts and Connecticut, they helped set the stage for several other states to amend their state constitutions to require state governments to fund a system of free public education (Odden & Picus, 2004).

The Progressive Era of Education

The dawn of the 20th century brought with it the concepts of the Industrial Revolution, which included increased efficiency and an assembly line type of approach to educational reform. The change from the old one room school houses of the 18th and 19th centuries to larger consolidated schools and school districts ushered in a more efficient type of school that would help prepare students for life in an industrial society based on the concept of efficiency. The primary goal of the public school during the early part of the 20th century was to present a body of information, efficiently split into several subject areas, to all students (Miles & Darling-Hammond, 1997). All students were expected to master the material in the same amount of time with the same level of instruction. Modifying lessons or grading practices to cater to one or two students would have been inefficient and would have cost schools valuable time and money.

Some students became very accomplished at succeeding under these circumstances, while others struggled to keep up and eventually chose to leave this system with little or no consequences for the school, administration, or teachers. The model of the public high school that came about in the early 20th century has survived, relatively unchanged, to the current day (Callahan, 1962). Many school districts operate on a calendar that was constructed to give the students who lived in an agricultural society time off to work in the fields during the summer. The standard school day is still seven or eight periods in which students move from one subject and one room to the next every hour with a five to ten minute break in between. Credits are given to students according to a Carnegie unit model that was constructed with college students in mind. Many students spend their K-12 years attempting to master an often rigid curriculum that only prepares them to enter a world that operates like it did in the early 20th century (Tyack & Cuban, 1995). One major problem exists though, the global economy of the world in which we live today is much different than the early and mid 20th century, but the structure of the schools of this nation have not necessarily mirrored this change.

Equality of Resource Inputs

Throughout the 20th century, the gap in the quality of education across the nation continued to widen. Schools continued to operate in the same fashion, but since the structure of revenue collection for school districts was dependent on local taxes it became impossible for small rural districts with low property values to generate enough tax money to keep up with large wealthy districts. These differences in funding were magnified by the fact that the low wealth district students and those with special needs, who were often in greatest need of increased funds, were likely to receive the smallest amount (Tyack & Cuban, 1995). Problems with the differences in available resources were not limited to rural versus urban districts. The landmark case, *Brown v. Topeka Board of Education (1954)*, was based on the right of all children to receive equal educational opportunities in spite of racial differences. The decision that came out of this case served as the foundation for many arguments calling for equitable educational opportunities for all students despite not only their racial differences but also socioeconomic status and physical characteristics for the rest of the 20^{th} century.

The court system became a more integral part of the school finance debate in the decades following the *Brown* decision. Several other important court cases were filed throughout the latter half of the 20^{th} century in response to the lack of equal funding for schools. Many claimed that the disparities in funding led to a marked difference in educational opportunities for all children. *Serrano v. Priest (Serrano I, 1971),* was a landmark case in that it was the first court case that was successful in bringing about a change in the finance structure of public schools through the state judicial system. Judges in California ruled that the state's system for collecting educational revenues was in violation of equal protection clauses in both the U.S. Constitution and the California constitution. The reliance on local property taxes as the primary source of educational revenues was leading to an increasing disparity in per-pupil expenditures that ranged from $407 to $2,586 at the elementary level and $722 to $1,761 at the secondary level (Ladd & Hansen, 1999).

The success of *Serrano I* opened the door for other state lawsuits based on arguments of wealth-neutrality. The school finance systems of 43 states had been challenged in a similar fashion by 1998 with 19 of those cases finding current systems of school funding unconstitutional. Even when the lawsuits were not initially successful, the plaintiffs would simply file new complaints to challenge the funding system. This onslaught of equity related lawsuits became the most effective way for poorly funded school districts to stake their claim to increased funds since they had grown tired of waiting for legislative intervention on their behalf (Ladd & Hansen, 1999).

Not all lawsuits seeking equitable funding were successful though. In 1973, *San Antonio Independent School District v. Rodriguez* (1973) was brought into the federal court system. This case was similar to *Serrano I* in that the plaintiffs were making a case for increased funding to help equalize the large disparities in per-pupil expenditures for students living in Texas. As in California, these differences in school funding were linked to local property valuations and the wealthier areas were allocated a larger share of financial resources by the funding formula whether they needed it or not. This case was rejected in an appeal to the U.S. Supreme Court. The court ruled that education was not a "fundamental interest" that would call for the federal government to interfere with the school finance system that was under the control of individual states, according to the Tenth Amendment of the United States Constitution. The outcome of this case effectively ended appeals to the federal courts and directed potential lawsuits to the state judicial systems (Ladd & Hansen, 1999).

The Coleman Report

In the wake of the *Brown* decision, the debate for equal educational opportunities for all students was at the forefront of both school finance and school reform debates. The Civil Rights Act that was passed by Congress in 1964 helped extend the influence of the federal government over issues of equal education. In addition to providing schools with mandates on desegregation practices and potential penalties for non-compliance, this act called for a thorough study of educational opportunity in the schools of this nation. The landmark piece of research that came out of this study was *Equality of Educational Opportunity* (Coleman et al., 1966).

The Coleman Report (1966), as it is often called, dealt a major blow in the ongoing debate on the relationship between the equality of school resources and educational achievement. The results of this controversial and widely disseminated study claimed that resource inputs had little or no impact on student achievement. It also claimed that the best predictors of student achievement were family and other background characteristics. While the findings of this study are being increasingly challenged by current researchers, at the time it managed to focus the school finance debate on issues of equality in resource inputs, thus distracting researchers from analyzing relationships between spending and achievement (Ladd & Hansen, 1999).

Educational Production Function Studies

Since the release of *Project Talent* (Flanagan et al., 1964) and to a greater extent *Equality of Educational Opportunity* (Coleman et al., 1966) the literature on educational production functions has provided mixed results at best regarding the relationship between school resources and academic achievement. A study by Hanushek (1989) reviewed all of the educational input-output relationships that were available in the literature at that time. These studies were called educational production functions, a term taken from economics and manufacturing. These educational production functions analyzed the relationships between various educational resources and student achievement. Many of these regression analyses were designed to control for external factors that were considered out of school control such as socioeconomic status, parent education, as well as several others.

Although the overarching discussion regarding educational funding is typically centered on increasing total funding, many of these production function studies analyzed the effects of a few specific resources. The thought behind this approach was that studying educational resources separately would give a clear picture of the building blocks of total school expenditures. For example, changes to any one factor or combination of factors such as teacher salaries, teacher/pupil ratios, materials and supplies, or administrative expenses would affect the total expenditure level. Determining how manipulation of each of these and other resources affects student achievement has been the guiding principle for the production function line of educational research.

Hanushek (1989) reports that the use of systematic statistical analysis in production function studies over the previous three decades has given current educational practices a less than glowing review. Many reports have indicated that current practices are both inefficient and ineffective. The compilation of these results led Hanushek to report, “there is no strong or systematic relationship between school expenditures and student performance” (Hanushek, 1989).

This study by Hanushek led to another study with a much different set of results by Hedges, Laine, and Greenwald (1994) where their study found that the same data studied by Hanushek provided a much more consistent and positive relationship between school resources and academic achievement than previously reported. In 1996, Greenwald, Hedges, and Laine compiled the known universe of education production function studies covering almost 30 years of research. The purpose of their study was to provide a definitive and complete study on how school resources affect student achievement. The articles used for their compilation study included all studies used in the most complete work of Hanushek (Hanushek, 1989) as well as additional studies found through electronic database searches in the fields of economics, education and psychology.

During the past 25 years, Hanushek (1981, 1986, 1989, 1992, 1994, 1996), published several studies dealing with the growing education production function literature. His conclusion on the relationship between school resources and educational achievement has remained fairly consistent with the findings of Coleman et. al (1966) in that they found no evidence of a strong or consistent relationship. These findings have gained considerable acceptance throughout the academic, legal, and public policy circles.

Hedges et al (1994) and Greenwald et. al (1996) disagree with Hanushek in that they do not feel that his synthesis method, *vote counting*, was sophisticated enough to provide relevant conclusions on the potential relationship between school resources and educational achievement. Hedges & Olkin (1980, 1985) found that *vote counting* is an insensitive summarizing procedure and would not be the most appropriate model to use in a synthesis study such as the studies conducted by Hanushek. Further, they maintained that Hanushek's method of vote counting is now rarely used in empirical research due to the prevalence of more sophisticated models.

In a reanalysis of Hanushek's earlier studies, Hedges, Laine, & Greenwald (1994) found that the data provided a much more consistent and positive relationship between school resources and academic achievement than previously reported by Hanushek. Also, these authors feel that the results of their reanalysis provide evidence that several of these relationships were strong enough to possibly influence educational policy in a manner contradictory to Hanushek's previous results.

In their compilation study, Greenwald, Hedges, and Laine (1996) used two meta-analytic methods, combined significance testing and effect magnitude estimation, to analyze the data used from previous production function studies. School resource inputs were examined from three separate categories: (a) expenditures, including per-pupil expenditures and teacher salary; (b) teacher background characteristics, including teacher ability, teacher education, and teacher experience; and (c) size, including class size and school size. Outcome measures were varied throughout the studies with several studies using the *Test of Economic Literacy* as the outcome measure. The use of different variables throughout these studies makes it more difficult to define a true relationship between studies.

The cumulative nature of education provides an additional source of error for education production functions. For example, schools with high mobility rates might not give a true picture of their academic performance due to the fact that their student population undergoes significant changes from one assessment to another. Many students enrolled in schools with high mobility rates might have just arrived but are still required to take the tests. These same students are often no longer enrolled in that particular school when the test results are released. Potential situations which are out of the control of schools, such as student mobility and socioeconomic status, make the true assessment of educational achievement difficult at best and must be taken into consideration by district leaders and policy makers when evaluating school districts and individual schools (Greenwald, Hedges, and Laine, 1996).

While the results of the Greenwald, Hedges, and Laine study (1996) claim that evidence exists of a positive correlation between resource input variables and student achievement, Hanushek (1996) points out that many of the studies analyzed through combined significance testing and effect magnitude testing did not include identical variables. This practice of combining different studies with multiple variables adds another layer of potential error that can only be addressed through further study.

Greenwald, Hedges, and Laine (1996) provided several interesting recommendations on potential areas to be targeted to improve student performance. One such suggestion was that an increase of $500/student in PPE would translate to an increase of one sixth of one standard deviation in student achievement. This amount was proposed due to the fact that it was approximately 10% of the average PPE in the nation at that time (United States Center for Education Statistics, 1994) and it was an amount that the authors thought state legislators might consider a reasonable increase. Although this proposal is not an extremely large increase in expenditures or achievement, it does begin to make a case for the need for additional funding. Other suggestions made by the authors included the need for resources to be targeted toward creating a teaching staff that is more educated and experienced as well as reducing class size. In response to the argument that increased funding over the decades from the 1970s to the early 1990s did not lead to increased student achievement, Greenwald, Hedges, and Laine (1996) refer to an analysis of national achievement trends from data collected by the National Assessment of Educational Progress (NAEP). The NAEP report referenced by Greenwald, Hedges, and Laine (1996) shows that achievement levels in the core academic subjects of reading and mathematics increased during this time period. Other interesting trends during this time show that when the data are disaggregated by race, the achievement of African-Americans and Hispanics has undergone a substantial increase.

Although the case has been made that a positive relationship does exist between school resources and student achievement, the effects of home environment cannot be ignored. Coleman (1987, 1988) offered the term *social capital* to describe quantitative variables related to the home environment of students. The most prominent social capital variable measured the amount of time that parents and their children spent together focused on academic work. Due to an increasing number of single-parent homes, homes with both parents working, and even the increasing number of teenage mothers, the levels of social capital shared or transferred to students over the past few decades has been decreasing. However, the fact that achievement levels have still increased in both math and reading since 1971 have led to the conclusion that the increase in school funding during this time has been able to offset the decrease in social capital. Therefore, increased school funding is needed to offset any further decrease in levels of social capital (Greenwald et. al 1996; Flyer & Rosen 1997).

The conclusion that school resources are systematically related to student achievement might lead many supporters of education to call for increased funding at all costs. This attitude might prove to be counter-productive in that increasing funding levels might not always be possible. Despite their positive findings, Greenwald et. al (1996) maintain that increased funding without taking allocation patterns into consideration might not lead to the desired outcome of increased student achievement. In order to maximize levels of student achievement, school leaders must use available data to target the most effective resources that are available to them. While money is not everything, it is important to determine how available resources can be allocated most effectively to promote student learning outcomes.

In response to the 1996 Greenwald, Hedges, and Laine study, Hanushek (1996) states that the sets of data observed by these authors clearly show that resources are being used effectively by some schools. Unfortunately, little research has been conducted to discover or describe the instances in which schools effectively use their resources to increase student achievement. The conclusion that an increase in the amount of educational resources would lead to higher student achievement is a major oversimplification on the part of Greenwald, Hedges, and Laine (1996). The samples used in their study were highly selective and biased the results toward their conclusion and policy recommendations. The fact that their recommendation of simply increasing school resources might be considered by policy makers will take away from more fundamental school reform issues such as having schools examine how to more effectively use the resources which they currently possess (Hanushek, 1996).

In his report for the Panel on the Economics of Education Reform, *Making Schools Work*, Hanushek (1994) made a request for changes in economic policy concerning the effective use of educational resources. His report made the recommendation that the focus of schools must change before any further substantial gains in achievement will be realized. It further noted that the current structure of schools does not provide adequate performance incentives nor the sense of urgency to learn from successful alternative programs. The majority of schools across the nation are tied to the same traditions that have been in practice for much of the last century and are not adequately preparing students for the global economy of the 21st century. In order to ensure the continued health and success of the U.S. economy, the development of effective schools must be a priority.

As reported by Hanushek (1996) the recommendations of the Panel report stand in contrast to the findings of Greenwald, Hedges, and Laine (1996) in that the central positions of Greenwald, Hedges, and Laine were: (a) that U.S. schools have been working quite well, (b) that schools have been providing a good return on expenditure, (c) that any performance problems of students are best attributed to poorer students and parents and not the schools, and (d) implicitly, that more resources devoted to the current schools would be productive and would be a wise investment for society to make.

Hanushek (1996) states that the fundamental problem with the results of their study can be attributed to their flawed statistical approach. A major assumption that they made when combining data was that all schools are the same and have identical situations on which to collect data. Another assumption was that all of the studies that they examined should be held in the same regard. According to Hanushek (1996), these authors attempt to force homogeneity onto clearly heterogeneous situations and therefore introduce significant levels of bias into their analyses. This misinterpretation provides policy makers with information that might lead them away from more important school reform issues such as a more effective reallocation of resources.

According to Hanushek (1996), instead of examining whether money is related to student achievement, the methods that Hedges et al (1994) and Greenwald et. at (1996) used were really asking, "whether there is any evidence that resources or expenditure differences ever, under any circumstances, appear to affect student performance?" By designing the study in this manner, the authors were assured of rejecting the null hypothesis to this question due to the fact some schools are using their resources effectively enough for their students to achieve at proficient levels.

Hanushek (1996) continues by stating that there are some instances where resources are used effectively and some instances where resources are not used wisely. Unfortunately, there are even some instances where the allocation of resources has a negative impact on achievement. These examples make a case for a thorough examination of when and where resources are used effectively. By studying these situations, policy makers would have a more informative tool to use when making decisions regarding adequate amounts of educational resources and how they should be allocated to ensure the highest levels of effectiveness.

Rolle (2001) explains that the majority of educational finance research has attempted to study public school districts using cost-minimizing assumptions that are found in traditional economic theory. Several researchers have attempted to define an educational production function in which educational outputs, usually measured by some form of academic achievement, are predicted by resource inputs, which often include both financial and staffing related resources. While the history of such studies has produced mixed results, the growing consensus among researchers and policy makers is that public school districts are increasingly becoming economically inefficient organizations. Rolle concludes that developing a mathematical representation for a process as complex as a state's legislative session, which often has competing interests working to develop the formula for school funding, "may be a primary reason that a primary educational production function is yet to be found" (Rolle, 2001).

In attempting to show how public organizations, including public school districts, often maximize their budgets, Niskanen (1968) hypothesized that: 1) public bureaus operate on budgets that are larger than necessary, 2) outputs are often lower than corresponding input levels, and 3) high output levels are often inefficiently matched to high input levels. The results of the study conducted by Rolle (2001) claimed that more than 30 percent of the public school districts in the state of Indiana could be designated as efficient producers of educational outcomes. However, the same study found that nearly 15 percent of the public school districts in the state could be classified as economically inefficient when comparing educational outputs to resource inputs. The results of this study make the case that Niskanen's theory that all public bureaus are inefficient, when applied to public school districts in Indiana, is not entirely true.

In addition to the analysis of educational outcomes relating to Niskanen's theory, the study by Rolle (2001) unexpectedly found that more Indiana school districts were ineffectively using their economic resources as opposed to inefficiently using their economic resources. This finding led Rolle (2001) to call for further research pertaining to what factors lead to low funding levels, low achievement levels, and the less than adequate levels of education provided to students. These factors can be uncovered through an examination of how public schools are allocating their resources in order to achieve educational achievement objectives.

Despite differences on how to properly analyze the available data, the results of educational production function studies up to this point have shown the important role that finances play in education. Due to the contrasting results of these studies, more research is needed on decision-making processes and allocation practices as related to educational resources. Therefore, educational research and policy should shift from the present concern with how much money is being spent to how currently available resources are being used by schools and school districts.

Standards-Based Reform

Currently, schools are in the midst of a standards-based reform and calls for accountability are being heard from local, state, and federal policy makers. Taxpayers are often hearing about failing schools and are becoming more concerned with exactly how their tax money is being used. As a result, schools are being held more responsible for ensuring that students not only cover important subject matter, but that they can apply what they have learned to a variety of situations. All students, not just the elite ones, are now expected to reach rigorous academic standards. In order to prepare students for the workplace of the future, schools and teachers must work together in new ways while placing a greater emphasis on the improved literacy and critical thinking skills of all students (Miles, 2003a).

According to Miles and Darling-Hammond (1997) many recent efforts have attempted to redirect dollars from administrative functions back to the classroom in order to help improve achievement levels of all students. Increased funding levels and policy changes in federal programs such as Title I have allowed school districts to use this money to improve other areas of their general education programs. Many districts have creatively used their Title I funds to help reduce class sizes in hopes that improvements in educational achievement will follow. However, according to O'Neill and Mercier (2003), the reduced average class sizes that are reported from the reallocation of these funds are not enough. These changes must be supported by improved professional practice and an actual reduction in the number of students in each classroom in order for student achievement to improve. They also add that the advantages of reduced class sizes might not have to require additional funding if a change in the planning of school structure and resource allocation occurs.

Until recently, little attention has been given to rethinking the use of existing instructional resources, especially teachers. The basic structure and configuration of many schools has remained essentially the same over the past century. For example, many schools still follow an eight period day with one period allocated to staff members for planning. Lessons are often presented in a lecture intensive format with little or no connections made between the material being learned and real world applications. Even the structure of teacher pay scales has remained relatively untouched with the focus on years of experience and levels of education as opposed to teaching competency.

While many aspects of schools remained the same throughout the 20^{th} century, it appears that when new resources became available they were mostly added around the classroom rather than into it. In order to meet the changing needs of students and communities, schools have been increasing their number of counselors, teacher aides, security personnel, and other non-teaching staff. Despite recent calls for restructuring, it appears that public schools rarely engage in a major reallocation of resources. Since 1950, the proportion of school staff in the United States who are classified as teachers has dropped to around 43%, while 60-80% of staff are teachers in most European countries (Miles & Darling-Hammond, 1997).

Clover et al. (2004) state that significant changes could be made to educational programs by reallocating existing resources. Data obtained from a recent survey and interviews indicated that elementary, middle and high school building principals believe that they can improve current educational programs without acquiring additional funding. This analysis by Clover et. al (2004) also states that principals believe they could improve current educational programs in their school if they were given more flexibility to reallocate current resources within instruction-related funds.

Principals at all three levels of public schools believe that student performance can be increased through resource allocation. According to the Clover et al (2004) study, almost 50% of the middle level principals along with 85% of high school principals who responded made evident their desire for greater flexibility in the allocation of instruction-related funds. The average for all groups in this study evidenced that 53% of the principals surveyed desired greater flexibility in the allocation of resources to instructional funds. This number was followed by 29% of the respondents who desired greater flexibility while dealing with capital outlay funds and 18% of the respondents who desired greater flexibility in allocating resources to general funds.

Within the instructional funds category, the principals in this study consistently chose the sub-category of employee salaries and benefits as the most desirable area to attain flexibility in allocating resources. Contracts and purchased services, supplies and materials, and regular instructional equipment were the other sub-category funds through which these principals felt that they could improve educational programs at their schools by reallocating current resources.

Financial Planning

The calls for schools to reexamine the use of their existing resources coupled with the current standards-based reform movements have made the need for schools to develop a financial plan imperative. By developing a financial plan, districts would be able to evaluate how effectively their funds are being used, identify future financial needs, and determine how the resource allocation decisions of today will impact future educational goals and financial needs (Pereus, 2002).

The need for a well designed financial plan, that takes the increasing costs of public education into consideration, requires school leaders to analyze all programs on a regular basis. Programs should be assessed through their impact on student achievement, whether they are in line with the district vision, whether they maintain parental support, and how they are currently funded. Budget priorities, especially on high cost items such as personnel and technology, should be set up to carefully match student needs and school priorities (Picus, 2000).

Another important piece to consider when developing a district financial plan is the current financial condition of the school district. According to Mead (2001, p. 59), “financial condition is the ability of a school district to meet its obligations as they come due and to finance the services its constituency requires.” The overall fiscal health of a district can be determined through factors that include the prosperity of the local economy, the temperament of the political environment, and the established values of the local citizens.

Assessing the financial condition of a school district goes beyond an annual audit in that the concern lies with what services the district is offering presently as well as what services might be offered or need to be modified in the future. A thorough examination of information found in budget documents, bond prospectuses, financial statements, socioeconomic data, demographic data, and achievement data can help guide district leaders as they examine the current state of the district and the possibilities for the future (Mead, 2001).

Many school leaders have had to examine difficult issues such as staff reductions and facility maintenance needs in order to make sure that current resources are effectively allocated to provide current and future students with adequate educational opportunities (Daignault, 2003). Downey (2001) states that district leaders must be held responsible for how district resources are allocated. She continues by saying that resources should be properly allocated to ensure that an experienced and highly skilled teaching faculty and administration are employed in the school. All schools should have adequate facilities that approach learning with creative and innovative ideas and programs.

The creation of a data-driven school culture is an important initial step in developing a financial plan that requires a reallocation of current resources. Unfortunately, the current practice in many schools is not conducive to collecting and analyzing present data in a timely manner. This structural weakness hinders the ability of schools to revise programs and policies that are not designed to maximize student achievement. Schools should strive to set priorities and efficiently allocate the necessary resources to meet the educational needs of their students through a change in the collection and analysis methods of available resource and achievement data. Successful data-driven schools use quantitative patterns to make program decisions including curriculum and instruction reform. These schools also use achievement and resource data to modify their resource allocation patterns when necessary to improve student achievement. To ensure future success, schools must include an adequate level of funds in their financial plans to establish and maintain a data collection system as well as funds for training personnel to effectively operate this system (Noyce, Perda, & Traver, 2000).

Financial Resources for Professional Development

One important area of a school budget that is often overlooked is the professional development fund. Hornbeck (2003) states that schools cannot expect an increase in funding to help meet the increasing demands that are being placed on them. Instead, schools must invest in professional development programs that are aimed at improving teaching and learning. School leaders should link professional development to the school vision and financial plan while holding all stakeholders more accountable as strategies from these programs are implemented.

Hirsh (2003) reports that in order to meet the challenge of the National Staff Development Council (NSDC) to have all teachers experiencing high quality professional learning by 2007, every teacher must be part of a learning team. Learning teams consist of teachers who meet almost every day about practical ways to improve teaching and learning. In order to support effective staff development that improves the learning of all students, the NSDC recommends that school systems dedicate at least 10% of their budgets to staff development and at least 25% of an educator’s work time to learning and collaboration with colleagues. In contrast to this recommendation, Senate Bill 380 in the state of Missouri currently calls for 1% of a district's budget to be devoted to professional development (Missouri Senate, 1993).

In these times of shrinking budgets and increasing expectations, the calls for increased funding for professional development often go unheard. During difficult financial times, it seems as if educators often overlook the most obvious sources of additional funding that could be reallocated from their school or district budgets (Mizell, 2003). For example, schools should constantly evaluate their current spending patterns to ensure that all programs and development initiatives are in line with the current school vision and financial plan. In other words, the times of a one day workshop for teachers with no follow up training or means of accountability are in the past. If this process is undertaken successfully, a focused professional development program that includes ongoing training and assessment can lead to improvements in student achievement without requiring the district to pursue additional funding.

Current Research on Resource Allocation

The economic downturn from 1999 to 2004 has recently led many discussions regarding school finance to take on a tone similar to the one seen in the production function studies of the late 1980s and early 1990s. In 2001, the Legislative Post Audit committee of the State of Kansas released a report (KLPA, 2001) based on data from the National Center for Education Statistics (NCES) Common Core Data (CCD) criticizing the resource allocation patterns of public school districts in that state. The districts were ranked near the bottom nationally in the percentage of education revenues allocated to instruction as well as higher than average administrative expenses. This report came at a time when the state school funding formula was being challenged in the state courts and the state budget was being cut in all categories. The scenario in Kansas was repeated throughout the United States as school district revenues were being cut and lawsuits challenging school-funding formulas were sprouting up everywhere (Baker, 2003).

Many districts have found themselves in these situations partly due to the tendency of state legislators to micro manage and target new revenues towards specific educational programs rather than raising funding levels overall. One argument for the targeting of new funds is to reduce administrative inefficiency or across the board raises for existing staff. Others contend that general education programs might be hurt in the long run if comparable funding increases are not seen in general funds. Several questions have been raised by these practices regarding their effect on school budgets. For example, does the state role in funding public schools affect the decisions of local administrators to allocate funds to core instruction versus administration? Is administrative bloat a byproduct of the increased burden of managing higher levels of restricted funds and needing specialized expertise to administer legislators' favorite programs? The answers to these questions will surely be different depending on whom one asks, but they certainly call for further research on both state aid policies and local resource allocation (Baker, 2003).

A study conducted by Augenblick (2003) examined and estimated the cost of providing an adequate education to the students of the 524 public school districts in the state of Missouri. This study received a lot of attention because it was a clear signal that the relationship between school finance and student performance had changed. School districts and policy makers are no longer as constrained by calls for equity in education funding. It is becoming more widely accepted that not all districts will, or even should, receive the same levels of funding. The different needs determined by district size, location, and population are undeniable.

The subject of this current education finance discussion has led many policy makers to look for a minimum level of funding that must be reached in order for all students to be given an opportunity for an adequate education. According to Augenblick (2003), in 2001-02 that minimum expense would be $5,664 per pupil. The Joint Committee on Education recently raised this amount to $6,117 as part of SB 287 in the 2005 legislative session (Powers, 2005). The amount originally determined by Augenblick, and since modified, was determined by the basic costs of school districts that had at least 69.3% of their students reach the performance standards required by NCLB. Although there are 524 public school districts in Missouri, only 38 were spending at an adequate level as determined by Augenblick’s research team. This discovery led to the call for increased school funding throughout the state and a lawsuit currently involving many school districts working to ensure full funding for the current funding formula.

According to Augenblick (2003), several factors addressing adequacy, equity, and accountability need to be taken into consideration when designing a new finance system. First of all, the system must take differences in taxing ability and revenue generating ability of school districts into consideration. Second, the new finance system must be related to the state expectations and standards for student achievement with clear consequences for not meeting those standards.

In a recent study examining the effects of state policies on district resource allocation patterns, Baker (2003) found that the resource allocation patterns of school districts is mainly determined by the size of the district and the amount of financial resources available. Larger school districts often spend proportionately fewer funds on administration and more on instruction while smaller districts typically employ more teachers and administrators per 1,000 pupils. Baker also found that districts with higher per pupil expenditures allocated a higher percentage of their budgets to administration as opposed to reducing class size or hiring more highly qualified teachers.

Obviously knowing where schools are spending their money and identifying differences in resource allocation patterns among schools of varying size and demographics is important in order to track equity in school finance. However, as stated before, the standards-based reforms in education are calling for funding adequacy along with increased accountability. The resource allocation patterns examined by Baker were not measured against student achievement data and therefore provided no information on how adequate these practices were in increasing student achievement. The knowledge of how schools spend their money must be combined with measuring how effectively the school is meeting the educational needs of its students in order to provide information on the relationship between resources and student achievement.

An alarming trend over the past four decades can be seen in the decreasing percentage of teachers that make up the staff of a public school. In 1950, almost 70 percent of the staff members in a typical public school were classified as teachers. That number had decreased to 52 percent in 1993 and had fallen to 50.8 percent for the 2001-02 school year. Also during this time period, the percentage of administrative and support staff increased to make up over 30 percent of the entire staff while the number of other instructional staff members, mostly in special education, increased nearly 15 percent

(NCES, 2002). These trends have led many policy makers, educational leaders, and community members to question the resource allocation priorities of school districts and have increased the demand for research studies that will examine the resource allocation patterns of districts and their effects on student achievement (Darling-Hammond, 1997).

Many discussions regarding the reallocation of educational resources have led to a growing interest in business models, especially site-based management. This approach to school budgeting has spread rapidly throughout New Zealand and the United Kingdom and is beginning to gain favor in Canada and Australia. School districts in the United States have been somewhat slower to adopt this strategy due to the difficult task that school boards would face in developing the appropriate formula to use in allocating resources to individual schools. Also, the necessary models of accountability that must be in place for continued success take time to plan and implement (Caldwell, 1996).

The resource allocation patterns of highly productive schools are often similar to those found in successful businesses. First of all, the majority of resources are focused on the core purpose of the business which, in the case of schools, would be in the classroom as opposed to non-instructional services. Second, a school that devotes a larger percentage of resources to the core classrooms will often experience reduced pupil-teacher ratios as well as an increased amount of common planning time for teams of teachers. The creation of teacher teams is similar to the emerging modern business philosophy that calls for decreased layers of bureaucracy and increased levels of collaboration. In addition to these measures, highly successful schools require students and teachers to cover a smaller number of topics at one time. This focus on a few subjects at a time, often through block scheduling, offers students and teachers the opportunity to cover items in greater depth and is designed to lead to a deeper understanding of the core subjects (Darling-Hammond, 1997).

A New School Finance Reporting Structure

Although many researchers have tried to find a connection between school spending and student achievement, they often find themselves limited by the finance and achievement data that is reported by school districts. In order to show a clear relationship between school resources and student achievement, a new reporting structure might be needed. Odden et.al (2003) presented a school expenditure structure to address some of the shortcomings in existing fiscal reporting systems. They maintained that this model was superior to others in three ways. First of all, it is specifically designed to report school-level expenditures. Second, it can show spending variations of multiple educational units within a school structure that features small learning communities. Finally, expenditures are categorized by elements that are in line with current research concerning effective instructional strategies and resource allocation.

The proposed expenditure structure is divided into two different but related sets of data concerning resources and strategies. The first data set can provide information about the instructional focus of the school and current educational strategies. The second set of data includes a breakdown of nine expenditure areas: Core academic teachers, specialist and elective teachers, extra help, professional development, other non-classroom instructional staff, instructional materials and equipment, student support, administration, and operations and maintenance. This expenditure structure allows school leaders to compare resource allocations across schools in order to evaluate and ensure that all areas of the school budget are in constant alignment with the goals of the school or district (Odden, 2003).

Most of the studies that have been conducted regarding educational spending strategies have dealt with data at the district level. While the results of these studies have been mixed, they are laying a foundation for the future line of finance studies. Recently, the trend in education finance research has been to analyze data at the school level in hopes of uncovering a more direct connection between resource allocation patterns and student achievement. An analysis of well-organized fiscal data at the school level can provide insights into how well the resource allocation patterns of a school are matched to the instructional strategies. The growing attention that has been paid to school-level data appears to be affecting budgeting decisions with increasing prominence. Future research in this area will most likely play a major role for school finance policy makers and district leaders (Odden, 2003).

The 65 Percent Solution

The goal of the initiative being heavily promoted by First Class Education (FCE), is for legislation to be passed in all 50 states and the District of Columbia requiring all public school districts to spend at least 65% of their operating budgets on expenditures directly related to classroom instruction. Expenditures that are considered “in the classroom” include: (a) classroom teachers, (b) general instruction supplies, (c) instructional aides, (d) student activities, and (e) tuition to other districts. Expenditures that are considered “out of the classroom” include: (a) administration, (b) plant operations and maintenance, (c) food services, (d) transportation, (e) instructional support including librarians, (f) teacher training and curriculum, and (g) student support services. The benefits of this plan, as proposed by FCE, include (a) increasing the amount of money spent in the classroom without increasing taxes, (b) making school districts more accountable for how they allocate their financial resources by reducing the amount spent on administrative costs that are seen as “wasteful” or not directly related to the classroom, and (c) increasing student achievement by targeting more funds on classroom activities as defined by NCES. The 65 Percent Solution has already been implemented in Texas with pending legislation in at least six other states including Missouri. In his 2006 State of the State speech, Governor Matt Blunt called for the state legislature to implement the 65 Percent Solution during the current legislative session (FCE, 2005).

Critics of the 65 Percent Solution contend that this initiative stands in contrast to current education reforms that emphasize outcomes-based programs as opposed to programs focused on modifying financial inputs. Some experts question how the effects of this mandate will differ between rural and urban districts, while others question the research on which this initiative is based (Standard & Poor’s, 2005). In a recent interview with *The New York Times*, Dr. James W. Guthrie, a professor of public policy and education at Vanderbilt University said, “This is well intended, but misguided.” He added, “Actually, it would be harmful, because it would add to the overlay of regulatory apparatus with which districts have to comply. Why do we want to restrict what school people spend?” (Finder, 2006).

CHAPTER 3 - METHODOLOGY

The purpose of this study is to examine the relationship between resource allocation patterns in Missouri public school districts and student achievement as measured by the Missouri Assessment Program (MAP) Test. The data collected in this study was analyzed using quantitative data analysis methods including a multiple linear regression and the construction of scatterplots to determine if a relationship exists between school district resource allocation patterns, PEER groups, and student achievement. This chapter outlines the participants and procedures used in this study.

Participants

This study consists of 447 Missouri K-12 public school districts that were selected from the 524 school districts in the state. These districts were chosen because they were independent K-12 public school districts with resource and achievement data that had been reported to the Missouri Department of Elementary and Secondary Education for the three school years beginning in 2001 and ending in 2004. First, all K-8 school districts in Missouri were eliminated from the sample. Next, two school districts, Revere C-3 and Wyaconda C-1, were taken out of the sample due to unreported MAP achievement scores for 10th and 11th grade tests in 2003 and 2004. Finally, despite their classification as K-12 districts, Special School Districts in St. Louis County and Pemiscot County were eliminated from the sample due to their unique circumstances as overlay districts where they are affiliated with and provide staff and services for many different school districts in their respective counties.

The rationale for selecting this sample of public school districts in the state of Missouri includes the fact that all categories of the Missouri PEER Groups will be represented. The Missouri PEER groups provide an existing model that represents school districts by size, rural/urban/suburban classification, percentage of students on free and reduced lunch, racial diversity, and several other demographic factors. Also, the results will be easily generalized to the entire state of Missouri as well as to other states due to the large sample size.

Data Collection

Quantitative data was collected in the form of school resource and achievement data from the Missouri Department of Elementary and Secondary Education (DESE). The Missouri DESE supplied the researcher with the official Microsoft Excel spreadsheet files from the department database. These files included achievement data from all subject areas of the MAP as well as financial and non-financial resource data.

Resource data consist of all district level expenditures for each district. Each district expenditure report is composed of fifteen expenditure funds. Twelve of these funds are then aggregated to form three main portions of a district budget. The expenditure funds are combined in the following manner: (1) instructional expenditures, including regular instruction, special instruction, compensatory education, vocational instruction, student activities, and tuition to other districts; (2) support services expenditures, including support services, general administration, building administration, operation of the plant, and pupil transportation; and (3) non-instructional expenditures, including food services. The three expenditure funds not included when determining total current expenditures are: (a) facility additions and renovation, (b) community and adult education programs, and (c) debt service. The names of the funds included in the analysis of total current expenditures are listed as the independent variables later in this chapter. Resource data for school districts in the state of Missouri is self-reported. While this practice might affect the external validity to the data in this study, there is no need to test for validity or make improvements since the data will be taken from a database which already exists and offers a high level of reliability for the data.

Achievement data for this study, which was included in the Microsoft Excel spreadsheet files collected from DESE, consist of the district scores on the secondary level state mandated portions of the MAP test, Mathematics for 10th grade and Communication Arts for 11th grade. Since the implementation of this test in the late 1990s, levels of validity and reliability for the MAP Test have been controlled for through the use of defined scoring rubrics that are developed and implemented by same-subject area teachers throughout the state. Achievement data consist of district level percentage of scores in the following levels of the MAP Test:

- 10th Grade Mathematics MAP Index
- 11th Grade Communication Arts MAP Index

Quantitative Data Analysis

The resource and achievement data from the DESE database were analyzed using a multiple linear regression model that measures the relationship between resource and achievement data over three separate school years: 2001-2002, 2002-2003, and 2003-2004. The independent variables for this analysis were taken from the resource data and included the following financial and non-financial district level expenditures for each of the school districts in the sample:

Financial Independent Variables

X_{IE} = percent of district budget allocated to instructional expenditures

X_{SS} = percent of district budget allocated to support services

X_{NI} = percent of district budget allocated to non-instructional expenditures

Non-Financial Independent Variables

X_{PG} = Missouri PEER Group

X_{EXP} = teachers' average years of experience

X_{PMA}= percent of teachers with a Masters Degree

X_{SAR} = students per administrator ratio

X_{SCR} = students per classroom teacher ratio

X_{STR} = student per teacher ratio

X_{ITS} = inverse of average teacher salary

X_{LPE} = log 10 of per pupil expenditures

The dependent variables for the multiple linear regression models consist of the performance data from the MAP Test. Although the MAP Test has five separate levels of achievement, the district level MAP Index score for each test will be used because it provides a score that shows the average level of achievement for each district. The set of dependent variables include:

Y_{MA} = District MAP Index Score for 10^{th} grade Mathematics

Y_{CA} = District MAP Index Score for 11^{th} grade Communication Arts

Question #1

In order to test the research hypothesis that a relationship exists between district level resource allocation patterns in Missouri K-12 public school districts and student achievement as measured by the MAP Index, the dependent variables were tested for each school year using the following linear models:

$$\mathbf{Y_{MA} = a + b_1 X_{IE} + b_2 X_{SS} + b_3 X_{NI} + E}$$

$$\mathbf{Y_{CA} = a + b_1 X_{IE} + b_2 X_{SS} + b_3 X_{NI} + E}$$

The results provided by this linear model were analyzed in an attempt to challenge the following null hypothesis:

Null Hypothesis #1

There is no relationship between district level resource allocation patterns and levels of student achievement of K-12 public school districts in Missouri over the three academic years beginning in 2001 and ending in 2004.

Question #2

In order to test the research hypothesis that a relationship exists between district level non-financial expenditure funds in Missouri K-12 school districts and student achievement as measured by the MAP Index, the dependent variables were tested for each school year using the following linear model:

$$\mathbf{Y_{MA} = a + b_1 X_{PG} + b_2 X_{EXP} + b_3 X_{PMA} + b_2 X_{SAR} + b_3 X_{SCR} + b_2 X_{STR} + b_3 X_{ITS} + b_2 X_{LPE} + E}$$

$$\mathbf{Y_{CA} = a + b_1 X_{PG} + b_2 X_{EXP} + b_3 X_{PMA} + b_2 X_{SAR} + b_3 X_{SCR} + b_2 X_{STR} + b_3 X_{ITS} + b_2 X_{LPE} + E}$$

The results provided by this linear model were analyzed in an attempt to challenge the following null hypothesis:

Null Hypothesis #2

There is no relationship between non-financial district level resource variables and levels of student achievement of K-12 public school districts in Missouri over the three academic years beginning in 2001 and ending in 2004.

Question #3

In order to test the research hypothesis that a relationship exists between a predetermined minimum level of district instructional expenditures (65%) in Missouri K-12 public school districts and student achievement as measured by the MAP Index, scatterplots were created for each academic year comparing the percent of district expenditures allocated to instruction versus MAP index scores. The results provided in these scatterplots were analyzed in an attempt to challenge the following null hypothesis:

Null Hypothesis#3

There is no relationship between a minimum percentage (65%) of district level instructional expenditures and student achievement as measured with MAP Index scores among small, medium, and large K-12 public school districts in Missouri over the three academic years beginning in 2001 and ending in 2004.

Limitations

The nature of this study lends itself to several limitations. The first of these limitations is that the expenditure funds to be examined are aggregated at the district level and include several sub-categories in each fund. This aggregation makes it more difficult to mine the financial data for a deeper understanding of the potential relationship that might exist between resource allocation patterns and student achievement.

Another limitation is found in the self-reported data from each school district. Some district funds have been rounded to the nearest percentage causing the total expenditures to not always equal 100%. This study will be undertaken under the assumption that the information in the spreadsheet files provided by DESE is factual. The student performance data, collected from DESE, is tabulated through scoring practices on the MAP test, which are not entirely objective. This lack of true standardization brings another limitation to the data in the study, but was necessary due to the fact that the MAP assessment system is the official assessment tool used by the state of Missouri.

Unforeseen district expenses that occurred during only one or two of the examined years might provide yet another limitation. A higher than normal percentage in the capital projects fund might indicate that the district was forced to unexpectedly increase its spending due to an emergency situation that arose during the school year that could not be funded through the debt service fund.

The potential failure of this study to reject a null hypothesis might be due to the fact that the effectiveness of individual district programs, faculty members, or leadership styles cannot be measured through either financial or non-financial expenditure funds. Also, the influence of social capital including students' families and the surrounding community cannot be measured through district expenditure funds. Many possibilities exist to explain the success or struggles of an individual school or district, this study is only attempting to target one of those possibilities.

CHAPTER 4 – RESULTS AND ANALYSIS

As stated in the introductory chapter, this study examined the relationship between resource allocation patterns in school districts and student achievement. This chapter presents the findings of the three research questions stated in the Introduction. It first reports the relationship between district level expenditure funds and student achievement as measured by MAP Index scores. Next, the chapter examines the relationship between district-level non-financial resources and student achievement as measured by MAP Index scores. Finally, the chapter concludes with the relationship between minimum district level expenditure funds and student achievement as measured by MAP Index scores.

The first research question was designed to examine the relationship between the three main district level expenditure funds and student achievement as measured by MAP Index scores for 10th grade mathematics and 11th grade communication arts over three separate academic years beginning in 2001 and ending in 2004. Throughout this chapter each school year will be referred to by the year in which it ended, for example the 2001-2002 school year will be referred to as the 2002 school year and so forth. Several assumptions about the data had to be met before the multiple linear regression analysis could be performed. The pre-test assumptions included normality, linearity, homoscedasticity, and collinearity of the independent and dependent variables.

First, the variables which measured percent of budget expenditures for instruction, percent of budget expenditures for support services, percent of budget for non-instruction expenditures, 10th grade Mathematics MAP Index scores, and 11th grade Communication Arts MAP Index scores for the 2002 and 2003 school years were found to have scores for skewness and kurtosis that fell within the appropriate normality range of -1.0 to +1.0. The kurtosis score of the percent of non-instruction expenditures variable for 2004 was slightly out of the normally acceptable range. However, this variable was left in the final analysis equation for both the Mathematics MAP Index and the Communication Arts MAP Index due to the fact that three separate transformations of this variable including calculating the square root, calculating the natural logarithm, and calculating the inverse failed to yield normality statistics that were closer to a normal distribution as measured by a Kolmogorov-Smirnov test.

Next, all variables were tested for linearity by using a bivariate correlation matrix. The results for the Pearson Correlation levels of significance, which were used to test for the presence of a linear relationship between the resource-related independent variables and the achievement-related dependent variable, are shown in *Tables 2, 3, and 4* for the Mathematics MAP Index and *Tables 5, 6, and 7* for the Communication Arts MAP Index. These correlation levels fail to show a strong linear relationship between the variables. The only variable approaching a significant level of correlation with the MAP Index scores was the percent of non-instruction expenditures in 2002 from the Mathematics MAP Index matrix (*Table 6*). However, the significance levels for the same variable increased in the 2003 and 2004 scores, so it was grouped with the other scores which showed a lack of strong linear correlations. The weak linear relationship between these variables does not call for their removal from the analysis, it only means that a note of caution should be added to the findings if a significant correlation is found in the multiple linear regression analysis.

Tests for homoscedasticity were conducted by looking at the scatterplot of the regression standardized residuals (zresid) versus the regression adjusted predicted values (adjpred) produced during the regression analysis. The regression line for the scores of the 2002 (*Figure 1*) and 2004 (*Figure 2*) school years show that the residuals are evenly distributed across most of the plot. This even distribution shows that the assumption of homoscedasticity has been met. The scatterplot for the 2003 school year was not produced by SPSS. This omission may have been due to complications in producing standardized residuals or adjusted predicted values from the data which was filtered by the year. The analysis of the 2003 data continued despite the lack of a scatterplot for 2003 due to all other assumptions having been met along with the scatterplots from 2002 and 2004 showing homoscedasticity of the residuals.

The assumption of collinearity of variables was tested by analyzing tolerance and variance inflation factor (VIF) statistics produced as part of a coefficient table during the regression analysis. All variables in each academic year had tolerance scores below 1.0 and VIF scores below 1.5. These scores fell safely in the range of acceptable levels for collinearity. Once all of these data assumptions were met, the data from the multiple linear regression analysis was able to be clearly analyzed.

Question #1 - What relationship exists between district level resource allocation patterns and levels of student achievement of K-12 public school districts in Missouri over the three academic years beginning in 2001 and ending in 2004?

The results of the multiple linear regression analysis of the three independent variables which measured the percent of the district operating budget allocated to instruction expenditures, non-instruction expenditures, and support services expenditures versus achievement scores as measured by the district MAP index scores for 10th grade mathematics and 11th grade communication arts failed to yield a significant relationship between district resource allocation patterns and student achievement. The ANOVA tables (Tabl*es 8, 9, 10, 11, 12, and 13*) produced during the backward regression analysis for each academic year show the corresponding F-ratios and their levels of significance for each model. Each new model was automatically produced by SPSS by removing the independent variable with the lowest level of correlation to the dependent variable from the analysis.

In the analysis of 10th grade mathematics scores for the 2002 academic year, the variable measuring the percent of the budget allocated to instructional expenditures was included in the second model, but removed before the third. The removal of that variable left non-instructional expenditures as the most influential variable in a non-significant model. Similar results occurred during the analysis of 10th grade mathematics scores for the 2004 academic year. The F-ratios from each of these years were very close and had similar levels of significance. The model summaries presented in *Table 14* and *Table 16* show that the R^2 for the third model in each year was less than 1%, adding further evidence to the results that this model did not provide a significant relationship.

The analysis of 10th grade mathematics scores for the 2003 academic year yielded slightly different models, but similarly non-significant results. In this model, the percent of the budget allocated to instructional expenditures was the first variable eliminated from the analysis. Unlike the other two years, the percent of the budget allocated to support services emerged as the variable with the most predictive power in a non-significant model. The model summary for 2003 (*Table 16*) shows an R^2 that is less than 1%, which is similar to the other two years. However, the F-ratio, and its level of significance, produced in the final model for the 2003 academic was much less than the same statistic produced in the other years. These differences might be attributed to changing resource allocation patterns within districts over the course of this three year period as a result of fluctuating levels of local, state, or federal funding. Nonetheless, the models still failed to reject the null hypothesis that no significant relationship exists between school district budget resource allocation patterns and levels student achievement.

The analysis of 11th grade Communication Arts Index scores for 2002 (*Table 11*) produced a model where the percent of the budget allocated to instructional expenditures was the variable that provided the most predictive power, but was still not significant. The model summary for the 2002 analysis (*Table 17*) showed an R^2 of 0.3% for the full model with all three expenditure variables included and a final R^2 of 0.1% with only percent of budget allocated to instruction expenditures included in the model. These scores are far from significant. The F-ratios and R^2 values for 2003 and 2004 (*Tables 18 and 19*) provided similar results which show no significant relationship between district level resource allocation patterns and student achievement as measured by the MAP Index. Therefore, this analysis has failed to reject the null hypothesis for question #1.

Question #2 - What relationship exists between the non-financial resource variables including PEER group classification, student-teacher ratios, percent of teachers with a Masters degree, & teachers' average years of experience and levels of student achievement of K-12 public school districts in Missouri as measured by the 10th grade Mathematics MAP Index over the three academic years beginning in 2001 and ending in 2004?

Before performing the multiple linear regression analysis for this question, all data was tested to meet the assumptions of normality and linearity. Tables 20, 21, and 22 show that all variables were found to have acceptable levels of skewness and kurtosis, which were between -1.0 and +1.0, before being included in the regression model. The variables representing student-administrator ratio, average teacher salary and per pupil expenditures underwent transformations in order to meet the assumption of normality. The results of the normality tests for the transformations of each of these variables, *Tables 23 and 24*, show that the inverse of teacher salary and the logarithm of per pupil expenditures both had acceptable levels of skewness and kurtosis as measured by the Kolmogrov-Smirnov test. The skewness and kurtosis values seen in *Table 25* show that the logarithm of student-administrator ratio is within the acceptable range for inclusion in the study. Although the transformations for teacher salary and per pupil expenditures were used for the analysis in all three years, the transformation for student-administrator ratio was only used in 2002 due to the fact that the variable was normally distributed without needing a transformation in 2003 and 2004.

Following the tests for normality, all eight independent variables were tested for a linear relationship with the dependent variables 10th grade mathematics and 11th grade communication arts MAP Index scores. The 2002 results for mathematics, *Table 26*, show that the PEER Group and percent of teachers with a Masters degree variables had a Pearson correlation value that was significant at the $p < .01$ level. The variable for teachers' average years of experience showed a Pearson correlation value that was significant at the $p < .05$ level. These three independent variables were also found to have significant levels of correlation with the mathematics dependent variable in 2003 and 2004. In 2003, *Table 27* shows that all three of these variables had a Pearson correlation value that was significant at the $p < .05$ level, while *Table 28* shows that all three variables had a Pearson correlation value significant at the $p < .01$ level in 2004.

The 2002 results for communication arts, *Table 29*, showed even more promising correlations than the mathematics portion of this analysis. Four independent variables, PEER Group, teachers' average years of experience, percent of teachers with a Masters degree, and the inverse of teacher salary, had a Pearson correlation value that was significant at the $p < .01$ level. The other four independent variables had Pearson correlation values that were significant at the $p < .05$ level. *Table 30* shows that the Pearson correlation values for PEER Group, percent of teachers with a Masters degree, and inverse of teacher salary remain significant at the $p < .01$ level for 2003 while the value for teachers average years of experience was only significant at the $p < .05$ level. The values for 2004, *Table 31*, show that all eight independent variables had Pearson correlation values that were significant at the $p < .05$ level. The significant levels of correlation seen in many of these independent variables, especially the variables that were strongly correlated for both mathematics and communication arts, allow this analysis to continue with the anticipation that results from the multiple linear regression will show a significant relationship between variables.

Due to a larger number of independent variables, the multiple linear regression for question #2 was conducted using a forward addition technique where new variables are added to the model only if they will increase the model strength while keeping the F statistic significant. The mathematics results for 2002, *Table 32*, show that three variables were included in the final model producing an F statistic of 28.725 which was significant at the $p < .05$ level. The model summary shown in *Table 35* shows that mathematics MAP Index scores can be predicted by PEER group, student-teacher ratios, and teachers' average years of experience with an R^2 of 16.3% which is seen as significant due to the sample size of 447 school districts. The collinearity statistics for this model, *Table 38*, show that the Tolerance level was below 1.00 and the VIF was well below 10.0, both were within the acceptable range or scores.

The communication arts portion of the 2002 analysis, *Table 41*, produced a predictive model with an R^2 of 12.2% that included only PEER Groups and teachers' average years of experience. The F-ratio of 30.903 for this model was significant, *Table 44*, and the Tolerance and VIF levels shown in *Table 47* indicated insignificant collinearity between these variables.

The mathematics results for 2003 show that five acceptable models were produced with significant F statistics, *Table 33*. However, due to increasing VIFs for models #4 and #5, *Table 39*, and the fact that only three variables were used in the final model for the previous year, the results from model #3 will be interpreted as the best fitting model with an F statistic of 32.562 which is significant at the $p < .05$ level. The model summary in *Table 36* shows that PEER group, student-teacher ratio, and percent of teachers with a Masters degree were able to predict 10th grade MAP Index scores with an R^2 of 18.1% which is also seen as significant due to the sample size. The communication arts results from 2003 show that once again only two independent variables make it into the most predictive model. *Table 42* shows that the variables are PEER group and percent of teachers with a Masters degree. This model has an R^2 of 9.9% which is still significant due to the large sample size, but noticeably less than the mathematics model. The F-statistic of 24.403, *Table 45*, was also less than the mathematics level, while the collinearity statistics seen in *Table 48* were once again within the acceptable range.

The 2004 results appear to be a combination of the results from the previous two years for both mathematics and communication arts. Similar to the ANOVA table from 2003, *Table 34* shows that five models were produced for the data from 2004. An analysis of collinearity statistics, *Table 40*, allow the use of model #4 as the best model for this year due to a VIF of over 3 for teacher salary in model #5. Although this VIF was still within acceptable limits, this model was not seen as the best model due to the recurrence of variable from previous years seen in model #4. The model summary seen in *Table 37* shows that model #4 has an R^2 of 17.8% which is significant at the $p < .05$ level. This model includes PEER group, percent of teachers with a Masters degree, student-teacher ratio, and teachers' average years of experience. All of these variables were included in the most predictive models at least two out of the three years of this study with PEER group and student-teacher ratio appearing in the best model all three years.

The 2004 results for communication arts, *Table 43*, produce a model with an R^2 of 10.2% that includes PEER group, percent of teachers with a Masters degree, and teachers' average years of experience. The F-statistic for this final model was 17.835 and the collinearity statistics were within reasonable limits as seen in *Tables 46 and 49*.

The significant F statistics and R^2 scores for the models from the multiple linear regression analysis for these three years show that a significant relationship does exist between the PEER group classification of a school district, the percent of teachers in a district with a Masters degree, district student-teacher ratio, & teachers' average years of experience and district 10th grade mathematics MAP Index scores. Also, significant relationships exist between PEER groups, percent of teachers with a Masters degree, teachers' average years of experience and 11th grade communication arts MAP Index scores. The fact that three of the same variables were significant over multiple years for both mathematics and communication arts allows the analysis to be made that the independent variables of PEER groups, percent of teachers with a Masters degree, and teachers' average years of experience are important predictors of success in both mathematics and communication arts. Therefore, the null hypothesis is rejected for question #2.

Question #3 - What relationship exists between a predetermined minimum level of instructional expenditures and student achievement of K-12 public school districts in Missouri as measured by the MAP Index over the three academic years beginning in 2001 and ending in 2004?

In order to answer the third question in this study, six separate scatterplots were created to analyze the potential relationship between student achievement as measured by district MAP Index scores and the percent of district budget expenditures allocated to instruction. In addition to providing a visual analysis on this potential relationship, the scatterplots also show how these variables are related to a proposed 65% minimum level for percent of district budget expenditures allocated to instruction. This 65% level for percent of expenditures allocated to instruction is seen as a vertical line on each graph.

The scatterplots of this data, shown in *Figures 3 through 8*, clearly show that there is no significant relationship between student achievement and the percent of district budget expenditures allocated to instruction. Surprisingly, the graphs for mathematics MAP index scores for 2002 and 2004 actually show a slightly negative correlation between the variables with 2003 showing no correlation. The graphs for communication arts MAP index scores show a very weak positive correlation for 2002 and 2003 with a very weak negative correlation for 2004. As for the 65% line, it can be seen that high levels of student achievement in mathematics or communication arts is not guaranteed even for districts allocating more than 65% of their budget expenditures to instruction. Further analysis of these graphs is not necessary as they provide clear evidence that there is no relationship between student achievement as measured by the MAP index and a 65% level of instructional expenditures. Therefore, the null hypothesis for question #3 has failed to be rejected.

CHAPTER 5 – SUMMARY AND CONCLUSION

This final chapter presents the summary of this study along with important conclusions taken from the data that was analyzed in Chapter Four. The conclusions reached in this chapter will, at times, be presented in relation to previous research. Also, it will provide a discussion of how this study might affect education policy and practice. Finally, this chapter will recommend further research that needs to be considered in order to form a more complete picture of the relationship between resources and student achievement.

The purpose of this study was to examine the relationship between resource allocation patterns in school districts and student achievement within the state of Missouri. The most talked about topic in education in the past two or three decades, NCLB, is demanding that school districts become more accountable for the education of all students. In reaction to this law, educational leaders and policy makers across the country have become more discerning about potential increases to the billions of dollars of funding that public school districts currently receive. Public school districts contend that despite legislative actions to change funding formulas they still remain under-funded and should not be expected to meet the increased standards set forth by NCLB without receiving increased financial resources. Beginning with *Serrano v. Priest* in 1971 to the current lawsuits in multiple states, including Missouri, these opposing sides have at times taken their debate to the court rooms in search of equitable and adequate funding for education. However, it seems that no matter what rulings come out of these cases or what new legislation is passed, these changes are only temporary solutions. Both sides are appeased for the time being only to see the debate taken up with the same or greater levels of intensity several years later.

The lack of permanent solutions that have been provided to the education finance debate might be attributed to the conflicting conclusions provided through many production function studies. Beginning with *Equality of Educational Opportunity* in 1966, the link between educational inputs and student achievement came to the forefront of education finance debate and research. The lack of a strong relationship between these variables was the basis for much of Hanushek's work during the 1980s and 90s. Although he consistently reported that student performance and financial resources were not related, Hanushek (1996) stated that some schools are using their resources effectively and that educational research should examine in what cases resources are used effectively. The viewpoints presented by multiple authors such as Greenwald, Hedges, and Laine (1996), throughout the last fifteen years stand in contrast to earlier studies as they found that there is a relationship between financial resources and student achievement. This debate continues today and only shows that the conclusion about whether money really matters to student achievement is still up in the air.

The most recent research has evolved from funding equity to adequacy, but many critics still ask the question, how can we truly define an adequate level of funding? In order to answer this question, the group First Class Education has proposed the 65 Percent Solution which calls for all districts to allocate at least 65 percent of their district expenditures directly into the classroom. This proposal has been gaining a lot of momentum throughout the country with several states including Texas and Georgia already adopting it. Governor Matt Blunt of Missouri has also been a strong supporter of this plan and even discussed it in his 2006 State of the State speech (Blunt, 2006). Many critics of the 65 Percent Solution are questioning what research this initiative is based on. This study was designed, in part, to conduct relevant research on this latest proposal. It is believed that the results of this study will provide another piece of information to leaders and policy makers as they examine the merit of the 65 Percent Solution. The importance of providing educational leaders and policy makers with unbiased research as they work to determine how to increase student achievement on already tight budgets cannot be understated.

District Level Expenditure Funds

The first question posed in this study examined the potential relationship between the three major expenditure funds for public school districts in Missouri and student achievement as measured by the MAP Index in communication arts and mathematics. The analysis of the data for this question agreed with the findings of The Coleman Report (1966) and the work of Hanushek in that it showed that there was not a significant relationship between these district level expenditure funds and student achievement. This conclusion really came as no surprise due to the fact that these district level funds are so far removed from the day to day occurrences in classrooms. However, it was still important to analyze the data through this model since district level expenditure funds are all that are provided by the state of Missouri.

Until a well-defined school level accounting system can be created to report expenditures in public school districts it will be nearly impossible to find any strong correlation between expenditures and student achievement. There are just too many superseding variables such as individual teachers, student motivation, student’s social capital, and especially the use of a single test to assess what students have learned over the course of their academic careers. The data provided by district level funds is not sensitive enough to effectively measure any of these variables.

School districts would be well served by a reporting model similar to the one proposed by Odden (2003) that gathers information from the school level and shows how resources are being allocated to reflect the instructional focus and educational strategies of the school. This type of reporting structure would provide more detailed information that would allow school leaders to examine the resource allocation patterns at each school and ensure that the spending strategies are aligned with the instructional goals of the individual school and district. Since educational leaders and policy makers are spending so much time and effort debating school funding issues, it seems somewhat counterintuitive that they would not spend a similar amount of time creating a well-designed reporting system. Why would they not want a reporting system that would provide relevant data that could be analyzed to measure how effective their initiatives really are at improving student performance?

"Non-Financial" Variables

The second question of this study attempted to examine how some of these "non-financial" resources were related to student achievement. Several of the variables used in the linear model created to analyze this question were similar to variables used in the 1996 meta-analysis by Greenwald, Hedges, & Laine in which they concluded that per pupil expenditures, class size, and teacher quality were all positively related to student achievement. The results of this analysis of Missouri data were similar on all of these variables except for per pupil expenditures.

The variable that was most highly related to student achievement throughout the analysis of the second question was the district's PEER group. The strength of the relationship observed between district PEER group and student achievement can be more thoroughly explained by understanding what other variables are included under the PEER group umbrella. Since PEER groups are created according to location, district size, racial diversity, and percent of students on free and reduced lunch, it appears that the effects of social capital on student achievement as presented by Coleman (1988) should be considered in new education policy and programs.

Some critics might use this suggestion as an opportunity to argue that since social capital is so strongly related to student achievement then the findings of earlier researchers such as Hanushek are true and increased funding is not necessary. However, the significance of variables in this study, such as percent of teachers with a Master's degree and student-teacher ratio, show that increases in student achievement can be achieved through increased funding targeted at specific variables. In response to Hanushek's (1996) question on whether any research had been conducted that could describe when resources were used effectively in schools, the results of this study show that mathematics achievement is related to the percent of teachers with a Master's degree and lower student-teacher ratios, while communication arts achievement is related to percent of teachers with a Master's degree, but not student-teacher ratios. These findings should serve as useful information to school leaders on the importance of investing in professional development for their teachers and working to decrease student-teacher ratios, especially in mathematics classes.

The results of this study show that when Missouri school districts invest their time and money in decreasing class size and improving the quality of their teachers through the pursuit of advanced degrees, increased student achievement is possible. The failure of per pupil expenditures to emerge as a significant variable in this study might call into question the significance of the study conducted by Augenblick (2003) that established an adequate funding level based on per pupil expenditures. If meeting Augenblick's proposed adequate level of funding is so important for improving student achievement, why did per pupil expenditures not appear significant in the current study? These findings also add leverage to the findings of authors such as Miles (2001b), Odden (2001), and Picus (1995) that a generic increase in funding does not guarantee increased performance. Instead, schools should re-examine their current resource allocation patterns and target funding towards instructional programs that are in line with school and district goals.

School and district efforts to improve student achievement must take certain demographics factors into account, as seen in the significance of PEER groups, and focus on allowing their teachers to gain more experience while continually undergoing more training in advanced degree programs. This conclusion stands beside the works of Hornbeck (2003) and Hirsh (2003) who call for school districts to invest in restructuring their professional development programs so that all teachers are receiving effective training that is focused on improving the teaching and learning process. According to the results of this study, developing better and more experienced teachers through advanced degree programs and reducing student-teacher ratios in mathematics classes are both strategies that schools might consider in order to raise levels of student achievement.

Minimum Funding Levels

Perhaps the most over-hyped and under-researched solution to the problem of increasing student achievement is the 65 Percent Solution that is being touted across the country. Policy makers view it as a way for classrooms to receive increased funding without having to modify current funding formulas or raise taxes. Others view it as another way for state and federal governments to demand more from schools without providing increased funding. On the surface, it sounds plausible that if school districts simply focused more financial resources into classroom related expenses, achievement scores are bound to improve. However, the results of the analysis for the final question of this study show that the 65 Percent Solution is either not always necessary or would not guarantee high levels of student achievement. The graphs that were examined in the last chapter showed that many schools are achieving at high levels without meeting the 65 percent minimum while other districts are spending over 65 percent and are still not experiencing high MAP Index scores. Therefore, the hope of the "65 Percent Solution" truly being a solution to raising student achievement appears to lack the support of significant research results from this study.

This latest solution appears to mimic the input-based initiatives of the past which called for more funding to improve achievement. Not only has this idea been discounted in this study, but also by many other production function studies from the past. Instead of requiring districts to reallocate their resources to meet this minimum level that has not been proven to increase achievement, it makes more sense to require schools to improve their professional development programs and teacher quality. If a teaching staff does not have the necessary skills or experience to create and present a variety of lessons and teaching strategies to students, simply raising their salaries or providing more classroom technology and supplies will not improve their student's achievement.

Conclusion

The conclusion reached through the analysis of the three questions presented in this study is that in order for school districts to improve the academic performance of their students, they must invest in the continuous improvement and assessment of their current staff and instructional programs. This study shows that certain student demographic characteristics as measured in PEER groups are important and should not be ignored. Any strategy to significantly improve student achievement must begin with assessing the demographic factors of the students and community and developing a school or district-wide set of goals that are focused on meeting the unique needs of the students who are an integral part of the surrounding community.

In order to meet these goals, schools must be staffed with better teachers. The process of becoming a better teacher takes time and a commitment to pursue advanced training. This study shows that teachers who have experience and advanced degrees significantly impact student achievement. School leaders should use this information to reallocate their resources to invest time and money on developing better teachers inside every school. Creating a professional development program that encourages teachers to pursue advanced degrees and is designed to provide teachers with skills that will allow them to better meet the unique needs of the students and community is definitely challenging, but also necessary to help improve student achievement.

According to the results of this study, reducing student-teacher ratios will also help increase student achievement levels in mathematics. This information should be important to school leaders since mathematics is often the core subject area that needs the most improvement in a district. The topics covered in mathematics classes tend to be more difficult to integrate into other subject areas either due to curriculum issues, the hesitancy of a non-mathematics teacher to integrate mathematics related topics into his or her class, or various other reasons. The fact remains that mathematics is often seen as a difficult subject for many students and school leaders should take this information into consideration to ensure that their students are getting effective mathematics training from good teachers in classes that are small enough to provide plenty of individual attention.

Finally, the results of this study show that enacting the 65 Percent Solution will not guarantee high levels of student achievement. This proposal is input-based at the district level, and it attempts to improve achievement in ways that this study shows are not effective. School leaders, policy makers, and especially state leaders should examine the results provided in this study before enacting any new legislation. Before jumping to conclusions or joining the latest fad in education finance, they would be wise to demand more research be conducted so that they do not end up adopting a program that is counterproductive to their goal of increased student achievement.

Recommendations for Further Research

Although this study has provided valuable information on the relationship between educational resources and student achievement, much more research is needed in this area to help develop a more complete picture on the variables that have the greatest impact on student achievement. The significance of PEER groups in the state of Missouri was shown in this study, but more information is needed to determine why these groups were strongly related to achievement. Obviously, characteristics such as district location and percent of students on free and reduced lunch are impossible to manipulate or change, but it would be worthwhile to determine whether any of the variables that make up PEER groups can be modified or if they are out of district control.

Next, it would be interesting to see how the "non-financial" resource variables would impact student achievement if they could be measured from the building level as opposed to the district level. Some states are beginning to report school level data and if this study could be slightly modified to analyze data from the school level, it might provide a deeper insight into how truly close these variables are related to student achievement. Also, school leaders would probably find it helpful to learn more about what types of professional development and advanced degree programs are most effective in helping create better teachers. Is a teacher's Master's degree in education equivalent to one in a subject area in terms of increased student performance? Do any advanced degree programs or schools separate themselves from others in terms of enhancing teacher skills? Does an advanced degree in administration or leadership help a teacher to improve student achievement? Do district sponsored professional development and in-service programs have the same effect as Masters degree programs? These are just a few questions that might be explored to help develop a more clear understanding on the importance of advanced teacher training and professional development. If districts are going to spend large amounts of money in this area, they will definitely want to know that they are getting the best return on their investment.

Another area for future research is on the significance of student-teacher ratios for mathematics classes. Although many teachers and school leaders will agree with the finding of this study, more information is still needed on the ideal student-teacher ratio. Is this ratio the same for all grade levels? Is a low student-teacher ratio needed in high school honors courses? Can student-teacher ratios be too small? Are student-teacher ratios significant in other subjects? The answers to these questions would provide more valuable information that would help school leaders adjust their staffing patterns and ensure that the goals of their school and district are aligned with the best research available.

Further research is also needed to either challenge or confirm the 65 Percent Solution. Although it is gaining popularity with policy makers across the country, much more research needs to be conducted to either confirm or deny its viability. This study helps to confirm the results of the Standard and Poor's study (2005) that the solution to improving student achievement does not necessarily include adopting the 65 Percent Solution at all costs. However, more research is needed to ensure that policy makers have the most complete results possible in order to make the most informed decisions for their constituents.

Finally, there is a limit to the amount of information that can be provided on the education finance debate through purely quantitative research. At some point, extensive qualitative research needs to be conducted on topics such as the effectiveness of a well regarded district instructional philosophy or professional development programs that are considered to be the best at developing better teachers and impacting student achievement. What characteristics separate high achieving districts from low achieving districts? Do high achieving districts have similar approaches to professional development? What factors do school leaders from small, medium, and large districts believe make them high achieving schools? Why are certain 90-90-90 schools (90%

minority, 90 % free and reduced lunch, 90 % meeting state standards) able to succeed in spite of their obvious challenges? In addition to these questions, many other qualitative questions need to be asked in order to help gain a deeper understanding of how high achieving schools have managed to increase student achievement. The debate on how to improve our nation's schools is one truly worthy of extensive research by many great educational minds. The future success of our students, schools, and nation depends on it.

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Appendix A

Table 1

Sample District Expenditure Profile

DISTRICT RECEIPTS AND EXPENDITURES

	ACTUAL					
	%CHG	2003	%CHG	2004	%CHG	2005
RECEIPTS						
LOCAL	3	$57,817,744	0	$58,081,827	2	$59,241,878
COUNTY	6-	$1,241,844	2-	$1,219,076	11	$1,349,879
PROPOSITION C	1-	$8,732,271	5	$9,180,235	4	$9,502,859
STATE	8	$39,754,364	3	$41,073,136	5	$43,273,204
FEDERAL	18	$7,929,306	3	$8,205,311	6	$8,728,592
NON-REVENUE	100	$12,280,657	100-	$50,124	0	$10,141,762
TOTAL RECEIPTS	17	$127,756,187	8-	$117,809,711	12	$132,238,177
EXPENDITURES						
REG INSTR	3	$52,576,243	2-	$51,632,814	3-	$50,187,992
SPEC INSTR	13	$2,775,575	3	$2,870,773	2-	$2,810,408
COMP ED	7	$1,860,032	4	$1,932,206	91	$3,699,258
VOC INSTR	10-	$1,177,787	5	$1,233,243	7	$1,313,857
STUDENT ACT	4-	$1,302,452	2-	$1,278,997	7	$1,372,145
PAY OTHER DIST	144	$2,102,341	39-	$1,290,918	4-	$1,238,707
SUPPORT SERVIC	11-	$11,288,680	3-	$10,911,064	13-	$9,536,596
GEN ADMIN	1	$3,583,256	6	$3,811,443	14-	$3,268,069
BUILDING ADMIN	3	$7,916,972	2-	$7,754,570	0	$7,758,629
OPER OF PLANT	3-	$15,565,609	7-	$14,478,939	1	$14,633,341
PUPIL TRAN	5	$2,183,193	8	$2,350,663	2	$2,397,249
FOOD SERV	15	$3,873,988	1-	$3,837,142	3	$3,964,387
FACIL ACQ	178	$3,354,863	225	$10,891,801	41-	$6,403,496
DEBT SERV	4	$3,252,550	11	$3,626,203	110	$7,621,762
COMM/ADULT ED	5	$4,579,203	1	$4,643,511	19-	$3,742,134
TOT EXPENDITURE	4	$117,392,744	4	$122,544,287	2-	$119,948,030
CURRENT EXPEND	4	$99,464,840	2-	$97,137,140	1-	$96,289,011

Source: Missouri Department of Elementary and Secondary Education (DESE)

Table 2

10th Grade Mathematics 2002

Correlations

		MAP_INDEX 10 - MA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 10 - MA	Pearson Correlation	1	-.055	-.020	-.083
	Sig. (2-tailed)	.	.245	.677	.081
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	-.055	1	.303**	.487**
	Sig. (2-tailed)	.245	.	.000	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	-.020	.303**	1	.425**
	Sig. (2-tailed)	.677	.000	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	-.083	.487**	.425**	1
	Sig. (2-tailed)	.081	.000	.000	.
	N	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3

10^{th} Grade Mathematics 2003

Correlations

		MAP_INDEX 10 - MA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 10 - MA	Pearson Correlation	1	.003	-.051	.027
	Sig. (2-tailed)	.	.943	.282	.569
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	.003	1	.209**	.447**
	Sig. (2-tailed)	.943	.	.000	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	-.051	.209**	1	.380**
	Sig. (2-tailed)	.282	.000	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	.027	.447**	.380**	1
	Sig. (2-tailed)	.569	.000	.000	.
	N	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4

10^{th} Grade Mathematics 2004

Correlations

		MAP_INDEX 10 - MA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 10 - MA	Pearson Correlation	1	-.024	-.016	.081
	Sig. (2-tailed)	.	.611	.729	.086
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	-.024	1	.103*	.455**
	Sig. (2-tailed)	.611	.	.029	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	-.016	.103*	1	.229**
	Sig. (2-tailed)	.729	.029	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	.081	.455**	.229**	1
	Sig. (2-tailed)	.086	.000	.000	.
	N	447	447	447	447

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5

11th Grade Communication Arts 2002

Correlations

		MAP_INDEX 11 - CA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 11 - CA	Pearson Correlation	1	.029	-.025	-.014
	Sig. (2-tailed)	.	.548	.602	.761
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	.029	1	.303**	.487**
	Sig. (2-tailed)	.548	.	.000	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	-.025	.303**	1	.425**
	Sig. (2-tailed)	.602	.000	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	-.014	.487**	.425**	1
	Sig. (2-tailed)	.761	.000	.000	.
	N	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6

11th Grade Communication Arts 2003

Correlations

		MAP_INDEX 11 - CA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 11 - CA	Pearson Correlation	1	.012	.021	.008
	Sig. (2-tailed)	.	.795	.662	.870
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	.012	1	.209**	.447**
	Sig. (2-tailed)	.795	.	.000	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	.021	.209**	1	.380**
	Sig. (2-tailed)	.662	.000	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	.008	.447**	.380**	1
	Sig. (2-tailed)	.870	.000	.000	.
	N	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7

11th Grade Communication Arts 2004

Correlations

		MAP_INDEX 11 - CA	% Instruction Expenditures	% Support Services Expenditures	% Non-Instruction Expenditures
MAP_INDEX 11 - CA	Pearson Correlation	1	-.020	-.021	.006
	Sig. (2-tailed)	.	.673	.654	.893
	N	447	447	447	447
% Instruction Expenditures	Pearson Correlation	-.020	1	.103*	.455**
	Sig. (2-tailed)	.673	.	.029	.000
	N	447	447	447	447
% Support Services Expenditures	Pearson Correlation	-.021	.103*	1	.229**
	Sig. (2-tailed)	.654	.029	.	.000
	N	447	447	447	447
% Non-Instruction Expenditures	Pearson Correlation	.006	.455**	.229**	1
	Sig. (2-tailed)	.893	.000	.000	.
	N	447	447	447	447

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8

10^{th} Grade Mathematics 2002

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	691.164	3	230.388	1.116	.342[a]
	Residual	91456.294	443	206.448		
	Total	92147.459	446			
2	Regression	657.339	2	328.669	1.595	.204[b]
	Residual	91490.120	444	206.059		
	Total	92147.459	446			
3	Regression	630.770	1	630.770	3.067	.081[c]
	Residual	91516.689	445	205.655		
	Total	92147.459	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Non-Instruction Expenditures

d. Dependent Variable: MAP_INDEX 10 - MA

Table 9

10th Grade Mathematics 2003

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	434.974	3	144.991	.766	.513[a]
	Residual	83841.368	443	189.258		
	Total	84276.342	446			
2	Regression	431.289	2	215.644	1.142	.320[b]
	Residual	83845.053	444	188.840		
	Total	84276.342	446			
3	Regression	219.132	1	219.132	1.160	.282[c]
	Residual	84057.210	445	188.893		
	Total	84276.342	446			
4	Regression	.000	0	.000	.	.[d]
	Residual	84276.342	446	188.960		
	Total	84276.342	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

e. Dependent Variable: MAP_INDEX 10 - MA

Table 10

10^{th} Grade Mathematics 2004

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1254.851	3	418.284	1.883	.132[a]
	Residual	98406.783	443	222.137		
	Total	99661.634	446			
2	Regression	1125.017	2	562.509	2.535	.080[b]
	Residual	98536.617	444	221.929		
	Total	99661.634	446			
3	Regression	657.108	1	657.108	2.954	.086[c]
	Residual	99004.526	445	222.482		
	Total	99661.634	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Non-Instruction Expenditures

d. Dependent Variable: MAP_INDEX 10 - MA

Table 11

11^{th} Grade Communication Arts 2002

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	222.259	3	74.086	.373	.772[a]
	Residual	87885.334	443	198.387		
	Total	88107.593	446			
2	Regression	179.647	2	89.824	.454	.636[b]
	Residual	87927.945	444	198.036		
	Total	88107.593	446			
3	Regression	71.665	1	71.665	.362	.548[c]
	Residual	88035.928	445	197.834		
	Total	88107.593	446			
4	Regression	.000	0	.000	.	.[d]
	Residual	88107.593	446	197.551		
	Total	88107.593	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Instruction Expenditures

d. Predictor: (constant)

e. Dependent Variable: MAP_INDEX 11 - CA

Table 12

11th Grade Communication Arts 2003

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.335	3	14.445	.075	.973[a]
	Residual	84861.944	443	191.562		
	Total	84905.279	446			
2	Regression	42.127	2	21.063	.110	.896[b]
	Residual	84863.153	444	191.133		
	Total	84905.279	446			
3	Regression	36.409	1	36.409	.191	.662[c]
	Residual	84868.870	445	190.717		
	Total	84905.279	446			
4	Regression	.000	0	.000	.	.[d]
	Residual	84905.279	446	190.371		
	Total	84905.279	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

e. Dependent Variable: MAP_INDEX 11 - CA

Table 13

11th Grade Communication Arts 2004

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96.818	3	32.273	.185	.907[a]
	Residual	77339.637	443	174.582		
	Total	77436.455	446			
2	Regression	59.936	2	29.968	.172	.842[b]
	Residual	77376.519	444	174.271		
	Total	77436.455	446			
3	Regression	35.079	1	35.079	.202	.654[c]
	Residual	77401.376	445	173.936		
	Total	77436.455	446			
4	Regression	.000	0	.000	.	.[d]
	Residual	77436.455	446	173.624		
	Total	77436.455	446			

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

e. Dependent Variable: MAP_INDEX 11 - CA

Table 14

10th Grade Mathematics 2002

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.087[a]	.008	.001	14.3683	.008	1.116	3	443	.342
2	.084[b]	.007	.003	14.3547	.000	.164	1	445	.686
3	.083[c]	.007	.005	14.3407	.000	.129	1	446	.720

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Non-Instruction Expenditures

d. Dependent Variable: MAP_INDEX 10 - MA

Table 15

10th Grade Mathematics 2003

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.072[a]	.005	-.002	13.7571	.005	.766	3	443	.513
2	.072[b]	.005	.001	13.7419	.000	.019	1	445	.889
3	.051[c]	.003	.000	13.7438	-.003	1.123	1	446	.290
4	.000[d]	.000	.000	13.7463	-.003	1.160	1	447	.282

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

Table 16

10th Grade Mathematics 2004

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.112[a]	.013	.006	14.9043	.013	1.883	3	443	.132
2	.106[b]	.011	.007	14.8973	-.001	.584	1	445	.445
3	.081[c]	.007	.004	14.9158	-.005	2.108	1	446	.147

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Non-Instruction Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Non-Instruction Expenditures

d. Dependent Variable: MAP_INDEX 10 - MA

Table 17

11th Grade Communication Arts 2002

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.050[a]	.003	-.004	14.0850	.003	.373	3	443	.772
2	.045[b]	.002	-.002	14.0725	.000	.215	1	445	.643
3	.029[c]	.001	-.001	14.0653	-.001	.545	1	446	.461
4	.000[d]	.000	.000	14.0553	-.001	.362	1	447	.548

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Instruction Expenditures

d. Predictor: (constant)

Table 18

11th Grade Communication Arts 2003

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.023[a]	.001	-.006	13.8406	.001	.075	3	443	.973
2	.022[b]	.000	-.004	13.8251	.000	.006	1	445	.937
3	.021[c]	.000	-.002	13.8100	.000	.030	1	446	.863
4	.000[d]	.000	.000	13.7975	.000	.191	1	447	.662

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

Table 19

11^{th} Grade Communication Arts 2004

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.035[a]	.001	-.006	13.2129	.001	.185	3	443	.907
2	.028[b]	.001	-.004	13.2012	.000	.211	1	445	.646
3	.021[c]	.000	-.002	13.1885	.000	.143	1	446	.706
4	.000[d]	.000	.000	13.1767	.000	.202	1	447	.654

a. Predictors: (Constant), % Non-Instruction Expenditures, % Support Services Expenditures, % Instruction Expenditures

b. Predictors: (Constant), % Support Services Expenditures, % Instruction Expenditures

c. Predictors: (Constant), % Support Services Expenditures

d. Predictor: (constant)

Table 20

Descriptives

			Statistic	Std. Error
PEER Group	Mean		7.772	.1715
	95% Confidence Interval for Mean	Lower Bound	7.435	
		Upper Bound	8.109	
	Median		9.100	
	Variance		13.149	
	Std. Deviation		3.6261	
	Minimum		1.1	
	Maximum		14.2	
	Interquartile Range		4.900	
	Skewness		-.228	.115
	Kurtosis		-.927	.230
TEACHER_AVERAGE_YEARS_EXP	Mean		12.368	.0989
	95% Confidence Interval for Mean	Lower Bound	12.174	
		Upper Bound	12.562	
	Median		12.600	
	Variance		4.372	
	Std. Deviation		2.0909	
	Minimum		5.5	
	Maximum		17.7	
	Interquartile Range		2.900	
	Skewness		-.361	.115
	Kurtosis		-.070	.230
TEACHER_MAST_DEGREE_PERCENT	Mean		36.405	.6292
	95% Confidence Interval for Mean	Lower Bound	35.168	
		Upper Bound	37.642	
	Median		35.700	
	Variance		176.985	
	Std. Deviation		13.3036	
	Minimum		1.6	
	Maximum		84.9	
	Interquartile Range		16.700	
	Skewness		.454	.115
	Kurtosis		.393	.230
STUDENTS_PER_ADMIN_RATIO	Mean		169.77	2.786
	95% Confidence Interval for Mean	Lower Bound	164.29	
		Upper Bound	175.24	
	Median		170.00	
	Variance		3469.080	
	Std. Deviation		58.899	
	Minimum		49	
	Maximum		334	
	Interquartile Range		91.00	
	Skewness		.166	.115
	Kurtosis		-.566	.230
STUDENTS_PER_CLASSRM_TCH_RATIO	Mean		16.35	.144
	95% Confidence Interval for Mean	Lower Bound	16.06	
		Upper Bound	16.63	
	Median		17.00	
	Variance		9.218	
	Std. Deviation		3.036	
	Minimum		7	
	Maximum		25	
	Interquartile Range		3.00	
	Skewness		-.562	.115
	Kurtosis		.175	.230
STUDENTS_PER_TEACHER_RATIO	Mean		12.47	.108
	95% Confidence Interval for Mean	Lower Bound	12.25	
		Upper Bound	12.68	
	Median		13.00	
	Variance		5.249	
	Std. Deviation		2.291	
	Minimum		6	
	Maximum		19	
	Interquartile Range		3.00	
	Skewness		-.374	.115
	Kurtosis		.127	.230
INTCHSAL	Mean		.0000	.00000
	95% Confidence Interval for Mean	Lower Bound	.0000	
		Upper Bound	.0000	
	Median		.0000	
	Variance		.000	
	Std. Deviation		.00000	
	Minimum		.00	
	Maximum		.00	
	Interquartile Range		.0000	
	Skewness		-.041	.115
	Kurtosis		.205	.230
LOGPPE	Mean		3.6627	.03307
	95% Confidence Interval for Mean	Lower Bound	3.5977	
		Upper Bound	3.7276	
	Median		3.6646	
	Variance		.489	
	Std. Deviation		.69913	
	Minimum		1.42	
	Maximum		5.79	
	Interquartile Range		.8601	
	Skewness		.016	.115
	Kurtosis		.320	.230

Table 21

Descriptives

			Statistic	Std. Error
PEER Group	Mean		7.772	.1715
	95% Confidence Interval for Mean	Lower Bound	7.435	
		Upper Bound	8.109	
	Median		9.100	
	Std. Deviation		3.6261	
	Minimum		1.1	
	Maximum		14.2	
	Skewness		-.228	.115
	Kurtosis		-.927	.230
TEACHER_AVERAGE_YEARS_EXP	Mean		12.368	.0989
	95% Confidence Interval for Mean	Lower Bound	12.174	
		Upper Bound	12.562	
	Median		12.600	
	Std. Deviation		2.0909	
	Minimum		5.5	
	Maximum		17.7	
	Skewness		-.361	.115
	Kurtosis		-.070	.230
TEACHER_MAST_DEGREE_PERCENT	Mean		36.405	.6292
	95% Confidence Interval for Mean	Lower Bound	35.168	
		Upper Bound	37.642	
	Median		35.700	
	Std. Deviation		13.3036	
	Minimum		1.6	
	Maximum		84.9	
	Skewness		.454	.115
	Kurtosis		.393	.230
STUDENTS_PER_ADMIN_RATIO	Mean		169.77	2.786
	95% Confidence Interval for Mean	Lower Bound	164.29	
		Upper Bound	175.24	
	Median		170.00	
	Std. Deviation		58.899	
	Minimum		49	
	Maximum		334	
	Skewness		.166	.115
	Kurtosis		-.566	.230
STUDENTS_PER_CLASSRM_TCH_RATIO	Mean		16.35	.144
	95% Confidence Interval for Mean	Lower Bound	16.06	
		Upper Bound	16.63	
	Median		17.00	
	Std. Deviation		3.036	
	Minimum		7	
	Maximum		25	
	Skewness		-.562	.115
	Kurtosis		.175	.230
STUDENTS_PER_TEACHER_RATIO	Mean		12.47	.108
	95% Confidence Interval for Mean	Lower Bound	12.25	
		Upper Bound	12.68	
	Median		13.00	
	Std. Deviation		2.291	
	Minimum		6	
	Maximum		19	
	Skewness		-.374	.115
	Kurtosis		.127	.230
INTCHSAL	Mean		.0000	.00000
	95% Confidence Interval for Mean	Lower Bound	.0000	
		Upper Bound	.0000	
	Median		.0000	
	Std. Deviation		.00000	
	Minimum		.00	
	Maximum		.00	
	Skewness		-.041	.115
	Kurtosis		.205	.230
LOGPPE	Mean		3.6627	.03307
	95% Confidence Interval for Mean	Lower Bound	3.5977	
		Upper Bound	3.7276	
	Median		3.6646	
	Std. Deviation		.69913	
	Minimum		1.42	
	Maximum		5.79	
	Skewness		.016	.115
	Kurtosis		.320	.230

Table 22

Descriptives

			Statistic	Std. Error
PEER Group	Mean		7.772	.1715
	95% Confidence Interval for Mean	Lower Bound	7.435	
		Upper Bound	8.109	
	Median		9.100	
	Std. Deviation		3.6261	
	Minimum		1.1	
	Maximum		14.2	
	Range		13.1	
	Skewness		-.228	.115
	Kurtosis		-.927	.230
TEACHER_AVERAGE_YEARS_EXP	Mean		12.558	.0981
	95% Confidence Interval for Mean	Lower Bound	12.365	
		Upper Bound	12.750	
	Median		12.600	
	Std. Deviation		2.0736	
	Minimum		5.8	
	Maximum		17.6	
	Range		11.8	
	Skewness		-.297	.115
	Kurtosis		-.043	.230
TEACHER_MAST_DEGREE_PERCENT	Mean		37.984	.6387
	95% Confidence Interval for Mean	Lower Bound	36.729	
		Upper Bound	39.239	
	Median		37.400	
	Std. Deviation		13.5026	
	Minimum		2.3	
	Maximum		82.7	
	Range		80.4	
	Skewness		.377	.115
	Kurtosis		.038	.230
STUDENTS_PER_CLASSRM_TCH_RATIO	Mean		16.81	.149
	95% Confidence Interval for Mean	Lower Bound	16.51	
		Upper Bound	17.10	
	Median		17.00	
	Std. Deviation		3.150	
	Minimum		7	
	Maximum		25	
	Range		18	
	Skewness		-.621	.115
	Kurtosis		.207	.230
STUDENTS_PER_TEACHER_RATIO	Mean		12.74	.109
	95% Confidence Interval for Mean	Lower Bound	12.53	
		Upper Bound	12.96	
	Median		13.00	
	Std. Deviation		2.299	
	Minimum		5	
	Maximum		19	
	Range		14	
	Skewness		-.392	.115
	Kurtosis		.196	.230
INTCHSAL	Mean		.0000	.00000
	95% Confidence Interval for Mean	Lower Bound	.0000	
		Upper Bound	.0000	
	Median		.0000	
	Std. Deviation		.00000	
	Minimum		.00	
	Maximum		.00	
	Range		.00	
	Skewness		-.125	.115
	Kurtosis		.182	.230
LOGPPE	Mean		3.7857	.03607
	95% Confidence Interval for Mean	Lower Bound	3.7148	
		Upper Bound	3.8566	
	Median		3.7463	
	Std. Deviation		.76261	
	Minimum		1.48	
	Maximum		6.08	
	Range		4.60	
	Skewness		.098	.115
	Kurtosis		.426	.230
LOGSTADM	Mean		2.2083	.00830
	95% Confidence Interval for Mean	Lower Bound	2.1920	
		Upper Bound	2.2246	
	Median		2.2405	
	Std. Deviation		.17547	
	Minimum		1.63	
	Maximum		3.23	
	Range		1.60	
	Skewness		-.173	.115
	Kurtosis		2.258	.230

Table 23

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TEACHER_SALARY_AVG	.081	447	.000	.947	447	.000
SQTCHSAL	.115	447	.000	.886	447	.000
LGTCHSAL	.050	447	.009	.984	447	.000
INTCHSAL	.032	447	.200*	.997	447	.574

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 24

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Per Pupil Expenditures	.341	447	.000	.389	447	.000
LOGPPE	.023	447	.200*	.995	447	.137
SQPPE	.441	447	.000	.126	447	.000
INVPPE	.303	447	.000	.531	447	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 25

Descriptives

			Statistic	Std. Error
LOGSTADM	Mean		2.2062	.00799
	95% Confidence Interval for Mean	Lower Bound	2.1905	
		Upper Bound	2.2219	
	5% Trimmed Mean		2.2126	
	Median		2.2330	
	Variance		.029	
	Std. Deviation		.16889	
	Minimum		1.72	
	Maximum		2.73	
	Range		1.00	
	Interquartile Range		.2355	
	Skewness		-.525	.115
	Kurtosis		-.107	.230
INVSTADM	Mean		.0067	.00014
	95% Confidence Interval for Mean	Lower Bound	.0065	
		Upper Bound	.0070	
	5% Trimmed Mean		.0065	
	Median		.0058	
	Variance		.000	
	Std. Deviation		.00295	
	Minimum		.00	
	Maximum		.02	
	Range		.02	
	Interquartile Range		.0033	
	Skewness		1.512	.115
	Kurtosis		2.472	.230
SQSTADM	Mean		33624.19	1162.009
	95% Confidence Interval for Mean	Lower Bound	31340.50	
		Upper Bound	35907.88	
	5% Trimmed Mean		31827.26	
	Median		29241.00	
	Variance		6.0E+08	
	Std. Deviation		24567.63	
	Minimum		2809.00	
	Maximum		281961.0	
	Range		279152.0	
	Interquartile Range		30600.00	
	Skewness		2.840	.115
	Kurtosis		22.616	.230
STUDENTS_PER_ADMIN_RATIO	Mean		172.49	2.946
	95% Confidence Interval for Mean	Lower Bound	166.71	
		Upper Bound	178.28	
	5% Trimmed Mean		171.08	
	Median		171.00	
	Variance		3878.546	
	Std. Deviation		62.278	
	Minimum		53	
	Maximum		531	
	Range		478	
	Interquartile Range		90.00	
	Skewness		.542	.115
	Kurtosis		1.492	.230

Table 26

10^{th} Grade Mathematics 2002

Correlations

		MAP_INDEX 10 - MA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	LOGPPE	LOGSTADM	INTCHSAL
MAP_INDEX 10 - MA	Pearson Correlation	1	-.334**	.108*	.162**	-.076	-.058	.037	-.061	-.028
	Sig. (2-tailed)	.	.000	.023	.001	.110	.218	.440	.196	.549
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlation	-.334**	1	-.055	-.338**	-.300**	-.359**	.267**	-.324**	.327**
	Sig. (2-tailed)	.000	.	.245	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAGE_YEARS_EXP	Pearson Correlation	.108*	-.055	1	.415**	.209**	.166**	-.254**	.242**	-.466**
	Sig. (2-tailed)	.023	.245	.	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_DEGREE_PERCENT	Pearson Correlation	.162**	-.338**	.415**	1	.353**	.384**	-.508**	.383**	-.700**
	Sig. (2-tailed)	.001	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CLASSRM_TCH_RATIO	Pearson Correlation	-.076	-.300**	.209**	.353**	1	.900**	-.570**	.811**	-.597**
	Sig. (2-tailed)	.110	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TEACHER_RATIO	Pearson Correlation	-.058	-.359**	.166**	.384**	.900**	1	-.579**	.807**	-.671**
	Sig. (2-tailed)	.218	.000	.000	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlation	.037	.267**	-.254**	-.508**	-.570**	-.579**	1	-.606**	.657**
	Sig. (2-tailed)	.440	.000	.000	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGSTADM	Pearson Correlation	-.061	-.324**	.242**	.383**	.811**	.807**	-.606**	1	-.647**
	Sig. (2-tailed)	.196	.000	.000	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlation	-.028	.327**	-.466**	-.700**	-.597**	-.671**	.657**	-.647**	1
	Sig. (2-tailed)	.549	.000	.000	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 27

10th Grade Mathematics 2003

Correlations

		MAP_INDEX 10 - MA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	LOGPPE	INTCHSAL	STUDENTS_PER_ADMIN_RATIO
MAP_INDEX 10 - MA	Pearson Correlatior	1	-.362**	.121*	.216**	-.021	-.016	.052	-.021	.015
	Sig. (2-tailed)	.	.000	.011	.000	.656	.735	.268	.659	.750
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlatior	-.362**	1	-.050	-.314**	-.290**	-.366**	.112*	.325**	-.331**
	Sig. (2-tailed)	.000	.	.289	.000	.000	.000	.018	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAG _YEARS_EXP	Pearson Correlatior	.121*	-.050	1	.415**	.191**	.147**	.092	-.430**	.183**
	Sig. (2-tailed)	.011	.289	.	.000	.000	.002	.053	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_D GREE_PERCENT	Pearson Correlatior	.216**	-.314**	.415**	1	.309**	.350**	-.181**	-.692**	.391**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CI ASSRM_TCH_RATIC	Pearson Correlatior	-.021	-.290**	.191**	.309**	1	.901**	-.210**	-.597**	.796**
	Sig. (2-tailed)	.656	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TE ACHER_RATIO	Pearson Correlatior	-.016	-.366**	.147**	.350**	.901**	1	-.281**	-.654**	.804**
	Sig. (2-tailed)	.735	.000	.002	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlatior	.052	.112*	.092	-.181**	-.210**	-.281**	1	.298**	-.238**
	Sig. (2-tailed)	.268	.018	.053	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlatior	-.021	.325**	-.430**	-.692**	-.597**	-.654**	.298**	1	-.635**
	Sig. (2-tailed)	.659	.000	.000	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_AI MIN_RATIO	Pearson Correlatior	.015	-.331**	.183**	.391**	.796**	.804**	-.238**	-.635**	1
	Sig. (2-tailed)	.750	.000	.000	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 28

10th Grade Mathematics 2004

Correlations

		MAP_INDEX 10 - MA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	LOGPPE	INTCHSAL	LOGSTADM
MAP_INDEX 10 - MA	Pearson Correlation	1	-.346**	.155**	.246**	.028	.017	-.081	-.088	.046
	Sig. (2-tailed)	.	.000	.001	.000	.555	.717	.087	.062	.332
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlation	-.346**	1	-.042	-.285**	-.269**	-.356**	.242**	.317**	-.331**
	Sig. (2-tailed)	.000	.	.379	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAGE_YEARS_EXP	Pearson Correlation	.155**	-.042	1	.369**	.179**	.121*	-.203**	-.406**	.185**
	Sig. (2-tailed)	.001	.379	.	.000	.000	.011	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_DEGREE_PERCENT	Pearson Correlation	.246**	-.285**	.369**	1	.307**	.352**	-.416**	-.684**	.357**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CLASSRM_TCH_RATIO	Pearson Correlation	.028	-.269**	.179**	.307**	1	.892**	-.475**	-.548**	.778**
	Sig. (2-tailed)	.555	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TEACHER_RATIO	Pearson Correlation	.017	-.356**	.121*	.352**	.892**	1	-.521**	-.627**	.794**
	Sig. (2-tailed)	.717	.000	.011	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlation	-.081	.242**	-.203**	-.416**	-.475**	-.521**	1	.578**	-.482**
	Sig. (2-tailed)	.087	.000	.000	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlation	-.088	.317**	-.406**	-.684**	-.548**	-.627**	.578**	1	-.596**
	Sig. (2-tailed)	.062	.000	.000	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
LOGSTADM	Pearson Correlation	.046	-.331**	.185**	.357**	.778**	.794**	-.482**	-.596**	1
	Sig. (2-tailed)	.332	.000	.000	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 29

11th Grade Communication Arts 2002

Correlations

		MAP_INDEX 11 - CA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_ADMIN_RATIO	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	INTCHSAL	LOGPPE
MAP_INDEX 11 - CA	Pearson Correlation	1	-.315**	.169**	.232**	.108*	.108*	.094*	-.168**	-.118*
	Sig. (2-tailed)	.	.000	.000	.000	.022	.023	.047	.000	.013
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlation	-.315**	1	-.055	-.338**	-.319**	-.300**	-.359**	.327**	.267**
	Sig. (2-tailed)	.000	.	.245	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAGE_YEARS_EXP	Pearson Correlation	.169**	-.055	1	.415**	.216**	.209**	.166**	-.466**	-.254**
	Sig. (2-tailed)	.000	.245	.	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_DEGREE_PERCENT	Pearson Correlation	.232**	-.338**	.415**	1	.380**	.353**	.384**	-.700**	-.508**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_ADMIN_RATIO	Pearson Correlation	.108*	-.319**	.216**	.380**	1	.760**	.757**	-.623**	-.597**
	Sig. (2-tailed)	.022	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CLASSRM_TCH_RATIO	Pearson Correlation	.108*	-.300**	.209**	.353**	.760**	1	.900**	-.597**	-.570**
	Sig. (2-tailed)	.023	.000	.000	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TEACHER_RATIO	Pearson Correlation	.094*	-.359**	.166**	.384**	.757**	.900**	1	-.671**	-.579**
	Sig. (2-tailed)	.047	.000	.000	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlation	-.168**	.327**	-.466**	-.700**	-.623**	-.597**	-.671**	1	.657**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlation	-.118*	.267**	-.254**	-.508**	-.597**	-.570**	-.579**	.657**	1
	Sig. (2-tailed)	.013	.000	.000	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 30

11th Grade Communication Arts 2003

Correlations

		MAP_INDEX 11 - CA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	INTCHSAL	LOGPPE	STUDENTS_PER_ADMIN_RATIO
MAP_INDEX 11 - CA	Pearson Correlation	1	-.272**	.105*	.235**	.047	.071	-.150**	-.019	.089
	Sig. (2-tailed)	.	.000	.027	.000	.323	.135	.002	.683	.059
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlation	-.272**	1	-.050	-.314**	-.290**	-.366**	.325**	.112*	-.331**
	Sig. (2-tailed)	.000	.	.289	.000	.000	.000	.000	.018	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAGE_YEARS_EXP	Pearson Correlation	.105*	-.050	1	.415**	.191**	.147**	-.430**	.092	.183**
	Sig. (2-tailed)	.027	.289	.	.000	.000	.002	.000	.053	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_DEGREE_PERCENT	Pearson Correlation	.235**	-.314**	.415**	1	.309**	.350**	-.692**	-.181**	.391**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CLASSRM_TCH_RATIO	Pearson Correlation	.047	-.290**	.191**	.309**	1	.901**	-.597**	-.210**	.796**
	Sig. (2-tailed)	.323	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TEACHER_RATIO	Pearson Correlation	.071	-.366**	.147**	.350**	.901**	1	-.654**	-.281**	.804**
	Sig. (2-tailed)	.135	.000	.002	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlation	-.150**	.325**	-.430**	-.692**	-.597**	-.654**	1	.298**	-.635**
	Sig. (2-tailed)	.002	.000	.000	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlation	-.019	.112*	.092	-.181**	-.210**	-.281**	.298**	1	-.238**
	Sig. (2-tailed)	.683	.018	.053	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_ADMIN_RATIO	Pearson Correlation	.089	-.331**	.183**	.391**	.796**	.804**	-.635**	-.238**	1
	Sig. (2-tailed)	.059	.000	.000	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 31

11th Grade Communication Arts 2004

Correlations

		MAP_INDEX 11 - CA	PEER Group	TEACHER_AVERAGE_YEARS_EXP	TEACHER_MAST_DEGREE_PERCENT	STUDENTS_PER_CLASSRM_TCH_RATIO	STUDENTS_PER_TEACHER_RATIO	INTCHSAL	LOGPPE	STUDENTS_PER_ADMIN_RATIO
MAP_INDEX 11 - CA	Pearson Correlation	1	-.277**	.154**	.222**	.125**	.136**	-.166**	-.147**	.142**
	Sig. (2-tailed)	.	.000	.001	.000	.008	.004	.000	.002	.003
	N	447	447	447	447	447	447	447	447	447
PEER Group	Pearson Correlation	-.277**	1	-.042	-.285**	-.269**	-.356**	.317**	.242**	-.244**
	Sig. (2-tailed)	.000	.	.379	.000	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
TEACHER_AVERAGE_YEARS_EXP	Pearson Correlation	.154**	-.042	1	.369**	.179**	.121*	-.406**	-.203**	.123**
	Sig. (2-tailed)	.001	.379	.	.000	.000	.011	.000	.000	.009
	N	447	447	447	447	447	447	447	447	447
TEACHER_MAST_DEGREE_PERCENT	Pearson Correlation	.222**	-.285**	.369**	1	.307**	.352**	-.684**	-.416**	.232**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_CLASSRM_TCH_RATIO	Pearson Correlation	.125**	-.269**	.179**	.307**	1	.892**	-.548**	-.475**	.507**
	Sig. (2-tailed)	.008	.000	.000	.000	.	.000	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_TEACHER_RATIO	Pearson Correlation	.136**	-.356**	.121*	.352**	.892**	1	-.627**	-.521**	.528**
	Sig. (2-tailed)	.004	.000	.011	.000	.000	.	.000	.000	.000
	N	447	447	447	447	447	447	447	447	447
INTCHSAL	Pearson Correlation	-.166**	.317**	-.406**	-.684**	-.548**	-.627**	1	.578**	-.399**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000	.000
	N	447	447	447	447	447	447	447	447	447
LOGPPE	Pearson Correlation	-.147**	.242**	-.203**	-.416**	-.475**	-.521**	.578**	1	-.329**
	Sig. (2-tailed)	.002	.000	.000	.000	.000	.000	.000	.	.000
	N	447	447	447	447	447	447	447	447	447
STUDENTS_PER_ADMIN_RATIO	Pearson Correlation	.142**	-.244**	.123**	.232**	.507**	.528**	-.399**	-.329**	1
	Sig. (2-tailed)	.003	.000	.009	.000	.000	.000	.000	.000	.
	N	447	447	447	447	447	447	447	447	447

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 32

10th Grade Mathematics 2002

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10289.376	1	10289.376	55.935	.000[a]
	Residual	81858.083	445	183.951		
	Total	92147.459	446			
2	Regression	13656.367	2	6828.183	38.625	.000[b]
	Residual	78491.092	444	176.782		
	Total	92147.459	446			
3	Regression	15005.998	3	5001.999	28.725	.000[c]
	Residual	77141.460	443	174.134		
	Total	92147.459	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO

c. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP

d. Dependent Variable: MAP_INDEX 10 - MA

Table 33

10^{th} Grade Mathematics 2003

ANOVA[f]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11039.163	1	11039.163	67.076	.000[a]
	Residual	73237.179	445	164.578		
	Total	84276.342	446			
2	Regression	13179.860	2	6589.930	41.154	.000[b]
	Residual	71096.482	444	160.127		
	Total	84276.342	446			
3	Regression	15226.159	3	5075.386	32.562	.000[c]
	Residual	69050.183	443	155.869		
	Total	84276.342	446			
4	Regression	16912.381	4	4228.095	27.742	.000[d]
	Residual	67363.961	442	152.407		
	Total	84276.342	446			
5	Regression	17959.944	5	3591.989	23.887	.000[e]
	Residual	66316.398	441	150.377		
	Total	84276.342	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO

c. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT

d. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT, INTCHSAL

e. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT, INTCHSAL, TEACHER_AVERAGE_YEARS_EXP

f. Dependent Variable: MAP_INDEX 10 - MA

Table 34

10^{th} Grade Mathematics 2004

ANOVA[f]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11899.505	1	11899.505	60.337	.000[a]
	Residual	87762.129	445	197.218		
	Total	99661.634	446			
2	Regression	14254.181	2	7127.090	37.051	.000[b]
	Residual	85407.453	444	192.359		
	Total	99661.634	446			
3	Regression	16887.406	3	5629.135	30.127	.000[c]
	Residual	82774.228	443	186.849		
	Total	99661.634	446			
4	Regression	17718.640	4	4429.660	23.894	.000[d]
	Residual	81942.994	442	185.391		
	Total	99661.634	446			
5	Regression	19109.591	5	3821.918	20.924	.000[e]
	Residual	80552.043	441	182.658		
	Total	99661.634	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO

d. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP

e. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP, INTCHSAL

f. Dependent Variable: MAP_INDEX 10 - MA

Table 35

10th Grade Mathematics 2002

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.334[a]	.112	.110	13.5628	.112	55.935	1	445	.000
2	.385[b]	.148	.144	13.2959	.037	19.046	1	444	.000
3	.404[c]	.163	.157	13.1960	.015	7.751	1	443	.006

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO

c. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP

d. Dependent Variable: MAP_INDEX 10 - MA

Table 36

10^{th} Grade Mathematics 2003

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.362[a]	.131	.129	12.8288	.131	67.076	1	445	.000
2	.395[b]	.156	.153	12.6541	.025	13.369	1	444	.000
3	.425[c]	.181	.175	12.4848	.024	13.128	1	443	.000
4	.448[d]	.201	.193	12.3453	.020	11.064	1	442	.001
5	.462[e]	.213	.204	12.2628	.012	6.966	1	441	.009

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO

c. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT

d. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT, INTCHSAL

e. Predictors: (Constant), PEER Group, STUDENTS_PER_TEACHER_RATIO, TEACHER_MAST_DEGREE_PERCENT, INTCHSAL, TEACHER_AVERAGE_YEARS_EXP

f. Dependent Variable: MAP_INDEX 10 - MA

Table 37

10th Grade Mathematics 2004

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.346[a]	.119	.117	14.0434	.119	60.337	1	445	.000
2	.378[b]	.143	.139	13.8694	.024	12.241	1	444	.001
3	.412[c]	.169	.164	13.6693	.026	14.093	1	443	.000
4	.422[d]	.178	.170	13.6159	.008	4.484	1	442	.035
5	.438[e]	.192	.183	13.5151	.014	7.615	1	441	.006

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO

d. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP

e. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, STUDENTS_PER_TEACHER_RATIO, TEACHER_AVERAGE_YEARS_EXP, INTCHSAL

f. Dependent Variable: MAP_INDEX 10 - MA

Table 38

10th Grade Mathematics 2002

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	174.360	1.519		114.810	.000					
	PEER Group	-1.325	.177	-.334	-7.479	.000	-.334	-.334	-.334	1.000	1.000
2	(Constant)	193.078	4.540		42.528	.000					
	PEER Group	-1.616	.186	-.408	-8.688	.000	-.334	-.381	-.381	.871	1.148
	STUDENTS_PER_TEACHER_RATIO	-1.311	.300	-.205	-4.364	.000	-.058	-.203	-.191	.871	1.148
3	(Constant)	184.379	5.483		33.625	.000					
	PEER Group	-1.619	.185	-.408	-8.767	.000	-.334	-.385	-.381	.871	1.148
	STUDENTS_PER_TEACHER_RATIO	-1.442	.302	-.225	-4.780	.000	-.058	-.221	-.208	.850	1.177
	TEACHER_AVERAGE_YEARS_EXP	.844	.303	.123	2.784	.006	.108	.131	.121	.972	1.028

a. Dependent Variable: MAP_INDEX 10 - MA

Table 39

10th Grade Mathematics 2003

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	178.545	1.436		124.293	.000					
	PEER Group	-1.372	.168	-.362	-8.190	.000	-.362	-.362	-.362	1.000	1.000
2	(Constant)	193.195	4.250		45.459	.000					
	PEER Group	-1.609	.178	-.425	-9.065	.000	-.362	-.395	-.395	.866	1.154
	STUDENTS_PER_TEACHER_RATIO	-1.027	.281	-.171	-3.656	.000	-.016	-.171	-.159	.866	1.154
3	(Constant)	189.163	4.338		43.605	.000					
	PEER Group	-1.471	.179	-.388	-8.202	.000	-.362	-.363	-.353	.827	1.209
	STUDENTS_PER_TEACHER_RATIO	-1.304	.288	-.217	-4.535	.000	-.016	-.211	-.195	.805	1.242
	TEACHER_MAST_DEGREE_PERCENT	.176	.049	.170	3.623	.000	.216	.170	.156	.838	1.194
4	(Constant)	151.590	12.083		12.546	.000					
	PEER Group	-1.456	.177	-.384	-8.213	.000	-.362	-.364	-.349	.826	1.210
	STUDENTS_PER_TEACHER_RATIO	-.601	.354	-.100	-1.696	.091	-.016	-.080	-.072	.519	1.928
	TEACHER_MAST_DEGREE_PERCENT	.312	.063	.302	4.946	.000	.216	.229	.210	.486	2.058
	INTCHSAL	789268.9	237285.0	.247	3.326	.001	-.021	.156	.141	.327	3.059
5	(Constant)	135.611	13.443		10.088	.000					
	PEER Group	-1.501	.177	-.396	-8.481	.000	-.362	-.374	-.358	.819	1.221
	STUDENTS_PER_TEACHER_RATIO	-.469	.355	-.078	-1.318	.188	-.016	-.063	-.056	.508	1.968
	TEACHER_MAST_DEGREE_PERCENT	.284	.063	.275	4.481	.000	.216	.209	.189	.473	2.115
	INTCHSAL	964312.1	244852.3	.302	3.938	.000	-.021	.184	.166	.303	3.301
	TEACHER_AVERAGE_YEARS_EXP	.841	.319	.128	2.639	.009	.121	.125	.111	.759	1.317

a. Dependent Variable: MAP_INDEX 10 - MA

Table 40

10th Grade Mathematics 2004

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	182.193	1.572		115.862	.000					
	PEER Group	-1.424	.183	-.346	-7.768	.000	-.346	-.346	-.346	1.000	1.000
2	(Constant)	173.985	2.813		61.840	.000					
	PEER Group	-1.236	.189	-.300	-6.542	.000	-.346	-.296	-.287	.919	1.088
	TEACHER_MAST_DEGREE_PERCENT	.178	.051	.160	3.499	.001	.246	.164	.154	.919	1.088
3	(Constant)	188.538	4.766		39.557	.000					
	PEER Group	-1.444	.194	-.350	-7.432	.000	-.346	-.333	-.322	.844	1.185
	TEACHER_MAST_DEGREE_PERCENT	.232	.052	.210	4.457	.000	.246	.207	.193	.847	1.180
	STUDENTS_PER_TEACHER_RATIO	-1.178	.314	-.181	-3.754	.000	.017	-.176	-.163	.805	1.242
4	(Constant)	181.532	5.787		31.370	.000					
	PEER Group	-1.473	.194	-.357	-7.593	.000	-.346	-.340	-.327	.840	1.191
	TEACHER_MAST_DEGREE_PERCENT	.190	.056	.172	3.421	.001	.246	.161	.148	.739	1.354
	STUDENTS_PER_TEACHER_RATIO	-1.185	.313	-.182	-3.790	.000	.017	-.177	-.163	.805	1.242
	TEACHER_AVERAGE_YEARS_EXP	.710	.335	.099	2.117	.035	.155	.100	.091	.859	1.164
5	(Constant)	145.882	14.138		10.318	.000					
	PEER Group	-1.494	.193	-.362	-7.750	.000	-.346	-.346	-.332	.839	1.192
	TEACHER_MAST_DEGREE_PERCENT	.293	.067	.265	4.401	.000	.246	.205	.188	.506	1.978
	STUDENTS_PER_TEACHER_RATIO	-.603	.375	-.093	-1.608	.109	.017	-.076	-.069	.551	1.815
	TEACHER_AVERAGE_YEARS_EXP	.983	.347	.136	2.831	.005	.155	.134	.121	.790	1.267
	INTCHSAL	704274.3	255214.3	.205	2.760	.006	-.088	.130	.118	.332	3.011

a. Dependent Variable: MAP_INDEX 10 - MA

Table 41

11th Grade Communication Arts 2002

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.315[a]	.099	.097	13.3552	.099	48.981	1	445	.000
2	.350[b]	.122	.118	13.1982	.023	11.652	1	444	.001

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_AVERAGE_YEARS_EXP

c. Dependent Variable: MAP_INDEX 11 - CA

Table 42

11th Grade Communication Arts 2003

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.272[a]	.074	.072	13.2915	.074	35.607	1	445	.000
2	.315[b]	.099	.095	13.1259	.025	12.295	1	444	.001

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Dependent Variable: MAP_INDEX 11 - CA

Table 43

11th Grade Communication Arts 2004

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.277[a]	.077	.074	12.6765	.077	36.892	1	445	.000
2	.315[b]	.099	.095	12.5359	.022	11.037	1	444	.001
3	.328[c]	.108	.102	12.4885	.009	4.373	1	443	.037

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, TEACHER_AVERAGE_YEARS_EXP

d. Dependent Variable: MAP_INDEX 11 - CA

Table 44

11th Grade Communication Arts 2002

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8736.336	1	8736.336	48.981	.000[a]
	Residual	79371.256	445	178.362		
	Total	88107.593	446			
2	Regression	10766.057	2	5383.028	30.903	.000[b]
	Residual	77341.536	444	174.193		
	Total	88107.593	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_AVERAGE_YEARS_EXP

c. Dependent Variable: MAP_INDEX 11 - CA

Table 45

11th Grade Communication Arts 2003

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6290.358	1	6290.358	35.607	.000[a]
	Residual	78614.922	445	176.663		
	Total	84905.279	446			
2	Regression	8408.711	2	4204.356	24.403	.000[b]
	Residual	76496.568	444	172.290		
	Total	84905.279	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Dependent Variable: MAP_INDEX 11 - CA

Table 46

11th Grade Communication Arts 2004

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5928.312	1	5928.312	36.892	.000[a]
	Residual	71508.143	445	160.692		
	Total	77436.455	446			
2	Regression	7662.815	2	3831.407	24.381	.000[b]
	Residual	69773.640	444	157.148		
	Total	77436.455	446			
3	Regression	8344.892	3	2781.631	17.835	.000[c]
	Residual	69091.563	443	155.963		
	Total	77436.455	446			

a. Predictors: (Constant), PEER Group

b. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT

c. Predictors: (Constant), PEER Group, TEACHER_MAST_DEGREE_PERCENT, TEACHER_AVERAGE_YEARS_EXP

d. Dependent Variable: MAP_INDEX 11 - CA

Table 47

11th Grade Communication Arts 2002

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	194.052	1.495		129.763	.000					
	PEER Group	-1.221	.174	-.315	-6.999	.000	-.315	-.315	-.315	1.000	1.000
2	(Constant)	181.235	4.035		44.916	.000					
	PEER Group	-1.188	.173	-.307	-6.883	.000	-.315	-.311	-.306	.997	1.003
	TEACHER_AVERAGE_YEARS_EXP	1.022	.299	.152	3.414	.001	.169	.160	.152	.997	1.003

a. Dependent Variable: MAP_INDEX 11 - CA

Table 48

11th Grade Communication Arts 2003

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	191.441	1.488		128.632	.000					
	PEER Group	-1.036	.174	-.272	-5.967	.000	-.272	-.272	-.272	1.000	1.000
2	(Constant)	183.615	2.672		68.709	.000					
	PEER Group	-.837	.181	-.220	-4.636	.000	-.272	-.215	-.209	.901	1.109
	TEACHER_MAST_DEGREE_PERCENT	.173	.049	.166	3.506	.001	.235	.164	.158	.901	1.109

a. Dependent Variable: MAP_INDEX 11 - CA

Table 49

11th Grade Communication Arts 2004

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	191.057	1.419		134.602	.000					
	PEER Group	-1.005	.166	-.277	-6.074	.000	-.277	-.277	-.277	1.000	1.000
2	(Constant)	184.013	2.543		72.362	.000					
	PEER Group	-.844	.171	-.232	-4.940	.000	-.277	-.228	-.223	.919	1.088
	TEACHER_MAST_DEGREE_PERCENT	.152	.046	.156	3.322	.001	.222	.156	.150	.919	1.088
3	(Constant)	177.591	3.981		44.610	.000					
	PEER Group	-.869	.171	-.239	-5.095	.000	-.277	-.235	-.229	.914	1.094
	TEACHER_MAST_DEGREE_PERCENT	.114	.049	.117	2.314	.021	.222	.109	.104	.791	1.264
	TEACHER_AVERAGE_YEARS_EXP	.643	.308	.101	2.091	.037	.154	.099	.094	.859	1.164

a. Dependent Variable: MAP_INDEX 11 - CA

Appendix B

Figure 1

10th Grade Mathematics 2002

Scatterplot

Dependent Variable: MAP_INDEX 10 - MA

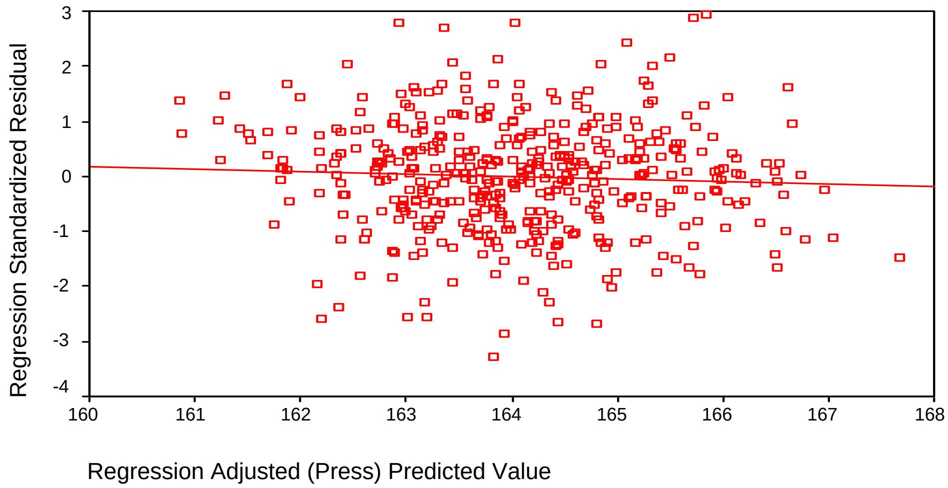


Figure 2

10th Grade Mathematics 2004

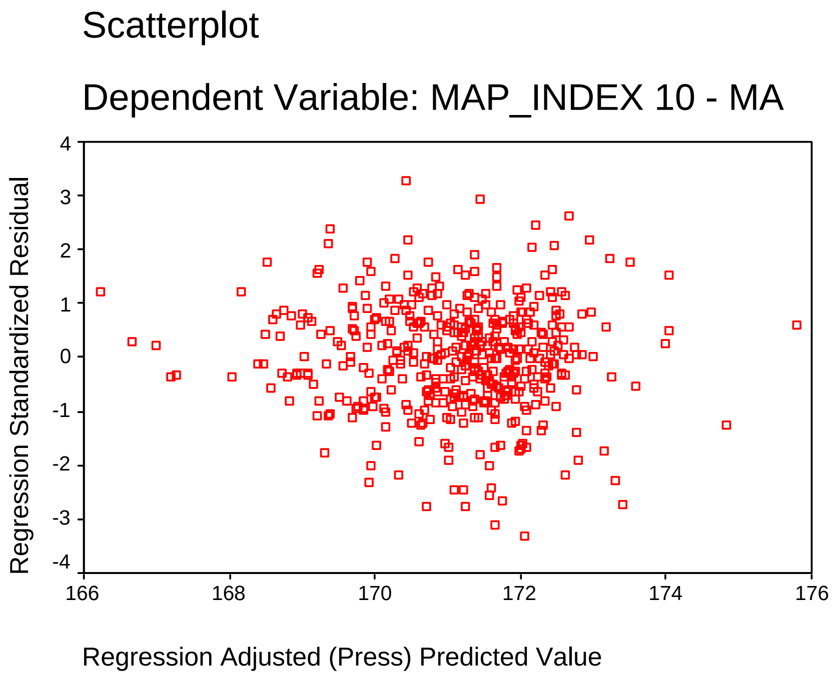


Figure 3

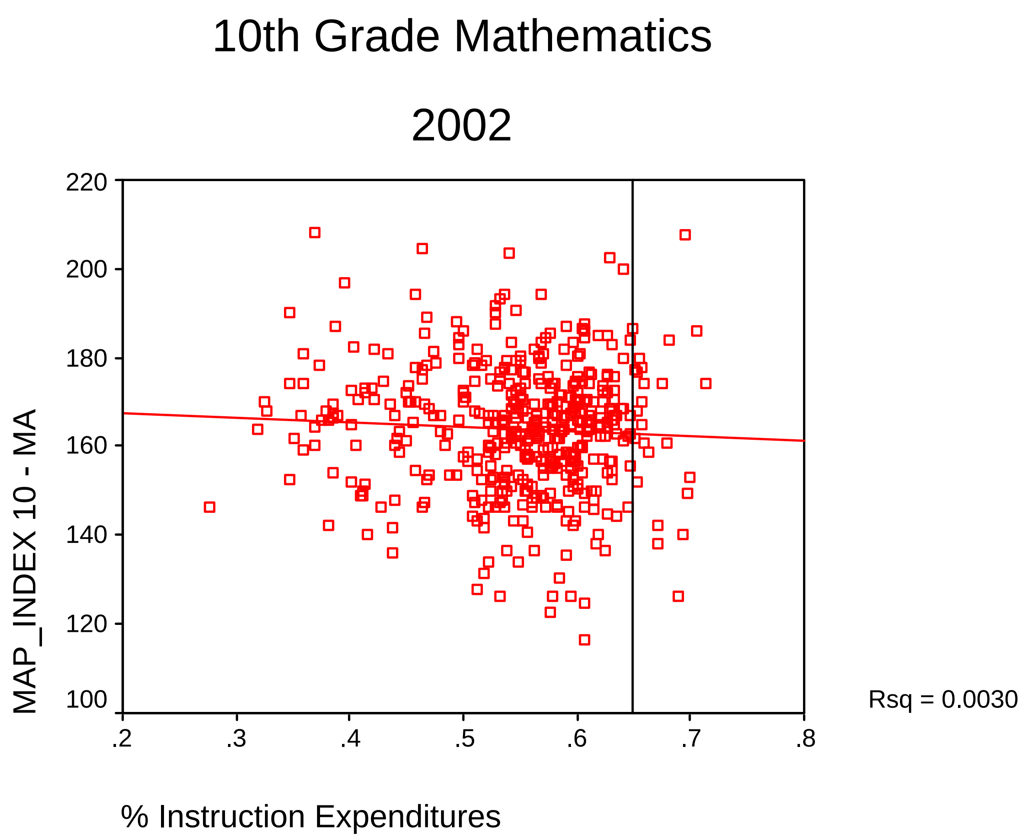

10th Grade Mathematics
2002
MAP_INDEX 10 - MA
220
200
180
160
140
120
100
.2
.3
.4
.5
.6
.7
.8
Rsq = 0.0030
% Instruction Expenditures

Figure 4

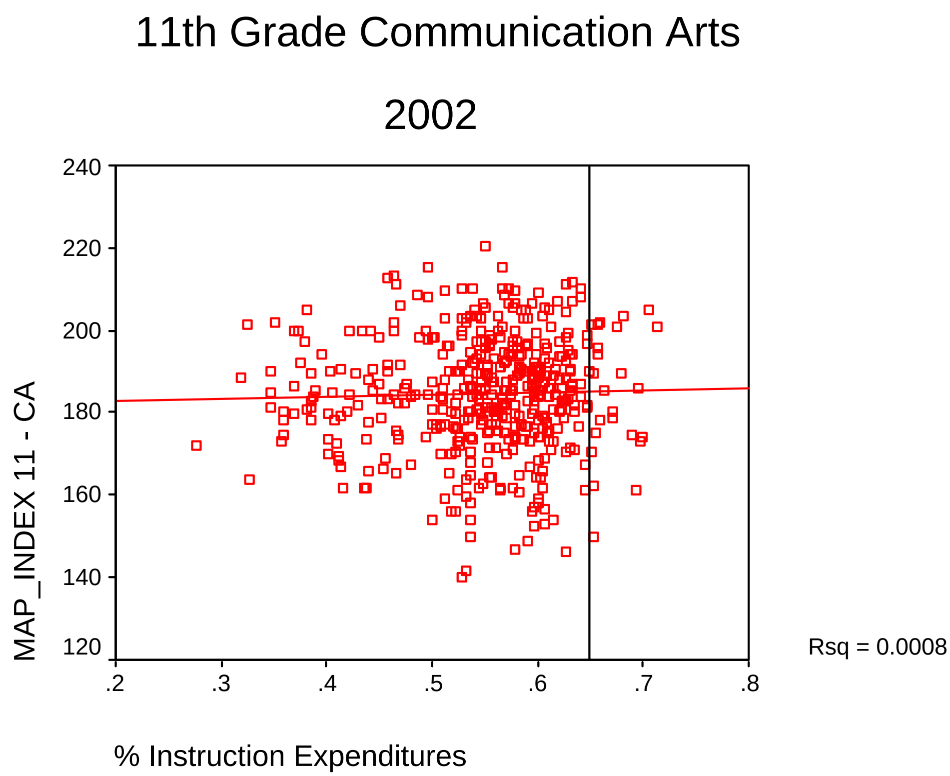

11th Grade Communication Arts
2002
240
220
200
180
160
140
120
MAP_INDEX 11 - CA
.2
.3
.4
.5
.6
.7
.8
% Instruction Expenditures
Rsq = 0.0008

Figure 5

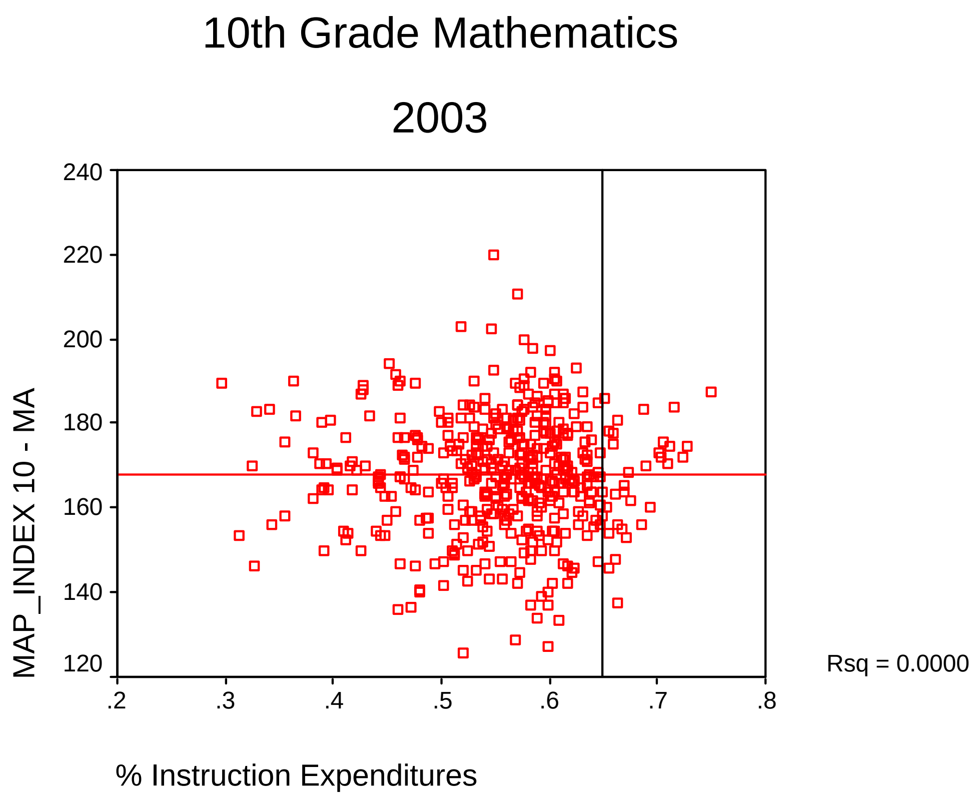

10th Grade Mathematics
2003
240
220
200
180
160
140
120
MAP_INDEX 10 - MA
.2
.3
.4
.5
.6
.7
.8
Rsq = 0.0000
% Instruction Expenditures

Figure 6

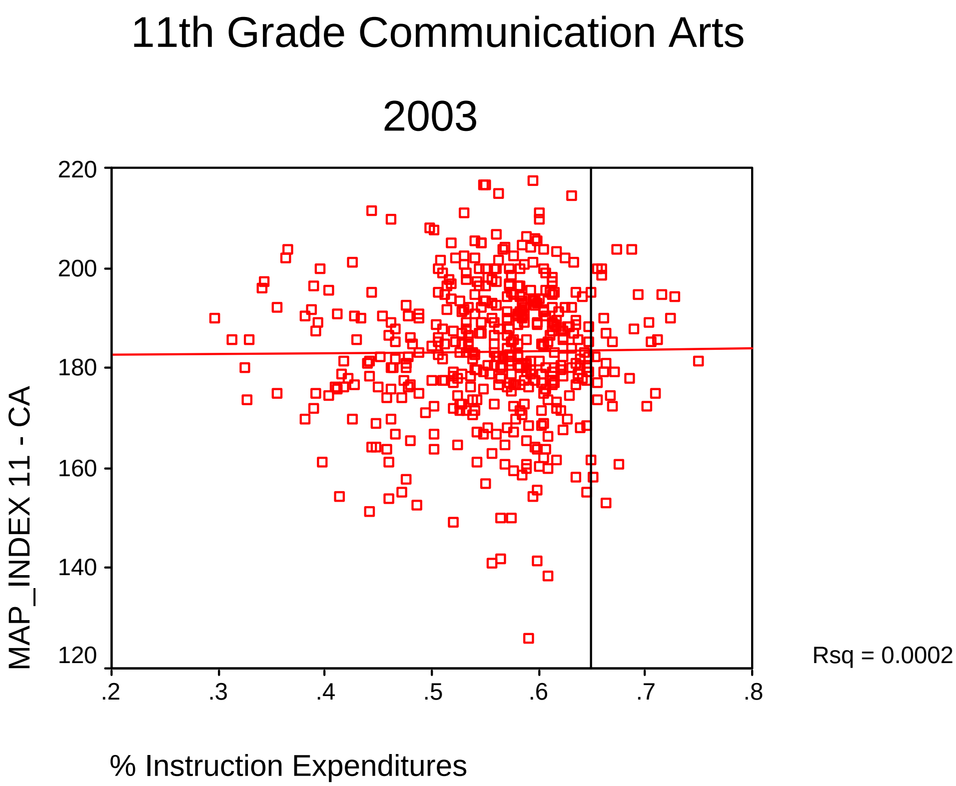

11th Grade Communication Arts
2003
220
200
180
160
140
120
MAP_INDEX 11 - CA
Rsq = 0.0002
.2
.3
.4
.5
.6
.7
.8
% Instruction Expenditures

Figure 7

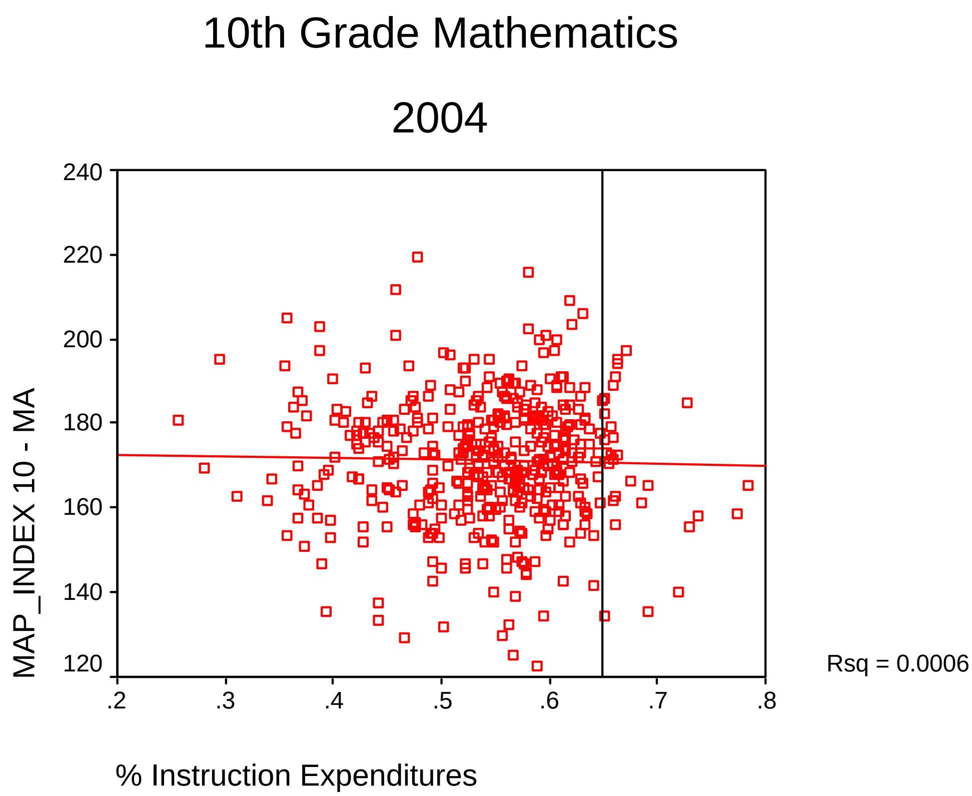
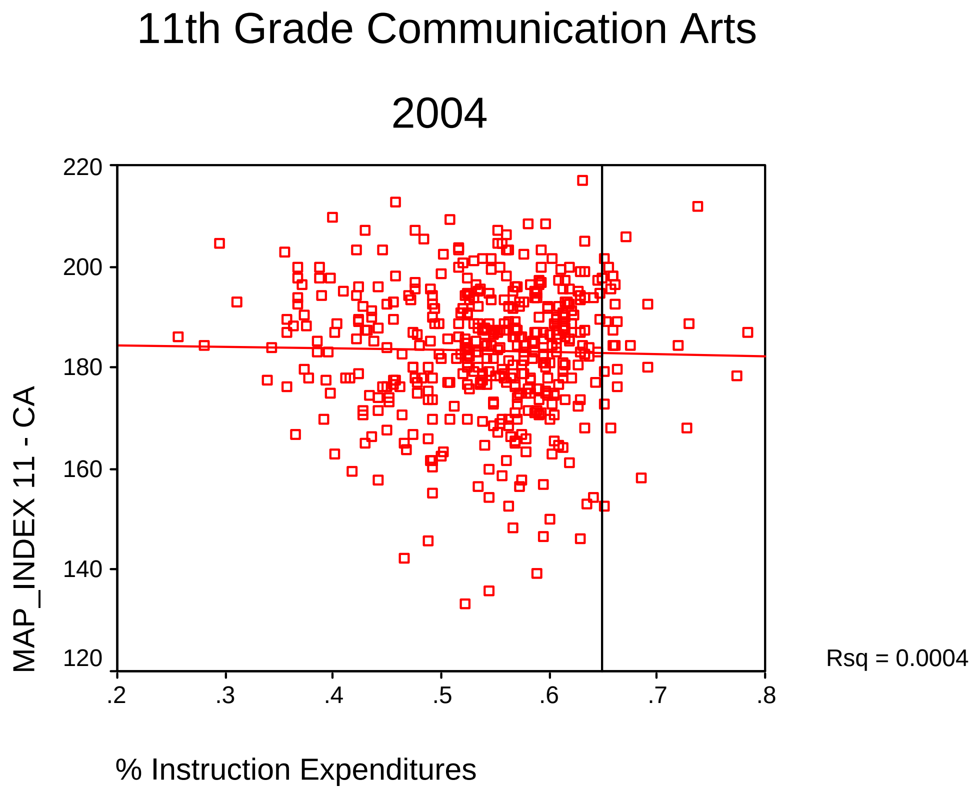

10th Grade Mathematics
2004
240
220
200
180
160
140
120
MAP_INDEX 10 - MA
.2
.3
.4
.5
.6
.7
.8
% Instruction Expenditures
Rsq = 0.0006

Figure 8


11th Grade Communication Arts
2004
220
200
180
160
140
120
MAP_INDEX 11 - CA
.2
.3
.4
.5
.6
.7
.8
Rsq = 0.0004
% Instruction Expenditures