

STUDY OF THE RELATIONSHIP OF THE MISSOURI ASSESSMENT PROGRAM
AND COMMUNICATION ARTS RESULTS TO RESOURCES AND
DEMOGRAPHICS IN MISSOURI SCHOOLS

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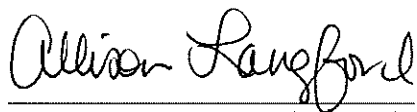
Amy Dill

2016

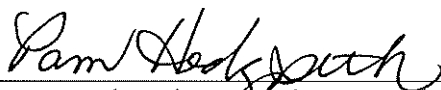
The undersigned, approved by the Department Chair of Graduate studies in Education have examined a dissertation entitled:

STUDY OF THE RELATIONSHIP OF THE MISSOURI
ASSESSMENT PROGRAM AND COMMUNICATION ARTS
RESULTS TO RESOURCES AND DEMOGRAPHICS IN MISSOURI
SCHOOLS

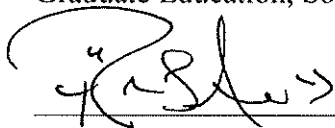
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STUDY OF THE RELATIONSHIP OF THE MISSOURI ASSESSMENT PROGRAM
AND COMMUNICATION ARTS RESULTS TO RESOURCES AND
DEMOGRAPHICS IN MISSOURI SCHOOLS

A Dissertation
Presented to
The Faculty of the Graduate Education Department
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In Partial Fulfillment
Of the Requirements for the Degree

Doctor of Education

By

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ABSTRACT

Due to the increase in accountability measures, educational policy has been focused on concerns over school funding and educational demographics (Piro & Mullen, 2013). Federal legislation such as the passage of No Child Left Behind and Race to the Top has increased pressure for educators and students alike (Elish-Piper, 2013). The implementation of high-stakes testing, published school data systems, and school choice has led to greater accountability for schools and educators. In Missouri, schools are faced with decreased funding and higher accountability.

This study addressed the nature of the relationship between Communication Arts results in Missouri schools and school resources and school demographics to investigate the highest leverage for spending in Missouri schools. The purpose of this study was intended to determine whether a relationship existed between Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and financial expenditures and school demographics. The nature of the relationship of money appropriations were examined by considering two factors which included monies spent on instruction from base pay salaries and resources allocated for professional development. The nature of the relationship between Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and district demographics were examined by considering the following five factors which included per pupil expenditure, expenditures in local effort, hold harmless status, assessed valuation, and school district size. The study attempted to provide research to educators advocating for more resources for school districts and to help identify high leverage strategies in expenditures.

Chapter One

INTRODUCTION

An increased focus on student achievement and educator accountability has been building in the United States educational system. Federal legislation such as the passage of No Child Left Behind and Race to the Top has increased pressure for educators and students alike (Elish-Piper, 2013). The implementation of high-stakes testing, published school data systems and school choice has led to greater accountability for schools and educators. Due to the increase in accountability measures, educational policy has focused on concerns over school funding and educational demographics (Piro, 2013). Questions of adequacy and equity in school resources have been raised to address achievement gaps in schools.

Missouri schools are faced with decreased funding and higher accountability. The funding formula for Missouri schools has not been fully funded since fiscal year (FY) 2010 and currently pays out at only 92% of revenues. (Missouri Department of Elementary and Secondary Education, 2014). The lack of fully funding the formula requires Missouri school educators to determine the best method to meet accountability measures. In an effort to discover the best approach for leveraging funds, this study investigates the nature of the relationship between Communication Arts results in Missouri schools and school expenditures and demographics.

The purpose of this study was to determine whether a relationship existed between Communication Arts scores in grades three through eight on the Missouri

Assessment Program (MAP) from 2012 to 2014 and financial appropriations and school demographics.

The purpose of this study was to determine whether a relationship existed between Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and various financial appropriations and district demographics. The financial factors considered were: teacher base pay and professional development funds. The district demographics included five factors which were: per pupil expenditures, local tax effort, hold harmless status, assessed valuation, and school size. The study attempted to provide research to educators advocating for more resources for school districts. The research was published for use by educators and legislators making fiscal decisions affecting student achievement. The study was developed based on a theoretical framework that emerged from the literature.

Theoretical Framework

The theoretical framework of the study was based upon experts in the fields of student achievement and/or school finance. The literature review expounded on the work of Kern Alexander on the subject of school law. The successful school study by Augenblick and Myers was presented. The works of Eric Hanushek, Alfred Lindseth, and Michael Rebell provided perspective on school finance and student achievement. Information based on research from the works of John Hattie and Richard Dufour provided information on improving student achievement.

Problem Statement

Students in Missouri public schools may be disadvantaged in academic achievement in Communication Arts due to a lack of financial resources and varied

demographics. The study was intended to determine the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The financial resources and demographics examined included expenditures spent on instruction from teacher base pay salaries, resources allocated for professional development, per pupil expenditures, school expenditures based on the hold harmless formula, appropriations from assessed valuation, expenditures from local effort, and school size.

Rationale for the Study

Financial resources for any district or state are limited; thus, it is important for school districts to utilize funds in ways that maximize student learning. By examining possible correlations between various types of spending and MAP scores, the results may provide insight on how to best leverage district resources. Good stewardship is crucial in order to reach the Missouri Department of Education's goal of reaching the Top 10 by 20.

Research Questions

This study was intended to determine the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The following research questions were examined in the study:

1. What is the nature of the relationship between Missouri school expenditures and scores of advanced or proficient on Missouri Assessment program in grades three through eight? Two factors were examined to determine the nature of the relationship:

- a. What is the nature of the relationship between expenditure in teacher base pay and scores of advanced or proficient on Missouri Assessment program in grades three through eight from 2012 to 2014?
 - b. What is the nature of the relationship between expenditures in professional development and scores of advanced or proficient on Missouri Assessment program in grades three through eight from 2012 to 2014?
2. What is the nature of the relationship between district demographics and scores of advanced or proficient on MAP in grades three through eight from 2012 to 2014? Five factors were considered when addressing this question:
- a. What is the nature of the relationship of per pupil expenditure in Missouri and scores of advanced or proficient on Missouri Assessment program in grades three through eight from 2012 to 2014?
 - b. What is the nature of the relationship between local effort and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?
 - c. What is the nature of the relationship between schools which operate under the hold harmless formula and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?
 - d. What is the nature of the relationship between assessed valuation and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

- e. What is the nature of the relationship between school size and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

Limitations/Delimitations

Based on the research questions, limitations, delimitations, variables, and terms were also established. Limitations included the administration of the Missouri Assessment Program in grades three through eight in Communication Arts. This study is limited to public school districts in Missouri.

Design Controls

The independent variable for the study was the various resources expended per school and variation in demographics. The independent variables considered were per pupil expenditure, expenditures spent on teacher base pay salaries, resources allocated for professional development, school expenditures based on the hold harmless formula, assessed valuation, local effort, and school size. The dependent variable consisted of MAP data collected from the Missouri Department of Elementary and Secondary Education.

This information was obtained through examination of fiscal budgeting documents through the Missouri Department of Elementary and Secondary Education website and through literature published regarding fiscal spending (Division of Finance and Administrative Services, 2012).

Definition of Terms

The following definitions were specific to this study:

1. *Adequate Yearly Progress*: As required by No Child Left Behind, an indication if the school: receives federal Title I funding; achieved Adequate Yearly Progress (AYP) in the previous year; and if the school has been identified as “in school improvement” or other special status.
2. *Assessed Valuation*: The total assessed property value of the school district minus tax-increment-financed valuation as of December 31 of the previous calendar year.
3. *Average Daily Attendance*: The average daily attendance for the regular school term divided by the January membership; or the total hours of student attendance divided by the sum of the total hours of student attendance and total hours of absence for the regular school term.
4. *Average Current Expenditures per Pupil*: The average current expenditure per pupil, in average daily attendance (ADA), for the district.
5. *Dollar Value Modifier*: Legislators considered the cost of living across the state and the effect of those differences on the cost to educate children.
6. *Hold Harmless School Funding*: Hold harmless allows an entity to not lose money as a result of laws changing. For school districts, this refers to provisions which guarantee school districts receive at least as much state funding as received prior to legislative changes in school funding formulae may have reduced their funding or may phase in reductions over a period of time.
7. *Local Effort Calculation*: The local effort calculation assumes a local tax levy of \$3.43 for the district, then subtracts local taxes, revenues in Funds I and II from Financial Institutions Tax, Fines and Escheats, In Lieu of Tax, Merchants and

Manufacturers Tax, State Assessed Railroads & Utilities, Federal Properties (unless Impact Aid) and one half of Proposition C funds (Davis, 2007).

8. *Missouri School Improvement Program (MSIP)*: Missouri's accountability system for reviewing and accrediting public school districts, outlines the expectations for student achievement with the ultimate goal of each student graduating ready for success in college and careers. MSIP is currently in its fifth cycle.
9. *Proposition C Funds*: Calculated amount (stated in pennies) required to be subtracted from the school purposes (General (Incidental) and Special Revenue (Teachers) Funds) unadjusted tax levy. Subtracting the Proposition C rollback from the unadjusted tax levy results in the adjusted tax levy, districts may seek voter approval to waive all or a portion of the required rollback per Section 164.013, RSMo.
10. *State Adequacy Target*: A base amount of combined state and local funding for each child. The base has been \$6,131 per pupil and was scheduled to increase to \$6,423 for the 2012–13 school year and rise to \$6,716 the following year.
11. *Tax Levy* - Amount levied against the patrons of a school district by a governmental unit for the purpose of financing services performed for the common benefit.
12. *Top 10 by 20*: A major improvement effort aimed at targeting student achievement in Missouri to rank among the top 10 states by 2020.
13. *Weighted Average Daily Attendance*: - Total regular term hours of attendance (including remedial hours) divided by calendar hours in session PLUS the summer school ADA (total number of hours attended in an approved summer

school divided by 1,044 hours) plus weights of students populations: weighted by taking 25 percent multiplied by the free and reduced lunch pupil count exceeds the threshold of regular term ADA plus summer school ADA, plus 75 percent multiplied by the number of Special Education Pupil count exceeds the threshold of regular term ADA plus summer school ADA, plus 60 percent multiplied by the limited English proficiency count exceeds the threshold of regular term ADA plus summer school ADA.

Summary

Missouri schools are faced with partial funding and higher accountability in the Top 10 by 20 initiative. The study was designed to identify the nature of the relationship between Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and various resources and demographics in Missouri public schools. Pearson- r was conducted to determine the nature of the relationships. The relationship of appropriations and student achievement was examined by considering two factors which included monies spent on instruction from teacher base pay salaries and resources allocated for professional development. The nature of the relationship between Communication Arts scores in grades three through eight on the MAP from 2012 to 2014 and district demographics was examined by considering five factors which included per pupil expenditure, local effort, hold harmless status, assessed valuation, and school size.

Chapter Two outlined the context for funding decisions made by educators and legislators. It gave a summary of background in accountability and litigation which has impacted decision making, Missouri funding, and provided information on equity and

adequacy in creating funding formulas. It also supplied information on the importance of literacy and communication arts and the impact of professional development in schools. It offered background information concerning hold harmless funding, school size, local effort, and assessed valuation.

Chapter Three outlined the study to be completed. It provided a synopsis of the research design, validity and reliability of the study, and statistical treatment of the data. In Chapter Four, the researcher presented the results of the study. Through the use of tables and narrative analysis, the researcher discussed the findings. Chapter Five summarized the complete study; present conclusions obtained from the research and consider ideas for future research.

Chapter Two

REVIEW OF RELATED LITERATURE

Introduction

The development of school funding formulas has evolved over the years. A background in school accountability has given educators and legislators' impetus to make difficult choices in regard to school funding. Litigation and case law have supplied motivation for stakeholders to change school funding formulas throughout the years. Each state has developed funding formulas through different means. A thorough examination of Missouri school funding is explained to provide context in the funding formulas. Determining adequacy in spending was the process lawmakers and educators followed to ensure objectivity throughout school funding regardless of size or location.

In order to make difficult choices in school resources, educators need a background in educational funding sources and varying demographics. A background in the Augenblick and Myers study, which determined adequacy in Missouri schools, is described to give context for successful schools' approach to school funding. The importance of literacy and Communication Arts skills is examined. A background of expectations for educators in professional development practices and professional development research is explained. Research regarding hold harmless provisions, assessed valuation practices, local effort, and school district size is explored to present context for decision makers. A background in accountability and financial reform provides information for making financial decisions.

Accountability and School Finance

The evolution of school accountability developed slowly from colonial America to the present. In colonial America, education became a financial responsibility of the citizens with little or no accountability to educators. Slowly, education began to become a political lever and accountability increased. Hargreaves and Shirley, in the book *The Fourth Way* (2009), described the political world of school accountability in five eras: The First Way, Interregnum, The Second Way, The Third Way, and the Fourth Way. The First Way of accountability started with World War II and lasted until the mid-1970s and was influenced by civil rights and social movements (Hargreaves & Shirley, 2009). The era of Interregnum focused on market competition and was fueled by political pressure. The Second Way began when the political pressure increased and performance standards and achievement targets were set. The Third Way focused on transparency of public information and individual accountability for schools and educators. The Fourth Way incorporated strong public engagement and national standards. These eras were categorized as predictors in school accountability and to aid educators in understanding the political lens in which schools operate (Hargreaves & Shirley, 2009). The process of education evolution from a financial responsibility on the citizenry to a political responsibility on educators occurred slowly over time.

Educational accountability in colonial America. In colonial America, little accountability and/or financial responsibility was provided for schools. Schools were managed through the general public town or district meetings (Norton, 1996). The Massachusetts law of 1642 was the first time in the English-speaking world in which the legislative body enacted legislation requiring educators to teach children to read

(Alexander, 1995). In 1647, the Massachusetts legislature enacted the Ye Old Deluder Law (Alexander & Salmon, 1995). This law ordered every town of more than 50 people to appoint and provide wages for a teacher of reading and writing. In addition, the legislation required every town with at least 100 households to provide a grammar school to prepare students for attending a university. The law carried financial penalty to the town's citizenry if ignored. The law was unprecedented, because it set a standard for educational requirements and gave authority to levy taxes for schools (Alexander & Salmon, 1995). Laws, political pressures, and financial penalties continued throughout the nineteenth century.

During the nineteenth century, the most influential advocates of tax-supported public schools were laypeople (Alexander & Salmon, 1995). Horace Mann, Secretary of the State Board of Education in Massachusetts, was particularly effective in convincing the public to support schools through taxation (Alexander & Salmon, 1995). The National Association of School Superintendents called its first meeting in Washington D.C. in 1866 to correspond and to share ideas on educational practices (Norton, 1996). Political pressures continued to mount in the twentieth century to lead to the accountability measures in the twenty-first century. During the political and financial crisis of the 1930's, public opinion of schools became "safeguards of democracy" (Norton, 1996). This led into the political movements of The First Way.

The first way. The First Way was characterized by an increase in academic rigor and political outcry. During World War II, President Roosevelt requested his director of the Office of Scientific Research and Development, Vannevar Bush, to submit recommendations on how to support scientists and research after the war. This

recommendation led to new mathematics and science curricula for public schools (Johanningmeier, 2010). In 1957, the Soviet Union launched Sputnik, and the public began a heated debate about the quality of education in the United States. Educators were given the priority of revising and updating public school curricula (Johanningmeier, 2010). The change in expectations led to increased funding for public schools. The political situation and the market competition of the 1960s led to the era of Interregnum.

Interregnum. The Interregnum stage was characterized by increased federal funding and implementation of curricular standards. Prior to 1965, direct federal funds had never been allocated to public education (Shaik Ali-Williams, 2007). President Lyndon Johnson pushed the *Elementary and Secondary Education Act of 1965* (ESEA) to address illiteracy and poverty in his War on Poverty legislation (Shaik Ali-Williams, 2007). ESEA emphasized equal access to education and established standards in education. This law authorized federally funded education programs (Elementary and Secondary Education Act, 2013). The market competition in the 1980s created governmental researchers to publish the report called *A Nation at Risk* (Hargreaves & Shirley, 2009). *A Nation at Risk* report was published in 1983 by the U.S. Department of Education. The report stated 13% of 17-year-olds were functionally illiterate, SAT scores were dropping, and students needed an increased array of remedial courses in college (U.S. Department of Education, 2008). The Commission recommended the following areas of improvement: curriculum content, standards and expectations of students, time devoted to education, teacher quality, educational leadership, and financial support of education (U.S. Department of Education, 2008). Content standards and grade level expectations began to shape American education through the 1980s and 1990s (U.S.

Department of Education, 2008). The Second Way developed due to legislation emphasizing educational goals and standardized instruction (Hargreaves & Shirley, 2009).

The second way. The political climate began to change for educators beginning in the 1990's. President Bill Clinton pushed legislation for the *Improving America's Schools Act of 1994* which required state academic-content standards and tests. Congress also passed the *Goals 2000: Educate America Act* (1994) which provided federal funds to aid states in writing content standards (U.S. Department of Education, 2008). Increased expectations in curriculum and rigor led to legislation that changed the political climate in education during the twenty-first century. *No Child Left Behind Act of 2001* (NCLB) ushered in The Third Way. NCLB emphasized individual teacher and school accountability (Hargreaves & Shirley, 2009).

The third way. The Third Way was characterized by stringent school accountability and a reliability on standardized testing. In 2001, the *Elementary and Secondary Education Act* (ESEA) was amended and renamed *No Child Left Behind Act of 2001* (NCLB) which ensured "states accepting the federal government's targeted investments agreed to measure and report on results in terms of standards and accountability" (U.S. Department of Education, 2008, p. 5). The law set a standard of 100% of students reaching a proficient level on state testing by 2014. Measures of accountability adopted with the NCLB law included published achievement scores for each school, published Annual Yearly Progress (AYP) reports, and emphasized standardized testing results (No Child Left Behind Act of 2001). According to a report by the National Governors Center for Best Practices, states with rigorous assessments and

ambitious standards were specifically penalized by NCLB (NGA Center for Best Practices, 2011). The report also noted that AYP targets were obscure due to the focus on a single point in time (NGA Center for Best Practices, 2011). The increased reliability on standardized test results led to educators searching alternatives in the current reforms (Hargreaves & Shirley, 2009).

The fourth way: current reform in accountability. The current reforms in accountability are demonstrated in the Fourth Way. Congress created gridlock over the reauthorization of NCLB in 2011 so the Secretary of Education, Arne Duncan, proposed providing flexibility to states (Brenchley, 2013). In September 2011, the Obama Administration offered states an opportunity to pursue waivers to NCLB (Brenchley, 2013). The majority of states and the District of Columbia were approved for ESEA flexibility waivers (Brenchley, 2013). On June 29, 2012, the Department of Elementary and Secondary Education (DESE) received a waiver releasing Missouri schools from the NCLB requirements. The Obama Administration put forth their *Blueprint for Reform of Elementary and Secondary Education Act* (Blueprint for Reform) in 2010 to address the lack of reauthorization of NCLB (Brenchley, 2013). The Blueprint for Reform called for a highly monitored evaluation system of administrators and teachers, Race to the Top competitive grants, and adoption of state-approved common standards. (National School Board Association, 2010). Missouri responded to these federal accountability initiatives through changes in funding measures, Missouri School Improvement Program (MSIP), and The Top 10 by 20 initiative.

Missouri's Response to Educational Reforms. Missouri focused on improving accountability through funding measures to increase student achievement (Davis,

Markum, Mitchell, & Redlich, 2007). On July 1, 2006, a funding formula was implemented using both a resource-oriented model approach and the performance-oriented model approach (Davis, Markum, Mitchell, & Redlich, 2007). The performance-oriented model approach examined the spending habits of schools in states that performed at 100% on Annual Performance Report (APR) (Davis, Markum, Mitchell, & Redlich, 2007). After a target number was identified for required funding, weighted factors such as free and reduced lunch populations, limited English proficiency populations, and special needs students were considered (Davis, Markum, Mitchell, & Redlich, 2007). By using the performance-oriented approach model, funding was coordinated to increased student achievement and accountability measures (Davis, Markum, Mitchell, & Redlich, 2007).

Justification for increasing accountability and implementing the The Top 10 by 20 initiative in 2010 was intended to address economic and employment issues in Missouri (Missouri Department of Elementary and Secondary Education, 2011). The data showed many concerning trends for Missouri citizens. In 2009, unemployment rates were twice as high for Missourians who did not complete high school than those with a diploma or GED. Adults without a high school diploma had a weekly median income of \$356, whereas adults with a bachelor's degree or higher had a median weekly income of \$885 (Missouri Department of Elementary and Secondary Education, 2011). Missouri ranked in the middle of the 50 states in terms of educational performance on standardized national examinations (Missouri Department of Elementary and Secondary Education, 2011).

As a result of implementation of The Top10 by 20 initiative, DESE outlined four goals for improving education in Missouri: (a) all Missouri students will graduate college or career ready; (b) all Missouri children will enter kindergarten prepared to be successful in school; (c) Missouri will prepare, develop, and support effective educators; and (d) the Missouri Department of Education will improve departmental efficiency and operational effectiveness (Missouri Department of Elementary and Secondary Education, 2011). The goal must be achieved for all Missouri schools by the school year 2020 (Missouri Department of Elementary and Secondary Education, 2011). Despite the major financial and accountability reforms implemented, student achievement has continued to be stagnant.

National Perspective on Accountability and High Stakes Testing

According to Hanushek and Lindseth (2009), student achievement has remained flat for more than thirty years (Hanushek & Lindseth, 2009). A quarter to half of 12th grade public high school students scored below basic level in reading, math, and science skills (Hanushek & Lindseth, 2009). Hanushek and Lindseth (2009) reported the United States outspends almost all other developed countries, but U.S. students ranked below average among the world's developed countries. The authors argued that between 1960 and 2005, spending per pupil quadrupled including adjusting for inflation (Hanushek & Lindseth, 2009). Hanushek (1986) suggested inefficiency in school finance, family background, demographic characteristics of the school, and organizational aspects of a school for the lack of student achievement. The question remained whether high stakes testing provided the appropriate accountability measure.

Improving student achievement through high-stakes testing has been inconclusive in the United States. Audrey Amrein and David Berliner (2002) analyzed 18 states which had implemented high-stakes testing and found little effect on student achievement. The authors noted that no compelling evidence from a set of states with high-stakes testing resulted in deeper knowledge or higher skills (Amrein & Berliner, 2002). Jaekyung Lee (2006) completed a meta-analysis of 76 effect size estimates from 14 studies. Lee reported a $d = 0.36$ effect in reading and math, but the effects were observed in elementary schools ($d=0.44$) and middle schools ($d= 0.35$) but not in high school ($d=0.03$). The author noted in the headnote that inconsistencies were discovered in many of the findings (Lee, 2006).

Lee (2006) warned against adopting strong accountability policies until improvements were made in school practices and conditions. Skeptics of the accountability system claimed issues of reliability and validity in data were suspect due to the variations across models and data systems (Graue, 2013). For example, the same teacher can be shown as adding value in one model and not adding value in another model (Graue, 2013). Rand Corporation (2004) noted concerns in using value-added models due to missing or corrupt data, difficulty of assigning effect scores to one person when students have a variety of influences, variability of class size, and inconsistency throughout years (Harris & McCaffrey, 2010). Internationally, high stakes testing has proven to be inconclusive as well.

International Perspective on Accountability and High Stakes Testing

High stakes testing has also been debated in international circles. An international perspective of school accountability systems was given by Rustique-

Forrester in 2005. The author noted concerns in the American accountability system compared to the English school accountability system (Rustique-Forrester, 2005).

Rustique-Forrester (2005) stated the accountability systems in both countries were similar due to political pressures to increase student achievement. England and the United States have initiated increased accountability reliant on student assessments, school ranking data, and school choice. Rustique-Forrester's study (2005) concluded that the increased accountability system has created a system that excludes students. The exclusion of students was influenced by multiple factors including student and social background, school context, and national policies. Accountability increased pressures to exclude students who are low-performing (Rustique-Forrester, 2005). The author suggested school organization context influences how accountability policies are implemented (Rustique-Forrester, 2005). The study also concluded that teacher capacity plays a role in how educators and schools responded to marginalized students (Rustique-Forrester, 2005). The negative effects of accountability systems have caused changes in Wales and Northern Ireland as well (Olson, 2004).

Changes in accountability systems have been made in Wales and Northern Ireland due to negative effects. Olson (2004) reported that Wales and Northern Ireland have discontinued the practice of publishing school accountability reports. Wales placed a heavier emphasis on teacher tests and limited the number of exams given to students (Olson, 2004). High-stakes testing was shown to be unnecessary and harmful to schools in Wales (Olson, 2004). Olson stated that England's reforms based on raising standards and construction of the high-stakes accountability system does not provide an equitable

system for students. The question that educators and legislators have been trying to answer is: how do you create an equitable system?

Equity and Adequacy in the United States

Legislators in the United States have attempted to address fairness of accountability measures through equitable and adequate resources. Standards of horizontal equity, vertical equity, and adequacy in funding formulas have been established. Litigation in both equity and adequacy has been pursued by educators and schools to ensure standards have been implemented.

History of equitable and adequate resources. The evolution of funding legislation and the establishment of equitable and adequate resources evolved slowly. The first federal acknowledgement of education came in the Ordinance of 1787 which implied education is statehood's responsibility. Some states instituted tax-supported schools through state constitutions, legislation, and taxation (Alexander & Salmon, 1995). In 1820, Missouri's first constitution encouraged but did not require public education (Alexander & Salmon, 1995). By 1850, a child's access to a free education depended upon the state of residency. In 1875, the Missouri Constitution provided for free public schools. Article IX Section 5, adopted 1875, required public revenues be dedicated to public elementary and secondary education (Alexander & Salmon, 1995).

School funding has been debated in the Missouri legislature since 1839 and continues today. The first funding milestone in Missouri occurred in 1839 when the first significant legislation was enacted which gave the General Assembly the authority to regulate the distribution of funds (Missouri Department of Elementary and Secondary Education, 2013). In 1931, the legislature established an equalization quota as a basis for

distribution of state aid. The first funding formula for Missouri was established in 1955 and ruled unconstitutional in 1977 (Missouri Department of Elementary and Secondary Education, 2013). A new foundation formula was adopted in 1977 and was used until 1993 when the Missouri finance system was challenged on grounds of equity and found unconstitutional. A funding formula addressing the potential deficiencies in adequacy and equitable resources was addressed in Senate Bill 287 (Rowe, 2010).

Types of equity. When legislators and litigators examined funding formulas, horizontal and vertical equity were strongly valued. The purpose of pursuing equity was to create a system where equitable opportunities to learn are offered to every child regardless of student characteristics or educational need (Brown, 2010). Horizontal equity was defined as equal opportunity for all students without taking into consideration any special circumstances. Because some students need more resources to meet their educational goals, vertical equity allowed for additional funding for students with specific needs (Hull, 2007). Specific needs included the students who qualified for free and reduced lunch, lacked English-language proficiency, had certain disabilities, and/or included members of particular ethnic groups (Baker, 2005). Equity studies used range distributions and statistical analysis to evaluate the student need, state and local taxes, and per pupil expenditure (Baker, 2005). Although equity was valued, the courts have divided opinions on how to distribute resources.

Litigation

Litigators have challenged the fairness in the school systems. Court decisions have been divided on their opinions of school financing and the best way to provide

equity and adequacy for students. Litigation has been a catalyst for states pursuing equity and adequacy measures in school finance (Baker, 2004).

Equity litigation. Equity litigation has spanned across states with varying results. In *McInnis v. Shapiro* in 1968, United States District Court Eastern Division, Illinois school funding was challenged. The plaintiffs claimed the Illinois school finance method denied equal protection rights due to large variations in expenditure per pupil. The courts concluded equal expenditures are not required by the Fourteenth Amendment and therefore variations created by taxation of property in school districts did not discriminate (Alexander, 2012). However, in 1971 *Serrano v. Priest* reflected a change of view by the California Supreme Court. The decision stated that school finance systems based primarily on local property tax violated state constitutions. The court concluded that education is a fundamental interest and concluded the system of finance unconstitutional under both the Fourteenth Amendment and the California Constitution (Alexander, 2012). However, not all courts agreed with the California Supreme Court.

Equity was challenged in the Texas court system with contradictory results. In *San Antonio v. Rodriguez*, 1973, the Texas Supreme Court ruled the right to education was not fundamental under the U.S. Constitution (Alexander, 2012). The U.S. Supreme Court upheld the constitutionality of the Texas method of financing schools and ruled education was not a fundamental right (Alexander, 2012). The *Edgewood Independent School District v. Kirby* in 1989 challenged funding equity in public schools. The disparities between various school districts to raise revenue varied greatly. The wealthiest district had over \$14,000,000 of property wealth per student and the poorest district had approximately \$20,000 of property wealth per student (Alexander, 2012). The Texas

Supreme Court affirmed that the Texas school financial system was unconstitutional (Davis, Markum, Mitchell, & Redlich, 2007; Ogle, 2007). The courts demanded equitable and adequate resources be provided for all students.

Adequacy litigation. The concept of adequacy was challenged in the court system through several landmark cases. In *Rose v. Council for Better Education*, the Kentucky Supreme Court declared all Kentucky school children had a constitutional right to an adequate educational opportunity. Chief Justice Stephens stated that the Kentucky General Assembly had not provided a fair and efficient system of common schools throughout the state (Alexander, 2012). In *Connecticut Coalition for Justice in Education Funding v. Rell*, a three justice plurality stated that the court has a role in providing public school students a fundamental guarantee of an appropriate education (Russo, 2010). *Rell* cited *Horton v. Meskill (1977)* which declared that the state has a duty to provide equal opportunities for all school children (Russo, 2010). Litigation concerning equity and adequacy in school finance has been divided.

Litigation has been filed in 45 of the 50 states with varying results (National Education Access Network, 2014). The courts of 24 states determined victory for plaintiffs. In 2009, the Missouri Supreme Court denied that the state school funding formula was unconstitutionally disparate and inadequate (National Education Access Network, 2014). In 2014, litigation was pending in eleven states over school finance reform (Pew, 2014). Critics continue to debate whether legislators or courts should drive the impetus for school funding reforms (Hanushek & Lindseth, 2009; Rebell, 2009).

Effectiveness of litigation. The contradictory results in litigation have led to criticisms of the fairness of funding. As a result of the litigation, courts have had the

opportunity to award financial remedies to address school funding legislation (Suarez, 2010). Hanushek and Lindseth (2009) argued cost-studies are flawed, and money awarded by the courts did not improve student achievement. The authors claimed judges generally concurred with vested interest in the educational community to preserve the status quo despite fewer political pressures. Hanushek and Lindseth (2009) argued that judges have made little effort to improve how expenditures are used or to find alternative methods of school reform. The authors cited the example of the lack of growth in the National Assessment of Educational Progress (NAEP) achievement scores in states with judicial remedies compared to the nation as a whole (Hanushek & Lindseth, 2009). Hanushek and Rivkin (2007) argued that in order for the courts to be effective in addressing educational reform, factors such as teacher certification barriers, teacher compensation, and career advancement must be addressed first. According to the authors, legislators not judges should lead the reform in student achievement (Hanushek & Lindseth, 2009). Critics of Eric Hanushek disagreed with opinions on school finance reform and the court decisions (Rebell, 2009).

Rebell (2009) argued that student achievement has been positively impacted by school finance lawsuits. Courts have a “degree of staying power” other branches of government cannot claim (Rebell, 2009). The author acknowledged courts alone cannot produce meaningful reform but should coordinate with other branches of government to improve conditions for students (Rebell, 2009). Rebell contended Congress should take affirmative steps to overcome impediments to at-risk students as they did with disabled children in the Individuals with Disabilities Education Act (Rebell & Wolff, 2008).

Hanushek and Rebell agreed that student achievement was essential to both individual success and to economic progress of the nation (Hanushek & Lindseth, 2009; Rebell, 2009). The authors stated the improvement of the achievement of the subgroups of children was imperative (Hanushek & Lindseth, 2009; Rebell, 2009). The authors concurred on the fact that money does affect student achievement. Hanushek claimed it must be spent efficiently on appropriate resources, although appropriate resources have not been defined (Hanushek, & Rivkin 2007; (Rebell & Wolff, 2008; Rebell, 2009; Hanushek & Lindseth, 2009). Rebell noted 29 of 30 State Supreme Court cases have directly addressed the issue of whether money matters and determined that funding affects educational opportunity through issues of equity and/or adequacy (Rebell, 2009).

Equity and Adequacy in Missouri

Equity and adequacy in Missouri school finance was determined by Augenblick and Myers' successful school study in 2003. A successful school study tabulated resources in successful schools and estimated the cost of utilizing those resources in other schools (Baker, 2004). The successful schools approach used outcome data on measures such as attendance and dropout rates, achievement test scores, and resource allocations (Baker, 2004). The Augenblick and Myers determined equity and adequacy in Missouri schools.

Augenblick and Myers' adequacy study in Missouri. Augenblick and Myers conducted a study to determine the level of spending required to meet student achievement goals in a school (Augenblick & Myers, 2003). The six-month study was designed to determine adequacy in Missouri school funding in order to hold schools accountable for student achievement. According to the Augenblick and Myers study,

“The primary purpose of the study was to determine the funding levels needed to assure that all school districts in the state would have sufficient operating funds, excluding transportation and food services, to be able to meet the requirements and expectations that Missouri and the federal government use to hold school districts accountable” (Augenblick & Myers, Inc., 2003, p. 7).

One of the major recommendations was a goal of adjusting funding to schools to reach a target of \$7,832 per pupil expenditure by 2013-2014 school year. A recommendation was made to create an equitable finance system taking into account revenue disparities and differences in tax rates among districts and linking the school finance system with the state’s education accountability system. According to the Augenblick and Myers recommendation (2003), school districts should reasonably be expected to meet state standards if adequate revenues were provided.

In 2005, the legislature determined the minimum adequate level of spending was \$6,117 per student. The legislature arrived at this number based upon the average operating expenditures for 113 districts with good scores on the Annual Performance Report (Podgursky, 2008). Augenblick and Myers did note that programs for Special Education students, English as a Second Language, and At-Risk students were not included in the base total. The authors contended an additional 90-125% of the base cost to fund a child in Special Education services (Carl, 2005). Critics of Augenblick and Myers study reported inconsistencies in data (Carl, 2005).

Critics of the Augenblick and Myers’ study. Skeptics of Augenblicks and Myers’ study warned that the successful schools model used in the study is not immune from manipulation (Carl, 2005). Carl, Portwood, and Savage (2005) recommended an

adequacy based model should be used as the primary means of funding public education as opposed to an equity based model. Wood and Baker (2007) argued the Augenblick & Myers study only used five different size K-12 school districts which caused inaccuracies in cost estimates particularly between a large pupil count (364-1,196) and small pupil count (130-364). Buck (2011) examined 18 measurements of equity in Missouri public schools from FY 2006 to FY 2010. The author suggested that in terms of total revenue, FY 2006 was more equitable on five out of six measures than FY 2010. In terms of expenditures of ADA, FY 2006 was more equitable, on six out of six measures, than FY 2010 (Buck, 2011). Buck's research indicated Missouri schools were becoming less equitable. Buck argued Senate Bill 287 has created a discrepancy in providing adequate and equitable resources to Missouri schools, and therefore, lack of funding may affect meeting the goal of The Top 10 by 20 (Buck, 2011).

Equity measures in Missouri finance. Equity in Missouri schools has been measured and monitored. Senate Bill 380, also called *The Outstanding Schools Act*, established equity measures in Missouri school finance (Monsees, 2012). The Missouri Department of Elementary and Secondary Education (DESE) performed equity tests in 1999 and found equity improved in per pupil revenue basis but not at target levels (Monsees, 2012). Ko (2006) extended the DESE study to include two additional years of data. The author concluded equity declined during FY 1998- 2000 time frame and concluded equity was on the decline in Missouri (Ko, 2006). Ogle (2007) extended DESE's research in equity by including calculations for the McCloone Index and suggested improvements in equity had stopped. However, Ogle noted equity measures were improved from the previous formula (Ogle, 2007). David Buck continued research

on Missouri equity issues during FY 2006 to FY 2010 (Buck, 2011). The results of the study suggested more equity was reported in FY 2006 than FY 2010 and implied that the current funding formula is less equitable than its predecessor (Buck, 2011). The Missouri funding formula not only addressed equity issues but also addressed adequacy as well.

Adequacy measures in Missouri schools. The concept of adequacy was addressed in Missouri funding formula in 2004. One of the directives of the State Board of Education in 2004 was implementation of a funding formula that included equitable and adequate resources for Missouri schools (Copeland, 2006). Adequacy provided resources based on student need. According to Bruce Baker (2005), two different types of adequacy existed: absolute and relative. Absolute adequacy measured the amount of resources available to reach educational goals. Relative adequacy was defined as the cost differences among student needs. Adequacy studies used more qualitative methods than equity studies (Baker, 2005).

Equity and adequacy in regard to school funding formulas have been debated in the courts since 1968 beginning with *McInnis v. Shapiro* (Alexander, 2012). Due to controversial adequacy issues, a lawsuit was activated and went to trial in January 2007 (Podgursky, 2008). On October 17, 2007, a Missouri circuit court upheld the constitutionality of the public school finance system. The Court declared the current funding system was sufficient to provide adequate and equitable resources to Missouri school students (Podgursky, 2008). However, critics of the funding formula argued equitable and adequate resources were not provided in the funding formula (King, 2005).

Critics of the school finance have argued a fair system has not been established. King, Swanson, and Sweetland (2005) contended that policymakers have not adequately

examined inefficiencies and removed impediments in order to provide adequacy in financial resources. Wong (2008) suggested the politics of adequacy reform needed to focus on disenfranchised students such as ethnic groups, income class differences, and place-based competition. The author argued school reform has switched from inputs to outputs and has relied upon greater participation by non-educators in public schools by federal, state, and local level (Wong, 2005). Finally, Wong (2005) disputed that adequacy reform remains contentious and intensifies interest-based politics. Baker (2012) purported equitable and adequate allocations of financial inputs provided an underlying condition for improving outcomes in student achievement. The author claimed that financial resources were necessary to ensure outcomes were met (Baker, 2012). Although supporters and critics do not agree on effectiveness of financial resources, legislators in Missouri addressed equitable and adequate allocations through funding legislation such as Senate Bill 380, Senate Bill 287, and Senate Bill 180 (Senate Bill 380- Outstanding School Act, 1993; Senate Bill 287, 2006).

History of Missouri School Funding Legislation

School funding in Missouri has been shaped by several legislative bills. The adoption of *The Outstanding Schools Act of 1993* addressed adequate and equitable resources for Missouri students. The bill called for an extensive overhaul in school funding and accountability (Senate Bill 380- Outstanding School Act, 1993). Senate Bill 380 had four major themes: improved academic performance, greater financial equity, increased funding, and increased accountability (Senate Bill 380- Outstanding School Act, 1993). The act reduced class sizes, created the A+ and Career Ladder programs, provided tutoring, expanded the Parents-as-Teachers program, improved vocational

programs, and provided more access to technology (Senate Bill 380- Outstanding School Act, 1993). In 2003, in response to restive school districts, the Missouri School Board Association contracted with a consulting firm to address issues of adequacy in Missouri school finance (Podgursky, 2008).

In hopes of avoiding another lawsuit in Missouri, the legislature passed a new funding formula in 2005 to address the issues of adequacy. Senate Bill 287 was signed into law on June 29, 2005 by Governor Matt Blunt (Senate Bill 287, 2006). This new formula was based on a student-need formula providing a certain amount of money per student per penny of tax rate. It sought to move toward a student-needs based philosophy (Thalhuber, 2006). The formula assigned additional weights to districts' student counts based on certain student characteristics such as students who qualify for free and reduced lunch, for special education services, and for limited English Language proficiency (Thalhuber, 2006).

The formula in SB 287 was intended to be implemented slowly from 2006 to 2012. The formula developed new attendance calculations and considered factors such as weighted average daily attendance, the State Adequacy Target, and the Dollar Value Modifier before subtracting local effort (Davis, Markum, Mitchell, & Redlich, 2007). The Dollar Value Modifier was designed by the legislature to reflect the relative purchasing power of a dollar as related to wage data for metropolitan, micropolitan, and county areas (Davis, Markum, Mitchell, & Redlich, 2007). The local effort amount was fixed for the life of the formula with two exceptions. First, if a district's Assessed valuation decreased below the 2004 valuation, the lower valuation was used. Second, if the district's revenue from fines increased, the higher amount was used for local effort.

Critics of the new formula claimed that funding would be lost with the new formula; concessions were made on behalf of districts losing money (Podgursky, 2008).

As the formulas were enacted, political compromises were made to ensure schools would not lose money. Senate Bill 180 made provisions for Hold harmless schools and froze their aid at the 1992-1993 levels (Podgursky, 2008). These districts were primarily wealthier districts (Podgursky, 2008). Categorical aid was also offered in programs such as transportation, special education, remedial reading, and vocational education (Podgursky, 2008). The Revised Missouri Statute outlined spending for all school boards into four funds: Teacher Fund, Incidental Fund, Capital Projects Fund, and Debt Service Fund. The purpose of the funds was to promote quality in Missouri schools as outlined in Revised Missouri Statute 160.251 (Missouri Revised Statutes Chapter 160, 2013).

School accountability and financial reforms through legislation and litigation has been controversial. In order to meet the standards set by legislators, one of the first priorities for educators was a focus on improving literacy rates in Missouri (Missouri Department of Elementary and Secondary Education, 2011).

Importance of Literacy

The importance of literacy for academic and economic success for adults and children has been established (Hattie, 2009; Snow 2002). High literacy rates in adults have been linked to academic, professional, and social success. Increased student achievement and academic success has been associated with high literacy rates in children. Literacy has become a focus for educators in Missouri to meet the goal of Top 10 by 20 and accreditation standards set by DESE.

Importance of literacy for adults. Literacy rates in adults are linked to economic and academic success (National Center for Education Statistics, 1999). Literacy skills were strongly related to weekly and annual earnings overall and for most demographic and socioeconomic subgroups of the employed, although the relationship was considerably weaker for younger workers (under the age of 25) and for high-school dropouts (National Center for Education Statistics, 1999). Literacy skills such as using computers and accessing the Internet required rigorous demands on individuals' essential skills for success in the work force (Snow, 2002). Ensuring adults have proficient literacy skills has become an economic necessity (Kelly & Strawn, 2011).

Strong reading comprehension skills are central to academic success, professional success, and a productive civic life (Snow, 2002). According to the Institute of Education Sciences and U.S. Department of Education, in 1992 and again in 2003, approximately 14% of American adults (30 million people) had below basic literacy skills and performed at a simple skill level (National Center for Educational Statistics, 2014). Sixty-three million Americans (29%) only performed simple and everyday literacy activities (National Center for Educational Statistics, 2014). Most of the below basic population (55%) did not graduate from high school which severely limited employment opportunities (National Center for Educational Statistics, 2014). Adult reading competencies varied substantially across states. In Louisiana 49% of adults scored basic in literacy compared to seven percent of students in Missouri (Reardon, 2012). Low literacy rates have been tied to increased prison populations and immigration issues (Institute of Education Sciences, 2003).

The lack of literacy skills in prison and immigrant populations has been established (Institute of Education Sciences, 2003). One in every 100 U.S. adults aged 16 and older was in prison or jail in America (about 2.3 million in 2006). A total of 43% of the prisoners did not have a high school diploma or equivalent, and 56% had very low literacy skills (Institute of Education Sciences, 2003). According to the National Commission on Adult Literacy (2008), approximately two million immigrants came to the United States each year seek jobs and better lives. Approximately 50% of the immigrants in America had low literacy levels and lacked high school education and English language skills which severely limited their access to jobs and job training, college, and citizenship (National Commission on Adult Literacy, 2008). In order to increase literacy skills in adults, Missouri educators have identified a focus on literacy at an early age (Missouri Department of Elementary and Secondary Education, 2011) .

Importance of literacy for students. Developing strong literacy skills at an early age increased the likelihood of success in school (Snow, 2002). Hattie surmised if students did not develop sufficient reading acumen by the middle of elementary school, a handicap was created in other curricula (Hattie, 2009). The Southern Regional Education Board Committee to Improve Reading and Writing in Middle and High Schools (2009) noted reading instruction was impeded after the elementary grades. The report showed that eighth-grade National Assessment of Educational Progress (NAEP) reading scores were stagnant in many states, and students needed more intensive reading instruction throughout the middle grades and high school (Southern Regional Education Board, 2009). On the 2007 NAEP, 29% of eighth graders scored below the basic level in reading. The students had experienced extreme difficulty succeeding in high school

(Southern Regional Education Board, 2009). According to NAEP, reading scores of high school students did not improve from 1973 to 2003, and reading achievement of grade 12 students decreased significantly (Snow, 2002). Only 67% of the nation's Class of 2009 met ACT Inc.'s college-readiness benchmark in English, and only 53% reached the benchmark in reading (Southern Regional Education Board, 2009). Hattie (2009) suggested schools must focus on improvements in reading and literacy skills to prepare students for adulthood and the work force. In order to prepare students for the work force, DESE has set rigorous standards in student achievement scores (Missouri Department of Elementary and Secondary Education, 2014).

Emphasis on student achievement scores in literacy. The Top 10 by 20 initiative increased the required standard in student achievement gains on MAP in Reading and English Language Arts for grade three through eight (Missouri Department of Elementary and Secondary Education, 2011). In order to meet the goal of Top 10 by 20, Missouri achievement scores in fourth grade were required to be raised by 17 percentage points from the baseline year in 2011 (33.0% to 50%) by eighth grade 15 percentage points (31% to 46%) (Missouri Department of Elementary and Secondary Education, 2011). English Language Arts scores were required to be raised in grades three through eight by an average of 14.2 percentage points (Missouri Department of Elementary and Secondary Education, 2011).

Ultimately, DESE intended to ensure that all students will graduate from college and be career ready (Missouri Department of Elementary and Secondary Education, 2011). DESE has placed an emphasis on raising four-year graduation rates from 78.6% in the baseline year of 2011 to 92.0% by the year 2020 (Missouri Department of

Elementary and Secondary Education, 2011). In order to address college and career readiness, DESE has also placed a focus on educator evaluation, learning standards, and increased proficiency rates on state assessments through the implementation of improved instructional practices.

Instruction

A focus on instructional effectiveness has been emphasized through federal and state mandates such as Race to the Top, Blueprint for Education, and The Top10 by 20 initiative. In Missouri school finance, the Special Revenue Fund (Fund II) is set aside for expenditures for teacher salaries, teacher benefits, and tuition payments to other schools (Missouri Department of Elementary and Secondary Education, 2012). This fund is focused on expenditures to promote instruction in Missouri schools. In their research, John Hattie, Richard Dufour, and Robert Marzano have emphasized the power of instruction for improving student achievement through their research. Missouri schools have incorporated the works of John Hattie and Robert Marzano in the teacher evaluation system. Roberts (2011) reported that instructional expenditures are the expenditures most closely affecting student learning. The study indicated a pattern of increase in longitudinal capital expenditures and longitudinal instruction positively affects outcomes in student achievement (Roberts, 2011).

Instruction and accountability in Missouri. Accountability in instruction has become a key element to improvements in student achievement. The Missouri statute 168.128 required the board of education in each school to implement a comprehensive performance-based evaluation for all teachers and administrators employed by the district (Missouri Department of Elementary and Secondary Education, 2013b). The Missouri

Educator Evaluation System was approved by the State Board of Education in June 2012 and was aligned to Missouri Senate Bill 291 for the purpose of increased accountability for teachers and administrators in instruction (Missouri Department of Elementary and Secondary Education, 2013b). Two key outcomes were encouraged through the teacher evaluation system. The first was a systematic improvement of effective practice at all levels in the school. The second was a precise and accurate identification of a school's strengths and areas of concern to be addressed. Teachers were evaluated on a professional continuum ranging from emerging teacher, developing teacher, proficient teacher to distinguished teacher. Growth guides were established by DESE to help teachers in their journey towards the category of "distinguished teacher" (Missouri Department of Elementary and Secondary Education, 2013).

Instruction and teacher effectiveness. An emphasis on instructional practices has led to studies in improving teaching practices. According to Hattie (2009), teaching strategies were considered the 23rd most influential effect on student learning. An effective teacher expected an average growth per year of $d=0.20$ to $d=0.40$ (Hattie, 2009). A teacher who was able to obtain an effect size of $d= 0.60$ in a year was considered excellent (Hattie, 2009). Hattie (2009) also concluded teacher clarity as the eighth most effective influence in schools. Dufour and Marzano (2011) reported the quality of instruction students received in the classroom was the most important variable in student achievement. In addition to evaluating instructional effectiveness, the authors outlined conditions for continuous school improvement and increased student achievement was maintained through a coordinated and systematic effort using

professional development strategies specifically designed to address student achievement deficits (Dufour & Marzano, 2011).

Professional Development

An emphasis has been placed on professional development in the federal and state arenas (Brenchley, 2013; Missouri Department of Elementary and Secondary Education, 2013; National School Board Association, 2010). Application of professional development strategies have led to increased student achievement with an effect size of 0.62 (Hattie, 2009). Hattie (2009) considered professional development to be ranked 19th in effective practices. Missouri has addressed professional development goals through teacher and leadership accountability, the Regional Professional development centers (RPDC), and financial requirements.

Professional development and accountability. Professional development has been required of Missouri educators since *Excellence in Education Act of 1985* and was extended through the *Outstanding Schools Act (OSA)* (Missouri Department of Elementary and Secondary Education, 2012). The OSA outlined expectations for public schools by creating the following professional development requirements: (a) a Professional Development Committee in each district, (b) Professional Development Plan for teachers, (c) allocation of one percent of the state funds from the school's foundation formula be used for professional development, (d) a collaborative process between teachers and administration regarding professional development, and (e) established a penalty for non-compliance by the school district (Missouri Department of Elementary and Secondary Education, 2012). Allocation of professional development money had to be spent under a plan developed by the professional development committee of the

district in consultation with school administrators and approved by the local board of education (Missouri Department of Elementary and Secondary Education, 2012). The statute provided for the Regional Professional Development Centers (RPDC) throughout Missouri.

The RPDC was created to provide professional development opportunities which promoted student achievement and state compliance to laws and regulations. The RPDC Consultants offered a variety of professional development opportunities to teachers and administrators. The presentation materials were vetted by Missouri Department of Elementary and Secondary Education, therefore, teachers and administrators were assured information was current and appropriate for Missouri schools (Missouri Department of Elementary and Secondary Education, 2012). The Regional Professional Development Centers were a result of Missouri's emphasis on teacher training and improved student achievement. The professional development standards extended to certified staff, classified staff, and school leadership (Missouri Department of Elementary and Secondary Education, 2013).

The professional development requirements emphasized a focus for leadership on improved student achievement and meeting accreditation standards. The revised *Interstate Leaders Licensure Consortium* (ISLLC) Standards reinforced the leader's primary responsibility to improve teaching and learning for all children through professional development activities (Missouri Department of Elementary and Secondary Education, 2012). DESE required schools to tie Professional Development goals to Comprehensive School Improvement Plan in order to maintain accreditation. The goals were collaboratively developed between administration and teachers in public school

districts (Missouri Department of Elementary and Secondary Education, 2012). The Code of State Regulations established two requirements for schools: (a) teacher leader standards were developed within each district to ensure effective instructional staff for all students and (b) improved student learning was driven through professional learning and instructional practices (Kinder, 2013). Certification guidelines required every educator with a professional certificate to complete 30 hours to 120 hours of professional development over a four year time span (Missouri Department of Elementary and Secondary Education, 2013). According to DESE, teachers were considered the critical leverage point for improving student achievement. Districts were required to invest in teachers' skills and knowledge to influence student achievement (Missouri Department of Elementary and Secondary Education, 2013) Professional Development was required to ensure high student achievement standards were met and maintained.

Professional development and student achievement. A link between student achievement and professional development has been established. Hattie (2009) discovered an effect size of $r=0.44$ when examining quality of teaching and improved student achievement. In addition, the meta-analyses indicated professional development was likely to improve teacher learning ($d=0.90$). Higher effect sizes were observed in studies where training groups involved both high school and elementary school teachers rather than only one of the groups (Hattie, 2009). Timperley, Wilson, Barrar, and Fung (2007) discovered a correlation (.34) between high achievement scores in reading and professional development in a 72 meta-study analysis. In the Missouri Professional Learning Guidelines for Student Success, DESE has stated that it takes 50 hours or more

of effective professional learning to realize performance gains for students (Missouri Department of Elementary and Secondary Education, 2013)

Studies conducted in professional development and school leadership has established a positive impact on student achievement (Dufour & Marzano, 2011; Hattie, 2009). Hedgpeth (2000) concluded that professional development was perceived (92.3%) as playing an important role in developing leadership qualities in principals. The author also indicated that professional development for principals, related to student achievement data and instructional strategies was perceived by principals (93.9%) as essential in improvement of student achievement (Hedgpeth, 2000). Waters, Marzano, and McNulty's (2003) meta-study analysis concluded that effective leaders provided professional development and resources to increase student achievement ($r=.26$).

Although studies have demonstrated that a positive relationship existed between school expenditures and student achievement, limited research on professional development expenditures and student achievement existed (Hanushek & Lindseth, 2009; Hattie, 2009; Ko, 2006; Rebell, 2009; Chambers, 2004; Odden & Picus, 2011).

Per Pupil Expenditure

The relationship between per pupil expenditure and student achievement has divided researchers (Hanushek & Lindseth, 2009; Hattie, 2009; Ko, 2006; Rebell, 2009). The impact of per pupil expenditures, student achievement, and school revenue has also been debated with controversial results (Hanushek & Lindseth, 2009; Hattie, 2009; Ko, 2006; Rebell, 2009). A link between per pupil expenditures and school revenues has not been determined.

Per pupil expenditures and school revenue. Critics have argued that the impact of per pupil expenditures and school revenue has not been established. According to Hanshek and Lindseth (2009), an increase in accountability was accompanied by an increase in spending but not an increase in student achievement (Hanushek & Lindseth, 2009). From 1960 to 2005, spending per pupil quadrupled including measures to adjust for inflation (Hanushek & Lindseth, 2009). The United States Department of Education published a report on Revenues and Expenditures for Public School District in FY 2007 and determined a substantial difference between total revenues per pupil at the 5th (\$7,740.00) and 95th (\$22,653.00) percentiles present in schools nationwide (U.S. Department of Education, 2009). Per pupil expenditures in Missouri schools during FY 2013 ranged from \$5404.00 to \$36,000.00. Venteicher (2005) examined per pupil expenditure and student achievement in Missouri MAP scores. The author reported a correlation (0.244) between higher levels of spending per pupil and greater school performance on MAP test scores (Venteicher, 2005). The reasons for the large differences in expenditures included variances in communities' local revenues and property taxes (Baker, 2012).

The role of revenue received by a school impacted the per pupil expenditures for the school. The Center of American Progress published a report with the conclusion that property taxes played a disproportionate role in inequality in per pupil revenue (Baker, 2012). Six of the ten most inequitable states are among the states where local revenues are most sensitive to property taxes (Baker & Corcoran, 2012). In Pennsylvania, for example, property tax revenues accounted for 90% of district level variation in revenues (Baker & Corcoran, 2012). The report described Missouri as a state with a fragmented

state system with 523 districts which provided a greater opportunity for inequity in property wealth (Baker & Corcoran, 2012). The question researchers have tried to answer was the extent in which per pupil expenditures affected student achievement.

Per pupil expenditures and student achievement. Numerous studies have attempted to determine the connection between per pupil expenditure and improved student achievement but the results have been contradictory. Hattie (2009), in a meta-analysis of 189 studies, reported an effect size of 0.23 between school finance and student achievement. The author warned that the conclusion could be misleading (Hattie, 2009). Hanushek and Lindseth (2009) argued that spending does not increase student achievement. The authors contended that a major impediment to effective school finance reform has been a separation of financial decisions and policy decisions on student achievement (Hanushek & Lindseth, 2009). Hanushek (2009) argued that one problem with tracking expenditure was money given to school districts had no evidence of efficiency in spending or effectiveness on student outcomes.

No clear link between per pupil expenditures and student achievement has been established, but research indicated that increased spending in specific areas would lead to improvement. Hanushek and Lindseth (2009) argued a needs adjusted funding system was preferred. A needs-adjusted funding system linked funding to individual students based on environmental factors (Hanushek & Lindseth, 2009). Konstantopoulos and Hedges (2006) analyzed the link between NAEP scores and school finance; the authors discovered that most of the achievement variation occurred within schools not among them. The authors continued to report less variation was found between schools when background characteristics were considered (Konstantopoulos & Hedges, 2006).

Crampton and Thompson (2008) concluded school facilities and infrastructure funding in low-income communities was severe enough to deny students equality of educational opportunity. This led to the question whether low-income communities with low tax effort collection rates impacted student achievement scores of students.

Local Tax Effort

The link between Local Tax Effort and school revenue has been established. The Local Tax Effort, required by 167.126, RSMo, is calculated annually by school districts with consideration of factors such as prior year tax revenue, Intangible taxes, M & M surtaxes, In Lieu of taxes, city sales tax, State Assessed Utilities, and the sum of the prior year resident Average Daily Attendance (ADA) (Missouri Department of Elementary and Secondary Education, 2012). Lutz (2008) stated that property tax represented three-fourths of the local tax amount collected and was particularly important for school since the revenue provided approximately 95% of the tax to school districts. This amount could be important in times of financial downturn. Lutz (2008) stated that during the state financial crisis of 2002 – 2004, localities responded to cuts in state education aid by increasing property tax revenues in order to prevent cuts in education budgets. The Local Tax Effort is determined by the wealth of the community, with the exception of special school district, and can create large discrepancy in school finances across Missouri (Lutz, 2008; Ogle 2007).

Discrepancy in per pupil revenue varies greatly and affects state and local budgets (Lutz, 2008; Ogle 2007). An example of the discrepancy occurred during the 2014 fiscal year, the Missouri Department of Elementary and Secondary Education reported that Naylor R-II had a Local Tax Effort per ADA of \$820.23 compared to Clayton with

\$17,679.91 (see appendices). Ogle (2007) reported property-poor districts received substantially greater state funding per pupil than property-rich districts. Brazeale (2014) reported a weak positive relationship (0.066) between local debt service tax rate and Annual Performance Report percentage in Missouri schools. As a result of these inequities, Missouri addressed discrepancy in funding sources through a Hold harmless provision which ensured schools did not fall below their Fiscal Year budgets of 2005-2006.

Hold Harmless

The allocation of resources in school finance continued to challenge Missouri schools since the funding formula has not been fully funded since the formula adjustment in 2005 (Singer, 2014). Senate Bill 287 (SB 287) was created to address funding inequities in the previous funding formula with a Hold harmless provision. The goal of SB 287 was to fully fund the foundation formula by 2013, which has not been achieved. The evolution of funding formulas in Missouri has led to debate over the efficacy of Hold harmless.

Hold Harmless and Missouri funding formula. Schools annually evaluate whether to budget using the Hold harmless funding formula or the current funding formula (Missouri Department of Elementary and Secondary Education, 2012). The federally-mandated *Outstanding Schools Act of 1993* (OSA) stated that no district could receive less state aid per eligible student than it received according to the base year formula of 1992-1993 school year (United States Department of Education, 2012). Any district which received less state aid under the current funding formula compared to the OSA formula was protected by the provision of Hold harmless. The Hold harmless

protection limited the maximum reduction of a Local Education Agency's (LEA) allocation compared to the LEA allocation for the preceding year (United States Department of Education, 2012).

Senate Bill 287 (SB 287) was created to address the Hold harmless formula for Missouri schools. SB 287 was intended to transition the state from a tax-rate driven philosophy to a formula primarily based on student need (Senate Bill 287, 2006). The bill was created to address inadequacies reported by the courts in SB 380 and was intended to be phased in through a seven year plan (Senate Bill 287, 2006). The formula assigned additional weight to student counts based on student characteristics such as free and reduced lunch counts, special services, and English language proficiency counts (Senate Bill 287, 2006). Hold harmless calculations were based on the actual amount of state revenue received by the district in the FY 2004-2005 or FY 2005-2006 whichever was greater (Senate Bill 287, 2006). Districts of all sizes could be held harmless. School districts with less than 350 students were guaranteed at least as much total funds as they received in 2005-2006. In theory, this means a school district could lose students and still receive the same amount of funding as it did in 2005-2006 (Missouri Department of Elementary and Secondary Education, 2012). For larger districts the formula guaranteed the same level of funding per Weighted Average Daily Attendance (Missouri Department of Elementary and Secondary Education, 2012).

Hold Harmless provisions. According to the Center for Evaluation and Education Policy (2006), Hold harmless provisions were created in state formulas to protect districts from harm when new funding formulas were introduced. Hold harmless was often used when revenues declined due to decreasing enrollments. Proponents of

Hold harmless argued that some variable costs may be fixed in the short run for small changes in enrollment (Center for Evaluation & Education Policy, 2006). The Center for Evaluation and Education Policy listed five reasons to choose Hold harmless provisions: (a) scale adjustments used as a function for enrollment; (b) additional funding for districts with falling enrollment; (c) a cap for foundation grants; (d) an alternative to the states' foundation formula; (e) weighted average of past enrollments in foundation grant calculations (Center for Evaluation & Education Policy, 2006). Although there may be some benefits from the Hold harmless provisions, there are also some criticisms.

Criticism of Hold Harmless. Skeptics of Hold harmless provisions argued that Hold harmless created equity issues in Missouri school funding (Buck, 2011). Ogle (2007) determined the Hold harmless provision reduced initial improvements in equity and allowed a further reduction in equity over time (Ogle, 2007). The author contended that the legislative decision to provide a state minimum (Hold harmless) had a negative effect on equity. Ogle (2007) suggested phasing out the practice of Hold harmless to ensure equity in the formula. Wood and Baker (2007) argued that Hold harmless precluded uniformity in funding and therefore prevented school district with the greatest need to benefit. The question of whether Hold harmless provisions met equity and adequacy standards should be addressed the use of Hold harmless provisions continued to fund public schools (Wood & Baker, 2007). An important factor for schools to determine local wealth which influenced decisions on Hold harmless funding is through Assessed valuation of property wealth in a community (Carl, 2005).

Assessed Valuation

The impact of Assessed valuation on school funding has not been established (Ward, 2012; Haxton, 2009 ; Jordan, 2012). According to DESE, Assessed valuation was defined as the total assessed property value of the school district minus tax valuation as of December 31 of the previous calendar year (Missouri Department of Elementary and Secondary Education, 2012). Ward (2012) stated that Assessed valuation indicated a school district's potential for self-funding ability.

The impact of Assessed valuation in a school district affected facilities, enrollment, and per pupil expenditures (Ward, 2012; Haxton, 2009 ; Jordan, 2012). Haxton (2009) studied Assessed valuation variations of schools in Oklahoma and maintained adjustments in net Assessed valuation caused differences in building fund and bond fund revenues throughout districts. Building fund and bond fund differences provided the two major sources of revenues for capital expenditures throughout districts (Haxton, 2009). Brian Jordan (2012) concluded that high Assessed valuation was a vital component for success in Kansas school districts. The School District Equalization Act in Kansas created inequities in the amount of dollars available to fund local school districts (Jordan, 2012). Disparities between wealthy and poor school districts were evident in school districts with high Assessed valuation per pupil than poor school districts levying taxes at the same rate (Jordan, 2012). The author also noted that the majority of schools that experienced increases in Assessed valuation per pupil had increased enrollment (Jordan, 2012). Assessed valuation in Missouri schools indicated similar findings for urban and residential areas but not necessarily rural areas (Ward, 2012).

Assessed Valuation in Missouri. Research indicated Assessed valuation has impacted Missouri schools (Carl, 2005; Davis, Markum, Mitchell & Redlich, 2007; Ward, 2012). Ward (2012) contended Assessed valuation of rural Missouri schools were artificially low and therefore struggle with adequate funding for individual schools. The author also purported that rural school districts in Missouri relied on the state to subsidize education in schools (Ward, 2012). Carl (2005) concluded that areas with high concentrations of residential and commercial property had a much larger influence on the overall average of Assessed valuation per pupil than rural areas with a high concentration of agricultural property (Carl, 2005). Davis, Markum, Mitchell, and Redlich (2007) discovered that high achieving schools had a higher Assessed valuation than low achieving schools. High achieving school had a difference of \$30,299.65 in assessed valuation and spent \$612.53 more per pupil (Davis, Markum, Mitchell & Redlich, 2007). The authors argued that a correlation existed (.634) in assessed valuation per pupil and revenue in high achieving schools (Davis, Markum, Mitchell & Redlich, 2007). A positive significant correlation between a district's expenditures per average attendance and assessed valuation per pupil at the $r=.0503$ level was also found (Davis, Markum, Mitchell & Redlich, 2007). Wood and Baker (2007) claimed the southern and southeastern Missouri rural areas and small towns performed poorly under the current formula due to the relatively low assessed valuation per pupil. Ward (2012) argued the best predictor of assessed valuation was district size. This leads to the question of the impact on school district size on school funding.

School district size

The relationship between school district size and school finance has been inconclusive (Hattie, 2009; Wood, 2007; Eberts, Kehoe-Schwartz, Stone, 1990). Wood and Baker (2007) determined Missouri schools smaller than 500 students had lower local and state revenue than the national average. The current operating costs and current instructional spending were also below the national average (Wood, 2007). The author contended larger districts in Missouri fared much better than smaller ones in spending at or above national levels (Wood, 2007). The current operating costs and current instructional spending were also below the national average (Wood, 2007). Studies conducted over the last thirty years have led researchers to look at demographics within the schools when evaluating funding, school district size, and student achievement (Hattie, 2009; Wood, 2007; U.S. Department of Education, 2009; Eberts, Kehoe-Schwartz, Stone, 1990).

School district size and student achievement. The impact of school district size on student achievement has been debated. Hattie (2009) concluded school size has an effect of $d=0.43$ on student achievement and ranked 59th in effective practices. The author stated that schools had an optimal size, and when a school is too large or too small, efficiency is reduced (Hattie, 2009). Eberts, Kehoe-Schwartz, and Stone (1990) conducted a study in 1984 on a nationwide sample of more than 300 elementary schools. The researchers argued that the differences in student achievement between small schools (less than 200 students) and medium schools (200-800 students) are not significant. A significant difference was noted between small schools and large schools (more than 800 students) with large schools demonstrating higher student achievement than the small

schools (Eberts, Kehoe-Schwartz, & Stone, 1990). The authors' documented four factors affected the student achievement scores: (a) student characteristics; (b) teacher characteristics; (c) instructional process; and (d) administrators characteristics (Eberts, Kehoe-Schwartz, & Stone, 1990). Hattie (2009) concluded variables within the schools appear to have a greater relationship to student achievement than school size.

Critics argued that factors affecting school population had a greater effect than school district size alone (Howley, 2000; Eberts, Kehoe-Schwartz, Stone, 1990; Minolfo, 2010). A relationship between school size and socioeconomic status was substantially weaker in smaller schools than larger schools (Howley, 2000). Howley, Strange, and Bickel (2000) stated that schools with differing grade-span configurations but with the same enrollment did not have a similar impact on student achievement. According to their findings, schools in impoverished communities should be smaller than their counterparts (Howley, 2000). Minolfo (2012) purported school size did not show a significant relationship to student achievement but acknowledged the poverty index was a significant influence on student achievement despite his efforts to neutralize the effects of the variable (Minolfo, 2010). The debate has led to the query of determining what economic or demographic factors lead to the highest student achievement.

Summary of Review of Literature

Accountability for student achievement results has been rising for the last fifty years. National accountability standards in certification of teachers and administrators, Sputnik, Nation at Risk, No Child Left Behind, and Common Core State Standards are all examples of the increased political pressure on educators. The Missouri legislature has addressed the increased political pressure through increased accountability measures such

as Outstanding School Act, State Adequacy Target, and Missouri School Improvement Plan. Legislature has attempted to address concerns in school finance as well. Changes in the school funding formulas to meet equity and adequacy standards have been made to increase student achievement. Equity and adequacy measures have been defined through legislation, litigation, and adequacy studies. DESE has specifically targeted English Language Arts as being one focus area of concern. New requirements by DESE in the areas of instruction and professional development have been implemented to meet accountability standards. Per pupil expenditures and Local Tax Effort have been addressed to meet the financial needs of districts meeting accountability standards. Funding sources such as assessed valuation and hold harmless have been examined as a means to increase funding to schools. Research on school district size has been assessed to help educators identify key aspects of student achievement. Many experts agreed that money spent in schools must be used to the highest leverage (Baker & Corcoran, 2012; Hanushek & Lindseth, 2009; Hanushek & Rivkin, 2007; Hanushek, 2003; Rebell, 2009; Rebell & Wolff, 2008). The purpose of this study is to identify the nature of the relationship between student achievement and various district expenditures, resulting in potential leverage areas for educators to target when making fiscal decisions.

Chapter Three

RESEARCH DESIGN AND METHODOLOGY

Introduction

The study was intended to determine the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The financial resources and demographics examined included expenditures spent on instruction from teacher base pay salaries, resources allocated for professional development, and resources based on per pupil expenditure, hold harmless status, assessed valuation, expenditures from local effort, and school size. Data was collected from the Department of Elementary and Secondary Education website to determine the nature of the relationships. A correlation was examined through a Pearson-*r*.

The research provided educators and legislators information on school funding. The findings of this study were intended to define the link between educational accountability and educational funding. It was intended to determine if adequate funding is essential in improving student achievement in Missouri schools. In order to reach the Missouri Department of Education's goal of reaching the Top 10 by 20, a link between funding and achievement needs to be examined. The results were intended to indicate which expenditures offer the highest leverage for success in Communication Arts in grades three through eight.

Subjects

The general population of students from Missouri public schools participating in the Missouri Assessment Program (MAP) was evaluated. Factors such as percentage of

students qualifying for free and reduced lunch, students receiving Special Education services, and students who are English language learners are considered in the funding formula; thus, these students were not given special consideration of their own subgroups when evaluating MAP scores. The Dollar Value Modifier in the foundation formula addresses the cost of living in Missouri so the geographical area of the district was not addressed.

Sampling Procedures

The sample included all students participating in the Missouri Assessment Program grades three through eight in Missouri public schools from 2012 to 2014.

Research Setting

The setting for this study included all public schools in the state of Missouri. Data was collected from published information from the Department of Elementary and Secondary Education (DESE).

Research Design

The information from 2012, 2013, and 2014 Missouri Assessment Program (MAP) scores from Missouri schools were used since these were the last three years the traditional paper-based MAP test was administered in Missouri. The purpose of the study was to investigate the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The financial resources and demographics examined included expenditures spent on instruction from teacher base pay salaries, resources allocated for professional development, and resources based on per pupil expenditure, hold harmless formula, assessed valuation, expenditures from local

effort, and school size. Data was collected from the Department of Elementary and Secondary Education website to determine the nature of the relationships. A correlation was examined through a Pearson-*r*.

The relevance of this information can determine the link between educational accountability and educational funding. It was intended to determine if adequate funding is essential in improving student achievement. In order to reach, the Missouri Department of Education's goal of reaching the Top Ten by Twenty, a link between funding and achievement needs to be addressed. The information was intended to guide school districts in decisions regarding finance and demographics. The results indicated which expenditures offer the highest leverage for success in Communication Arts in grades three through eight.

Instrumentation

The data were analyzed using a Pearson-*r* test. The statistical test indicated the nature of the relationship between student achievement and various school resources and demographics. The Pearson-*r* established the nature of the relationship between the following variables:

- student achievement on MAP tests and money spent on instruction from teacher base pay salaries in Missouri public schools;
- student achievement on MAP tests and resources allocated for professional development;
- student achievement on MAP tests and per pupil expenditures;
- student achievement on MAP tests and hold harmless funding;
- student achievement on MAP tests and assessed valuation;

- student achievement on MAP tests with local tax effort; and
- student achievement on MAP tests and school district size in Missouri public schools.

The results indicated whether the respective variables were correlated.

Statistical Treatment of Data

The data was collected and analyzed using a Pearson- r formula. A Pearson- r was used to determine the nature of the relationship between various school resources and demographics and student achievement in Communication Arts of advanced and proficient scores on the Missouri Assessment Program during 2012 to 2014. Data was disaggregated to include information regarding money spent on per pupil expenditure, money spent on teacher base pay and resources allocated for professional development. Data on hold harmless funding, assessed valuation, local effort, and school size was evaluated.

Rationale for Selected Statistical Treatment

Data was disaggregated to divide and compare the results into meaningful groups. The Pearson correlation coefficient, r , was given to determine a range of values from +1 to -1. A value of 0 indicated that there was no association between the two variables. As the value of one variable increased, so did the value of the other variable. A value less than 0 indicated a negative association. A narrative was provided to convey the findings of the data collected.

Summary

The increased accountability on legislators and educators to improve student achievement has led to No Child Left Behind, Senate Bill 380, Missouri School

Improvement Program 5, and the goal of Top 10 by 2020. Litigation regarding funding has also shaped funding formulas in Missouri. The current funding formula and the Hold harmless formulas have been designed to provide for all students in Missouri public schools. Professional development and instructional spending have been increased to address student achievement in Missouri schools. The Augenblick and Myers study was completed as legislators considered horizontal and vertical equity and adequacy in funding formulas. A State Adequacy Target was created to improve school finance and address adequacy issues.

Chapter Three outlined the study to be completed. It provided a synopsis of the research design, validity and reliability of the study, and statistical treatment of the data. In Chapter Four, the researcher presented the results of the study. Through the use of tables and narrative analysis, the researchers discussed the findings. Chapter Five summarized the complete study, presented conclusions obtained from the research and future research was considered.

Chapter Four

ANALYSIS OF THE DATA

Introduction

This chapter provides an overview of the data sets and the correlations that were calculated. The chapter is divided into three sections: (a) a description of the MAP data set and of each of the variables, (b) an analysis of the variable and the corresponding correlations, and (c) a summary of the chapter.

Data and Variable Descriptions

This study was designed to detect statistical significance between student achievement and school finance and demographics. This section includes the background and description in the data and variables considered in the study, including information on the MAP Assessment administered from 2012 to 2014 in Communication Arts, teacher base pay, resources allocated for professional development, per pupil expenditures, local tax effort, assessed valuation, hold harmless funding, and school district size.

Description of the MAP Data

The MAP assessment administered from 2012 to 2014 included Mathematics and Communication Arts for grades three through eight; however, this study only examined relationships involving Communication Arts scores. Each MAP assessment required approximately three hours of testing time, and most assessments included three types of test items: multiple choice, constructed response, and performance events. For most assessments, the multiple-choice component was the survey portion of the Terra Nova, a

nationally normed achievement test published by DESE's MAP contractor, CTB McGraw-Hill.

The MAP test was administered in 2012 in 522 districts and in fiscal year 2013 and fiscal year 2014 in 520 districts. The number of students who participated in Communication Arts MAP testing in 2012 to 2014 respectively is 515,160 students, 532,120 students, and 530,574 students. The percentages of students who scored at or above proficient level from 2012 to 2014 respectively were 55.6%, 55.7%, and 53.5%. The Department of Elementary and Secondary Education analyzed the results and published the information for accountability purposes (Missouri Department of Elementary and Secondary Education, 2016).

Background of the Variables

The background between Missouri school expenditures and advanced and/or proficient on Missouri Assessment Program in grades three through eight was reviewed. The factors examined included the impact of teacher base pay and resources allocated for professional development had on student achievement in Communication Arts scores in grades three through eight on the MAP from 2012 to 2014. The study also reviewed background information regarding the relationship between Missouri school demographics and advanced and/or proficient on Missouri Assessment Program in grades three through eight. The nature of the relationship between Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and district demographics were examined by considering the following five factors: per pupil expenditure, expenditures in local tax effort, hold harmless status, assessed valuation, and school district size.

Table 1: Teacher Base Pay Expenditures

Year	Average Salary	Median Salary	Most Frequently Occurring Salary
2012	\$27,751	\$29,000	\$29,000
2013	\$30,065	\$29,500	\$30,000
2014	\$30,750	\$30,000	\$30,000

Teacher Base Pay

Requirements for teacher base pay are determined by the Missouri Legislature. According to Section 163.172 RsMo, beginning in the fiscal year 2010, teacher base pay salary must be at least \$25,000; base pay for teacher with 10 years' experience and a master's degree is \$33,000 (Missouri Department of Elementary and Secondary Education, 2012). A summary of the teacher base pay set is displayed in Table 1. In addition to base pay, resources allocated for professional development was another variable considered.

Professional Development

Requirements for professional development standards are also determined by the Missouri Legislature. During Fiscal Years 2012 and 2013, House Bill 1543 allowed schools relief from professional development spending (Missouri Department of Elementary and Secondary Education, 2012). The one percent rule was not enforced for professional development in Missouri public school districts. In Fiscal Year 2014, Senate Bill 287 took precedence and schools were required to spend one percent of an LEA's revenues from the foundation formula (Missouri Department of Elementary and

Secondary Education, 2013). This law required that 75% of the monies must be spent in the same fiscal year for purposes determined by the Professional Development Committee to address the Comprehensive School Improvement Plan per LEA (Missouri Department of Elementary and Secondary Education, 2013). Requirements for professional certifications for teachers include thirty hours of professional development in four years for the professional certification in core areas, 24 hours was required for reactivation of certification and 15 hours annually was required for career certification (Missouri Department of Elementary and Secondary Education, 2013).

Although the professional development requirements and enforcement have varied some, professional development funding was a variable considered. A third variable in the study was per pupil expenditures.

Per Pupil Expenditures

Total expenditures for Missouri's public school students in 2012 were \$11,169,914,420 with an average expenditure per student of \$9,626.52 (Missouri Department of Elementary and Secondary Education, 2016). Total expenditures for Missouri's public school students in 2013 were \$11,075,403,822 with an average expenditure per student of \$9,786.52 (Missouri Department of Elementary and Secondary Education, 2016). Total expenditures for Missouri in 2014 were \$11,523,871,014 with an average expenditure per student of \$10,004.95 (Missouri Department of Elementary and Secondary Education, 2016).

Thus, from 2012 to 2014, the total expenditure and average per pupil expenditures steadily increased. Another variable that has experienced a steady increase was the local tax effort.

Local Tax Effort

Local tax effort fluctuates per LEA. Local calculations include local funds, county revenue, and Prop C. money. The percentages of revenue from local funds in Missouri in 2012, 2013, and 2014 are as follows respectively: 55.26%, 55.94%, and 56.28% (Missouri Department of Elementary and Secondary Education, 2016). The tax rate ceiling was an average in 2012, 2013, and 2014 respectively as 3.6366%, 3.6622%, and 3.6520% (Missouri Department of Elementary and Secondary Education, 2016).

The percentage of local tax effort and tax rate ceiling increased steadily from 2012 to 2014. In addition to the local tax effort, the assessed valuation was another variable considered.

Assessed Valuation

The assessed valuation for a school district was the total assessed property value of the school district minus tax-increment-financed valuation as of December 31 of the previous calendar year. These revenues were tracked through local codes provided by the Missouri Accounting Manual intended for school expenditures (Missouri Department of Elementary and Secondary Education, 2012). Assessed valuation averages in Missouri public schools in 2012, 2013, and 2014 respectively are \$89,200,779,060, \$90,184,341,192, and \$89,759,971,068 (Missouri Department of Elementary and Secondary Education, 2016).

Revenues from assessed valuation fluctuated from 2012 to 2014. As well as assessed valuation, the hold harmless provision was a variable considered in this study.

Hold Harmless

The funding formula contained a hold harmless provision which stated that no district can receive less revenue, on a Weighted Daily Attendance basis, than the district received in fiscal year 2006 (Missouri Department of Elementary and Secondary Education, 2012). The revenue was weighted for relative purchasing power of a dollar. The number of hold harmless districts in 2012, 2013, and 2014 respectively include 154 districts, 170 districts, and 177 districts (Missouri Department of Elementary and Secondary Education, 2016).

The number of schools accessing hold harmless funding varied from 2012 to 2014 increasing every year. In this study, another variable considered was school district size.

School District Size

School district size in Missouri fluctuates from small rural schools (DESE designates as an LEA with fewer than 600 students to large urban districts (Missouri Department of Elementary and Secondary Education, 2015). The definitions for medium and large school are not designated by DESE. However, large cities, mid-size city, large town, and small towns are defined (Missouri Department of Elementary and Secondary Education, 2015).

A large city is a central city of a consolidated metropolitan statistical area (CMSA) with a population of 250,000 or more (Missouri Department of Elementary and Secondary Education, 2015). A mid-size city is a central city of a CMSA but not designated as a large central city (Missouri Department of Elementary and Secondary Education, 2015). A large town is a place not within a CMSA but with a population of 2500 or more. A small town is considered is a place not within a CMSA with a

population of at least 2,500. A place with a population smaller than 2,500 is considered rural (Missouri Department of Elementary and Secondary Education, 2015).

School districts size varies significantly across the state. The range of students per district in 2012, 2013, and 2014 respectively is 19 at Cowgill to 24,352 in Springfield, 15 in Missouri City 56 to 25,200 in St. Louis City, and 19 in Gorin to 24,905 in Springfield (Missouri Department of Elementary and Secondary Education, 2016). The total enrollment for Missouri public schools in 2012, 2013, 2014 respectively is 862,264, 885,684, and 885,575 (Missouri Department of Elementary and Secondary Education, 2016).

In summary, this study was designed to detect linear relationships between student achievement and school finance and demographics. A background and description in the data and variables discussed included information on the MAP assessment administered from 2012 to 2014 in Communication Arts, teacher base pay, professional development, per pupil expenditures, local tax effort, assessed valuation, hold harmless funding, and school district size. The background information and analysis of data was intended to provide context for educators finding leverage when determining factors that affect student achievement. The following section analyzes the data utilizing the Pearson's correlation coefficient.

Analysis of Data

This study was intended to determine the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The financial resources and demographics examined included expenditures from

teacher base pay, resources allocated for professional development, and per pupil expenditure, hold harmless formula, assessed valuation, expenditures from local effort, and school size. Data was collected from the Department of Elementary and Secondary Education website to determine the nature of the relationships. A correlation was examined through a Pearson-*r*. A Pearson-*r* and *p* value was given to each factor to determine if a significant relationship existed between each factor and student achievement on the MAP test in Communication Arts from 2012 to 2014. A small magnitude of correlation is measured from 0.10 through 0.19, a moderate magnitude of correlation is measured from 0.20 through 0.49, and a large magnitude of correlation is measured above 0.50 (Cohen, 1992). A *p* value ≤ 0.01 was intended to document significance in the relationship between the financial and demographic factors and student achievement.

A correlational analysis with student achievement was divided into two subsets: school expenditures and school demographics.

School Expenditures and Student Achievement

The first research question reviewed the relationship between Missouri school expenditures and advanced and/or proficient scores on Missouri Assessment Program in grades three through eight. Teacher base pay and resources allocated for professional development were the two factors examined when investigating school expenditures and student achievement on the MAP test in Communication Arts. The first category of school expenditures reviewed was teacher base pay and student achievement.

A small magnitude (.159004) of correlation was discovered between teacher base pay salaries and student achievement from 2012 to 2014 (see table 2). This indicated that

teacher base pay may have affected student achievement. A p value of 0.00028 was also observed which indicated that significance may exist when analyzing the relationship between teacher base pay to advanced and/or proficient MAP scores in fiscal years from 2012 to 2014 (see table 2). Another correlation considered in school expenditures was money spent on professional development.

No correlation (-0.020292) was found between resources allocated for professional development from 2012 through 2014 and student achievement among grades three through eight in Missouri public schools in Communication Arts and advanced and/or Proficient on MAP (see table 2) on Pearson- r . Because the p -value is greater than the significance level of 0.01, there is inconclusive evidence about the significance of the association between the variables (see table 2). This may indicate that resources allocated for professional development may not be connected to student achievement.

Table 2: School Expenditures and Student Achievement

School Expenditure	Number	Pearson- r	P
Teacher Base Pay	491	0.159004	0.00028
Professional Development	518	-0.020292	0.649729

School demographics and student achievement were also examined for correlation.

School Demographics and Student Achievement

The second research question examined the relationship between Missouri school demographics and advanced and/or proficient on Missouri Assessment Program in grades three through eight. The nature of the relationship between Communication Arts scores

in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014 and district demographics were examined by considering the following five factors which included per pupil expenditure, expenditures in local effort, hold harmless status, assessed valuation, and school district size. The first correlation in school demographics examined was per pupil expenditures.

Pearson- r calculations indicated that no correlation (-0.093036) was discovered between per pupil expenditures and student achievement from 2012 through 2014 (see table 3). A p value of 0.034335 also indicated no significant relationship existed between per pupil expenditure and Communication Arts scores from 2012 to 2014 (see table 3). Because the p -value is greater than the significance level of 0.01, there is inconclusive evidence about the significance of the association between the variables (see table 3). This indicated that per pupil expenditures spent by the district may not affect student achievement. Although per pupil expenditures were not considered significant regarding school demographics, the study also examined local tax effort.

A small magnitude (.188997) of correlations was ascertained between local tax effort and student achievement from 2012 through 2014 (see table 3). This indicated that student achievement may be affected by local tax effort. A p value of 0.00015 also indicated that a significant relationship may exist between local tax effort and Communication Arts scores from 2012 to 2014 (see table 3). Another school demographic considered was hold harmless funding.

A small magnitude (0.14557) of correlation was observed between hold harmless funding and student achievement from 2012 through 2014 (see table 3). This indicated that schools that utilized the hold harmless formula were likely to experience higher

achievement on the MAP test in Communication Arts from 2012 to 2014. A p value of 0.048923 also indicated that a significant relationship may exist between hold harmless and Communication Arts scores (see table 3). A fourth school demographic measured was assessed valuation.

A small magnitude (.161221) of correlation was determined between assessed valuation and student achievement from 2012 through 2014 (see table 3). This indicated that student achievement may be impacted by assessed valuation. A p value of 0.00023 also indicated that a significant relationship may exist between assessed valuation and Communication Arts scores from 2012 to 2014 (see table 3). This research indicated that students who live in higher assessed property areas score higher on the Missouri Assessment Program. Research also indicated that areas where lower assessed valuation exists, student achievement may be affected. Educators must determine strategies to address lower achievement in those communities where lower assessed valuation exists. The final school demographic evaluated was student achievement and school district size.

No magnitude of correlation (0.072736) was observed between school district size and student achievement from 2012 through 2014 (see table 3). This indicated that school district size may not have affected student achievement according to this study. A p value of 0.09837 also indicated that a significant relationship may not exist between school district size and Communication Arts scores from 2012 to 2014 (see table 3). Because the p -value is greater than the significance level of 0.01, there is inconclusive evidence about the significance of the association between the variables (see table 3).

Table 3: School Demographics and Student Achievement

<u>School Demographic</u>	Number	Pearson r	P
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Per Pupil Expenditure	518	-0.093036	0.034335
Local Effort	518	0.188997	0.00015
Hold Harmless	188	-0.146	0.048923
Assessed Valuation	518	0.161221	0.00023
School District Size	518	0.072736	0.09837

This study determined a small magnitude of significance was found in school expenditures in teacher base pay (see table 2). This indicates that base pay salaries may impact student achievement. Superintendents may want to examine school budgets in order to increase the pay scale for teachers. A small magnitude of significance was calculated in school demographics such as local tax effort and assessed valuation (see table 3). These factors should be addressed by educators when examining ways to positively increase student achievement. Superintendents may want to reach out to their communities in order to increase revenues in these areas. A small magnitude of significance was also found in hold harmless status. Superintendents should examine their budgets closely to ensure they are receiving the highest amount of revenue possible. Local tax effort and higher property values associated with higher assessed valuations indicate higher wealth which in turn creates opportunities for increased base pay for teachers.

However in this study, no significance was discovered in the areas of resources allocated for professional development, per pupil expenditure, or school district size (see table 1 and 2). This may indicate that educators should use high leverage strategies to affect these factors when confronting issues in student achievement.

Summary

The study was intended to determine the nature of the relationship between resources and demographics in Missouri public schools and Communication Arts scores in grades three through eight on the Missouri Assessment Program (MAP) from 2012 to 2014. The financial resources and demographics examined included expenditures on teacher base pay, resources allocated for professional development, and resources based on per pupil expenditure, hold harmless formula, assessed valuation, expenditures from local tax effort, and school size. Data was collected from the Department of Elementary and Secondary Education website to determine the nature of the relationships. A correlation was examined through a Pearson- r with calculated p values. Findings, conclusions, and recommendations are presented in the following chapter.

Chapter Five

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter discusses the implications of the data presented in Chapter Four. First, an overview of the research design and protocol is presented. Second, the findings for each research question are discussed. Third, the findings are compared to the related literature, and conclusions are presented. Based on these findings, suggestions for improved practice and recommendations for future research are included. Summary of the Methods

The data was analyzed using a Pearson-*r* test. The statistical test indicated the nature of the relationship between student achievement and various school resources and demographics. Data was disaggregated to include information regarding money spent on instruction from teacher base pay and resources allocated for professional development. Data on per pupil expenditures, hold harmless funding, assessed valuation, local effort, and/or school district size was evaluated.

After calculating the Pearson-*r* value and the corresponding *p* value for each of the comparisons, the findings were examined and interpreted.

Limitations of the Study

Limitations included the administration of the Missouri Assessment Program in grades three through eight. This study was limited to public school districts in Missouri.

Findings

This section presents the findings for each research question in the study. A correlational analysis with student achievement was examined in regard to school expenditures and school demographics.

Research Question One was designed to determine a relationship between school expenditures and student achievement on the MAP test in Communication Arts in 2012 to 2014 considering factors of teacher base pay and resources allocated for professional development.

Research Question One

What is the nature of the relationship between Missouri school expenditures and scores of advanced or proficient on Missouri Assessment program in grades three through eight? Two factors were examined to determine the nature of the relationship:

- a. What is the nature of the relationship between expenditure in teacher base pay and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?
- b. What is the nature of the relationship between resources allocated for professional development and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

In investigating Question One, statistical significance was observed for teacher base pay salaries but not for resources allocated for professional development. Scores may indicate that as teacher base pay increases, advanced achievement scores may also

increase. Higher pay possibly attracts higher quality teachers with more advanced degrees and more training. However, research has indicated that teacher motivation does not depend upon pay. Hayden (2011) found a common theme for teacher motivation was a love for children and a passion to see them learn. Marcotte (2015) studied teacher motivation and performance pay. In his overall findings, performance pay did not influence motivation of teachers in public schools in Indiana. Other research supports that principal leadership style is a key factor in teacher motivation regardless of years of service or gender (Smith, 1999).

The findings of this study are consistent with the current literature on base teacher pay results. The National Council of Professors of Educational Administration calculated that the most important predictor of student achievement was per pupil expenditures spent on instructional service improvements (James, 2011). Steele (2010) calculated a weak correlation between teacher salaries and student achievement in AYP requirements (Steele, 2010). In an Illinois study, Reilly (2007) established a low significance level between teacher salaries and the top level on state testing composite scores (Reilly, 2007).

Although teacher base pay was considered statistically significant, resources allocated for professional development was not considered significant. Therefore, this study indicates that resources allocated for professional development from 2012 to 2014 on the MAP Communication Arts test did not increase student achievement. The results of this study were consistent with certain literature on resources spent on professional development.

Similar outcomes were obtained by Christiansen (2009) in a Missouri study. Christiansen evaluated a relationship between professional development provided by the Missouri Regional Professional Development Center to student achievement on the MAP test in Communication Arts and Math (Christiansen, 2009). In addition, Dalton (2010) examined professional development expenditures and student achievement for middle school students on state testing in Texas. After determining that there was not a significant correlation between variables, Dalton proposed the following questions:

- How is the money spent?
- What criteria are administrators using to select professional development activities for their staff?
- How much control do building administrators have on professional development expenditures?
- What is the goal of professional development at the high school level?
- Are there other factors for evaluating professional development effectiveness other than student achievement, such as faculty morale, student discipline referrals, or dropout rates? (Dalton, 2010).

Thus, even with a lack of significant findings, there may still be important questions to study regarding the content, context, and process of professional development. Mizell (2011) stated that in order to experience gains in student achievement, professional development must have the following components: (1) specifically articulate the purpose of the professional development to educators and the community, (2) accountability for professional development that improves student achievement, (3) support educator implementation of the professional development, and (4) collect and report data that

documents the results of the professional development. Administrators need to evaluate that the resources that are used for professional development are utilized in a way that promotes student achievement.

In addition to how professional development funding is used, the amount of funding in Missouri has varied as the enforcement of the one percent rule varied. During Fiscal Years 2012 and 2013, House Bill 1543 allowed schools relief from professional development spending (Missouri Department of Elementary and Secondary Education, 2012). The one percent rule was not enforced for professional development in Missouri public school districts. In Fiscal Year 2014, Senate Bill 287 took precedence and schools were required to spend one percent of an LEA's revenues from the foundation formula (Missouri Department of Elementary and Secondary Education, 2013). In 2012, only 94% of Missouri public schools spent money on professional development (Missouri Department of Elementary and Secondary Education, 2012). In 2013, only 95% of Missouri public schools spent money on professional development (Missouri Department of Elementary and Secondary Education, 2013). Since one percent of the funding formula was not spent in all three years, this may have caused irregularities in the data interpretation.

Another concern related to professional development is using the funds to improve student achievement. In Missouri, professional development may include all teacher training, even if not directly related to student success. For example, professional development funds can go for district-wide active shooter training which can be an expensive undertaking. In order to measure the impact of professional development funds, a consistent definition and application of professional development would be

helpful. Administrators should consider supporting safety-related professional development initiatives from budgets other than professional development monies.

Thus, educators should use resources from professional development monies that meet the above criteria.

Research Question One considered the relationship between school expenditures and student achievement. Research Question Two considered the relationship between student achievement and school demographics.

Research Question Two

What is the nature of the relationship between district demographics and scores of advanced or proficient on MAP in grades three through eight from 2012 to 2014? Five factors were considered when addressing this question:

a. What is the nature of the relationship of per pupil expenditure in Missouri and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

b. What is the nature of the relationship between local effort and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

c. What is the nature of the relationship between schools which operate under the hold harmless formula and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

d. What is the nature of the relationship between assessed valuation and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

e. What is the nature of the relationship between school size and scores of advanced or proficient on Missouri Assessment Program in grades three through eight from 2012 to 2014?

Research Question Two was intended to determine the relationship between student achievement and school demographics. This study found three categories of statistical significance in the school demographics examined.

In investigating Question Two regarding school demographics and student achievement, statistical significance was determined in hold harmless funding, assessed valuation, and local tax effort. Scores may indicate that as funding for these specific categories increase, student achievement may also increase. Positive statistical relationships were also shown in other literature regarding school demographics and student achievement.

The results of this study were consistent with outcomes in academic research by Henson (2009), Brazeale (2014), Buck (2011), and Ogle (2007) regarding local tax effort, assessed valuation, and hold harmless provisions.

Literature on local tax effort, assessed valuation, and hold harmless provisions concluded positive results between school demographics and student achievement. Local wealth appears to have a positive impact on student achievement. Brazeale (2014) discovered a weak positive correlation between local tax effort and APR percentage (which factors student achievement into the formula). Henson's (2009) findings had similar positive results in regard to assessed valuation per pupil and student achievement.

Although hold harmless funding appeared to increase student achievement in this study and in Buck's and Ogle's research, Buck (2011) and Ogle (2007) also argued that

hold harmless provisions impeded equity in schools in the long term. The authors argued that it should only be considered a short term solution in school finance (Buck, 2011; Ogle, 2007). In 2012, 30% of Missouri public school districts (157) were considered hold harmless. In 2013, 28% of school districts (145) were hold harmless. In 2014, 35% of school districts (181) were considered hold harmless. As school finance fluctuates, hold harmless status also changes. Administrators should question whether local wealth attracts influential families to a certain neighborhood or if additional monetary resources attract higher quality teachers. Further study on local wealth needs be conducted to answer these questions.

Although positive results were determined in three areas of school demographics, no statistical significance was observed in per pupil expenditures or school district size. These results are consistent to other researchers' findings.

The results of no statistical significance from this study regarding per pupil expenditure and student achievements are similar to the results provided by Hanushek and Lindseth (Hanushek, 2009). Hanushek claimed resources must be spent efficiently to be effective but the term efficient was not defined (Hanushek, & Rivkin 2007; Hanushek & Lindseth, 2009). The National Council of Professors of Educational Administration determined that the most important predictor of student achievement was per pupil expenditures spent on instructional service improvements (James, 2011). The authors' results also indicated that resources spent per pupil should be used toward teacher salaries and less toward instructional services such as academic coaches, curriculum specialists, or professional development (James, 2011). This may indicate that money spent on per pupil expenditures do not increase student achievement unless spent on teachers' salaries.

As well as per pupil expenditure, research conducted on school district size did not indicate a significant relationship. This study's results are consistent with current literature on the subject.

In 2006, Diaz shared similar results from a study conducted in Washington State. He found that there was no correlation between the relationship between student achievement and school district size nor was school district size considered a predictor of student achievement (Diaz, 2006). McNeece (2008) reported a low positive significance result between school size in non-urban elementary schools and high schools but no significant relationship was identified with any other groups such as urban, suburban, and rural schools, elementary, middle school, and high school groups compared to Mississippi state testing achievement results (McNeece, 2008). This may indicate that school district size may not impact student achievement regardless of which state test is being utilized.

The findings in this study revealed that a significant relationship existed between school expenditures and school demographics with student achievement. The results indicated that a significant relationship existed between student achievement when compared to teacher base pay, local tax effort, assessed valuation, and hold harmless provisions. The conclusions of this study reveal two critical themes that emerge for administrators when finding high leverage strategies for improving student achievement.

Conclusions

Educators strive to find high leverage strategies in order to increase student achievement. School expenditures and demographics are important pieces of the puzzle when addressing student achievement. After analyzing the data and comparing the

findings to the literature, two critical themes emerged in this study. Building upon this research, several recommendations can be made in order to address student achievement in school expenditures and demographics. Each theme includes recommendations for educational administrators.

The first critical theme that emerged when investigating expenditures was that school expenditures may affect student achievement.

The first critical theme that emerged is related to the school expenditures that are positively correlated with student achievement. According to this study and the literature, educational leaders should further examine the relationship between teacher base pay salaries and student achievement. Administrators should consider recruitment incentives for attracting high quality teachers. Another alternative for increasing teacher pay would be stipends for tutoring or mentoring new teachers. Although professional development opportunities have other benefits, this study and other research indicates that resources allocated for professional development is not correlated with student achievement. However, the impact of context, content, or process was not examined in this study. For example, the Florida Protocol System, Florida's Department of Education's professional development system, requires all monies paid with professional development funds to be focused on content knowledge and content-specific research and/or evidence-based instructional strategies and interventions (Slabine, 2011). The state of Missouri has no requirements on their professional development monies. Legislators may want to consider requiring research-based practices as a requirement for professional development monies.

The state requires that a minimum of district revenue be spent on professional development and districts should comply; however district administrators may want to examine these correlations in greater depth to determine whether money spent on teacher base pay has the potential to be most beneficial to student achievement. Educators may also examine the context, content, and process of high quality professional development to address gains in student achievement.

The second critical theme when determining the high leverage strategies for increasing student achievement is in the area of school demographics. Specifically, this study calculated a positive relationship in the areas of local tax effort, assessed valuation, and hold harmless funding to student achievement. This study indicated that local tax effort and assessed valuation may be important factors in student achievement. One way superintendents may address issues with low local tax effort and low assessed valuation may be to work with community leaders in order to bring in businesses that could be an economic driver for increasing school funding. Superintendents must also advocate for their students by continually informing community members of the high costs associated with a quality education. School boards may consider proposing tax increases to their communities in order to help support the high cost of education. Superintendents may need to consider strategies for improving student achievement in areas that have low local tax effort and low assessed valuation.

Superintendents and school boards should examine closely the relationship between the local school resources and the community resources. By consistently evaluating the hold harmless provision, an increase in revenues may occur. This increase in revenues may be applied to an increase in teacher base pay. This is consistent with

current research on school resources and demographics and student achievement.

Hanushek and Rebell agreed that consideration of resources and demographics can positively affect student achievement (Hanushek, & Rivkin 2007; Rebell & Wolff, 2008; Rebell, 2009; Hanushek & Lindseth, 2009).

Thus, two critical themes emerged from the study and the literature. The findings of the study did have limitations which are included in the following section. In addition, suggestions for future research also emerged. Limitations to the study were considered when evaluating the results.

Suggestions for Future Research

Building upon this research, several recommendations can be made regarding the nature of the relationship between Communication Arts scores and district demographics and school expenditures. The review of literature outlined a basis for teacher base pay salaries, professional development, per pupil expenditures, local tax effort, holds harmless funding, assessed valuation, and school district size. It provided information from the Missouri Department of Elementary and Secondary Education on school accountability and school finance. In future research, super subgroups could be evaluated for statistical significance. Specifically, it could be beneficial to evaluate the impact of Average Daily Attendance, students with Individualized Education Programs, English Language Learners, and students on Free and Reduced Lunch on the Missouri Assessment Program. Examining causation rather than correlation would also provide important information for educators.

Summary

Because of the increase in school accountability, educators must find high leverage strategies to ensure increased student achievement. The research provided insight into which demographics and expenditures are positively correlated with student achievement in Missouri public schools. This study found that factors in both school expenditures and school demographics may have a significant relationship to student achievement. Specifically, addressing factors in school expenditures by evaluating teacher base pay and the impact on student achievement. By evaluating school demographics, administrators should address revenues received in local tax effort and assessed valuation. According to the results of this study, administrators should also reevaluate the hold harmless provision.

Although correlation was observed in teacher base pay, local tax effort, assessed valuation, and hold harmless provisions, correlation was not discovered with all of the factors considered. There was no correlation determined in resources allocated for professional development, per pupil expenditures or school district size. This study was intended to provide information for administrators to find high leverage strategies to improve student achievement.

Many factors combine to create an educational environment that enhances student learning. This researcher attempted to isolate a few factors to examine a direct correlation. Although some correlations were more significant than others, all of the factors are important and will continue to work together to enhance public education in Missouri.

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APPENDIXES

Appendix A: MAP Validity and Reliability

The Missouri Assessment Program:

Score Use, Meaningfulness, and Dependability

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

The MAP currently includes mathematics assessments for grades 4, 8, and 10; communication arts assessments for grades 3, 7, and 11; science assessments for grades 3, 7, and 10; social studies assessments for grades 4, 8, and 11. Each MAP assessment requires about three hours of testing time, and most assessments include three types of test items: multiple choice, constructed response, and performance events. For most assessments, the multiple-choice component is the survey portion of the Terra Nova, a nationally normed achievement test published by DESE's MAP contractor, CTB McGraw-Hill. (The social studies assessments include multiple-choice items that are not from the Terra Nova and the health/physical education and fine arts assessments do not utilize any Terra Nova items, although they do contain multiple-choice items.)

Constructed-response items require students to supply an appropriate answer and, in some instances, to show their work. Performance events call for students to work through more complicated problems and may allow for more than one approach to arrive at a correct answer. All three of these item formats, but especially the latter two, require students to apply what they have learned to complex, real-life situations.

Appropriate uses of MAP scores

MAP scores provide information about what individual students know and can do relative to the Show-Me Standards. For individual students, DESE and CTB report a MAP scale score, a MAP achievement level, and a Terra Nova national percentile. Educators may use these quantitative and qualitative results to make inferences about student's proficiency relative to the content and process Standards assessed at that grade and subject. Educators and policy makers may appropriately use MAP results for groups of students to judge the effectiveness of educational programs and services offered at the local level. DESE uses group-level data from the MAP in the Missouri School Improvement Program review process, and DESE encourages district personnel to use these scores to conduct their own internal evaluations, to monitor progress over time, and to inform planning for the future. DESE also uses data from MAP administrations to report to the public about the quality of education in the state. Judging the quality of assessment results

When we judge assessment results, we must consider two important qualities—how meaningful or “valid” the results are for their intended purpose(s) and how dependable or “reliable” the results are. These two characteristics are closely connected; in fact, score dependability limits score meaningfulness. We can evaluate assessment data by

examining score dependability, but we must also consider score meaningfulness if we want to arrive at sound judgments, about the worth of results.

Meaningfulness or “validity” of MAP scores

First and foremost, we ensure the meaningfulness or validity of MAP scores as indices of proficiency relative to the Show-Me Standards by using methodical and rigorous test-development procedures. CTB and DESE have developed MAP assessments in accordance with accepted procedures and criteria (as articulated, for example, in Standards for Educational and Psychological Testing, AERA, APA, NCME, 1985), intentionally aligning MAP assessments to the specific Show-Me Standards being measured at that grade and subject area. For each assessment, content experts determined that the Terra Nova items for that grade and subject measure the Standards, and Missouri educators wrote constructed-response items and performance events that match the designated Standards. Then, groups of Missouri educators reviewed each item to insure that it did indeed measure the content or process called for in the Standard. The “item-to-Standard” congruence ratings that these reviewers produced provide evidence for the meaningfulness of MAP scores.

Another way to verify the meaningfulness of MAP scores is to investigate the underlying psychological traits or “constructs” that a given assessment measures. CTB and DESE routinely examine how performance on individual items related to performance on other items and how performance on an individual item relates to performance on the entire assessment. The various item- and score-pattern analyses conducted on MAP results show that each assessment is measuring the traits it is intended to measure (e.g., communication arts assessments measure reading and writing skills) and does not

measure unrelated constructs.

A third type of evidence supporting the meaningfulness of MAP results comes from a recent study of the “consequential validity” of the MAP. This research, conducted in 1999 by the Center for Learning, Evaluation, and Assessment Research at the University of Missouri-Columbia, investigated the consequences resulting from the implementation of the MAP, focusing specifically on changes in instructional practices in mathematics. Researchers concluded that changes are occurring, primarily in the area of teacher beliefs and perceptions. Study results indicated that teachers are becoming more convinced of the work of authentic learning activities and assessment methods. In addition, researchers found that teachers are revising their grading practices as a result of the MAP, using more performance-based methods to determine grades than in the past. The process of collecting evidence for the meaningfulness of assessment data is ongoing, as is the process of ensuring meaningfulness through sound test-development procedures. CTB and DESE will continue to conduct validity studies on future editions of the MAP and to build meaningfulness into results by adhering to industry standards during test-development stages. However, we have very firm evidence that the MAP assessments yield scores that are valid, given the stated purposes of the program. Scores provide information about students’ attainment of the Show-Me Standards and can be appropriately used to fulfill the charges stipulated in the Outstanding School Act.

Dependability or “reliability” of MAP scores

We build score dependability or reliability into the test-construction process, just as we do score meaningfulness. We know that all educational test scores reflect some degree of error; no mental measurement is perfect. We also know that error can come from a

variety of sources: the instrument itself, the examiner, the assessment environment the scoring process, and, in the case of assessments like the MAP, in the process of establishing cut-point scores for the various achievement levels. How much error are we willing to tolerate? The answer to this question varies depending on the purpose of assessment. Scores that are used to make high-stakes decisions for individuals must be more dependable than scores that are used to make decisions of lesser import or judgments that pertain to groups of students.

Developers of educational assessments make every effort to create high-quality instruments that will yield dependable (and, of course, meaningful) scores. In an assessment program like the MAP, which includes constructed-response items and performance events that must be scored by knowledgeable scorers (as contrasted to selected-response items that can be scored by a machine using a key), developers also go to great lengths to ensure that the scoring process yields consistent information. CTB and DESE have put stringent procedures in place to ensure reliable scoring of MAP items.

*Dependability of scale scores

Score dependability or reliability can be quantified and reported as a number ranging from 0 to 1; the higher the coefficient, the more dependable the score. Table 1 presents reliability coefficients for MAP assessment scale scores for every operational year. All coefficients are high and indicate that we can have confidence in MAP scale scores. (It is important to keep in mind that it is these overall 1 scale scores for each assessment that are used for decision-making purposes.)

*Dependability of scores from open-ended items

While we appropriately place primary emphasis on the overall reliability of a given MAP

assessment score, we also have to consider the dependability of the scores derived from the subset of items that are judged by human readers—constructed-response questions and performance events. We know that we lose a bit of reliability when we use open-ended items that cannot be scored by a machine. However, what we lose in reliability, we gain in meaningfulness or validity—these types of items are much more representative of “real life” than multiple-choice items. (And, given the reliability coefficients for MAP scores, it is clear that we are not losing much in the way of dependability.)

One way to think about the dependability of open-ended item scores is to consider the percent of perfect agreement—the percent of cases for which two readers assign the same response the same score. Table 2 shows the median percent of perfect agreement for the 1999 and 2000 MAP assessments. These indices range from 75% to 96% and suggest that scorers are reaching perfect agreement much of the time.

Yet another way to think about the dependability of open-ended item scores is to consider the percent of adjacent agreement—the percent of cases for which two readers assign scores that are adjacent to (within one point of) one another. When adjacent agreement is used as the basis for defining reliability, percents of agreement are much higher; in fact, most of these indices are well above 95%. For example, on the 1999 communication arts grade-7 assessment, the percent of adjacent agreement ranged from 95% to 100%, with the median percent equal to 99%. On the 1999 mathematics grade-10 assessment, the percent of adjacent agreement ranged from 92% to 100%, with the median percent equal to 98%.

*Dependability of achievement-level classifications

CTB and DESE use the “bookmark procedure” to set achievement levels (step 1,

progressing, nearing proficiency, proficient, advanced) for the MAP assessments. This approach, which is described below, has been successfully applied to a number of state assessment program achievement-level settings. In this procedure, standard-setting panels are given booklets with items ordered according to level of difficulty. Panelists study the ordered item booklets to observe the increase in the knowledge, skills, and abilities required of students as the items increase in difficulty. They examine each item, discussing what the item measures and why it is more difficult than preceding items in the booklet. Each panelist moves through the ordered item booklet until the level of item difficulty surpasses that which the given achievement-level students (e.g. proficient) should be expected to know and be able to do (based on the panelists' expectations and the Show-Me Standards). Each panelist places a bookmark at this position in the ordered item booklet. One bookmark, is placed for each of the required cut points. Items preceding participants' bookmarks reflect content that all students at the given achievement level are expected to know and be able to do (according to panelists' expectations). Several rounds of judgments occur, and cut points are ultimately determined that translate the panelists' expectations into appropriate achievement levels. The bookmark procedure incorporates expert judgments as well as empirical data into the achievement-level setting process, so it builds a great deal of information into the cut-point scores. However, like examinees' scores, cut-point scores reflect some degree of error. Nevertheless, a careful inspection of reliability data for the achievement-level cut points indicates that the achievement-level classifications are highly reliable, especially given that panelists are creating five categories of performance. The degree of error associated with the cut-point scores is very low, ranging from 1 to 6 scale score points

across the mathematics, communication arts, and science assessments.

*Comparing MAP reliability data to data from other tests

It is worthwhile to compare these MAP coefficients with reliability data for other tests of a similar nature; Table 3 presents a sampling of this sort of data. Such a comparison shows that the dependability of MAP scores compares quite favorably with the reliability of scores from other well respected instruments that incorporate open-ended as well as selected-response items.

Conclusion

There is ample technical evidence to support the claim that MAP scores are reliable and valid measures of achievement relative to the Show-Me Standards. They are, in fact, more reliable than results from several other tests that are used of similar purposes. CTB, DESE, and Missouri educators can and should have confidence in MAP results.

Table 1			
MAP Scale Score Reliability Coefficients 1997	1998	1999	2000
Mathematics			
Grade 4	.919	.921	.915
Grade 8	.931	.927	.927
Grade 10	.936	.940	.929
Communication Arts			
Grade 3	.920		.915
Grade 7	.932		.905
Grade 11	.939		.919
Science			
Grade 3	.907		.903
Grade 7	.915		.875
Grade 10	.916		.908
Social Studies			
Grade 4		.918	
Grade 8		.906	
Grade 11		.925	

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