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BY

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## Dedication

This dissertation is rooted in the encouragement, prodding, and financial support from Ted R. Savage. If not for his generosity and faith, this study would not exist. Ted spurred me toward the goal of earning a Ph.D. not just for me, but also as a legacy and example for my children. I wish that I could hand him a bound copy of this finished work and tell him thank you again, face to face. Ted Savage was a leader and an inspiration to everyone who knew him. Gramps, this dissertation is dedicated to you.

For Olivia, Channing, and Nash. This work never defined me, but you always will. You are the *summaries* of my time on earth. I hope you view this book as a reminder to never to give up on yourself and your goals. If you put your mind to it, you can accomplish anything. Plus, if you read the whole thing, there may be some money in it for you.

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## **Abstract**

From 2009 to 2014, school districts in Oklahoma faced the challenge of educating a growing population of students to high academic standards and increased accountability while state aid has been restricted to flat or negative levels annually. These circumstances have left many stakeholders concerned about the adequacy of education funding in Oklahoma.

There is no evidence of empirical research into the issue of school funding adequacy in Oklahoma between the years of 2005 and 2015. Therefore, this study presents new knowledge about how district spending correlates with student achievement as an indication of the level of Oklahoma education funding adequacy. The results and conclusions provide perceptions of the current financial condition to assist the reader in judging whether changes are necessary to improve fiscal support for schools.

This study incorporated the Successful School District model of analysis and binary logistic regression to discover how instructional and administrative expenditures related to high levels of academic achievement. The analysis compared two groups of school districts that were demographically similar yet displayed varying degrees of academic achievement in order to determine if there was a statistically significant difference in their spending.

# CHAPTER ONE

## ADDRESSING THE NEED FOR EDUCATION FINANCE RESEARCH IN OKLAHOMA

Questions about what an adequate education is and what that education may cost have perplexed numerous researchers, policymakers, economists, and educators for many years. The most baffling part of the question is the word “adequate” to which there is not a simple and universal answer. Certain experienced researchers have defined adequacy as a standard of academic achievement or as the opportunity to reach maximum potential as measured by certain essential inputs and required outputs (Augenblick, Myers, & Anderson, 1997; Berne & Stiefel, 1999; Jacobs, 2010; Odden, Goetz, & Picus, 2007).

Federal and state laws established the concept of adequate yearly progress (AYP) to operationalize and define an adequate education where students must meet particular performance targets including satisfactory test scores, GPA levels, or a demonstration of academic improvement from one year to the next (Hemelt, 2011). The cost of that adequate education depends on a multitude of contributing factors such as the size of a district’s local tax base, state budget constraints, and a lot of political will (Berne & Stiefel, 1999). Those factors have the power to both enhance and weaken the adequacy of educational funding.

In my attempt to shed light on the adequacy of education funding in the state of Oklahoma, I designed this examination of the relationship between student academic achievement and the educational expenses associated with that achievement incurred by a sampling of Oklahoma school districts. The questions of adequacy and the financing necessary to reach it remain complex due to diverse factors contributing to the makeup of individual school districts, which in turn, are not uniform across a state let alone the nation. Consequently, this study can only function as a snapshot of the state of Oklahoma during a period of certain economic conditions with unique student demographics and certain school district achievement levels where a particular amount of financial support expended in a specific manner facilitated high academic achievement.

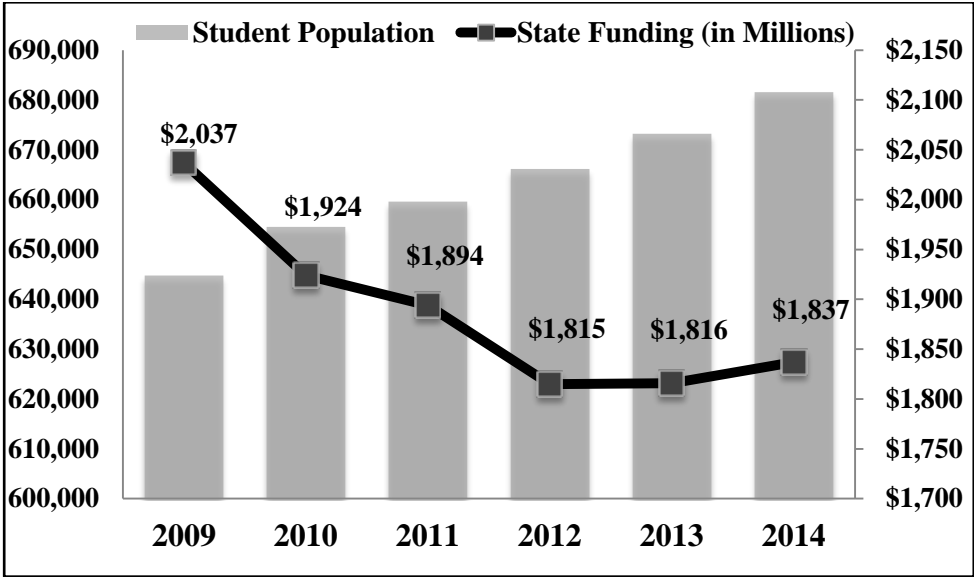
### **Background of the Problem**

During the past fifteen years, the state of Oklahoma has experienced growth and prosperity as well as recession and diminution. The funding patterns of Oklahoma's state-aided education system has followed suit. The state of Oklahoma appropriated \$4.9 billion to common education in 2000 and the school systems kept experiencing a general trend of growth throughout the decade reaching its pinnacle at \$7 billion in 2009. Then the national economy took a substantial downturn and financial resources for public education felt the brunt of the blow. Oklahoma public schools have received level or negative funding from the state from FY 2009 to FY2014. Per-pupil spending has fallen

by more than 23% (adjusted for inflation) since 2008, which is the deepest cut in the nation (Leachman & Mai 2014; Oklahoma Policy Institute, 2014b).

Concomitantly, during this funding decline, Oklahoma public schools experienced a steady increase in student population along with a wave of stricter accountability in the form of required federal and state mandated services (Ballard, Case, & Maiden, 2014). This study will account for funds expended for instructional and administrative activities in high achieving school districts and a comparison group of districts in order to understand the relationship that spending had with achievement from FY2009-2014.

**Figure 1.1: Oklahoma School Funding and Student Enrollment 2009-2014**



(Oklahoma Policy Institute, 2014a)

During this time, the flat or negative funding coupled with increases in enrollment and increases in required services certainly set the stage for a glaring deficit or dramatic reduction in non-essential services. Political leaders and

school administrators have voiced concerns about this problem and have pleaded with the state for additional funds for schools to little or no avail.

The funding problems for Oklahoma schools are bound to get worse before they get better. From 2009 to 2014, educational funding dropped by approximately 200 million dollars and student enrollment increased by over 36,500 students (Oklahoma Policy Institute, 2014a). In addition, the Oklahoma state legislature recently introduced new mandates that demand more accountability and higher standards for students and educators alike. Two examples of this are the new teacher evaluation system, Teacher Leader Effectiveness (TLE), based on teacher professional development and student performance and the reauthorized Reading Sufficiency Act of 2011, which essentially ended social promotion at the third grade level (Ballard et al., 2014).

Clearly, in Oklahoma, as in many other states, education finance has not kept up with the growing trends of high stakes accountability. Elected policymakers create the standards and the penalties and design the budgets for financing the educational system. However, when they declare a cost for reaching expected achievement goals, they frequently do so incorrectly and without fully understanding what they are doing (Augenblick, Palaich, & Associates, 2007). Therein lays the problem addressed by this study.

## **Statement of the Problem**

Oklahoma public schools face the difficulty of constricted budgets and scarcity of resources to provide educational services to a growing population of students. A part of the problem is that Oklahoma continues to enforce state mandated programs that are underfunded. Among those are the Achieving Classroom Excellence (ACE) Remediation program, which is funded at one-third of the level required under the law and the controversial Teacher Leader Effectiveness (TLE) evaluation system that was mandated to districts statewide accompanied with about half of the necessary funding (Ballard et al., 2014). Accountability for Oklahoma public schools is on the rise while state education funding is declining.

Another disconcerting condition that exists in Oklahoma is a stark lack of adequacy research in the field of education funding. The Oklahoma state legislature commissioned an inquiry into the state's education funding adequacy in 2003 (K. Bishop, personal communication, November 26, 2007). The experienced consulting firm of Augenblick, Palaich, and Associates (APA) completed a pair of studies in 2004. Yet the state did not publish or publicize the findings nor did they implement any of the firms suggestions based on the findings.

The historical record of school funding and appropriations in Oklahoma is easy to locate and review. However, the current body of literature yields no evidence that researchers have recently documented or widely published the cost



of adequately educating students in Oklahoma's environment of regulatory accountability and student population growth. The problem empirically investigated in this study is one of understanding how the cost of an adequate education, as approximated by expenditures, relates to achievement across a sampling of Oklahoma school districts.

### **Purpose of the Study**

This study investigated the cost of educating a student in a high achieving school district as estimated by district expenditures. In essence, this study explored the adequacy of education funding in Oklahoma. A determination of the cost of an adequate education and knowing whether costs vary among school districts of differing achievement levels would prove useful to policymakers and school administrators as they prepare budgets and establish educational services for students across the state.

### **Research Questions**

The questions examined in this study focus on the relationships between school district spending and student achievement. For the purpose of this investigation, expenditures serve a proxy for costs. When policymakers and other concerned stakeholders have a better understanding about how school districts spend money, then they can better appraise the level of education funding adequacy.

1. Do instructional expenditures predict a high level of achievement?
2. Do administrative expenditures predict a high level of achievement?

3. Do district expenditures other than instruction and administration predict a high level of achievement?
4. Is there a significant difference between the expenditures of high achieving districts and the expenditures of demographically similar districts not classified as high achieving?

### **Significance of the Study**

Adequacy as it pertains to education and funding for education has a strong presence in the activities of social science researchers, elected policymakers, courtrooms, and individual classrooms. Many states have commissioned adequacy studies in order to arrive at a dollar figure that would fund an adequate education for the students enrolled in that state's public schools. The state of Oklahoma has yet to release a study that provides empirical evidence that defines an adequate dollar amount to spend per pupil along with the reasoning behind the proposed funding amount.

This study provides information about how high achieving school districts in Oklahoma spent instructional and administrative dollars as part of the overall funding picture. As mentioned previously, some evidence concerning the adequacy of Oklahoma public school funding does exist. However, this decade-old, two-part study commissioned by the state of Oklahoma has remained unpublished.

Research in this particular field is sparse. This dissertation can furnish empirical evidence that describes the adequacy of Oklahoma public school funding and the spending efficiency of school districts that will fill a void in the current body of literature.

### **Definitions**

*Adequacy* is an ideology, a field of research, and an area of litigation where a determination is made whether a school district is provided with sufficient funding to afford an adequate education for its students (Augenblick et al., 1997; Augenblick et al., 2007; Baker, Taylor, & Vedlitz, 2004; Jacobs, 2010; Guthrie & Rothstein, 1999; Knoepfel, Verstegen, & Rinehart, 2007; Odden et al., 2007; Springer, Liu, & Guthrie, 2009).

An *adequate education* is one where students have met required state established academic standards (Baker & Green, 2008; Deering & Maiden, 1999; Picus & Blair, 2004; Darby, 2011; Springer et al., 2009).

The *administrative expenditures* highlighted in the research questions include the sum of administrative salaries for the district superintendent, the building level principals, and the support staff for those offices.

In general, education systems achieve *equity* when all school districts have the same level of access to funds and educational opportunities (Berne & Stiefel, 1999; Clune, 1995; Downes & Stiefel, 2008; Jacobs, 2010; Oden & Picus, 2004; Springer et al., 2009). Equity is typically defined in terms of two separate concepts: horizontal equity and vertical equity.

*Horizontal equity* is achieved when students with well-matched attributes are treated relatively the same (Downes & Stiefel, 2008). The related literature refers to this as the equal treatment of equals (Berne & Stiefel, 1999; Crampton & Thompson, 2011).

*Vertical equity* exists when students with different abilities or certain disadvantages receive some type of additional aid or consideration. Researchers call this the unequal treatment of unequals (Jacobs, 2010; Oden & Picus, 2004; Springer et al., 2009).

The adequacy of school funding relates closely to the *efficiency* of spending. To acquire efficiency, a school district should equalize the ratio of inputs to desired outputs by eliminating spending on efforts not related to improving student performance (Knoeppel et al., 2007; Jacques & Brorsen, 2002).

*Fiscal neutrality* is the condition in which differences among per-pupil expenditures are due to individual student needs and not related to the wealth of the local school district (Baker & Levin, 2014; Minorini & Sugarman, 1999).

The research questions include queries about *instructional expenditures*. Instructional spending encompasses salaries and benefits for teachers, teacher's aides, interpreters, and tutors.

The *Successful School District Model of Analysis* (SSD) is simply the name of an analytical process by which we evaluate the actual expenditures of a school that meets required achievement standards. There is no implication of

overall student, teacher, or school quality (Augenblick et al., 2007; Baker et al., 2004; Guarino & Tanner, 2012; Picus & Blair, 2004).

### **Conceptual Framework**

The concept of fiscal adequacy often is associated with fiscal equity. Both concepts share the element of funding, however, they differ in the way that funding is viewed and applied. The basic difference between the two concepts is that equity is the provision of equal educational opportunity through equal funding for all districts while adequacy is provision of sufficient funds to meet the expense of adequate educational opportunities for all students (Corcoran & Evans, 2008; Jacobs, 2010).

Equity studies determine ways to establish a formula for spreading funding equitably so that no district will have excess monies while other districts experience deficiencies. Adequacy studies provide a base cost for educational services or a funding formula that provides for an education that meets established academic standards. This inquiry into Oklahoma school funding and district spending did not culminate in a suggestion for a funding formula. Rather, this study revealed how schools are utilizing the available resources under the current funding structure to attain high academic achievement and determine if current funding is indeed at an adequate level to meet that goal.

Educational opportunity for all students, which can include ideas too lofty for classroom application, is the overarching theoretical aim of policy and practice. In the real world of accountability, academic achievement indicated by

test scores, grade point averages, and graduation rates of students are the tangible outputs demanded from various governing agencies.

There are many ways to provide an adequate education to the masses and the cost can vary greatly depending on the kind of educational opportunities offered by a school district. In order to make the complex notion of adequacy more accessible, researchers identify or at least estimate the cost of an adequate education through use of one of several existing school funding analytic models.

Adequacy research can be viewed as a variety of methods within a continuum ranging from resource-oriented analysis to performance based analysis, or put another way: input versus output (Baker et al., 2004; Downes & Stiefel, 2008). Studies that emphasize the resources needed for an adequate education and the costs incurred may employ one of the following methodologies: Professional Judgment or Evidence Based.

The Professional Judgment model incorporates interviews with experts in the field of education who will build a hypothetical educational environment with the necessary resources that will allow students to reach certain performance goals and then assign a price or value for such an educational environment (Guarino & Tanner, 2012; Picus & Blair, 2004). The Evidence Based method is similar to Professional Judgment in that they both establish the resources needed for academic success prior to analysis. However, researchers using the Evidence Based method identify resources through analyzing current

education research instead of using the opinions drawn from a panel of experts (Picus & Blair, 2004).

Studies that use performance as the basis of analysis typically employ one of the following methodologies: Successful School District (SSD) or Cost Function. The SSD method identifies actual expenses per pupil incurred by school districts that are attaining specific educational outcomes (Baker et al., 2004; Guarino & Tanner, 2012; Picus & Blair, 2004). The Cost Function approach relies on an econometric style of statistical analysis to ascertain the inputs necessary for a desired level of outcomes (Bhatt, Rodriguez, Wraight, & Best, 2010; Picus & Blair, 2004).

The outcome or performance oriented methods, Successful School District and Cost Function, use lesser detailed financial information than the resources oriented methods and do not offer any information about the ideal resources needed for academic success (Baker et al., 2004; Downes & Stiefel, 2008). The input or resource oriented methods, Professional Judgment and Evidence Based, rely on dependable resource cost information while viewing performance standards as less important in determining adequacy (Baker et al., 2004; Downes & Stiefel, 2008).

Adequacy research is a prominent field of study because the empirical evidence and practical findings prove useful in establishing a cost for financing academic achievement. The challenge is making a theoretical cost of an adequate education work in a concrete and finite budget (Augenblick et al.,

1997). Often an investigator may apply a mixture of the methods in order to arrive at realistic cost or funding figures. No determination of cost offered by an adequacy study can be an absolute certainty. However, this line of research has the power to guide policymakers toward using available funds in a responsible way through practical application of empirical results.

### **Assumptions**

The underlying assumption of this study was that certain school districts could provide a useful example of how to best utilize funding to reach desired high academic achievement outcomes. The driving logic behind this research was that money alone would not precipitate academic success. Rather, it is where and how efficiently the money is spent that will classify academically successful schools and can help inform funding decisions. Examining the instructional and administrative expenditures of high achieving school districts can assist policymakers establish a minimum level necessary to fund all districts.

Within each district, some students will require additional funding to reach the required level of academic success. One should calculate adjustments to cost figures for these select student groups. Modifications based on additional weights for students who may be in poverty, who are learning English as a second language, who are at risk, who have a disability, or who are assigned to an Individualized Education Program do exist in the education funding structure currently in place in Oklahoma. However, the data used in this study consisting of test performance, instructional and administrative expenditures, and other



district information do not contain any figures or statistics that include special educational services.

### **Overview of the Analytic Method**

The Successful School District (SSD) method identifies actual expenses per pupil incurred by school districts that are achieving specific educational outcomes (Baker et al., 2004; Guarino & Tanner, 2012; Picus & Blair, 2004). This approach is based on the reasonable belief that school districts that currently meet academic standards are likely spending an acceptable and sufficient amount of money to achieve their success (Downes & Stiefel, 2008).

Augenblick et al. (2007) described the SSD approach as an analytical method that delivers a realistic estimate of the base cost of an education compared to the performance of a school district in a particular place and time.

It is important to note that, while identified districts might be labeled ‘successful’, it is not accurate to refer to other districts in the state as unsuccessful. Other districts may, in fact, be making significant positive strides with student performance even though they do not now meet the definition of ‘success’ used in the SSD analysis (Augenblick et al., 2007, p. 5).

I do not attempt to make any argument that one group of students, teachers, and administrator are successful while others are failing. My intentions are to find relationships between high achievement test scores and district expenditures without commenting on the quality of the schools. Successful School District is simply a label applied and used by researchers to reference a specific analysis approach, not judgement about districts that have avoided

failure as compared to another group. I encourage the reader to keep this in mind while reading this study.

### **Summary**

Public school districts in Oklahoma are facing a funding problem where budgets are restricted while student enrollment and academic accountability are increasing. The SSD model that is applied in this study may suitably answer the questions of what levels of school funding are necessary for facilitating high achieving schools. This model will analyze spending patterns exhibited by academically successful school districts and arrive at an average cost for funding two educational inputs: instruction and administration, which are two widely accepted predictors of academic success of a school district.

Knowing the spending patterns of high achieving school districts could be very beneficial to the policymakers who establish the funding for all Oklahoma schools. This information could positively influence the design of yearly budgets for school aid as well as assist districts across the state reach a desired alignment with a calculated standard of fiscal adequacy.

## **CHAPTER TWO**

### **SCHOOL FUNDING ADEQUACY FRAMEWORKS, LITIGATION, AND LITERATURE REVIEW**

The adequacy of education funding has been the focal point of a number of studies over many years (Augenblick, 2003; Baker et al., 2004; Estrada, 2010; Guarino & Tanner, 2012; Guthrie & Rothstein, 1999; Jacobs, 2010; Knoeppel et al., 2007; Perez et al., 2007; Picus & Blair, 2004; Wood, et al, 2007). Concerns about whether or not states were providing adequate school financing emerged from issues of inequitable funding that have been studied and litigated since the early 1960's (Augenblick, 2003). The move toward adequacy as a concentration of research is due primarily to the standards-based reform movement and the many court cases related to the provision of money to facilitate an adequate education (Daniel, 2010).

This dissertation focused primarily on the cost of providing an adequate education for Oklahoma schools as indicated by instructional and administrative expenditures of academically successful schools. That information potentially exemplifies what an adequate level of spending is and therefore what schools need from a budgetary standpoint to facilitate an adequate education. In order to create and execute this examination of school finance, I constructed this review of previous adequacy research methodologies, research findings, and litigation motivated by school finance issues.

This chapter forms the foundation for my examination of the cost of an academically successful education and the general state of education finance in Oklahoma. In this review, I explore the issues of equity and adequacy within school finance to determine how money has proven to influence achievement.

From there, this narrative will transition into a review of how legal actions and court decisions have shaped the measures taken by some states to correct and improve the adequacy of school funding. I then establish the need to revive explorations and inquiries of Oklahoma's education finance adequacy. Finally, I review the various analysis methodologies that have evolved to fit the wide-ranging needs of adequacy research and endorse the specific model used in this current study.

### **Matters of Equity and Adequacy: A Literature Review**

Within the context of school finance, equity is the concept of making educational opportunities, facilities, and funding the same for all students while adequacy is the degree to which the funding for schools supports the desired academic outcomes. The federal constitution provides for equal protection of citizens' privileges but it is silent regarding specific education rights which individual states establish and make compulsory (Thompson & Crampton, 2002).

State constitutions offer both an equal protection clause and a provision for an adequate education but have little to nothing to say about the processes of how to achieve equality of services and adequacy of funding (Baker & Green,

2008). Therefore, these concepts began to take shape in the courts. Those court decisions have been utilized in the manufacture of funding formulas across the nation (Baker, 2005; Baker et al., 2004; Corcoran & Evans, 2008; Thompson & Crampton, 2002). Augenblick et al. (1997) summarize the search for equity and adequacy thusly:

Much of (the) litigation and legislative activity in education funding seeks to assure 'adequacy', that is, a sufficient level of funding to deliver an adequate education to every student in the state. Most states have not explicitly addressed the questions of how much education is 'adequate' or how educational standards can be converted to a finance formula. Ensuring equity and adequacy of education funding are two of the most complex problems facing state legislatures. Not only are the concepts of equity and adequacy difficult to measure and to implement, but every state must meet the needs of a large number of school districts, which usually vary considerably in their student characteristics and, costs of doing business, ability and willingness to raise local tax revenues, and local preferences for educational services (pp. 63-64).

Some scholars in the field of education finance contend that when school funding is adequate there will be sufficient financial support to provide students the opportunity for an education that meets the achievement goals defined by the state (Ellinger, Wright, & Hirlinger, 1995; Clune, 1995; Holmlund, McNally, & Viarengo, 2010; Odden & Picus, 2004; Spears, 2014).

Conversely, other researchers and policy analysts claim that money does not have a significantly positive affect on student performance (Hanushek, 1997; Hanushek, 2006; Husted & Kenny, 2000; Jefferson, 2005). Adequate funding does not guarantee academic success and money alone does not make the opportunities for educational growth and achievements materialize. According

to other studies, a multitude of other factors can enhance or undermine the success of students (Corcoran & Evans, 2008; Springer et al., 2009; Underwood, 1994).

Perhaps the most notable critic of increasing school funding to improve student achievement is Eric Hanushek. In his body of work, Hanushek (1994, 1996) has contended that the problem is not the amount of money furnished to schools, but rather the effectiveness or efficiency of how the money is spent. Hanushek goes further by even arguing that the current methods for determining the figures amounting to adequate funding are flawed and “fall short of scientific standards of inquiry and validity” (Hanushek, 2006, p. 3). Hanushek’s 1997 analysis of the findings from 377 different studies about adequacy resulted in a discovery of varied effects of increased funding on academic performance. His review of the impact of financial resources on student performance yielded the following conclusions:

The vast number of estimated real resource effects gives little confidence that just adding more of any of the specific resources to schools will lead to a boost in student achievement. Moreover, this statement does not even get into whether or not any effects are large. There is little reason to be confident that simply adding more resources to schools as currently constituted will yield performance gains among students. The concern from a policy viewpoint is that nobody can describe when resources will be used effectively and when they will not. In the absence of such a description, providing these general resources to a school implies that sometimes resources might be used effectively, other times they may be applied in ways that are actually damaging, and most of the time no measurable student outcome gains should be expected (Hanushek, 1997, pp. 144, 148-9).

Eric Hanushek influenced others to delve deeper into the question of whether or not money matters in improving educational quality (Plecki, 2000). His voice echoes across many subsequent inquiries into the impact of money, classroom size, teacher quality and effectiveness, and efficient use of resources on amplifying student performance. LeFevre and Hederman (2001) conducted an analysis of data collected from each state in the United States ranging from 1976-2000 and found no clear link between changes in educational inputs and changes in student test performance.

This study did not find a significantly larger proportion of students with higher test scores coming from schools with more teachers per pupil or with teachers receiving higher salaries. What is more, there were some instances of states experiencing inferior performance even with larger pools of resources per pupil (LeFevre & Hederman, 2001)

Murnane and Levy (1996) discovered that a sample of school districts in Texas that were awarded a considerable amount of additional school funding by the courts, but the districts did not translate the extra money into increased student achievement. Out of the fifteen schools receiving an increase in resources, only two districts showed improved student performance and attendance (Murnane & Levy, 1996).

The idea of simply providing additional money without enacting some kind of improved method of instruction delivery or efficient spending is a recurring theme in many school finance studies.

Pritchett and Filmer (1999) suggested that carefully thought out decisions as to where and how teachers and students utilize resources as well as providing teacher incentives better assists student achievement than simply increasing funding. In essence, these researchers are saying that schools are less academically successful due to poor school organization, low teacher quality, and ineffective curriculum. The policymakers first must fix the system before investing more money (Pritchett & Filmer, 1999). With this perception of the condition of schools, arguing for more money for education is indeed difficult.

A reasonable person could certainly accept the arguments made by researchers who claim that increasing financial support for schools is not the key to improve student achievement based on findings that show inefficient use of funds (Hanushek, 1997; Jefferson, 2005). However, schools today are required to provide students with an exceptional education with less in their budgets to do the task effectively (DuFour & Marzano, 2015). With many schools facing budget cuts to point of a crisis, the issue becomes one of under-funding and short-changing the education system more than one of worrying about waste. In short, money that school districts do not receive cannot be misspent (Hadderman, 1999).

The scholars who desire to establish a realistic appraisal of the cost for resources do so with the understanding that efficiency and good judgement are necessary to achieve the desired effect of adequately funding education. The research team of Hedges, Laine, and Greenwald (1994a) believed Hanushek's



analysis of how spending related to achievement to be flawed thus making his results inaccurate. To illustrate their notion, they performed a separate analysis of the same data used by Hanushek and arrived at much different conclusions.

The problem with Hanushek's work, according to Hedges, Laine, and Greenwald (1994b), was that his method of vote counting used to tabulate study findings lacked meaning because it failed to incorporate the power or degree of significance behind each finding. The re-analysis conducted by Hedges et al. (1994a) considered the magnitude of the positive or negative effect of resources (inputs) on achievement (output). They concluded that:

The production function studies of the relation between resource inputs and school outcomes examined by Hanushek do not support his conclusion that resource inputs are unrelated to outcomes. The analytic method he used to synthesize results across studies has low statistical power, and hence his conclusion would seem particularly suspect. Reanalysis with more powerful analytic methods suggests strong support for at least some positive effects of resource inputs and little support for the existence of negative effects (Hedges, et al., 1994a, p. 13).

Baker (2005) stated that, in general, whenever schools receive additional money, there is a positive connection with student performance outcomes. The investigations into adequacy do not stop at the argument that money aids student achievement. These studies inform the reader about what actions school districts should take and what resources school personnel should obtain with the money (Knoepfel et al., 2007). Hartman (1999) reasoned that "regardless of conflicting research findings, there is a strong appeal to the idea that dollars do make a difference; districts spending more money should be able to buy more and better

resources for their students that would yield enhanced educational opportunity” (p. 391).

Considering both the objections from critics and the encouragement for further inquiry from supporters of increasing school funding, there is value in and need for investigations into school finance mechanisms. There is especially a need for a renewed exploration into the amount and adequacy of school funding in Oklahoma. The Oklahoma public education system, like most systems across the country, faces ever-increasing calls for strict accountability and the desire for gains in student achievement.

Funding education is largely the responsibility of taxpayers within a local school district (Baker & Green, 2008; Corcoran & Evans, 2008). However, the state role in financing education has increased in recent years due to the proliferation of accountability standards (Picus & Blair, 2004; Maiden & Ballard, 2014). These increases in demands for specific outcomes ranging from student performance to teacher quality and beyond bring with them concerns about adequacy of funding.

In 2013, Oklahoma appropriated 51% of state funding to education. Common education received 34.2% of that appropriation (Ballard et al., 2013). The state issues these monies in part as aid and in part with some requisite performance from the school district in the form of mandates. When adequate funds to support compliance do not follow the mandate, the result is an underfunded or perhaps unfunded mandate (Maiden & Ballard, 2014).

School administrations and affected citizens are concerned about inadequate funding for costly accountability and performance standards. One underfunded mandate operating in Oklahoma is the end of instruction, high-stakes testing program called Achieving Classroom Excellence (ACE).

The program, which began in FY 2008-2009, necessitated a provision of funds to remediate students who did not pass the required examinations and the state fully funded ACE during the initial years of operation. However, by the year 2014 funding dropped to only about 30% of the amount entitled by state statute (Ballard et al., 2013).

Another example of an unfunded mandate in Oklahoma is the Teacher and Leader Effectiveness (TLE) program that began in FY 2011-2012. The TLE system is a multifaceted evaluation tool meant to facilitate professional growth along with ranking teacher quality on a scale of Superior to Ineffective. The program requires extensive training and paperwork, but schools will not see additional funding for implementation. However, failure to conform successfully to the TLE program will be grounds to withhold state aid funding until the district is compliant.

The existence of unfunded mandates may have profound effects on both the adequacy and the equity of education funding. The extent to which the state imposes specific educational requirements on districts, but the concomitant amount of state aid does not follow, may certainly raise questions about the degree to which the state is meeting its particular constitutional duty to provide thorough and efficient education to children” (Maiden & Ballard, 2014, p. 818).

Because accountability and funding are so closely related, there has been an outcry for increased school funding in order to meet required standards. Picus and Blair (2004) wrote that “the connection between increased accountability and adequacy is clear: If states are holding districts and schools accountable for what students should know and be able to do, then states must provide the resources to enable schools and districts to meet the state-set standards” (p. 2).

Adequacy studies provide a mechanism for costing out sufficient resources and inform the architecture of funding formulae that provide for an education that meets established academic performance standards. The concept of fiscal adequacy often is associated with fiscal equity because both concepts share an element of comprehensive or ample funding (Downes & Stiefel, 2008). However, the two domains of study differ in how funding is viewed and applied.

Equity studies attempt to establish a formula for spreading funding equitably so that no district will have excess monies while other districts experience deficiencies. Equity research also investigates the level of equality in monies spent among students of varying backgrounds and needs (Baker & Green, 2008). In this type of research, equity is a matter of the equal treatment of equals as well as the equal treatment of unequals (Baker & Green, 2008; Clune, 1994).

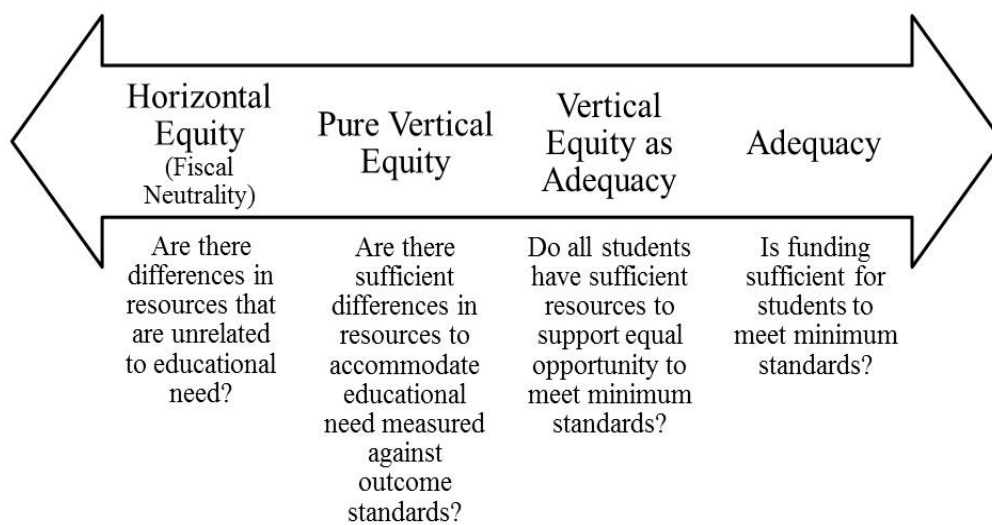
The matter of adequately funding education systems overlap with the issue of equal treatment of unequals and has brought adequacy research forward as a way to encourage appropriate spending for all students (Springer et al.,

2009; Underwood, 1994). Daniel (2010) pointed out that fiscal adequacy is an attempt to push the base level of education funding as high as possible.

Hadderman (1999) asserts that adequacy must be addressed in lieu of equity because equal amounts of scarcity will not benefit students and schools. The move to fiscal adequacy fosters improved and more realistic funding for schools to be better able to meet higher standards of quality and accountability (Baker, 2005).

In order to facilitate a better understanding of the connection between equity and adequacy, Baker and Green (2008) compiled a concise framework to address the underlying questions of the two issues with themes ranked in a particular sequence. Figure 2.1 provides a graphic depiction of the array of discrete yet interrelated themes and underlying concerns of equity and adequacy suggested by Baker and Green (2008).

**Figure 2.1: Equity and Adequacy Continuum**



(Baker & Green, 2008)

Within this study, the concepts of fiscal equity and fiscal adequacy are distinguished by defining equity as equal educational opportunity through funding for all districts and students and adequacy refers to adequate funding for educational opportunity for all districts and students (Augenblick et al., 2007; Corcoran & Evans, 2008; Downes & Stiefel, 2008; Jacobs, 2010).

The idea of providing adequate funds for an appropriate education is the basis of every foundation aid approach to school funding in existence today. Numerous states, including Oklahoma, use a foundation based funding formula. There are pros and cons to foundation aid funding formulas. This type of funding structure features per-pupil allocations, which challenges annual state budgets, prompts legal action, and creates political disputes. Yet, many policymakers see it as the best way a state can attain equity and adequacy in school funding (Augenblick et al., 2004; Guthrie & Rothstein, 1999).

Investigations into adequate school funding have become a widespread form of education research across the nation. The concept of adequacy brings a useful and different layer of inquiry above the questions about equitable funding for schools. Researchers now seek to estimate adequate funding for the outputs or academic performance of students rather than simply to define the equitable dispersion of educational funds (Augenblick et al., 2004; Guthrie & Rothstein, 1999).

The funding formula used by Oklahoma and many other state governments apportions funds for education with a series of weights based on student characteristics. However, state leaders may authorize budgets without an accurate idea of the actual costs associated with an adequate or academically successful education.

Adequacy studies are a tool that can assist elected officials to create funding structures with logic rather than political rhetoric and partisanship (Downes & Stiefel, 2008). Scholarly research and discourse help policymakers to view the needs of school districts objectively. In addition, research provides suggestions for constructing formulae to calculate a distribution of funds that would result in desired academic outcomes (Baker, 2005; Jimenez-Castellanos & Topper, 2012).

Due to the variety of research methods available, a researcher can tailor fit an adequacy study to the meet needs and characteristics of funding policies within a state or perhaps to bolster the arguments of a legal team involved in a lawsuit based on education funding adequacy (Baker et al., 2004). Plaintiffs have used the evidence drawn from school finance studies against states in litigation when the findings indicate that funding is below a level of sufficiency (Augenblick, 2003). The history of litigation initiated by concerns about equity and adequacy contains a variety of victories and setbacks for students and schools, but in the end illustrates an overall positive impact and meaningful improvement in funding for educational opportunities.

## **Review of Litigation Prompted by Concerns about Fiscal Adequacy**

Over the last three decades, educational spending in the United States has increased considerably. A bulk of this surge in spending came from court orders or from the desire of states to avoid litigation (Corcoran & Evans, 2008). Although educational spending is trending up, the manner in which states distribute funds as a means to support adequacy and reaching optimal student achievement is still under investigation and debate.

Litigation motivated by concerns about state furnished school funding began in the later part of the 1960s (Augenblick et al., 1997). According to Daniel (2010), recent education finance litigation emerged in three distinct waves. Each wave has a specific argument founded in a particular legal theory and differing success rates. The third wave is the most recent significant and successful with regard to plaintiff victories and school finance reform (Daniel, 2010). Most of the earlier cases focused on a push for more money for students with special needs, but quickly grew to encompass the basic funding for schools supplied by a state's funding formula (Augenblick, 2003; Augenblick et al., 1997).

During the first wave of litigation, equity was originally the central issue in many landmark cases concerning school finance (Baker & Green, 2008; Underwood, 1994). Odden and Picus (2004) credit the research team of Coons, Clune, and Sugarman with developing the initial strategy of basing a lawsuit on federal or state equal protection clauses. They based their argument that funding



was not equitable on two points: 1. Education is a fundamental right that should be provided to all students equally, and 2. that disproportionate school finance systems create a suspect class of people as determined by their property wealth (Odden & Picus, 2004).

The case of *Serrano v. Priest* filed in 1968 was initially dismissed as not justiciable on the grounds that educational need was not well defined and that there was no way to connect expenditures to student needs due to lack of a well measured or costed out standards (Odden & Picus, 2004). This case was appealed to the California Supreme Court in 1971 where it was ultimately decided that courts could rule based on the Fourteenth Amendment of the U.S. constitution and the California state constitution equal protection clause and standards of fiscal neutrality where education would be a protected right and that property wealth is a suspect class (Odden & Picus, 2004). This decision essentially paved the way for future litigation targeted to state level courts rather than Federal courts (Daniel, 2010).

The *Serrano* case was followed soon by another significant lawsuit. *San Antonio Independent School District v. Rodriguez* reached the district court in 1973. A three-judge panel ruled that education was a fundamental right and that property wealth was a suspect class. However, the state of Texas appealed to the U.S. Supreme Court where the justices handed down a 5-4 decision that education was not a fundamental right guarded by the Equal Protection Clause of the Fourteenth Amendment of the U.S. Constitution. This meant that certain

socio-economic classes of students in certain school districts did not fall victim to discrimination under federal law (Odden & Picus, 2004; Thompson & Crampton, 2002).

From the very beginning of school finance litigation, plaintiffs have had to overcome the obstacle of successfully positioning disparate student funding within the equal protection clause of the federal constitution (Odden & Picus, 2004). This set the stage for plaintiffs to bring future lawsuits at the state level rather than the federal level. The result of this switch of venue was an increase in victories for proponents of better education funding through revision of funding formulas throughout the United States leading into the second wave of school finance litigation (Daniel 2010).

During the second wave of litigation of the 1970's and 1980's many states were brought to court to defend accusations that funding mechanisms violated their constitutions (Augenblick, 2003). The trend began after the landmark case of *Robinson v. Cahill* heard in the New Jersey Supreme Court. The court ruled in the Robinson case that the state finance system was inequitable between rural and metropolitan school districts. That decision precipitated an overhaul of the New Jersey education funding formula because the previous one was unconstitutional (Daniel, 2010).

Jacobs (2010) states that in “successful adequacy challenges, plaintiffs demonstrate a causal link between what a state currently provides (inputs) and the resulting ‘inadequate’ student achievement (outputs)” (p. 250). The litigation

spanning most of the United States has resulted in at least 29 cases where courts ruled state funding systems as inadequate in meeting the needs of schools to provide an education that met the state's minimum standards (Jacobs, 2010).

The third wave of litigation began with the 1989 case of *Rose v. Council for Better Education* (Daniel, 2010). This case sparked the move toward establishing an education finance system that would provide adequate funding for a higher standard of education for all students (Minorini & Sugarman, 1999). The decision in the *Rose v. Council for Better Education* case called for total reform of the funding system and specified standards for how to define an adequate education in the state of Kentucky.

The court ruled that the school finance formula in Kentucky defied the equal protection clause and education provision. The result was a new state aid formula that increased the funding of impoverished school districts by twenty-five percent and eight percent to the more prosperous districts (Dennis, 2010). Since the *Rose v. Council for Better Education* decision, the courts appear to be more willing to jettison established funding systems in order to establish funding structures that will require and pay for higher academic standards (Picus, 2000).

The root of the legal actions taken by the plaintiffs in the majority of cases against state funding systems was the noticeable gaps seen among school district wealth and opportunities for achievement. There was a sense that schools had become the "last great social agency for righting wrongs" (Thompson & Crampton, 2002, p. 786). In general, these court cases and the ensuing decisions

affected the entire country by causing states to examine their funding structures out of both duty and fear of litigation. “The courts have helped to create a new standard of fairness through the adequacy argument by moving beyond dollars to the effects of money” even if those effects may have “only a marginal or temporal impact on long-term realities” (Thompson & Crampton, 2002, pp. 789, 794).

### **Litigation Prompted by Fiscal Adequacy Concerns in Oklahoma**

Like the majority of the states across the nation, Oklahoma is not void of school finance litigation. To date, there have been no cases tried in court, but lawsuits were brought by two groups in the 1980’s and mid-2000’s.

In 1980, a group called the Fair School Finance Council of Oklahoma (FSFC) initiated legal action to procure additional monies for education. This group of 40 school boards and districts sued the state of Oklahoma because they believed that the state was not equitably distributing educational funding among all of the districts (Corcoran & Evans, 2008; Grossman, 1995).

The state district court dismissed the original case filed in 1980 and the Oklahoma Supreme Court did not decide upon an appeal until late 1987. The decision from the Oklahoma Supreme Court was to uphold the dismissal based on the *San Antonio Independent School District v. Rodriguez* (1973) decision that a state constitution does not guarantee equal opportunity in education through equal funding (Corcoran & Evans, 2008; Grossman, 1995).

However, the ruling stimulated the notion that the Oklahoma constitution allows for an adequate education. The FSFC used this concept adequacy as the springboard for a new lawsuit that would advance and improve the level of funding allocated to schools. Over the subsequent five years, the FSFC group and its attorneys worked to define adequacy and bring a new lawsuit that could improve the financial situation for schools across the state. Still no lawsuit saw the inside of a courtroom.

By 1992, the state enacted new reforms and legislation, namely House Bill 1017. This bill provided many schools with sufficient funds to lull any remaining interest in pursuing litigation (Clune, 1995; Grossman, 1995). Furthermore, infighting among districts and loss of personnel in school administration and on various school boards served to effectually extinguish any efforts to go ahead with a lawsuit against the state of Oklahoma regarding inadequate school funding (Grossman, 1995).

Another attempt to effect change in school funding through litigation came in response to the 2005 study conducted by Augenblick, Palaich, and Associates Inc. commissioned by the Legislative Service Bureau of the Oklahoma State Legislature. The results of the study documented the need to increase the base funding levels for education by roughly \$844 million (Augenblick et al., 2004).

Although the state never published the findings, the popular media reported that in response to the study, the Oklahoma Educators Association (OEA) along with three Oklahoma school districts filed a lawsuit in district court seeking \$4 billion to raise funding for common education to an adequate level. Courts dismissed the lawsuit and to date no one has filed an appeal.

### **Adequacy Research in Oklahoma**

Most states in the United States have dealt with the issue of equity and adequacy either through independent research or through courtroom trials. Equity and adequacy inquiries arise from concerns about local wealth disparity and shortfalls in state funding (Minorini & Sugarman, 1999).

The first notable Oklahoma-based research in this field took place in the 1990's. Ellinger et al. (1995) conducted a study to determine the impact of several factors on students' cumulative achievement in Oklahoma from 1989-1991. The multiple regression analysis of the effects of total revenue, percentage of minority students, percentage of free lunch participants, average teacher salary, percentage of teachers with advanced degrees, and teacher experience on student achievement as indicated by 11<sup>th</sup> grade achievement test scores. The analysis revealed a "strong and statistically significant positive effect of per-pupil revenue on test scores" (Ellinger et al., 1995; Spears, 2014).

These findings supported the idea that additional money does matter for increasing student achievement and seemed to matter more than teacher quality and the amount of money spent on teacher salaries. These conclusions along

with those indicating that minorities and free lunch participants had a negative effect on test scores must be weighed against the fact that the study only considered one examination given to students in a singular grade level. A more complex study is necessary to corroborate these results.

In 2004, the state of Oklahoma commissioned the research firm of Augenblick, Palaich and Associates (APA) based in Denver, Colorado to conduct a study of the adequacy of the state's educational spending. The study found that in 2003-04, the state spent \$3.47 billion for education, which equated \$5,622 per pupil expenditure (Augenblick et al., 2004). This was substantially lower than the figures estimated by APA as adequate.

Augenblick et al. (2004) determined through two types of analysis that an adequate amount to spend on Oklahoma students should have been about \$4.32 billion or \$6,988 per pupil. In light of the findings of this state commissioned study, Oklahoma did not enact any policy changes nor did they update the funding formula in order to correct the inadequate funding. The findings of the APA study are now ten years old and the adequacy of the funding structures in Oklahoma are still in question among politicians, advocacy groups, educators, and parents.

The state of Oklahoma uses a foundation aid program to fund public education. The theoretical basis for this type of funding structure is to provide the money needed to meet the financial obligations of serving students. In reality, however, policymakers allocate financial aid based on political debate

and the available supply of money rather than educational demands (Augenblick et al., 2004). The information learned from this dissertation about the instructional and administrative spending patterns of high achieving school districts can assist policymakers and school leaders make decisions regarding funding strategies or it could spark additional studies to determine what represents funding adequacy in Oklahoma.

### **Review of Adequacy Research Methodologies and Underlying Theories**

For over half of a century, researchers have documented statistical inquiries and analyses relating to adequately funding education services so that students can reach peak performance (Augenblick, 2003; Downes & Stiefel, 2008; Estrada, 2010). The basic goal of any adequacy study is two-fold: establish the criteria for an adequate education and identify a basic cost for an adequate education as defined by those established performance standards (Downes & Stiefel, 2008).

There are differences in the approach to define the criteria for an adequate education. Some investigators focus on the type, quality, and quantity of resources (educational inputs) as the key to an adequate education. Other researchers consider the level of performance of students or school districts (educational outputs) as the essential indication of an adequate education (Baker et al, 2004; Estrada, 2010).



There are four prevalent analysis models that have emerged from the growing body of literature that assist researchers in determining educational funding adequacy: Professional Judgment, Evidence-Based, Cost Function, and Successful School (Augenblick et al., 2004; Jimenez-Castellanos & Topper, 2012). Investigators may couple or blend the methods in order to resolve problems addressed in their research more thoroughly.

Scholars have developed this variety of methods for calculating adequate educational spending in order to capture specific data that are unique to a state or agency's funding formulas and budgeting goals. The models have evolved into several options for rational and logical systems of analysis.

These methods provide an understanding of how achievement and school spending correlate in educational systems that do not supply researchers with an implicit statistical relationship between spending and student performance (Augenblick et al., 2004). Table 2.1 highlights each model with details about analytic methods, strengths, limitations, and sample questions.

Although each method differs somewhat in their fundamental structures, the amount and kind of information they require, and the relative price tag they assign to academic achievement, the universal goal is to determine as best as possible a minimum cost for achieving a specific level of student performance. Each method has inherent benefits or drawbacks that affect the amount of coherence between research questions, data, and study conditions.

Some adequacy research is oriented toward costing out a certain level of student achievement by matching the expense of a set of educational inputs and resources needed to meet desired performance outcomes. Other research models investigate the spending levels of certain schools or districts that are attaining the required academic standards in order to figure out how spending relates to achievement (Baker et al., 2004; Downes & Stiefel, 2008; Picus & Blair, 2004).

According to Daniel (2010), the practicality and soundness of the models are ranked in terms of highest validity to lowest in the following order: Successful School District Model, (Cost Function) Statistical Analysis Model, Evidence-Based Model, and Professional Judgment Model. Baker (2005) asserted that cost and outcome analysis would vary with district size, student needs within the population, and the given set of desired outcomes. The inconsistency of teacher quality, dissimilar costs for resources, the various needs of students all play a role in estimating adequate spending figures.

In their comparative study of adequacy research models, Baker et al., (2004) found that (after adjustments for inflation and regionally price differences) “resource-oriented methods like Professional-Judgment and Evidence-Based methods produced consistently higher (figures)” while “studies employing Successful Schools methods produced the lowest estimates of the cost of an adequate education” (p. 14).

**Table 2.1: Overview of Adequacy Research Methodologies**

Model	Analytical Methodology	Strengths	Limitations	Sample Research Question
Professional Judgment	A panel of professionals creates a prototypical school and cost out all of the necessary inputs needed for success.	The results are easy to articulate. Expert opinions are valuable to policymakers. Panelists account for the special needs of students.	The costs are not always easily linked to outcomes. The expenses of resources are often overestimated. Panelists may exhibit too much subjectivity.	What is the total cost of an ideal educational experience for all students in a typical school setting?
Evidence Based	Scholars use current educational research to identify the resources a prototypical school would need in order to meet state academic standards.	This approach is based in real-world educational research and knowledge. This method utilizes educational experts.	The findings may become outdated or unusable. The costs are not easily linked to outcomes. The findings may not be easily generalizable.	Is the current level of educational funding adequate to support a new comprehensive school reform proven effective in other schools?
Cost Function	Researchers use statistical analysis to identify inputs (funding) needed to achieve a certain level of student performance.	Researchers collect an extensive set of school and student variables. This method uses statistical modeling.	The results may be difficult to interpret. The results are only as good as the range of data available.	What is the cost of meeting the state minimum standards for a typical high school in Oklahoma? How does that cost vary across districts?
Successful School District	Scholars use spending levels of schools currently meeting state academic standards to estimate a funding level for all schools across the state.	The results reflect actual costs as measured by expenditures associated with meeting state standards.	The sample used may be atypical of the average district. Special needs are not taken into account. Estimates may be too low.	What are the expenditures of schools that currently meet the state academic standards?

(Baker et al., 2004; Gaurine & Tanner, 2012; Jimenez-Castellanos & Topper, 2012; Picus & Blair, 2004)

## **Overview of the Successful School Model Applied in Research**

The Successful School District (SSD) model of analysis identifies actual expenses per pupil incurred by school districts that are achieving specific educational outcomes (Baker et al., 2004; Guarino & Tanner, 2012; Picus & Blair, 2004). The SSD method is said to be the first technique to be created to assess adequacy (Estrada, 2010).

According to Augenblick et al. (2007), the Successful School District approach “provides a reasonable estimate of the base cost in relation to how school districts are performing at a specific place and time. Under this approach, the (non-weighted) base cost is determined by examining the spending of districts that meet performance standards” (p. 5).

Across the body of literature, researchers have also labeled the SSD method as a resource cost model, deductive inference from exemplary school districts, the high performance model, and an empirical observation approach (Daniel, 2010; Estrada, 2010; Verstegen, 2002).

Studies using SSD establish selection and analysis parameters which typically include: 1. identifying a sample of schools that meet a specific academic performance goal, 2. establishing average per pupil spending, 3. eliminating spending data that falls within the highest or lowest 5% so that wealth and district sizes do not skew the results, 4. considering additional outcome data such as attendance or graduation rates, and 5. weighing the

additional costs of students with special needs or who qualify for free and reduced lunches (Baker et al., 2004; Estrada, 2010).

Out of the abundant research projects that employed the SSD method of analysis, many of them also make use of additional adequacy methods and even secondary qualitative measures to assist in answering the research questions. This dissertation was modeled after the SSD design.

John Augenblick was a pioneer of the SSD methodology. He and his research associates have utilized this analytic method in many states, including Oklahoma, in order to assist policymakers in quantifying and establishing school funding adequacy. Augenblick's original SSD study was an unpublished investigation into the schools across Ohio in 1995 (Picus, 2000; Verstegen, 2002).

Augenblick along with two other investigators analyzed all Ohio school districts excluding those considered outliers due to very high or very low property wealth and especially high or low spending (Verstegen, 2002). Districts that exhibited test scores that landed at or above the 70<sup>th</sup> percentile were considered successful in delivering an adequate education (Verstegen, 2002).

The team further examined those selected districts in order to identify additional instructional outcomes such as teacher to pupil ratios, class size, and course offerings. Then they assigned costs to those outcomes (Verstegen, 2002). This dissertation will echo the use of test scores to select high achieving

districts. However, the reach of this current study does not include additional outcome data beyond test scores in the analysis.

The Augenblick et al. (APA) (2004) investigation into education spending in Oklahoma influenced this dissertation in the way that it distinguished certain school districts from others based on number of grade levels served. In the 2004 Oklahoma study, APA conducted two analyses, one for K-8 and another for K-12. In addition to those SSD analyses, APA also performed a Professional Judgment analysis of the two groups.

Upon finding an estimate of adequate per pupil funding for Oklahoma schools, APA then built a weighed formula to allow adjustments to funding based on student characteristics including socio-economic status and special educational needs. Due to this dissertations limited scope, I used only the K-12 data. Further, I did not perform a separate adequacy analysis beyond SSD nor did I generate a revised weighted student aid formula based on the findings.

A study conducted by Pérez et al., (2007) used a mixed methods approach where they examined the allocation of resources while controlling for certain school characteristics and student demographics. They found that the introduction of additional resources was not a strong predictive factor in explaining differences in school district performance. The key factors related to higher student achievement as revealed by a qualitative survey were teacher quality, curriculum, and student intervention services.

The Perez et al. (2007) study influenced the sample selection process used in this current investigation. However, the mixed method analysis used by Perez et al. (2007) went beyond simple spending factors to discover why money may not be the deciding factor in determining what influences student performance. Qualitative data such as surveys and interviews would be useful in gaining a full prospective of how spending interacts with other variables, but those analyses were beyond the scope of this current study.

### **Summary**

The recent past is replete with examples of states, special interest groups, and social scientists who have attempted to determine what constitutes adequate funding for education. The question is more than simply “what” is adequate school funding but also “how” can adequacy be achieved and afforded. Various scholars have investigated the issue and several decisions have been made in courtrooms nationwide. In many cases, school districts received monies that helped them achieve desired academic standards. Even though improvements to aid have been made and new methods of estimating and defining fiscal adequacy now exist, there is still a need for continued education finance research.

Not since 2005 has there been a meaningful and focused investigation into the state of Oklahoma education funding. The budgeting restrictions that now face the state appear to be near crisis level. New applied research that is geared toward understanding the state’s school funding condition is in order.

## **CHAPTER THREE**

### **DESIGN OF THE STUDY**

No researcher has published an empirical examination of the adequacy of school funding and district spending efficiency in Oklahoma for over a decade. This dissertation was my endeavor to clarify the degree to which the school funding structure in Oklahoma provides adequate support to maintain high achieving schools. As noted in the previous chapter, researchers often approach the issue of adequacy in one of two ways: find the cost of adequate educational inputs and resources or evaluate the expenditures associated with desirable student performance.

This study employed a Successful School District (SSD) research design to evaluate school district expenditure data and test performance data in order to estimate a base cost figure for an adequate education. This methodology is appropriate due to the purpose, scope and exploratory nature of this dissertation.

Within this chapter, I describe Oklahoma's funding system in terms of money sources and apportioning of funds. I also describe in further detail the particular method of analysis used to estimate the cost of adequately funding a high achieving school. This chapter includes all of the characteristics of the sample data and the criteria used to draw specific districts into a sample from the greater population. Finally, I describe the analytical procedures necessary to



understand the adequacy of funding and efficiency of spending in a sampling of diverse districts from across Oklahoma.

### **Oklahoma's Education Funding Structure**

The current mechanism for funding education in Oklahoma is a two-tiered formula that has been in place since 1981. On average, Oklahoma school districts receive more funding from state aid appropriated by the legislature than from any other source. Concomitantly, common education is the single largest appropriation of the state budget prepared by the Oklahoma Legislature each year. According to the Oklahoma Executive Budget reports, the average appropriation for education across the years examined in this study has been an about 52% of the state's total annual budget (Oklahoma Executive Budget, 2009, 2010, 2011, 2012, 2013, & 2014).

The Oklahoma Constitution describes the role of state funding as a "system of public school support (that) should assure that state and local funds are adequate for the support of a realistic foundation program". The statute further states that it is "unrealistic and unfair to the children of the less wealthy districts to provide less state support than is necessary for full educational opportunities" (O.S. 70, Section 18-101.5, 1971).

The Technical Assistance Document for School Finance issued by the Oklahoma State Department of Education (2014) stated that the significant amount of financial support appropriated by the legislature for education comes out of the state General Fund. The General Fund is a collection of monies

received from state income tax, sales tax, use tax, estate tax, and gasoline tax. The public K-8 and K-12 schools compete with institutions of higher education, career and technology education centers, highways, corrections, and other state agencies for a share of the available money.

Other state funding comes from separate revenue sources that are dedicated specifically to public schools and are incorporated into state statutes, which are typically not up for debate. Those earmarked funds come from gross production tax, motor vehicle collections, Rural Electrification Association (R.E.A.) tax, and state school land earnings.

One bonus feature of the funding system is a provision within the law that ensures a guaranteed yield. If collections experience increase or decrease, then district funding is either elevated or cut proportionally. In addition to those monies, Oklahoma also maintains a trust fund subsidized by the state's lottery. The lottery contributes finances toward many areas including teacher benefits, early childhood development programs, college financial aid, career technology grants, and the School Consolidation and Assistance Fund.

With only a few modifications throughout the years, the present state aid formula allocates funds to schools in three segments: foundation aid, a transportation supplement, and salary incentive aid. Like other states across the nation, Oklahoma's funding system is enrollment driven and the amount of aid allocated to each district is based on weighted factors applied to students

according to their grade level and those evaluated as having special needs (Maiden & Stearns, 2007).

In order to receive state aid, each school district must submit a report that contains student enrollment data, pupil category totals, and information pertaining to school provided transportation of students (Deering & Maiden, 1999). State aid is calculated by multiplying the foundation aid factor by a district's weighted ADM, then subtracting proceeds from local ad valorem, and finally adding the product of the districts average daily haul and the per-capita transportation allowance (Maiden & Evans, 2009; Maiden & Stearns, 2007).

The salary incentive aid is included into the funding when the local voters approve or allow a 20 mill ad valorem tax. This amount of aid is figured at a constant yield per pupil where the state will provide a higher portion of aid to make up the difference when certain districts experience lower levels of property wealth than other districts in the state (Maiden & Evans, 2009).

Oklahoma State Statute 70-18-101 addresses local district aid with this provision:

The system of public school support should effect a partnership between the state and each local district, with each participating in accordance with its relative ability. The respective abilities should be combined to provide a financial plan between the state and the local school district that will assure full educational opportunities for every child in Oklahoma. State support should, to assure equal educational opportunity, provide for as large a measure of equalization as possible among districts. The taxing power of the state should be utilized to raise the level of educational opportunity in the financially weakest districts of the state.

Each local school district receives an allotment from the state to use in carrying out the educational activities necessary to guide students toward meeting the academic standards imposed by the state. The goal of this study was to discover how high achieving schools are spending their allocated funds and use that information to assess whether Oklahoma financially supports education adequately. In order to arrive at this conclusion, I used the Successful School District model.

### **Description of the Successful School District Analysis Method**

The Successful School District (SSD) model gained popularity over twenty years ago as researchers began establishing adequate funding by analyzing the average expenditures of schools that met certain prescribed academic standards as opposed to examining the median of all districts in the larger population (Baker et al., 2004). This technique is recognized as being “one of the first methods used to determine the cost of an adequate education” (Estrada, 2010, pg. 13).

In terms of soundness and utility, the SSD model ranks at the top among available adequacy analysis methods (Daniel, 2010). Augenblick and Myers, Inc. (2001, 2002, 2003) and Standard and Poor’s School Evaluation Service (2004) have replicated the SSD mechanism in various adaptations across many states including Illinois, Colorado, Kansas, and New York.

Researchers who employ the SSD approach first isolate a specific group of school districts found to be achieving at a high academic level and then they analyze particular spending patterns in those districts that contribute to the academic achievement. The researchers then compare the group of school districts to find an average spending level that can be interpreted as an adequate level of funding needed to support academic success as defined by the state or local agency (Augenblick et al., 2004; Daniel, 2010; Wood et al., 2007).

The SSD method typically identifies actual expenses per pupil incurred by school districts that are achieving specific educational outcomes (Baker et al., 2004; Guarino & Tanner, 2012; Picus & Blair, 2004). This approach stems from the rational belief that school districts that currently meet academic standards are likely spending an acceptable and sufficient amount of money to achieve their success (Downes & Stiefel, 2008).

The SSD methodology is primarily outcome or performance oriented. However, this method will use somewhat lesser detailed financial information than other resource-oriented techniques and it will not offer any specific information about the ideal resources beyond financial support needed to promote academic success (Baker et al., 2004; Downes & Stiefel, 2008). The SSD was useful in this examination as a means to discover the nature of the relationship between district spending and student academic performance.

## **Research Questions**

This study addressed the following research questions:

1. Do instructional expenditures predict a high level of achievement?
2. Do administrative expenditures predict a high level of achievement?
3. Do district expenditures other than instruction and administration predict a high level of achievement?
4. Is there a significant difference between the expenditures of high achieving districts and the expenditures of demographically similar districts not classified as high achieving?

## **Source of Data**

To answer these research questions effectively, I identified a sample of school districts that met a high level of achievement in accordance with state performance standards as measured by annual examinations. I also evaluated district spending in the areas of instruction and administration and district expenses other than administration and instruction.

In the related literature, researchers examined a wide variety of input resources that relate to student academic achievement. These variables come as singular variables or groups of predictors. Some popular predictors are teacher experience, teacher education level, teacher salary, support expenditures, administration expenditures, student demographics, student to teacher ratios, and total per pupil expenditures (Augenblick, 2003; Ellinger et al., 1995; Hanushek, 1994; Hartman, 1999; Jones & Slate, 2010).

The data examined in this dissertation are exclusively ex post facto or after the fact reports provided by the Oklahoma Office of Educational Quality and Accountability (OEQA). The office of OEQA collects and reports school district and community data ranging from census and socio-economic information to district test scores and graduation rates. This series of reports is the yearly capstone for the Oklahoma Educational Indicators Program, established in 1989 with the passage of the Oklahoma School Testing Program (Senate Bill 183). The report is essentially a database that serves as a tool for school administrators, researchers, and the community at large to better understand and gauge the progress of Oklahoma schools.

This investigation features school district data ranging from 2009 through 2014. This six-year period is appealing due to the negative changes in educational funding, the increase in student enrollment, and the increase in student and school accountability across those years. Bearing in mind this climate of budgetary restrictions and increased accountability, it is a reasonable assumption that school districts are spending available funds more efficiently thus minimizing any concerns about mismanagement. If a school district is operating efficiently, then expenditures become a useful proxy for costs in the absence of actual price tags and receipts for various educational inputs.

The annual OEQA state and district profile reports describe community census statistics, school district enrollment and spending data. The District Educational Process section of the report reflects the learning environment

provided by the school district. This section includes information on the teacher credentials, the number of administrators and other staff, information on the various academic programs offered, and high school curriculum offerings.

Additionally, there are details about the amount of money the district spent in each of the major financial reporting categories. Specifically, the profile report accounts for the district revenues broken down into Federal, State, and Local sources and the district expenditures for instruction and administration as both a percent of the district total and as dollars per average daily membership (ADM) which is the average of days of membership divided by instructional days.

In this study, I examined district expenditures in the areas of instruction and administration in an attempt to establish an estimated cost of funding necessary to support an academically successful school. This combination of district expenditures is widely used in research for three reasons: 1. they provide a good summary of the variations of classroom level/teacher-based resources; 2. they are easily obtainable; and 3. they depict and measure changes in schools spending over the years (Hanushek, 1997; Hartman, 1999; Reschly & Christenson, 2012). Other research followed a similar pattern of pursuing these categories of expenditures as predictors of student achievement.

A study on the effects of increased education inputs through reform efforts in Michigan yielded some insight into the relationship between teacher pay and student test performance. This analysis revealed that increasing



instructional expenditures led to significant increases in 4<sup>th</sup> and 7<sup>th</sup> grade math examination scores (Chaudhary, 2009). The positive relationships were significant, but the gains on the 4<sup>th</sup> grade assessment were smaller in effect compared to gains on the 7<sup>th</sup> grade test. In order to see an increase of one standard deviation for the 4<sup>th</sup> grade, instructional spending had to increase 100% while the same effect could be achieved for the 7<sup>th</sup> grade test with only a 60% increase in spending (Chaudhary, 2009).

In another study, Loeb and Page (2000) investigated the relationship between teacher wages and student outcomes using longitudinal data from all fifty states across a range of ten years. The authors failed to find evidence that wages significantly affected positive student outcomes like high school graduation and continuing their education in college. Their results suggested that teacher salaries might affect other aspects of student educational attainment that were beyond the scope of their study and that specifically targeted spending would be better at improving achievement than providing blanket increases to education funding (Loeb & Page, 2009).

Anderson, Shughart, and Tollison (1991) investigated the relationship between school administration and student achievement. From an evaluation of evidence from all 50 states and the District of Columbia, they discovered that increases in expenditures in education administration bureaucracies made up of school administrators, counselors and other support staff had a negative influence on student achievement.

The authors did not suggest that administration is unnecessary. To the contrary, the investigators asserted that school administrations accomplish important tasks to coordinate instructional efforts, oversee programs and plans for students with special needs, and ensure that schools meet various regulations (Anderson, et al., 1991). However, there is a point where the size and expense of the administration becomes less than optimal. The spending should be balanced in such a way that administrative bloat is avoided.

Mensah, Schoderbek, and Sahay (2013) gave another example of the use of administrative expense to predict student achievement. These authors investigated the relationship among local funding and resource allocation on test performance in New Jersey. The evidence from their analysis indicated that, although not statistically significant, administrative salaries correlated negatively with student standardized test performance (Mensah et al., 2013). Yet with additional analysis using a different model, there was a positive relationship between administrative spending per pupil and changes in test scores. Mensah et al. (2013) noted that it was evident in this case that total administrative expenses did not have a uniform influence on student test performance.

Research continues to show that instruction and administration encompass tangible and intangible efforts that directly influence school environment, student learning, and test performance (Reschly & Christenson, 2012). For the majority of the districts across Oklahoma, these two categories

represent fifty percent or more of the total district expenditures (Oklahoma Executive Budget, 2009, 2010, 2011, 2012, 2013, 2014, 2015). In Oklahoma, instruction and administration essentially are the driving costs of a child's education, which is why they are a focal point of this study.

The other key segment of the annual district report data is the variety of performance highlights and markers for student academic success including individual grade level achievement test scores. The Student Performance section of the report contains information on test scores for the Oklahoma Core Curriculum Tests (OCCT), also known as the Criterion-Referenced Tests (CRT). Certainly, a great number of researchers and lay-people would suggest that a score on a math or reading examination could not solely define the sum total of a student's achievement. However, test pressure and test performance are the primary concerns of education policy, district administration, and classroom activities and accountability. In fact, Oklahoma's latest accountability tool known as the A-F Report Card system uses test data as the exclusive criteria for defining a student's academic growth and success (Oklahoma State Department of Education, 2015).

The proliferation of policy that is based on testing is largely due to the efficiency and cost-effectiveness of test administration and the fact that test scores are easy to represent graphically (Amrein & Berliner, 2002; Kohn, 2000). According to Kohn (2000), the "concepts such as intrinsic motivation and intellectual exploration are difficult for some minds to grasp, whereas test

scores, like sales figures or votes, can be calculated and tracked and used to define success and failure” (p. 32). Due to the importance placed on test scores by policymakers as evidence of academic success, I will use student performance on examinations administered to third through twelfth grade students to define a district’s level of academic achievement, which will become the criteria used to select samples for analysis.

### **Description of the Population**

The report compiled by the OEQA categorizes each school district by the grade levels that serve the students. One category of districts includes students ranging from early childhood through high school seniors. The other group of districts did not serve high school students. Because of this variation within the population, I excluded some districts so that the selected sample was as uniform as possible. Any district that did not offer four years of high school or did not administer all seven End of Instruction (EOI) examinations was not included in the population. The population included only districts that served students from kindergarten (KG) (or early childhood (EC)) through twelfth grade (12). I refer to those districts collectively as K-12.

Table 3.1 displays the tally of all of the Oklahoma school districts serving students during FY 2009-2014. School districts that did not report having a high school will not be included in the population because a battery of elementary and high school level examinations established the achievement criteria for sample selection.

**Table 3.1: Oklahoma School Districts' Populations 2009-2014**

Fiscal Year	2009	2010	2011	2012	2013	2014
Total Number of School Districts	534	532	527	522	521	517
Number of K-12 School Districts	424	424*	420**	419	418	419

\*One district reported serving only grades 1-12 in 2010

\*\*One district reported serving only grades 1-11 in 2011

A few districts did not technically fit the label of K-12 because they indicated that they offered one less grade level than the other districts in the population. However, those districts were included in the population because they reported scores for all of the examinations necessary for analysis. In summary, the study population consisted of the available 2,524 K-12 districts or cases that I separated from the larger population of a possible 3,153 districts or cases tallied across all six years (FY 2009-2014). I provide a full description of how I selected the samples used in analysis in the following section.

### **Sample School Selection Criteria**

In order to assemble the most suitable collection of schools for this study, there must be a set of selection criteria to guide the process. The method for designating an academically successful school is more complex than simply reviewing a list of examination scores across a six-year period.

There are seven to eight grade levels per elementary school, an additional two to three grade levels for middle or junior high schools, and three to four grade levels for high schools. There are various test scores reported for students enrolled in third through eighth grade. The eighth and ninth grade achievement tests and EOI examinations will then comingle with high school grades tenth through twelfth EOIs due to the reality that students may enroll in a variety of subjects at any grade level as determined by their previous performance.

The magnitude of data that exists for the 400-plus K-12 school districts across each of the six years creates quite a large compilation of data from which to choose a sample. Given this ample pool of K-12 data and the limited scope of this dissertation, I will not consider K-8 school districts for sample selection. The removal of K-8 districts kept the focus of this study on districts that have a similar make up and comparable learning conditions, thus making the analysis uniform in nature.

In addition to the removal of the K-8 districts, I had to eliminate a small number of districts each year due to nonexistence of test performance data for some districts on certain tests. The OEQA profiles did not report test performance data for districts that had either zero students or a very small number of students who took the test. According to the data source and the methodology report that supports the data source, when the number of students

who took a certain test is five or fewer, then the performance data are not reported due to protection under privacy laws.

I established two criteria that each school district selected to be part of the high achieving school district group must meet. The first criterion for selecting a district with high achieving students is that *the percentages of advanced test scores on 16 out of 23 tests must fall at least one-half of a standard deviation above the mean or state average for that individual examination*. As discussed previously, the data reported by the OEQA includes the average test performance for the state as a whole and for each grade level of every individual school district.

The data set expressed all test results as percentages of student scores that are satisfactory or advanced as related to the state performance standards. The state average of advanced proficiency of the K-12 districts that reported useable performance data established the mean by which I measured all academic achievement.

There are 26 tests administered yearly across grades three through twelve. There is a math and reading assessment administered to all students enrolled in grades three through eight. The schools administer additional examinations in the subjects of science, history, social studies, and geography in grades 5<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup>. There are seven End of Instruction (EOI) examinations administered to students enrolled in high school level courses. Those tests include Algebra I, Algebra II, Geography, Biology, U.S. History, English II, and

English III. In order to meet state graduation requirements, a student must pass a minimum of four out of the seven EOI tests. Two of those four obligatory tests are Algebra I and English II.

A caveat to this investigation is that three of the tests in the annual battery: 5<sup>th</sup> grade Social Studies, 7<sup>th</sup> grade Geography, and 8<sup>th</sup> grade History were undergoing field testing during two of the years in this study. Due to the incomplete performance data reported for those three tests in 2013 and 2014, I chose to remove them from the other years leaving me with 23 total tests for consideration for each year. With this in mind, a high achieving school district should typically perform substantially higher than the mean (state K-12 average) on at least seventy percent of the tests administered each year. That percent would translate to high achievement on 16 out of 23 tests administered in the district annually, which was a performance threshold used in previous adequacy research (Verstegen, 2002).

The second selection criterion is that *the district must meet the first criterion in four out of the six years represented in the study*. A concern with choosing a district based on student performance during a single year is that there is no consideration for performance over time. In order to avoid selecting anomalies each year, the districts should demonstrate consistency in its yearly testing performance.



After selecting the high achieving districts, I assembled a second sample group of school districts for comparison. I chose the comparison sample of districts through stratified random sampling. This counterpart sample essentially mirrored the original selected sample with the exception of the level of achievement exhibited by their reported test performance.

I used two measures to establish a suitable corresponding set of school districts: the percent of students categorized as minority and the percent of students receiving free or reduced school lunches.

According to work published by well-known social scientist, James Coleman and his colleagues "schools bring little influence to bear on a child's achievement that is independent of his back ground and social context" (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York, 1966, p. 325). Not only are the two measures widely regarded as useful predictors of achievement, they also exist to establish congruency of sample sets and control for variance (Coleman et al., 1966; Ellinger et al., 1995; Hoy, Hoy, & Kurz, 2008).

This purposeful sample of matched districts was characterized by the nature of one group exhibiting very high academic achievement while the other does not. Matching samples in this manner reduces the chance of an influential variable skewing the results and increases the validity between subjects (Stuart & Rubin, 2008).

In addition to the two samples actually used in the binary logistic regression, I compiled data for a third sample consisting of low academically achieving school districts. The low achieving districts exhibited student test score percentages in the advanced category that were one half of a standard deviation *below* the state mean on 16 out of 23 tests in four out of six year. I intended for this sample to provide a contrasting view of achievement in demographically similar districts. However, the districts identified as low achieving varied so greatly on the necessary socio-economic characteristics that I could not obtain a matched sample.

I also considered including a fourth type of school districts into the analysis. This group districts would have exhibited increases in academic achievement from 2009 to 2014. In order to qualify as an improved district, the district would begin as a low achieving district and rise to the high achieving level by 2014, using the respective selection criteria for low and high achievement.

The search for academically improved districts revealed that some districts began at zero percent advanced students and increased by varying percentages, but most often by only a couple percentage points. Consequently, none of the increases met the established criteria to qualify them as a high achieving district in 16 out of 23 tests for four out of six years. Therefore, I did not include any information about improving school districts in the analysis.

More details about how I selected the study samples and how I utilized those samples appear in chapter four. The following section contains a discussion of the independent variable data associated with the school district samples.

### **Description of the Variables and Quantitative Analysis**

The purpose of this study was to investigate the cost of educating a student in a high achieving school district as estimated by instructional and administrative expenditures. I employed a series of descriptive analyses and a binary logistic regression in order to learn about the nature and intensity of the relationships between the variables of interest.

The four research questions raised earlier introduce the independent and dependent variables and indicate where I attempted to locate potential relationships among those variables that may exist. The first three research questions posed in this study asked about the ability of instructional expenditures, administrative expenditures, and all other expenditures per pupil to correctly predict the categorization of a district as either high achieving or not high achieving.

The dependent variable used to address these questions is High Achieving District {0 = No; 1 = Yes}. The categorical nature of this variable lends itself to binary logistic regression analysis. Simply stated, this variable encompasses two groups of school districts. The model classified the sample districts as high achieving or not high achieving.

There were nine independent variables for this regression. The first independent variable was Instructional Expenditures per Pupil (INSTEXP). The instructional expenditures are a combination of two areas of spending: Instruction and Instructional Support. The Oklahoma Cost Accounting System (OCAS) codes associated with these variables are 1000 Series and 2000 Series respectively (Office of Accountability, 2009, 2014). The INSTEXP variable encompasses the salary and benefit expenses related to teachers, teacher's aides, interpreters, and tutors. Both of the instructional expense categories directly relate to student instruction and give a complete picture of how districts spent funds for instructional activities.

The second independent variable was Administrative Expenditures per Pupil (ADMNEXP). The administrative expenditures were also comprised of a pair of expenses: District Administration and School Administration. These blended expenditures were coded under the 2000 Series in OCAS (Office of Accountability, 2009, 2014). The ADMNEXP variable accounts for the sum of all administrative salaries for the district superintendent, building level principals, and the support staff in the administrative offices. This pair of expense categories is all encompassing of the administrative supervision efforts at both the school and the district levels.

The third independent variable was Other District Expenditures per Pupil (OTHEREXP). This spending category encapsulated all of the remaining school expenditures that may affect students. Debt service was excluded from this

variable. The OCAS codes for OTHEREXP were from the Series 2000, 3000, 4000, and 7000 (Office of Accountability, 2009, 2014).

The fourth independent variable was Fiscal Year (YEAR). There were six fiscal years covered by the investigation. This variable was not analyzed as a categorical predictor, but rather as continuous. The fifth independent variable was Average Daily Membership (ADM). This variable contributed the student count for each of the sample school districts.

The sixth and seventh independent variables were Percent of Students from a Minority Background (%MIN) and Percent of Students Receiving Free or Reduced School Lunch (%FRLUNCH). These variables were used to create a stratified random sample of comparison districts and they assisted the analysis by reducing bias from confounding factors.

The eighth independent variable was Percent of Students Receiving Special Education Services (%SPED). The purpose of this variable was to establish if the number of students with special educational needs was a significant predictor of how the model categorized school districts as either high achieving or not high achieving. I controlled for this predictor to determine if there was a threat to statistical conclusion validity.

The ninth independent variable was Federal Revenue per Pupil (FEDREV). Supplemental Federal revenue possibly varies widely among different districts. I included this factor to control its presence in the expenditures.

The final research question asked if there is a significant difference between the expenditures of districts deemed to exhibit a high level of achievement and the expenditures of a comparison group of districts not categorized as high achieving. I examined this relationship by means of binary logistic regression.

The goal of linear regression analysis is not to predict causation, but rather to discover relationships among events, objects, or some phenomena. The idea is that some event like spending money may correlate or be associated with a change in an occurrence like the improvement of test scores.

The basic principles that steer linear regression analysis also apply to logistic regression. A multiple linear regression allows a researcher the ability to use more than one predictor variable to find out in what ways a group of independent (explanatory or predictor) variable act and interact in the contribution of change in a dependent (criterion or response) variable (Gorard, 2012; Hosmer & Lemeshow, 2005). A logistic regression allows the researcher to conduct discrete analyses while using the same predictor variables and criterion variables. A logistic regression model is useful because the outcome or criterion variables are categorical in nature (Chatterjee & Simonoff, 2013; Hosmer & Lemeshow, 2005).

In logistic analysis, the sorting nature of the response variables is typically in the binary form of yes/no, pass/fail or inclusion/non-inclusion. This study will use the dichotomy of high achieving district or non-high achieving

district. In this analysis, the relationship between the variables is not assumed to be linear because the changes in the independent variables predicts the probability that a district will either be high achieving or not which translates to a restricted range from zero to one. The predictions made within the model represent relationships among the variables and do not specify causation.

### **Strengths and Limitations of the Study**

The successful school district approach to estimating adequate education funding is logical and intuitive. However, the method of selecting only schools deemed academically successful creates a sample that is not truly representative of typical schools across the entire state (Downes & Stiefel, 2008). Therefore, a limit to the study is the non-random sample that does not account for the adequacy of funding for every school in Oklahoma. This limit is characteristic of this specific method of analysis.

Another facet of the design of this study is that I define academic success based solely on student performance on annual achievement tests. As discussed previously, testing has become the leading accountability tool upon which policymakers rely. I did not place emphasis on several additional elements that contribute to student academic achievement.

Those factors such as student subject interest, student motivation, student gender, community poverty levels, and adult education levels were not germane to this study. Test data was the most appropriate measurement of achievement

for this study due to the role student assessment plays in Oklahoma's annual evaluation of each school district's performance.

Restricting the population to include only districts that provide instruction for pre-Kindergarten through twelfth grade is perhaps both a limitation and strength. Dropping elementary districts from the population will stream line the sample selection process and data analysis. However, excluding those districts means ignoring a piece of the adequacy puzzle as it pertains to students in the lower grade levels. The knowledge gained from analyzing the spending and test performance of K-8 and smaller districts may be quite informative and beneficial. Perhaps other researchers could initiate studies that consider this collection of districts for a more complete picture of funding adequacy.

### **Summary**

Education receives the lion's share of funding from the state each year, but public schools have to compete with other educational institutions for those funds. The state aid formula has an element of equity built in to assist districts that have low property wealth and each district is provided funding based on the individual needs of the students through a weighting system.

Although the state supplies funding in a calculated manner, there is a question of how adequate the funding has been over the last several years. Negative and level funding has left Oklahoma school districts with minimal dollars to use in facilitating learning for a growing number of students.



Through logistic regression analysis, this study provides a deeper examination into the relationship between student achievement and school district expenditures in the areas of instruction and administrative support. Notable districts selected for investigation due to their level of advanced achievement on annual tests were contrasted with a demographically matched sample of districts. Analysis of district spending and student performance could help estimate a funding level adequate to facilitate high achieving schools.

## **CHAPTER FOUR**

### **DESCRIPTION AND VISUAL REPRESENTATION OF THE DATA ANALYSIS**

Researchers agree that school funding is adequate when a state provides every school district with sufficient funding to pay for an education where students have met the required academic standards established by the state (Augenblick et al., 2007; Deering & Maiden, 1999; Knoepfel et al., 2007; Odden et al., 2007; Springer et al., 2009).

On average, common education is the single largest annual appropriation made by the Oklahoma Legislature (Oklahoma Executive Budget, 2009, 2010, 2011, 2012, 2013, 2014). Oklahoma school districts receive more funding from state aid appropriated by the legislature than from any other source. The state supplies those funds through a two-tiered formula that has been in place for over thirty years.

One layer of funding is foundation aid that originates from the state's General Fund. This fund is a collection of monies received from state income tax, sales tax, use tax, estate tax, and gasoline tax (Oklahoma State Department of Education, 2014). The other tier is salary incentive aid that the state backs by a provisional guaranteed yield. If collections experience increase or decrease, then district funding is either elevated or cut proportionally.

This study was an endeavor to see clearly how school districts use funds to support student achievement. This knowledge is necessary to define the level of adequacy in school funding in Oklahoma. Over the past six years, education budgets have been level or negatively funded while the student population has steadily grown. Schools have more students to teach with less capital at their disposal with which to complete the task effectively. The analysis described in this chapter shows how sample districts with varying degrees of academic success used their appropriated funds to guide and teach their students.

### **Sample Selection**

The task of identifying and assembling a sample of districts that will exemplify the definition of academic achievement is daunting due to the numerous ways to define achievement and subsequently select districts that best represent that definition. However, in this study, the crux of the definition of an academically successful school district is set squarely on how students performed on state mandated achievement tests.

The use of testing as the singular indication of academic achievement is appropriate for this study because the state of Oklahoma uses little other information to rate schools and districts on their annual performance. From 2009-2011, the Oklahoma State Department of Education quantified school district success with an Academic Performance Index (API) score. The state awarded school districts an API score on a scale of 0-1500. The scores were

based on a number of metrics, of which yearly achievement tests held the greatest importance.

According to popular media and individual district reports, Oklahoma based eighty percent of the API score on achievement test performance. The remaining twenty percent of the API was made up of graduation rates, attendance, ACT test scores, and advanced placement course enrollment. In 2012, Oklahoma began transitioning from API into a new method of assessing and scoring school district performance known as the A-F Report Card system.

The new academic performance assessment method used during the latter three years examined in this study placed even more emphasis on student test performance than before. Under the A-F report card system, one-hundred percent of the overall grade assigned to a school district stems from student performance on a battery of annual Oklahoma School Testing Program examinations (Oklahoma State Department of Education, 2015).

Student performance on assessments administered in grades three through twelve accounts for fifty percent of the district's report card grade. The other fifty percent of the district's grade is an equal combination of test scores that show growth by underperforming students in upper level English, lower level reading, Algebra and lower level math. The state will recognize district accomplishments in the areas of student attendance, graduation rates, enrollment in advanced placement courses, college entrance examination scores, and grade

point averages. However, the non-test related areas of student achievement only count as bonus points (Oklahoma State Department of Education, 2015).

The pattern of API scoring and the recently developed district report cards illustrates that Oklahoma unambiguously equates academic success with test performance. Therefore, testing will be the only indicator of academic achievement considered within this investigation.

The data set that I utilized for this study represented achievement as a percentage of students from each district that performed at either the satisfactory level or the advanced level on each test. The data did not contain information regarding the remaining pair of lower levels of achievement known as proficient and limited knowledge. The data revealed district-level test performance only, thus preserving the privacy of individual student information. The configuration of the test performance statistics was sufficient to select a cadre of academically elite school districts.

At the outset of the study, I planned to define high achieving school districts as those that have a high percentage of students who scored in the advanced category of test performance on all tests for all six years in the study. However, when I placed these constraints on the districts as selection criteria, I found that zero districts met that high of a standard. I attempted to acquire a sample by applying various combinations and patterns of test performance on twenty-three tests across the six years of data. Each time I relaxed the high achievement standards; there would be a small increase in sample size.

After several reiterations of the approach to sample selection, I ultimately found that I achieved a practical sample of high achieving school districts if I employed the following two-staged selection conditions:

- a school district must show that students perform one-half standard deviation above the mean (state average of K-12 district advanced test scores) on 16 out of 23 Oklahoma standardized assessments;
- a school district must meet the first criterion in four out of the six years investigated in the study.

This configuration of criteria yielded a sample of twenty high achieving school districts (HAD) out of 418 total districts that reported test performance data. The HAD sample equated to less than five percent of Oklahoma's K-12 school districts, which indeed is an elite group on which to base a study. Table 4.1 highlights some of the characteristics of the sample of High Achieving School Districts (HAD).

The sample of twenty high achieving districts was made up of a variety of schools from diverse settings. A quarter of the districts were located in large suburban areas including one large city. Twenty percent of the districts were found in distant or remote towns and half of the districts were located in rural areas. On average, the sample of high achieving districts obtained 47.1% of their revenue from local sources and 40.1% from state revenue. The federal government provided an average of 12.8% of the funding for the high achieving districts.

**Table 4.1: Characteristics of the High Achieving School Districts**

High Achieving Districts	Number of Years Scoring One Half SD <u>above</u> the Advanced Category Mean on 16 or more Tests	Avg ADM	Avg % Minority	Avg % F/R Lunch
HAD1	5	2856	26.0%	19.9%
HAD2	6	1438	23.8%	34.8%
HAD3	6	22203	33.0%	42.6%
HAD4	6	14713	26.3%	44.6%
HAD5	4	353	15.8%	56.0%
HAD6	6	1937	25.7%	50.4%
HAD7	6	919	11.7%	32.0%
HAD8	4	1306	28.5%	55.8%
HAD9	5	239	12.5%	48.0%
HAD10	4	1856	52.5%	45.0%
HAD11	6	4085	17.7%	7.4%
HAD12	6	21593	25.8%	25.7%
HAD13	6	1616	26.0%	42.6%
HAD14	4	473	38.3%	77.6%
HAD15	6	5760	21.8%	43.3%
HAD16	5	5096	20.0%	23.0%
HAD17	6	10479	33.5%	31.1%
HAD18	5	14955	51.5%	54.9%
HAD19	6	9130	30.2%	29.0%
HAD20	6	5932	33.2%	47.7%
Group Averages:		6347	27.7%	40.6%

The next step of sample collection was to assemble a comparison group of school districts to pair with the high achieving school districts. In order to reduce bias due to confounding variables, this collection of Comparison Districts (CD) needed to match certain socioeconomic and demographic characteristics possessed by the HAD group. I matched the CD group to the HAD sample using the percent of students classified as members of a minority group and the percent of students who qualify for free or reduced school lunches. These demographic data are widely utilized for matched sampling in the literature (Coleman et al., 1966; Ellinger et al., 1995; Hoy et al., 2008).

The set of potential comparison districts totaled 398. I randomized those districts and then selected individual districts that closely mirrored an individual high achieving district based on the socio-economic characteristics. I allotted a five percent variance among the reported averages. Two of the comparison districts fell outside this parameter due to the very low average of free or reduced lunches in two of the high achieving districts. I had no option other than to match those districts at a six percent and thirteen percent variance just for those specific cases.

Table 4.2 presents a complete description of the Comparison School District (CD) sample that I evaluated alongside the high achieving group of districts. The CD group did not have to meet any academic performance standards to qualify for selection.



**Table 4.2: Characteristics of the Comparison School Districts**

Comparison Districts	Number of Years Scoring One Half SD <u>above</u> the Advanced Category Mean on 16 or more Tests	Avg ADM	Avg % Minority	Avg % F/R Lunch
CD1	1	9077	25.2%	33.7%
CD2	0	1523	25.6%	51.2%
CD3	0	1885	27.7%	40.8%
CD4	0	266	12.8%	46.9%
CD5	0	639	29.8%	54.3%
CD6	1	1747	18.3%	20.9%
CD7	0	263	15.0%	55.9%
CD8	0	497	13.3%	32.1%
CD9	1	1731	35.4%	29.0%
CD10	0	936	18.1%	27.8%
CD11	2	1735	19.0%	42.7%
CD12	0	1808	53.7%	48.1%
CD13	0	2198	27.5%	48.9%
CD14	0	172	53.4%	57.3%
CD15	0	698	24.5%	35.8%
CD16	0	233	38.2%	78.4%
CD17	0	1241	30.4%	22.2%
CD18	0	2525	33.3%	46.5%
CD19	0	1242	23.3%	32.1%
CD20	0	448	33.0%	48.8%
Group Averages:		1543	27.9%	42.7 %

The sample of twenty districts used for comparison against the high achieving sample predominately consisted of rural schools. One tenth of the sample were located in large suburban areas and 25% were found in distant or remote towns. Sixty-five percent of the comparison districts were located in rural areas with the majority of those schools situated in distant to remote rural settings. On average, the sample of comparison districts received 36.4% of their revenue from local sources. The state provided an average of 49.5% of their revenue and 14.1% of their funding came from the federal government.

In addition to these two samples, I attempted to identify a sample of low achieving school districts (LAD) to include in a binary logistic regression against the HAD group. Like the CD sample, the LAD sample had to match the HAD group demographically plus it would also need to exhibit test performance on the opposing end of the scale from the HAD sample. The performance level of the LAD sample had to be at least one-half of a standard deviation below the mean in the advanced category on 16 out of 23 tests for four out of six years.

I conducted a search among the available school districts and I found a collection of 26 districts that met the necessary two tiered test performance criteria. Yet, when I make an effort to match the LAD group to the HAD using the socio-economic criteria established by the HAD group, I could not find enough resemblance between the two groups to achieve a matched sample.

**Table 4.3: Characteristics of the Low Achieving School Districts**

Comparison Districts	Number of Years Scoring One Half SD <u>below</u> the Advanced Category Mean on 16 or more Tests	Avg ADM	Avg % Minority	Avg % F/R Lunch
LAD1	5	383	47.0%	81.0%
LAD2	4	254	58.6%	73.6%
LAD3	4	260	79.6%	80.8%
LAD4	4	327	14.2%	75.1%
LAD5	4	244	51.2%	79.9%
LAD6	4	427	35.6%	81.3%
LAD7	6	238	53.0%	77.7%
LAD8	5	242	45.0%	67.2%
LAD9	4	215	51.4%	76.0%
LAD10	6	344	42.8%	70.0%
LAD11	4	364	25.8%	60.9%
LAD12	4	297	19.1%	74.7%
LAD13	5	275	57.7%	82.7%
LAD14	4	505	45.6%	72.3%
LAD15	5	277	32.8%	62.0%
LAD16	4	899	50.5%	74.8%
LAD17	5	990	97.6%	96.0%
LAD18	5	3601	59.9%	88.1%
LAD19	5	1084	83.6%	90.1%
LAD20	4	263	51.6%	80.2%
LAD21	4	303	32.4%	75.3%
LAD22	5	502	41.7%	70.7%
LAD23	6	324	26.3%	79.3%
LAD24	5	963	58.3%	68.4%
LAD25	4	733	48.4%	83.4%
LAD26	6	444	55.7%	73.3%
Group Averages:		568	48.7%	76.7%

More variables and additional analysis beyond the scope of this study would have been required to find a matched sample between academically divergent districts. It is indeterminate if a matched sample based on demographically analogous characteristics that would also be compatible with the test performance criteria necessary to create a high versus low achievement dichotomy for analysis exists. Due to this sampling difficulty, I chose to conduct the analysis using only the HAD and CD samples. Table 4.3 displays the features of the abandoned LAD sample.

Although I could not generate a sample consisting of only low achieving districts, the districts identified in the CD sample exhibited low enough achievement to establish a wide variation in academic performance between the samples. The differences in academic achievement would provide richer results with respect to understanding the differences in how higher achieving districts spend money compared to lower achieving districts.

In addition to the socio-economic data used to select each sample, the analysis also included other predictors to assist in finding a significant percent of possible variance. The following section provides an in-depth look into the independent variables that were drawn from the research questions and how those variables fit into the overall analysis.

## **Descriptive Statistics**

The independent variables considered in this analysis included: fiscal school year, average daily membership (student population), the percentage of students who are members of a minority group, the percent of students who receive free or reduced lunch at school, the percent of students classified as needing specialized education services, and federal revenue per pupil.

The other independent variables used in the analysis were instructional expenditures and administrative expenditures, and district expenditures that included neither administration nor instruction. These latter three predicting variables were of paramount interest because, as the foundation of my research questions, they would generate the new information about the adequacy of school funding and efficiency of district spending pursued through this study. Table 4.4 describes the independent variables from both the HAD and CD groups together (N=240).

**Table 4.4: Descriptive Statistics of the Independent Variables**

Variable	N	Minimum	Maximum	Mean	Standard Deviation
ADM	240	116.4	23056.9	3945.058	5544.4568
%MIN	240	0.090	0.710	0.27769	0.115670
%FRLUNCH	240	0.066	0.838	0.41656	0.154465
%SPED	240	0.085	0.390	0.131891	0.031660
FEDREV	240	\$173	\$4,219	\$850.29	\$436.359
INSTREXP	240	\$2,884	\$5,973	\$4,251.91	\$565.382
ADMNEXP	240	\$370	\$2,873	\$691.38	\$304.078
OTHEREXP	240	\$942	\$6,575	\$2,433.76	\$676.048
Valid N (listwise)	240				

The descriptive comparison of means illustrated by Table 4.5 revealed similarities and differences among the variables. The widest variance among the predictors appeared in the analysis of the ADM means. The districts classified as not high achieving had much smaller average daily memberships ( $M = 1,543$ ,  $SD = 1,882$ ) than the group of districts classified as high achieving ( $M = 6,347$ ,  $SD = 6,824$ ). The other predictor variables show less of a disparity.

**Table 4.5: Comparison of Independent Variable Means**

High Achieving or Not	YEAR	ADM	%MIN	%FRLUNCH	%SPED	FEDREV	INSTREXP	ADMNEXP	OTHEREXP	
Not High Achieving	Mean	3.50	1543.14	0.278	0.428	0.144	\$882.41	\$4,226.08	\$772.06	\$2,388.59
	N	120	120	120	120	120	120	120	120	120
	SD	1.72	1881.45	0.118	0.151	0.038	\$499.849	\$648.390	\$368.088	\$819.507
High Achieving	Mean	3.50	6346.98	0.277	0.406	0.134	\$818.17	\$4,277.74	\$610.70	\$2,478.92
	N	120	120	120	120	120	120	120	120	120
	SD	1.72	6823.86	0.114	0.158	0.024	\$361.232	\$469.302	\$192.582	\$492.156
Total	Mean	3.50	3945.06	0.278	0.417	0.139	\$850.29	\$4,251.91	\$691.38	\$2,433.76
	N	240	240	240	240	240	240	240	240	240
	SD	1.72	5544.46	0.116	0.155	0.032	\$436.359	\$565.382	\$304.078	\$676.048

The two groups of school districts shared closely related means for %MIN, %FRLUNCH, and %SPED. I based the selection criteria for the comparison group on the percentages of students from minority backgrounds and students who received free or reduced lunches. The %MIN of the high achieving districts ( $M = 0.27701$ ,  $SD = 0.114$ ) was marginally smaller than that of the non-high achieving districts ( $M = 0.27837$ ,  $SD = 0.118$ ). Those means varied by less than one-hundredth of one percent.

The %FRLUNCH for non-high achieving districts was somewhat elevated ( $M = 0.42751$ ,  $SD = 0.151$ ) above the districts classified as high achieving ( $M = 0.40562$ ,  $SD = 0.158$ ). The predictor variable, %SPED, appeared to be slightly higher in the districts not classified as high achieving ( $M = 0.14373$ ,  $SD = 0.038$ ) than the high achieving group ( $M = 0.13408$ ,  $SD = 0.024$ ).

The model also controlled for federal revenue per pupil. The FEDREV for high achieving districts was lower ( $M = \$818.17$ ,  $SD = \$361.23$ ) than the non-high achieving group ( $M = \$882.41$ ,  $SD = \$499.85$ ). The difference between the means showed to be just over sixty-four dollars per pupil.

The three predictor variables highlighted in my research questions were instructional expenditures per pupil, administrative expenditures per pupil, and other district expenditures that did not include instruction or administration. School districts categorized as high achieving spent more ( $M = \$4,277.74$ ,  $SD = \$469.30$ ) than the districts not classified as high achieving ( $M = \$4,226.08$ ,  $SD = \$648.39$ ).



In the same manner, the high achieving districts spent more on other expenditures not related to instruction and administration (M = \$2,478.92, SD = \$492.16) than the non-high achieving districts (M = \$2,388.59, SD = \$819.51). Conversely, the administrative expenditures were higher in the districts not classified as high achieving (M = \$772.06, SD = \$368.09) than the high achieving districts (M = \$610.70, SD = \$192.58).

### Results of the Logistic Regression Analysis

I performed a binary logistic regression to learn the effects of several factors on the likelihood that certain school districts are academically high achieving districts. Binary logistic regression renders estimates of the probability that an event will occur. In this study, the event is whether the model categorizes a school district as high achieving or not high achieving. Table 4.6 illustrates how the model classified the two samples of school districts prior to the addition of any independent predictors.

**Table 4.6: Initial Classification\* of School Districts**

Observed		Predicted		
		High Achieving or Not		Percentage Correct
		Not High Achieving	High Achieving	
Step 0	Not High Achieving	0	120	0
	High Achieving	0	120	100.0
Overall Percentage				50.0

\*The cut value is 0.500

If the estimated probability is equal to or greater than 0.50, then the model classified the school district as high achieving. This information exists as a comparison to the model with all of the independent variables included. According to the results, the predictor-free model assumes that one would correctly classify a school district as high achieving half of the time. The omnibus tests of model coefficients provides the overall statistical significance of the model and how well the model predicted the placement of school districts into categories compared to using no independent variables at all (Laerd Statistics, 2015).

The omnibus test reported a Chi-square ( $\chi^2$ ) value of 99.804 with 9 degrees of freedom, which was statistically significant, thus indicating that the model was a good fit. The model summary included the pseudo R-squared values of Cox & Snell  $R^2$  and the Nagelkerke  $R^2$ . A pseudo R-squared can be a useful proxy for a true R-squared in that they both range on a scale from zero to one. Unlike a standard R-squared, the Cox & Snell  $R^2$  never reaches zero nor one (Laerd Statistics, 2015).

In any case, a researcher interprets the pseudo  $R^2$  like a standard  $R^2$  in that as the higher the number, the better the fit of the model. The pseudo  $R^2$  values indicated that this model explained 34% to 45% of the variation in the dependent variable.

**Table 4.7: Final Predicted Classification\* of School Districts**

Observed		Predicted		
		High Achieving or Not		Percentage Correct
		Not High Achieving	High Achieving	
Step 1	Not High Achieving	98	22	81.7
	High Achieving	37	83	69.2
	Overall Percentage			75.4

\*The cut value is 0.500

Table 4.7 illustrates the post-analysis model predictions of the classification of the two groups of school districts. With the independent predictor variables included in the model, the overall percentage of accuracy in classification of school districts increased from 50% to 75.4 %. This indicates that the inclusion of the chosen predictor variables improved the power of the model to correctly place districts into the observed category of the dependent variable.

Another set of calculations imbedded in the post-analysis classification table (Table 4.7) relates to how well the model matched the observed achievement traits with the predicted achievement traits. A measure known as the sensitivity shows how well the model correctly predicted that a district did actually exhibit the traits of a high achieving district; also known as a true positive (Cohen, Cohen, West, & Aiken, 2003).

The sensitivity value or true positive percentage for this model was 69.2%. In addition to the sensitivity, the model measured specificity, which is a non-high achieving district being accurately predicted to belong the not high achieving group or true negative prediction (Cohen, et al., 2003). The specificity value or true negative percentage for this model was 81.7%.

Table 4.8 shows the regression function or contribution of each of the independent predictor variables and the results of the test of their significance within the model. The B coefficients show the change in the log odds that correspond to a one-unit change in the related independent variable, holding all other variables constant (Laerd Statistics, 2015).

The results indicate that there is a negative change in the log odds of year, administrative expenditures, percent minority, and percent special education. The results also indicated that there was a positive change in the log odds of instructional expenditures and percent free or reduces lunch. There was no noticeable change in the log odds for the predictors of other district expenditures, average daily membership, and federal revenue.

Table 4.8 also shows the standard error (S.E), Wald statistic, degrees of freedom (*df*), the statistical significance (Sig. ( $p < 0.05$ )), and the odds ratio (OR) associated with each predictor variable ( $\text{Exp}(B)$ ). Wald represents the distinctive influence of each individual variable, keeping the other predictors constant and separate.

**Table 4.8: Independent Variables\* in the Equation**

	B (change in log odds)	S.E.	Wald	df	Sig. ( $p < .05$ )	Exp(B) Odds Ratio (OR)
INSTREXP	0.002	0.001	17.688	1	0.000	1.002
ADMNEXP	- 0.004	0.001	13.361	1	0.000	0.996
OTHEREXP	0.000	0.000	1.117	1	0.290	1.000
YEAR	- 0.040	0.100	0.157	1	0.692	0.961
ADM	0.000	0.000	19.659	1	0.000	1.000
%MIN	- 1.690	1.673	1.020	1	0.313	0.185
%FRLUNCH	0.581	1.659	0.123	1	0.726	1.788
%SPED	- 10.827	6.789	2.544	1	0.111	0.000
FEDREV	0.000	0.000	0.079	1	0.779	1.000
Constant	-6.345	1.738	13.329	1	0.000	0.002

\*All variables entered on step 1.

In this study, the OR illustrates the ratio of the odds of making it into the high achieving group to the odds of not being classified as high achieving at a 95% confidence level. The Sig. column contains the statistical significance of each variable. Of the nine predictors, the model found only three to be statistically significant: average daily membership, instructional expenditures, and administrative expenditures,  $p = 0.000$  for all variables.

In summary, the analysis revealed that districts classified as high achieving districts had larger student populations and spent significantly more on instruction and significantly less on administration than other districts, controlling for other variables like district size, federal funding, and socio-economic characteristics. The means of these predictors were similar; however, the variances among them appeared to be quite incongruent. I performed a set of secondary analyses to provide a more complete understanding and expanded description of the findings from the primary analysis.

### **Secondary Analysis**

In addition to the binary logistic regression, I ran analyses on a compilation of ancillary data that were associated with the independent predictors, but not specifically addressed in my research questions. I processed a comparison of the means of average teacher and administrator salaries and the percent of the total district expenditures identified as instructional and administrative spending.

I also computed the means for the teacher to administrator ratio and the average daily memberships for the districts categorized as either high achieving or not high achieving. Along with those analyses, I computed the Pearson product-moment correlations between several primary and ancillary variables. The objective of running these correlations was to understand the level of significance of some of the primary findings better.

The new variables found in the secondary analyses were not included in the primary analysis because the expenditure data they provide were embedded within two of the major predictor variables used in the binary regression. Some of the data from the primary analysis are present in the secondary analyses in order to better verify relationships. The results of the secondary analyses provide richer descriptive details to support the primary findings. Table 4.9 shows the correlations among the ancillary data and Table 4.10 illustrates the comparison of their means.

I computed the Pearson's product-moment correlations in order to assess the relationship between average daily membership (ADM) and three other variables: instructional expenditures, administrative expenditures, other district expenditures, and teacher to administrator ratios. The level of the strength of the correlations are defined as small ( $0.1 < |r| < 0.3$ ), moderate ( $0.3 < |r| < 0.5$ ), or large ( $|r| > 0.5$ ) (Cohen, 1988).

In addition to the intensity of the correlations, I calculated the proportion of variance, also known as the coefficient of determination. This figure is the percentage of variance in one variable that is accounted for by the interaction of another variable and it is calculated by squaring the correlation coefficient ( $r^2$ ) (Laerd Statistics, 2015).

The analysis showed a small negative correlation between ADM and instructional expenditures,  $r(238) = -0.259$ ,  $p < 0.01$ , with ADM explaining 6.7% of the variation in instructional expenditures. There was a moderate negative relationship between ADM and administrative expenditures,  $r(238) = -0.384$ ,  $p < 0.01$ , with ADM explaining 14.8% of the variation in administrative expenditures.

Next the analysis showed that there was a small negative correlation among ADM and other district expenditures not related to instruction or administration,  $r(238) = -0.141$ ,  $p < 0.05$ , with ADM explaining 2% of the variation in other district expenditures. Finally, there was a borderline moderate positive correlation between ADM and teacher to administrator ratios,  $r(238) = 0.295$ ,  $p < 0.01$ , with ADM explaining 8.7% of the variation in the ratio of teachers to administrators.

According to the comparison of the means of the secondary data, the districts classified as high achieving spent more money on teacher salaries ( $M = \$44,130$ ,  $SD = \$1,417$ ) than the districts not classified as high achieving ( $M = \$42,395$ ,  $SD = \$1,469$ ). The results are similar with regard to the administrator



salaries. High achieving districts spent more on administrator pay (M = \$77,108, SD = \$5,249) than the non-high achieving districts (M = \$75,765, SD = \$6,816).

The standard deviation between the administration salary means was higher for the districts not categorized as high achieving. The percent of instruction of total expenditures was slightly lower for districts not classified as high achieving (M = 0.5789, SD = 0.053) than it was for the high achieving districts (M = 0.583, SD = 0.0369). The opposite was true of the percent of administrative expenses of the total school district expenditures.

**Table 4.9: Correlations of Ancillary Data**

		Average Daily Membership
Teacher to Administrator Ratio	Pearson <i>r</i>	0.295**
	Sig. (2-tailed)	0.00
	N	240
Instruction Expenditures	Pearson <i>r</i>	- 0.259**
	Sig. (2-tailed)	0.000
	N	240
Administration Expenditures	Pearson <i>r</i>	- 0.384**
	Sig. (2-tailed)	0.000
	N	240
Other District Expenditures	Pearson <i>r</i>	- 0.141*
	Sig. (2-tailed)	0.000
	N	240

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

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

**Table 4.10: Comparison of Ancillary Data Means**

High Achieving or Not	ADM	Average Teacher Salary	Average Administrator Salary	Percent of Instruction of Total Expenditures	Percent of Administration of Total Expenditures	Teacher to Administrator Ratio	
Not High Achieving	Mean	1543.14	\$42,395.32	\$75,764.93	57.895%	10.284%	12.402
	N	120	120	120	120	120	120
	SD	1881.46	\$1,469.19	\$6,816.25	5.311%	4.197%	3.614
High Achieving	Mean	6346.98	\$44,130.26	\$77,107.54	58.323%	8.182%	13.231
	N	120	120	120	120	120	120
	SD	6823.86	\$1,417.02	\$5,248.86	3.693%	1.604%	2.116
Total	Mean	3945.06	\$43,262.79	\$76,436.24	58.109%	9.233%	12.817
	N	240	240	240	240	240	240
	SD	5544.46	\$1,682.31	\$6,107.67	4.569%	3.341%	2.984

The districts categorized as high achieving spent a lower percentage of their total district expenditures on administration ( $M = 0.0818$ ,  $SD = 0.0160$ ) than the districts not classified as high achieving ( $M = 0.1028$ ,  $SD = 0.0419$ ). The standard deviation among the means of the administrative percentages of total district expenditures for the high achieving districts was smaller than the non-high achieving group.

Additionally, the teacher to administrator ratio was higher for districts categorized as high achieving ( $M = 13.231$ ,  $SD = 2.116$ ) than the districts not in the high achieving group ( $M = 12.402$ ,  $SD = 3.614$ ). The non-high achieving group of districts had a higher variance in the teacher to administrator ratio.

### **Summary**

The goal of this study was to examine how samples of school districts spent allocated funds and use that information to estimate the cost of an adequate education in Oklahoma. I used the Successful School District method to sample the data. I conducted a binary logistic regression with six years of data for a sample of twenty high achieving school districts and a sample of twenty demographically similar comparison districts.

I also ran secondary analyses with ancillary data that, although not specifically addressed in the research question, related to the predictor variables examined in the primary analysis. The secondary analyses provided richer description of the variables used to predict achievement and the analyses fostered a deeper understanding of the primary results.

The binary logistic regression model was statistically significant,  $\chi^2(9) = 99.80$ ,  $p = .0000$ . This model explained 45.4% (Nagelkerke  $R^2$ ) of the variance in high academic achievement and correctly classified 75.4% of the cases of high achieving school districts. Out of the 240 districts, the positive predictive value was 79.1% or 83 out of 105 districts predicted to be high achieving. The negative predictive value was 72.6% or 98 out of 135 districts predicted to not be high achieving.

The analysis confirmed that both instructional and administrative spending were statistically significant predictors of categorizing the samples of Oklahoma K-12 school districts as high achieving or not high achieving. Both linked expenditures to achievement, but in opposite ways. An increase in instructional spending was associated with an increase in the odds that the variable would correctly identify a district as high achieving. Alternatively, an increase in the administrative expenditures indicated a decrease in the odds that a district would belong in the high achieving group.

## **CHAPTER FIVE**

### **CONCLUSIONS DRAWN FROM DATA ANALYSIS, DISCUSSION OF IMPLICATIONS TO EDUCATION POLICY AND FINANCE, AND SUGGESTIONS FOR FURTHER RESEARCH**

This dissertation was an exploration into Oklahoma education funding adequacy and district spending efficiency from 2009 to 2104. The study was not a classic adequacy design in that the goal was not to create an adequate per pupil base funding figure. Instead, the study incorporated elements of the successful school district method (SSD) of analysis along with a binary logistic regression to reveal details about the relationship between district spending and student achievement.

The findings showed that spending was in fact a significant predictor of whether the model classified a school district as high achieving. Instructional spending showed a positive relationship with achievement and administrative spending related to achievement in a negative way.

The year variable was not significant in the model, which indicated that the relationships among spending and achievement did not change over time. In addition, the model controlled for federal revenue, which made no significant difference as a district funding source. Finally, the variables for the percent of students from a minority group, the percent of students who qualify for free or reduced lunches, and the percent of students who receive special education

services did not have a significant impact on classifying districts within the model.

### **Research Question #1 Conclusions**

The first research question asked if instructional expenditures could predict a high level of achievement. The results indicated that increased spending for instruction predicted higher levels of achievement. This finding agrees with other research where larger investments in instructional efforts were associated with increased student performance and achievement (Chaudhary, 2009; Dee, 2001; Jacques & Brorsen, 2002).

An interesting aspect of this discovery was that the means for instructional spending (i.e. the sum of salaries and benefits for teachers and instructional support staff) exhibited by districts classified as high achieving and those not classified as high achieving were very similar. In fact, the districts classified as high achieving spent only \$51.66 more per student than the other group of districts.

This difference in instructional spending amounts equated to less than one percent (0.7%) of the total district expenditures. It is remarkable that this very small amount was statistically significant. This revelation begs the question that if approximately fifty-two dollars per student can move a district into higher echelons of achievement, then how would \$100, \$500, or even \$1,000 more per student influence the relationship between instruction and achievement. I discuss that query at greater length later in this chapter.

### **Research Question #2 Conclusions**

The second research question asked if administrative expenditures could predict a high level of achievement. The findings revealed that higher levels of spending in the area of administration (i.e. the sum of salaries for district superintendents, principals, and administrative support staff) predicted lower levels of achievement. According to the comparison of means, the districts not classified as high achieving spent \$161.36 more per student for administration. This difference in administrative expenditures equated to 2.18% of the total district spending. School districts at the top of the achievement continuum spent an average of two percent less than the districts not classified at high achieving.

Findings from other research concur that an inverse relationship exists between student achievement and administrative spending (Anderson et al., 1991; Brewer, 1996; Jacques & Brorsen, 2002). The results from these studies suggested that decreasing administrative costs or shifting them to instructional areas of service within a district would relate to higher student achievement.

### **Research Question #3 Conclusions**

Research question number three asked if other district expenditures (those other than instruction and administration) could predict a high level of achievement. The results of the analysis showed that other district expenditures did not predict whether a district attained a high level of achievement. The districts classified as high achieving spent an average of \$90.33 more per

student on services not included in administrative or instructional activities, but the amount was not statistically significant within the model.

#### **Research Question #4 Conclusions**

The fourth research question asked if there is a significant difference between the expenditures of high achieving districts and the expenditures of demographically similar districts not classified as high achieving. The analysis of expenditures indicated that there was a significant difference in both administrative and instructional spending.

However, the difference between the other expenditures that did not include instruction and administration was not significant. It is curious that the differences in instructional and administrative spending between the two categories of districts were significant yet the model did not deem differences in other district expenditures to be significant, especially when the dollar amounts were somewhat similar among the three groups.

The model measured the odds ratio (OR) which can provide insight into why two of the dollar amounts could be significant while the third was not. The OR is a ratio of the odds of being classified as high achieving to the odds of not being classified as high achieving; otherwise known as a ratio of ratios.

Szumilas (2010) stated that “odds ratios are used to compare the relative odds of the occurrence of the outcome of interest given exposure to the variable of interest” (p. 227). In this case, the OR compared the relative odds that a school district is high achieving given the contributions of spending in the areas of



instruction, administration, and other areas not categorized as instruction or administration.

Table 4.8 shows that the OR for those expenditures did not deviate much from a ratio of one to one. This means that if there was an effect size, it was very small. The OR for instructional expenditures was 1.002. This signified a weak yet positive relationship between increasing instructional expenditures and high academic achievement. The OR for administrative expenditures was 0.996. This indicated that an increase in administrative spending related rather negatively to high academic achievement. The OR for other expenditures was equal to 1.000. This signified that there was no change in the odds that a change in other district expenditures had no relationship to high academic achievement (Szumilas, 2010).

### **Synopsis of Findings Placed in Context**

The results of this examination of school finance from 2009-2014 suggest that adequacy and efficiency share a strong bond. The funding levels (adjusted for inflation) for Oklahoma school districts have repeatedly decreased while accountability and student populations steadily increased (Ballard et al., 2014; DuFour & Marzano, 2015; Oklahoma Policy Institute, 2014a).

Was school funding adequate and was district spending efficient? The answers to these questions are more complex than a simple yes or no. The results of this analysis suggest that some districts could facilitate high achievement while other districts could not. However, the disparities may not lie

strictly within the context of adequacy and efficiency. Equity and local wealth could possibly affect these relationships between spending and achievement.

I did not conduct an analysis of the equity of the financial revenue and the local resources available to the sample of Oklahoma K-12 districts used in this study. On the surface, it is uncertain if the school districts had access to equitable resources. Additionally, the presence of fiscal adequacy also remained inconclusive. This examination revealed that a few districts, primarily through slightly elevated instructional outlay, were able to operate within restricted budgets to produce academically successful students where other districts did not. What is not clear is exactly how the districts were able to provide the additional money for instruction.

A small increase in instructional spending effectively separated the top five percent of school districts academically from the K-12 population. This finding implies that giving schools additional money for instruction appears to be the appropriate action to support student achievement. Previous research supports the move toward elevating the base level of education funding as high as possible (Daniel, 2010; Hadderman, 1999).

Hadderman (1999) asserted that adequacy must be addressed in lieu of equity because equal amounts of scarcity will not benefit students and schools. The move to fiscal adequacy fosters improved and more realistic funding for schools to be better able to meet higher standards of quality and accountability (Baker, 2005). However, the current revenue failures along with the record of

past state appropriations lead to the assumption that Oklahoma will likely not increase funding.

Considering the uncertainties of revenue and funding, the evidence provided by this study supports the opinion that school districts would benefit from additional money allocated for instruction and instructional support. The amounts of money school districts receive matters and the way in which districts spend their money matters just as much if not more. Like Chaudhary (2009), Dee (2005), Hedges et al. (1994a), and Jefferson (2005), this study contributed to the belief that additional money would have a positive association with student achievement, especially if the districts use the funds to increase particular education inputs, namely instruction.

The high achieving districts spent an average of less than half of one percent (0.042%; see Table 4.10) more for instruction as a percent of the total district expenditures than the non-high achieving group. This revelation would be noteworthy in any economy, but is more meaningful for districts facing large budget cuts. The spending changes that lower achieving districts need to make in order to match the levels of the high achieving districts found in this study appear to be affordable on any budget.

A study conducted by Jacques and Brorsen (2002), produced findings that were similar to results of this dissertation. They examined eleven categories of spending within school districts across Oklahoma in FY 1994-1995 in an attempt to find areas that were most effective at increasing student achievement.

Schools that spend more on instruction have higher test scores than those that spend less in those areas. However, schools that spend more on school administration and student support have lower test scores than schools that spend less. Since school districts have limited funds, increased spending (on any category whose parameter estimate is statistically insignificant) results in a misallocation of resources away from more productive areas such as instruction (Jacques & Brorsen, 2002, p. 1001).

The administrative expenditures examined in this dissertation also had a significant relationship with student achievement. However, it was not a positive correlation like instructional spending. The results indicated that higher spending in administration related to poorer test performance.

To put this finding into context, the comparison of means of the ancillary data revealed that districts in the high achieving category spent an average of 8.2% of their money on administration while the districts not classified as high achieving expended an average of 10.3% of their funds on administration. This difference in percentages is indeed worthy of further inquiry when considering that the average percent of administrative expenditures for the population of Oklahoma K-12 schools during the years of this study was 10.1%. The administrative spending in high achieving districts was situated two percent below the state average.

Oklahoma State Statute 70-18-101 fixed the cost of central office expenditures for superintendents and support staff at between five and eight percent of total district expenditures based on a district's average daily attendance. The data used for this study did not separate the costs of district and

building level administrative spending, but the evidence that districts with smaller ADM spent close to that same amount for administration as districts with large ADM appears to suggest some bloat.

The results of this study imply that reducing administrative expenditures could be associated with higher student achievement. This finding agrees with the nation-wide study produced by Anderson et al. (1991). The authors found that increasing the numbers of non-instructional staff or inflating the “educational bureaucracy”, had a negative impact on student achievement (Anderson et al., 1991, p. 40).

Over some range of the educational production function, the school systems may be able to get something for nothing. The something is better student performance; the nothing is getting rid of a few vice-principals, various assorted curriculum development specialists, and other non-participants in the actual educational process who absorb scarce budgetary resources (Anderson et al. 1991, p. 44).

The predominant conclusion of this study is that school districts should increase instructional spending while concomitantly decreasing administrative spending in order to maximize the probability that students will demonstrate high levels of achievement. The section that follows, addresses the implications of cutting administrative costs and the potential ways to increase instructional investments suitably.

## **Implications and Recommendations for Oklahoma Education Policy and Finance**

The spending patterns for instruction across all districts appear to be quite analogous. This could be due to the reality that funding for the districts represented in this study was so austere that spending could not be remarkably more substantial for some districts compared to others. Districts cannot spend or misspend money that they do not receive (Hadderman, 1999).

The results of analysis indicated that Oklahoma has flattened out the funding for common education as evidenced by the similarities of spending among districts with large variances in average daily memberships. With budget ceilings hanging so low across the state, the smallest changes in where money is spent can have a compellingly significant effect.

The findings of this study suggested that the lower achieving school districts might not need massive amounts of new money to match the spending of the top achieving districts. However, a study of the adequacy of the state funding formula would be necessary to determine just how much new money would be needed to facilitate adequate achievement. The 2005 study conducted by Augenblick et al. reported inadequacies in Oklahoma and the funding formula has not been altered since then which would lead to the assumption that funding continues to be inadequate. The question of how inadequate is Oklahoma's education funding remains to be determined.

The findings of this study cannot be statistically extrapolated beyond the data used in the analysis to make a reliable or comprehensive claim about how additional funding would affect achievement. Nevertheless, the results of this analysis inspire the speculation that if a school district had more money it would produce higher achieving students.

The average instructional spending for the districts classified as high achieving was comparable to the districts not classified as high achieving. Yet the high achieving group performed considerably better on annual achievement tests and did so by spending only an additional \$51.66 more per pupil. So what could districts do with additional monies earmarked for instruction? Perhaps incentive pay or merit-based bonuses would be an advantageous investment.

Similar to this study, research conducted in Texas found that instructional expenditures shared a positive relationship with achievement. A small difference in teacher compensation yielded the most significant gains in student performance outcomes (Harter, 1999). Those significant gains in achievement were not associated with teachers' base pay. Instead, the gains correlated with a \$110 (per pupil) merit-based teacher salary supplement (Harter, 1999). Jefferson (2005) asserted that more money for schools works best when it funds incentives instead of simply raising the level of funding across the board. The use of incentive pay could be a solid investment for teachers and students across Oklahoma.

The other significant finding in this study was that the administrative expenditures had an inverse association with achievement. High achieving districts paid their administrators \$1,343 more on average than the districts not in the high achieving group. The high achieving districts served an average of over 4,800 pupils more than the non-high achieving group. Apparently, smaller districts are paying their administrators salaries that are consistent with salaries paid to administrators in much larger districts, but without the same level of academic achievement. Stakeholders could view these results as evidence of bloat or inefficiency, which would in effect support the argument for reduction in administrative bureaucracies or even school consolidation.

The research team of Dodson and Garrett (2004) examined 287 districts in Arkansas (FY 1999-2000) to predict the effect of school consolidation through a simulation. According to Dodson and Garret (2004), the proposed district consolidations stemmed from the state's inefficient distribution of funding across "far too many and far too costly administrative units" (p. 271). The authors found that a simulated consolidation of four school districts into one district would save up to 34% in district costs per pupil.

Brewer (1996) asserted that the administrative bloating problem is the consequence of districts diverting too many resources from the classroom in order to compensate for district level administration. However, he found that not all administrative costs had a negative impact. His analysis showed that while central administration (i.e. superintendents) had a negative influence on student



performance, building level administrators were more likely to have positive effects (Brewer, 1996).

This dissertation provided further confirmation of the contrasting relationships that instructional and administrative spending have with student achievement as established in the current literature. The implication for Oklahoma education finance policy at both the state and local levels, backed by evidence provided in this study, is that the manner in which districts allocate and ultimately spend money matters in a significant way. Better achievement outcomes for students were linked with larger investments in instruction and instructional support salaries as a whole rather than investing in larger administrations or highly compensated school administrators.

The high achieving districts identified in this study showed the ability to rise to the top by spending practically the same amount of money as the lower achieving districts. That evidence could be support for arguments that funding is adequate, but it is still well below the funding level that existed over six years ago when school accountability was less stringent and student populations were smaller (Ballard et al., 2014; Oklahoma Policy Institute, 2014a).

The U. S. Census Bureau reported that Oklahoma ranked 47th in the nation for per pupil spending (U. S. Census Bureau, 2015). In addition, per pupil spending in Oklahoma has dropped by 23.6% (adjusted for inflation) since 2008, which is the highest reduction in the nation (Leachman & Mai 2014; Oklahoma Policy Institute, 2014b). Additionally, Oklahoma ranked 49th in the United

States in teacher pay while teachers in surrounding states earned approximately three thousand dollars more per year (National Center for Education Statistics, 2014; Oklahoma Watch, 2014).

At the time this investigation ended, during FY 2015-2016, Oklahoma experienced a teacher shortage. The state began issuing large numbers of emergency certifications to ensure that classrooms had instructors (Oklahoma Policy Institute, 2014b; Oklahoma Watch, 2014). Given this current study's findings that instructional expenditures associated positively to high achievement and the reality that schools are facing a teacher shortage crisis, the use of merit pay and bonuses could be a suitable move toward retaining qualified and talented teachers in Oklahoma while increasing the odds of facilitating high achievement for students.

Research from across the nation and spanning two decades, supports the notion that whenever schools receive additional money, there is a positive connection with student performance outcomes (Baker, 2005; Ellinger et al., 1995; Hedges et al., 1994a; Holmlund et al., 2010). Hartman (1999) asserted that providing more money to school districts should naturally have a positive influence in that "they are able to buy more and better resources for their students that would yield enhanced educational opportunity for these students" (p. 391). This study did not examine increases in funding, but the findings implied that additional financial support in the area of instruction could relate to higher achievement for more school districts.

### **Suggestions for Continued Research**

The findings of this investigation bear some important implications for Oklahoma's education funding policies and for continued research. One area of concern suggested by the results of this study was the possible need to better regulate or distribute administrative funds among the school districts across the state.

The results indicated that smaller school districts (demonstrated by ADM) pay competitive administrative salaries compared to larger districts. However, the smaller districts do not typically reach the top tier of academic achievement like the larger districts. This evidence supports arguments for actions that reduce inefficiency or bloat in administrative expenditures up to and including school consolidation.

Administrative costs should be fitting for the size of the district and they should be on an appropriate scale with respect to the student population in a district. Follow up studies could explore the aspects of this relationship.

One example of a course of inquiry would be to determine a cutoff point where administrative expenses no longer have a positive relationship with academic achievement. In terms of school consolidation, perhaps a study could investigate differences in academic achievement as it relates to administrative spending in districts that have the potential to be consolidated, those in the process of consolidation, and newly consolidated districts.

Investigating questions of scale and appropriateness of administrative expenses was beyond the scope of this study. The dollar figures and percentages used to account for administrative expenditures in this examination were a combination of district and school level data. The focus of this study was to find differences among expenditures for the entire district. Therefore, including all pertinent data for administrative expenses fit the needs of this investigation. Future studies might yield a different result if they measure spending at only the district or the school level instead of the combination.

This dissertation joins the scores of other literature and works currently in progress that seek solutions to education funding problems. As long as schools exist there continues to be the need to improve the collective knowledge about educational funding adequacy, equity, and school spending efficiency.

### **Summary**

Since 2009, Oklahoma has endured and continues to endure adverse education funding conditions where budgets are restricted while enrollment and school accountability are increasing. The concern is that funding for education in Oklahoma is inadequate. The purpose of this study was to examine how certain school districts expended resources and use that information to assess the adequacy of education funding and school district spending efficiency in Oklahoma.

This dissertation provided evidence of the relationship between student achievement and school district expenditures for instruction, administration, and

those other than instruction and administration. Both instructional and administrative spending were statistically significant, but only instructional expenditures proved advantageous for achievement.

This study took place at a time in Oklahoma where education budgets endured substantial cuts and there were no sure plans to reverse the declines in state revenue and improve funding conditions. The current budget crisis prompts many questions about how the system of education can endure.

Although this investigation offered no definite solutions for education funding problem facing Oklahoma, the empirical evidence it produced suggested that decreasing administrative costs or shifting them to instruction would correlate positively to higher student achievement. Oklahoma may not be able to guarantee additional money for education, so it is up to the individual school districts to adjust how they spend existing money so that students will have adequate access to educational opportunity.

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