

An Assessment of School District Spending and Student Achievement in Oklahoma

Full Report

ISEF – 002FR

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July 2017

Revised January 2018



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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 total state aid had been restricted to flat or negative levels annually. This study presents new knowledge about how district spending relates to student achievement as a preliminary indicator of the level of Oklahoma education funding adequacy. The analysis compared two groups of school districts that were demographically similar yet displayed varying degrees of academic achievement to determine if there was a statistically significant difference in their patterns of expenditure.

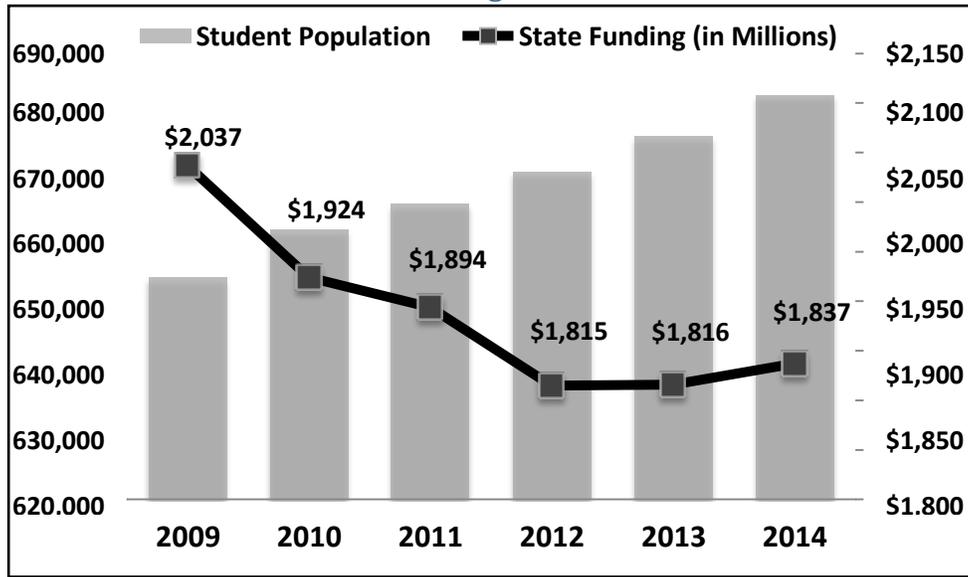
Introduction

During the past two decades, 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 followed suit. The state of Oklahoma appropriated \$4.9 billion to common education in 2000, and school districts generally experienced a growth trend in educational funding 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 and Mai 2016). 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, and Maiden 2014).

During these extraordinarily lean times in the face of declining revenues year after year, there is a need to closely examine district spending patterns to surmise the most efficient mechanisms for financially supporting the education of students in such a way to maximize student achievement. This study compared funds expended for instructional and administrative activities in high achieving school districts to a sample of other districts to understand the relationship that spending had with achievement from FY2009-2014. During this time, the flat or negative funding coupled with increases in enrollment and increases in required services certainly set the stage for examining the most efficient ways of expending increasingly limited funds.

As evident from the data presented in Figure 1, total educational funding dropped by 200 million dollars from \$2,037,000,000 to \$ 1,837,000,000 and student enrollment increased by approximately 36,800 students from 644,777 to 681,578 from 2009 to 2014 (Oklahoma Policy Institute 2014). In addition, the Oklahoma state legislature recently introduced new mandates that demand more accountability and higher standards for students and educators alike. 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. Oklahoma public schools face the difficulty of constricted budgets and scarcity of resources to provide educational services to a growing population of students.

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



(Oklahoma Policy Institute, 2014a)

This study focused on the relationships between both instructional and administrative spending and student achievement among Oklahoma school districts. Specifically, we examined the extent to which both instructional expenditures and administrative expenditures predict a consistently, relatively high level of achievement among districts. The intent is to provide information about how high achieving school districts in Oklahoma spent instructional and administrative dollars as part of the overall funding picture. There is little scholarly literature available to guide policy makers and practitioners about Oklahoma public school funding patterns and efficiencies, particularly related to achievement outcomes. There are two studies available from the last thirty years that help inform the current investigation.

The first notable Oklahoma-based research in this field took place in the 1990's. Ellinger, Wright, and Hirlinger (1995) conducted a study to determine the impact of several factors on students' cumulative achievement in Oklahoma from 1989-1991. The multiple regression analysis estimated 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 11th 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. The authors suggested that a more complex study would be necessary to corroborate their results.

About ten years later, 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 during 2003-04, the state spent \$3.47 billion for education, which equated \$5,622 per pupil expenditure (Augenblick, Palaich, and Associates 2004). This amount was substantially lower than the figures estimated by APA as adequate. The results from two types of analysis indicated that an adequate amount to spend on Oklahoma students during the 2003-04 school year should have been about \$4.32 billion or \$6,988 per pupil (Augenblick et al. 2004).

Even though the findings of this state commissioned study suggested that the funding strategy needed to be changed, Oklahoma did not modify any policies nor did they update the funding formula in order to correct the inadequate funding. The APA study is now over ten years old and the adequacy of the funding structures in Oklahoma are still in question among politicians, advocacy groups, educators, and parents. However, this decade-old, two-part

study commissioned by the state of Oklahoma has remained unpublished. Research in this field is sparse. This study furnishes 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, and to aid policy makers and practitioners in understanding the most efficient expenditure patterns.

Data and Methodology

Adequacy studies are a tool that can assist elected officials to create funding structures with logic rather than political rhetoric and partisanship (Downes and Stiefel 2008). 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 and Rothstein 1999). Adequacy methodologies may also be modified to examine the efficiency of expenditures as it relates to achievement, as in the case of the current study.

One such adequacy estimation procedure is the Successful School District (SSD), which involves ascertaining adequate funding by analyzing the average expenditures of schools that met certain prescribed academic standards as compared to spending patterns in those districts that contribute to academic achievement (Baker, Taylor, and Vedlitz 2004; Guarino and Tanner 2012; Picus and Blair 2004). This approach stems from the assumption that school districts that currently meet academic standards are likely spending an acceptable and sufficient amount of money to achieve their success (Downes and Stiefel 2008).

The SSD model ranks at the top among available adequacy analysis methods, both in statistical soundness and practical utility (Daniel, 2010). Augenblick and Myers, Inc. (2001,

2002, 2003) and Standard and Poor's School Evaluation Service (2004) have used the SSD model 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, subsequently analyzing particular spending patterns in those districts that contribute to the academic achievement. 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), based on the rational understanding 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 to discover the nature of the relationship between district spending and student academic performance.

The current study employed a modified version of the SSD model to examine the relationship of patterns of expenditure to student achievement in Oklahoma. A group of consistently (across the six years of the study) high achieving school districts was selected,

then compared statistically to an equal number of other districts with similar demographic characteristics to the high achieving districts. Though technically we did not conduct a full adequacy study, we modified the SSD to examine spending efficiencies in light of ongoing declines in state support for education.

To address the purpose of the study effectively, a sample of school districts that met a high level of achievement in accordance with state performance standards as measured by annual examinations was identified along with the spending in the areas of instruction and administration and district expenses other than administration and instruction. This investigation utilized extant school district fiscal and achievement data from 2009 through 2014. This six-year period is appropriate due to the negative changes in educational funding, the increase in student enrollment, and increases 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 district leaders are necessarily seeking not only new sources of revenue, but also seeking efficiencies in expenditures to maximize productivity in the face of limited resources. 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. This study examined per pupil 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. First, expenditures provide a good summary of the variations of classroom level/teacher-based resources. Second, expenditure data are readily obtainable. Third, they depict and measure changes in schools spending over

the years (Hanushek 1997; Hartman 1999; Reschly and 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 2015). In Oklahoma, instruction and administration essentially are the driving costs of a child's education, which is why they are at the center of this study.

Two criteria were established to select school districts to be part of the high achieving sample. The first criterion was *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*. The second selection criterion was *the district must meet the first criterion in at least 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. To avoid selecting anomalies each year, the districts should demonstrate consistency in its yearly testing performance.

Does the selection of districts into this high achieving districts imply that only these districts should be considered 'successful' and that other districts should be labeled in some way as 'unsuccessful'? Absolutely not! We are not arguing that one group of students, teachers, and administrator are successful while others are failing. The distinction between the high achieving sample and the comparison sample is strictly meant to induce comparisons of expenditures for this study. Our intentions are strictly to determine relationships between high achievement test scores and district expenditures without commenting on the underlying quality of the schools. We are fully cognizant of the fact that achievement test scores are crude indicators of 'success.' Nevertheless, these scores maintain a practical utility, as a host of educational decisions are based on these outcome measures. 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. We strongly encourage readers to bear this in mind while interpreting the results of the study.

The comparison sample of school districts was chosen through stratified random sampling. This counterpart sample essentially mirrored the original selected sample except for the level of achievement exhibited by their reported test performance. The two measures used to establish a suitable corresponding set of school districts was the percent of students categorized as minority and the percent of students receiving free or reduced school lunches. Not only are these two measures widely regarded as useful predictors of achievement, they also exist to establish congruency for the matched sample sets and control for as much variance as possible (Ellinger et al. 1995; Hoy, Hoy, and Kurz 2008). A practical sample of high achieving school districts was found using 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 of the six years examined 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 4.78 percent of Oklahoma districts. This top five percent of Oklahoma K-12 school districts during 2009-2014 was the elite group on which this study of spending versus achievement was based. Data from these same twenty districts were used across the six years included in the study.

Table 1 highlights some of the characteristics of the HAD sample. These twenty districts were selected 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 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 HAD sample.

Table 1: Characteristics of the High Achieving School Districts

High Achieving Districts	Number of Years Scoring One Half SD Above 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. This collection of Comparison Districts (CD) needed to match certain socioeconomic and demographic characteristics possessed by the HAD sample to reduce bias due to confounding variables. The CD sample was matched 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.

The set of potential comparison districts totaled 398 (418 total districts minus the top 20 high achieving districts). Twenty districts were selected by how closely they paralleled the 20 high achieving districts based on the socio-economic characteristics within a five percent variance among the reported averages. Table 2 presents a description of the CD sample evaluated alongside the high achieving group of districts.

The CD group did not have to meet any academic performance standards to qualify for selection. Most of the comparison group demonstrated a much lower level of academic achievement than the high achieving sample. The 20 school districts used for comparison against the high achieving sample predominately consisted of rural schools. One tenth of the sample was in large suburban areas and 25% were found in distant or remote towns. Sixty-five percent of the comparison districts were 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. As with the HAD sample, data for these 20 comparison districts were used across the six years of the study.

Table 2: Characteristics of the Comparison School Districts

Comparison Districts	Number of Years Scoring One Half SD Above 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 study relied on extant, ex post facto data 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 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. The annual OEQA state and district profile reports describe community census statistics, school district enrollment and spending data. The District Ed 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.

The study employed a series of descriptive analyses and a binary logistic regression to discover details about the nature and intensity of the relationships between the variables of interest. The predictions made within the model represent relationships among the variables and do not specify causation. The dependent variable used to address these questions is High Achieving District {0 = No; 1 = Yes}. The logistic regression was selected because the outcome variable is categorical and dichotomous.

There were nine independent variables used in the logistic regression analysis. The first of these was Instructional Expenditures per Pupil (INSTEXP), 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 encompassed the salary and benefit expenses related to teachers, teacher's aides, interpreters, and tutors. Both 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), 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. We did not separate district from school level administrative expenditures because of the initial, exploratory nature of this study (although replication studies might endeavor to explore these types of expenditures separately).

The third independent variable was Other District Expenditures per Pupil (OTHEREXP). This spending category encapsulated all the remaining school expenditures that may affect students, with debt service excluded. 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), intended to ascertain changes in the relationship over time. The fifth independent variable was Average Daily Membership (ADM), representing 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. We 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) included to control for the presence of federal dollars in the reports.

Results

The descriptive comparison of means illustrated by Table 3 shows the similarities and differences among the variables. The widest variance among the predictors appeared in the comparison 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 ($M = 6,347$, $SD = 6,824$). Of course, ADM is controlled in the logistic regression, mitigating the effects of districts student population on the achievement outcome. The other predictor variables show less of a disparity.

Table 3: Comparison of Independent Variable Means

High Achieving or Not		YEAR	ADM	% MIN	% FR LUNCH	% 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	\$499.85	\$648.39	\$368.09	\$819.51
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	\$361.23	\$469.30	\$192.58	\$492.16
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	\$436.36	\$565.38	\$304.08	\$676.05

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. The omnibus test reported a Chi-square (χ^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 which indicated that this model explained 34% to 45% of the variation in the dependent variable.

Table 4 describes the independent variables from the combined HAD and CD groups for each of the six years (N=240). The inclusion of the independent predictor variables into the model, increased the overall percentage of accuracy in classification of school districts from 50% to 75.4 %. Analysis showed that 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.

Table 4: Independent Variables in the Analysis

	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.

The results indicated that there is a negative change in the log odds of year, administrative expenditures, percent minority, and percent special education. The results also indicate 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. 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.

In addition to the binary logistic regression, a secondary analysis was conducted on a compilation of ancillary data that were associated with the independent predictors, but not specifically addressed in the primary analysis. The ancillary variables examined 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 5 illustrates the comparison of the ancillary data means.

Table 5: 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 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. 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.

The analysis supported the finding 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 expenditure categories 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.

Discussion

The results indicate that increased spending for instruction predicted consistently higher levels of achievement. An interesting aspect of this finding 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 on instruction and instructional support than the comparison 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. If approximately fifty-two dollars per student can move a district into higher echelons of achievement, one can only speculate as to the effects of \$100, \$500, or even \$1,000 more per student.

The findings also 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. The results of the analysis further 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. Finally, 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.

Within the given data set, it is uncertain if the school districts had access to equitable resources at the local level. Therefore, the presence of fiscal adequacy remained inconclusive. This examination revealed that twenty school districts, primarily through slightly elevated instructional outlay, could operate within restricted budgets to produce significantly higher percentages of academically successful students (as defined by test performance described earlier in this article) compared to other districts. The study did not ascertain how the districts were able to provide the additional money for instructional expenditures.

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 providing additional funding for instruction and instructional support 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).

Considering the uncertainties of revenue and funding, the evidence provided by this study supports the research based notion 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), Hedges et al. (1994), and Jefferson (2005), this study contributed to the concept that additional money would have a positive association with student achievement, especially if the districts use the funds to increase instruction related inputs.

The high achieving districts spent an average of less than half of one percent (0.0043; see Table 5) 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 to match the levels of the high achieving districts found in this study appear to be affordable on any budget. The administrative expenditures examined in this study also had a significant but inverse relationship to student achievement. These results indicated that higher spending on administration appears hinder consistently high levels of student achievement (as indicated by 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%. Administrative spending in high achieving districts was situated two percentage points below the state average.

However, the nature of administrative costs and their effects on academic achievement are a bit complex, and within this study general administrative expenditures were conflated with school level administrative expenditures. We are reticent to make definitive recommendations based on this study alone. Additional research that sheds light on distinctions between district and school level administration, and their relationship to academic performance, is warranted.

A primary conclusion of this study is that additional moneys should be made available to school districts, and that this additional funding should be focused on maximizing instructional spending to facilitate the probability that students will demonstrate high levels of achievement. Administrative needs are critical and, in many cases, may not be easily reduced (for example, complex areas such as complying with federal special education requirements requires specialized expertise that is often captured in administrative costs). It is highly likely that administrative expenditures are therefore inflated in states such as Oklahoma, in which a relatively small distribution of dollars in effect inflates administrative expenditures as a percentage. Adding additional resources and focusing these resources on instruction would have the effect of moderating administrative expenditures as a percentage.

The spending patterns for instruction across all districts appear to be quite similar. 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 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 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.

Similar research conducted in Texas found that instructional expenditures had a positive relationship with achievement. A small difference in teacher compensation by means of a \$110 (per pupil) merit-based supplement yielded the most significant gains in student performance outcomes (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.

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). That low ranking for teacher pay likely contributed to the teacher shortage experienced by Oklahoma during FY 2015-2016. Given this current study's findings that instructional expenditures are associated positively with 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.

The reality for schools in Oklahoma is that the state may not be able to guarantee additional money for education. With this in mind, it is up to the individuals in leadership across all Oklahoma school districts to adjust how they spend existing money so that students will have adequate access to educational opportunity.

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