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Money and Education: An Examination of Improved Student Achievement in Texas

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Abstract

The purpose of this study is to determine the efficient expenditure level among elementary students to improve student achievement over time. It is important for school finance scholars and practitioners as an examination of the expenditure level per student in order to determine an efficient expenditure level for student achievement. Little research has examined the efficient expenditure level for student achievement in a longitudinal and cross-sectional manner. School occurs over time. The major goal of this study is to examine the expenditure level in just such a way. The following question guided the current study, "What is the efficient expenditure level among elementary students to improve student achievement"? If looking at what should be spent to insure student success and achievement, we have to dive more deeply into the comparison of the cost plus the gained improvement in student achievement over time.

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In today's economy, more than ever, concerned citizens question the effectiveness of their tax dollars in relation to school expenditures, and how these expenditures improve student achievement. This wide audience includes educators who spend their days trying to increase student outcomes on standardized testing, parents of school-aged children who want the best education possible for their offspring, law makers who try to develop equitable school finance plans for their states, and researchers who formulate tables and graphs in order to explain those plans. Decision making over dollars and resource allocations has been a fierce debate for many years, yet little research exist in the United States on the elementary school level. Governments and school districts have varying opinions on how resources are best used to increase student performance. Before equity can move from a state or district level debate to a campus level debate improvements in school-level data collection must be achieved (Hadderman, 1999). Most in the debate over school financing tend to agree with Wenglinsky of the Policy Information Center at Educational Testing Service (ETS), that when it comes to school financing money does indeed matter in improving student performance (cited by Sena, 1997). However, most policy-makers stress that minimum outputs or achievements must be the primary goal in school finance (Clune, 1994). Since the Coleman Report of 1966 the concept of effectiveness in school expenditure has been studied and analyzed, but still the question arises, and the answer is not definitive.

According to Odden (1996), states must blend adequacy movements with concerns for equality in ongoing school-improvement measures of accountability and higher academic standards.

The Solomon and Fox study in 1998 found inefficiencies in allocating funds by districts, and then maintaining spending patterns plague state-aid funding formulas, and are often seen as "fatally flawed" unless they include equitable cost-accounting systems of efficiency and performance incentives (as cited by Hadderman, 1999). Augenblick cited a U.S. General Accounting Office report that concluded the larger a state's contribution to K-12 funding, the greater the equity (1997). The purpose of this study is to determine the efficient expenditure level among elementary students to improve student achievement overtime.

In 2006 Hanushek stated:

> cost-function approaches cannot identify the costs of an adequate education, as they do not even attempt to trace out the necessary cost of given performance levels. Instead, their name should reflect the fact that they simply capture the expenditures function for education – how much schools now spend to achieve at current levels (Hanushek, 2006, ¶ 38).

Hanushek states that if studies could show something similar to how much money each percentage gain in student achievement would take, consultant's jobs would be easy, but there are no studies to back up such a contention. Time after time his studies have come to the conclusion that more money has not led to better performance (2006).

Earlier, Hanushek had come to the conclusion that there was "no strong or systematic relationship between school expenditures and student performance" (Hanushek, 1986, 1989). Even though his cost-function and "vote-counting" research methods may not have found a relationship, approaches vary and findings are mixed as researchers continue to study state finance plans, and state

policy makers continue to look for ways to provide equitable educational opportunities and improve student achievement.

If looking at what should be spent to insure student success and achievement we have to dive more deeply into the comparison of the cost plus the gained improvement in student achievement overtime. Characteristics of what constitutes improvement in student achievement have been widely reported on the international level (Stoll and Fink, 1996; Hopkins and Harris, 1997; Harris, 1999; Simar and Wilson, 1999). Yet, although there have been studies conducted in the United Kingdom, Canada, and both Australia and New Zealand, virtually nothing has been conducted in the United States. Many of the factors affecting the efficiency in the schools in New Zealand, as pointed out by Alexander, Haug and Jaforullah (2007), have the potential to affect efficiency in the United States. Existing literature in the United States tend to provide descriptions of different school improvement projects. However, few detail school improvement in action and fewer still study those actions in a comparative forum (Harris, 2000). While the majority of studies on efficient expenditures have examined the cost-function approach in a cross-sectional manner and at the district level, this study will determine an efficient expenditure level to improve student achievement over time at the campus level via a multi-level growth model. In addition, this study will control for the methodological faults of prior efficiency studies pointed out by Hanushek (2003).

If the purpose of education is to impart the knowledge, concepts, processes, and attitudes necessary for all students to successfully function in society, then the data needed to make decisions on how to successfully disperse and facilitate that knowledge attainment must first be gathered and analyzed. Education recognizes the characteristics unique to each individual and provides a process for development. Having said this, it is

important to recognize the differences between each student, and formulate plans for improving the ability of each student to be able to internalize the knowledge being laid before them. In this effort this study strives to define the amount of expenditure for instructional purposes it takes to help these students not only meet the goals set forth by the District, but to accomplish goals that will facilitate their grasp of a successful future.

Whereas, Hanushek found a negative relationship between expenditures, which he referred to as part of "school inputs" (1989), and student achievement, in their 1994 study Hedges, Laine and Greenwald considered the level of statistical significance of the effects of school inputs on student performance and found an "economically substantial, positive relationship between school inputs and student outcomes" (Taylor, 1997).

The variation in resource costs across states is significant, and can vary by as much as forty percent (Chambers, 1981; McMahon, 1995). The age of these studies testify to the importance of new and updated research.

Stoll and Fink (1996) say that change in schools takes place from inside and outside of the school. The outside change factors necessary for improvement include standardized testing, national curriculum and publication of results. The missing factor between the United Kingdom and the United States is the analyses of the results published.

In Canada, more research findings may be due to the advancement in standardized testing and results reporting as early as 1997, when Bruce and Schwartz (1997) addressed the situation as a need for change. In Levin's study it was stated that because there was a government put into place in the early 1990s on a platform of gaining control over deficit and debt, criticism of public schools played a role in massive changes surrounding the governance of education, both on the local and international levels (as cited in Creasey, 2002).

Although researching secondary schools in New Zealand, Alexander, et al. stated they had found considerable evidence that improved school performance had a positive impact on economic performance, as opposed to the many study findings of Hanushek (Alexander et al., 2007). He and his co-authors reported their study would provide lessons on school performance for not only New Zealand, but other countries in a decentralized system. The authors offered ways of measuring efficiency and measuring effects of environmental and managerial factors that contributed to efficiency differences. They reported findings that improvement in efficiency could be found through improving teacher quality through qualifications and experience, that state schools did not perform as well as those in the "semi-private" sector, that single-sex schools out-performed co-educational ones, country schools out-performed urban schools in efficiency measures, that the size of schools positively impacted efficiency, and the lower socio-economic schools had lower efficiency.

Alexander reported the difficulty in assessing school performance was in the measuring of outputs. He states the issue to be resolved by using data from the scores of standardized examinations that are easily obtainable and valued by educators, bureaucrats and the community as a whole (p 4).

Problem Statement:

This study is important for school finance scholars and practitioners as an examination of the expenditure level per student in order to determine an efficient expenditure level for student achievement. No study has examined the efficient expenditure level for student achievement in a longitudinal manner. This is important as school does not occur in a cross-sectional manner. School occurs overtime. The major goal of this study is to examine the expenditure level in the state of Texas for the years 2003-04, 2004-05, 2005-

06, and compare them to the goals of student achievement set forth by the state in order to see if increased funding for instruction has increased proportionally to increased standardized examination scores. The following question guided the current study, "What is the efficient expenditure level among elementary students to improve student achievement"?

Background

In 1984, the Texas Legislature passed House Bill 72, enacting major reforms of the Texas public school system. The bill revamped public school finances and funneled more money into property-poor school districts. This was the first steps taken to improving academic achievement.

The second major reform came in the 1990s with a complete overhaul of the Texas Education Code, returning more authority to local school districts, the appointment of a commissioner of education by the governor, and establishing a separate State Board for Educator Certification. Along with these changes came wide reporting of school and district financial data. This study used the Actual Financial Data for the State of Texas Report. This report along with the Academic Excellence Indicator System Report is a state report card for the districts and began in 1991 under Dr. Lionel "Skip" Meno, former Texas Education Commissioner.

Methods

Participants:

The participants provided by the TEA for this study included 2,828 out of 4,104 regular instruction elementary campuses in the state of Texas. The Texas Education Agency (TEA) reports more than 4.5 million students in Texas public schools. The study only included campuses in districts of more than 1,000 students and less than 50,000

student populations. The reason districts of this size were chosen was because of the quality of data. The districts with less students do not report subpopulations, i.e. subpopulation figures will be unreported if this group has less than 5 students of a particular ethnic makeup in a classroom. By choosing only districts with 1,000 or more students a stratified random sampling of participants was achieved, therefore making sure certain subgroups in the population of elementary students was adequately represented. In this study's required-size districts TEA reports over 3 million students in grades Pre-Kindengarten through 12. Approximately 750,000 of those students in 3rd, 4th, and 5th grades were included. There are 1,256 Common, Charter, Independent, Consolidated and Municipal districts in Texas. This study included 479 of those districts. Charter schools and alternative education campuses were not included. Also, 6th grade campuses and primary schools (schools servicing only through grades 2) were eliminated from the study participants. Included were intermediate, academies, and 5th grade only campuses. Therefore, 68.9% of elementary campuses were included. Participants represent an ethnic distribution of 14.7% African-American, 45.3% Hispanic, 36.5% White, 0.3% Native American, and 3.1 % Asian/Pacific students taking the Texas Assessment of Knowledge and Skills (TAKS) test in the years of 2004, 2005, and 2006. The percentage figures were derived from TEA reports of 2006. The only major increase in the ethnic distribution across the state from the 2003-04 school year to the 2005-2006 school year was that of the Hispanic population, which rose from 33.9% to the 45.3% level. The TAKS test is given to 3rd, 4th and 5th grade students in Texas elementary schools. All three grades are tested in Reading and Mathematics. Additionally, 4th grade students are tested in Writing, comprehension and composition, and 5th grade students are tested in Science. The average class size in elementary schools across the state range from 18.9

students in the 3rd grade to 21.9 in the 5th grade. The TEA reports that Texas students are continuously being held to ever- increasing accountability standards and tougher statewide assessment test. Third-grade students must pass the TAKS test in order to be promoted and in the future additional grades will be held to the same standard.

Procedure

This study uses standardized testing as a means of measurement of improvement due to the quality of data available. For this study the main source of information on Texas elementary schools was provided by The Actual Financial Data Multi-year Table of financial statistics of expenditures incurred for 2003-04 through 2005-06. This information includes statewide total expenditure, as well as total expenditures per pupil, and total operating expenditures.

The Academic Excellence Indicator System (AEIS) is an information report on the performance of students in each school and district in Texas. The AEIS pulls together a wide range of information on the performance of students every year and includes, but is not limited to, performance ratings, attendance rates, completion and dropout rates for secondary schools, as well as SAT/ACT test results. This report also provides financial statistics of expenditures for all funds, and contains statewide total expenditures, total operating expenditures, total expenditures per pupil, and total operating expenditures. The report also breaks out the expenditure per student for instruction and instructional related services.

Data Analyses

The variables in this study include the student achievement test scoring for the elementary student participants and the instructional expenditure per student provided over each of the three years.

Data was initially obtained from the Texas Education Agency and entered into the researcher's computer to insure correct data entry, and the analyses conducted to insure data quality.

Descriptive statistics were examined for each of the variables and calculated in this study. Then a multi-level growth model was employed to gain further insight on how expenditure levels in instruction impacted student achievement over time. The method for analyzing repeated measures and longitudinal data used the growth model with specific focus on the generalized analysis of variance (ANOVA) model. Tables of growth percentages include the percentage of growth in TAKS scores per year of campuses across the state that met the size rule and are compared to the tables of percentages of per student expenditure.

Table 1 provides a look at the level of spending for instruction and instructional services on a per pupil basis as compared to the total per pupil expenditure for the studied years. While total expenditures increased at approximately 4% per year over the three year span, instructional expenditures actually decreased slightly from 2003-04 to 2004-05, and by an additional 2.77% from 2003-04 to 2005-06. The instructional cost included the break out cost of instruction, instructional related services and instructional support services for the student.

Table 1

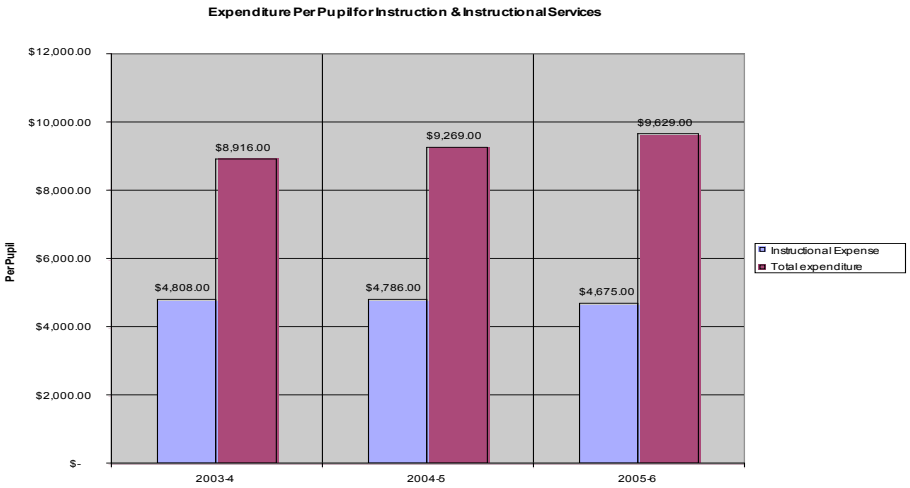
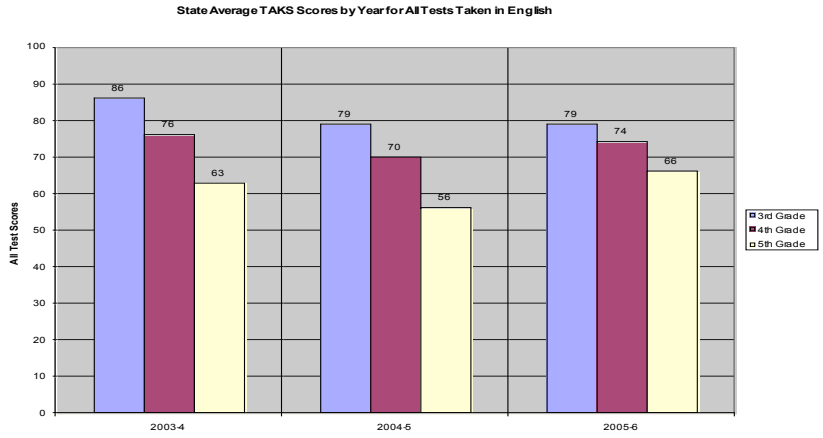


Table 2 shows the state average TAKS scores for the studied campuses by year for all tests taken in each grade level in English.

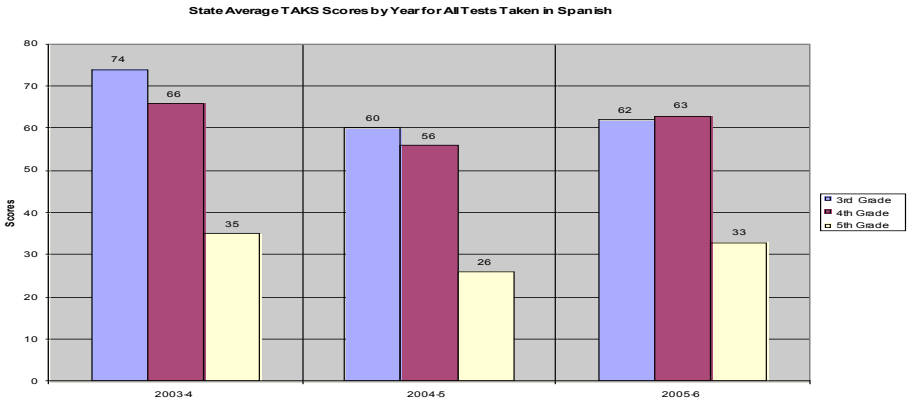
Table 2



To show a growth rate model student scores are shown for the years of 2003-04 through 2005-06. The 3rd grade student's scores declined in the fourth grade by 16.3% and continued the decline into the fifth grade by an additional 5.7%. Fourth graders in 2003-04 showed this decline in their fifth grade year by a 7.6% decrease from their previous year scores.

Table 3 shows the same tests taken by grade level in Spanish.

Table 3



The students' decline on the Spanish language test scores were more dramatic. The 3rd grade student in the 2003-04 school year showed a decrease of 27% in their fourth grade scores. The fourth grade students' average scores in 2003-04 declined by their 2005 fifth grade year by a much as 60%.

Some problems with a straight look at this decline could be raised by the discussion of the different kinds of test that are taken between the 3rd, 4th and 5th grade year.

The Pearson's coefficient represents the relationship between the two variables that are measured on the same interval or ratio scale. A value of +1 is the result of a perfect positive relationship between the two variables of expenditure and TAKS scores. Conversely, a value of -1 represents a prefect negative relationship.

Pearson's coefficient was determined by using the total expenditure variable, instructional expenditure variable, and the all test achievement scores for both English language and Spanish language tests.

With Pearson's coefficient correlation of variables is described as small with a correlation of a positive 0 to 0.3 or negative -0.3 to 0, medium with a correlation of positive 0.3 to 0.5 or a negative -0.5 to -0.3, and large if the correlation is a positive 0.5 to 1.0 or a negative -1.0 to -0.5. As determined by these variables, the result in this study was a -.15484 for instructional expenditure per pupil, and -.2121 for total expenditure per pupil. Therefore it was concluded there exists a small negative correlation that more funding will result in higher TAKS scores.

Conclusions

The Texas elementary school system is predominantly state and federal funded and has major obligations to account for state and national qualifications. Having said this, each campus still has a high degree of control over the decisions made in the spending of its resources, as long as district, state and federal obligations are met. Yet, meeting these standards has nothing to do with efficient spending of resources. There is little semblance of a determination of what is an efficient level of spending to achieve and adequate level of proficiency for the student. What this study does show is that in the Texas educational system that level does not appear to have been reached.

Further study could be rewarding and certainly deemed necessary on both a state and national level. More than just standardized test scores need to be explored to truly gauge the efficiency level on the elementary, and indeed, the secondary level. Yet more research is focused on the secondary level than the elementary level at this point. By studying the lower grades researchers and educators would get a broader view of the causes of problems associated later in the student's school career with graduation failures and dropout rates.

In this case study some possible cause for negative scores could be the unfamiliar test added within the different grade levels. A follow-up study using only the repeating tests of English/Language Arts/Reading and Mathematics as the achievement variable for the growth model may be a more qualified gauge of an efficient level of expenditure, but at this point in data collection and reporting it is difficult to get a reliable answer to the question of an efficient level of expenditures for student achievement. Perhaps a promising way of improving the quality of studies such as this would be to get more campus level detailed information on the student. Unfortunately, confidentiality issues arise, as well as the documentation of the data source. The improvement in a national assessment system is certainly called for immediately, as well as more in-depth research exploration. Equipping school leaders, political leaders, teachers, and parents with the kind of data that would dispel achievement gap myths and shed light on a much reported practice of expecting less of today's student would also help in the achievement battle. As school budgets become more limited a wise use of school finances to enhance student learning is imperative (Oswald, 1995).

Appendix 1

Achievement Level Averages on TAKS Scores

	2003-04 % Met Standard	2004-05 % Met Standard	2005-06 % Met Standard
Grade 3 English/Spanish Scores			
Reading	91/84	89/74	90/76
Mathematics	90/81	82/68	83/69
All Tests	86/74	79/60	79/62
Grade 4 English/Spanish Scores			
Reading	86/77	80/69	83/76
Mathematics	87/74	82/65	84/70
Writing	91/90	91/88	92/90
All Tests	76/66	70/56	74/63
Grade 5 English/Spanish Scores			
Reading	80/72	75/60	81/65
Mathematics	82/61	80/45	82/49
Science	70/35	64/24	76/31
All Tests	63/35	56/26	66/33

A glance into these averages show a less dramatic drop in achievement, particularly in Reading, where the student has had three years to master the skill and become familiar with the question format.

Appendix 2

Actual Financial Data – All Funds*

	Total Expenditures	Total Expenditures Per Pupil	Total Operating Expenditures	Total Operating Expenditures Per Pupil	Total Instructional Expenditures
2003-04	$38,436,673,980.00	$ 8,916.00	$30,539,587,274.00	$ 7,084.00	$ 4,808.00
2004-05	$40,627,525,739.00	$ 9,269.00	$31,684,439,697.00	$ 7,229.00	$ 4,786.00
2005-06	$43,375,742,026.00	$ 9,629.00	$33,632,935,147.00	$ 7,466.00	$ 4,675.00

	Instructional Expenditure Ratio
2003-04	64.80%
2004-05	62.50%
2005-06	64.10%

*Data retrieved from TEA website – Actual Financial Data Report

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