DISTRICT EXPENDITURES AND STUDENT ACHIEVEMENT: A FOLLOW-UP STUDY

Jay Pennington, Chief

Bureau of Planning, Research, Development and Evaluation Services

Abstract—The Iowa Department of Education (IDE) completed a follow-up study examining the relationship between test scores and per pupil expenditures. A previous study completed by the IDE revealed an inverse correlation between district per pupil expenditures and average test scores of 11th grade students. A copy of this study can be found at *http://intersect.iowa.gov*. Unlike the earlier study, this follow-up study found no correlation between average district achievement levels and per pupil expenditures.

Introduction—The IDE completed a follow-up study examining the relationship between test scores and per pupil expenditures. A previous study completed by the IDE revealed an inverse correlation between district per pupil expenditures and average test scores of 11th grade students. A copy of this study can be found at *http://intersect.iowa.gov.*

The original study suggests that as district expenditures increased student achievement actually decreased. However, the previous study also found that the percentage of students in a district with an individualized education plan was also negatively correlated with achievement in 11th graders. This indicates that the larger the percentage of students with disabilities in a district, the lower the average achievement of the district. These findings imply that multicollinearity exists between variables and required further analysis in order to tease out the relationship between district expenditures and achievement levels.

Background and Methodology—There is much debate on the impact of per pupil expenditures on student achievement (Hedges, Laine and Greenwald, 1994). Researchers have found evidence to indicate that expenditures have a strong impact on achievement while others have found little evidence (Hanushek, 1989).

In order to examine this issue more closely, the IDE first had to break out district general education and special education expenditures. As required by *Iowa Code*, the *Certified Annual Financial Report* (CAR) is a report of financial and pupil data to be filed annually with the Department of Education by each school district and area education agency and which is due no later than September 15 following the close of the fiscal year. The IDE also completes a CAR collection for all special education expenditures.

The combination of both general and special education CAR collections produces the per pupil expenditure amounts for each district in a given fiscal year. Multiple school years (2005-2006 and 2006-2007) were analyzed in order to verify results and ensure findings were not due to variability that could be determined by studying only one year of data.

The CAR collection aggregate for the 2005-2006 (fiscal year 2006) and 2006-2007 (fiscal year 2007) school years was first gathered and divided into a special education and general education per pupil amount for each district statewide.

Next, the test scores on the Iowa Test of Educational Development for all 11th grade students were separated into two groups: 1) general education and 2) special education students. This was done to examine general education test scores for the average student in a district in the areas of math, reading and science.

Iowa has multiple statewide testing periods and each district selects its own date for testing. As a result of multiple testing periods, there are differences in the interpretation of standard scores for each period: fall, midyear and spring. In order to accommodate for the difference in scores and norms, an overall district score was created. An average test result was then computed and converted to a z-score to allow for comparisons across testing periods. This created a district score for 2005-2006 and 2006-2007 for each subject area of math, reading and science for each district. District achievement scores were then used in order to examine the correlation between expenditures and student achievement. A Pearson correlation matrix was utilized in order to analyze this relationship.

Results—In 2006-2007, Iowa spent approximately $3.77 billion in education expenditures. The average per pupil expenditure amount was $7,818. During the 2005-2006 school year, about $3.6 billion was spent on education and the average per pupil amount was $7,462. Roughly, 42 percent of Iowa's state general fund appropriation goes to fund education. This is the largest single allocation in a given budget year suggesting Iowa spends a large portion of its overall budget to fund education for Iowa students.

Table 1 shows the range of per pupil expenditures in the 2005-2006 and 2006-2007 school years. This includes general education and special education funding.

Table 1—Per Pupil Expenditures 2005-2006 and 2006-2007

	Per Pupil Expenditures	Minimum	Maximum	Net Expenditures
2005-2006	$7,462	$5,668	$17,617	$3,591,954,677
2006-2007	$7,818	$6,015	$24,353	$3,771,708,614

Source: Iowa Department of Education, Bureau of Planning, Research, Development and Evaluation Services.

Special education expenditures were subtracted from the overall expenditures in order to focus on general education costs. Table 2 provides a breakdown of general education expenditures after special education amounts have been removed. The amount of variability that exists decreases substantially when focusing on general education expenditures alone.

Table 2—General Education Per Pupil Expenditures 2005-2006 and 2006-2007

	Average Per Pupil Expenditures	Minimum	Maximum	Net Expenditures
2005-2006	$6,055	$4,766	$10,826	$2,888,496,029
2006-2007	$6,367	$4,942	$10,520	$3,045,268,630

Source: Iowa Department of Education, Bureau of Planning, Research, Development and Evaluation Services.

Next, the average achievement of students in districts was entered into a correlation matrix to see if any association exists. Table 3 demonstrates that when general education and special education expenditures are separated, the district achievement of regular education students is no longer correlated with per pupil expenditures.

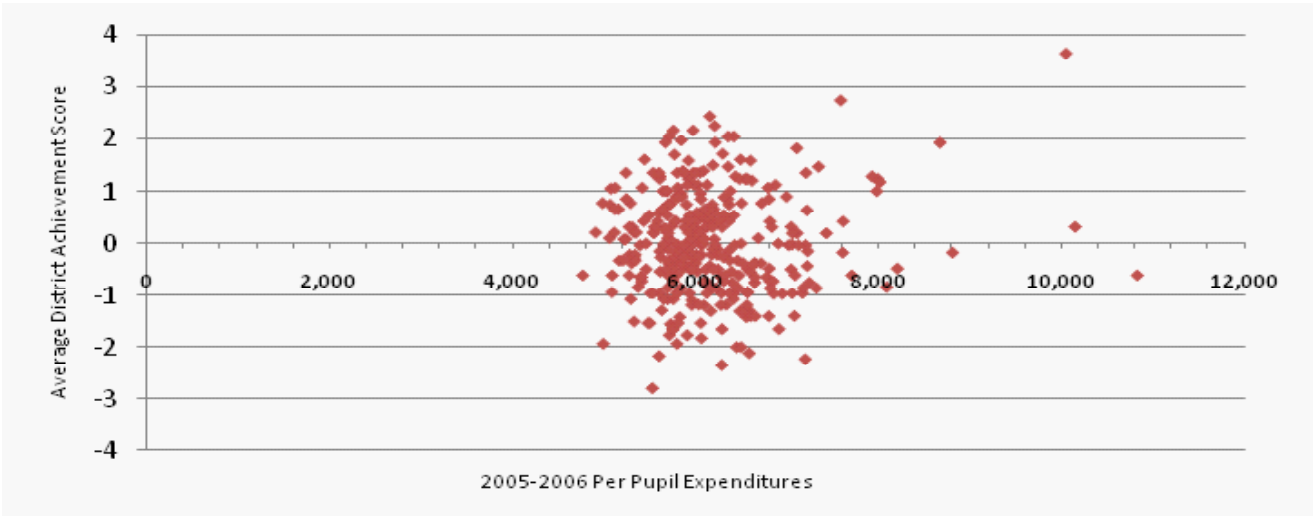
Table 3—General Education Per Pupil Expenditure Correlation with Achievement Levels

	Math	Reading	Science
2005-2006 Average Student Achievement	.01 p=.87	.07 p=.22	-.04 p=.52
2006-2007 Average Student Achievement	.02 p=.73	.02 p=.69	-.03 p=.54

Source: Iowa Department of Education, Bureau of Planning, Research, Development and Evaluation Services.

Figure 1 provides a scatter plot showing the achievement and per pupil expenditures relationship. This plot illustrates a clustering effect between district expenditures ranging from $5,550 to $7,000 and district achievement plus or minus one to two standard deviations from the mean. A similar pattern exists for each of the subject areas of math, reading and science and district per pupil expenditures for both the 2005-2006 and 2006-2007 school years.

Figure 1—Reading Achievement and Per Pupil Expenditures



Source: Iowa Department of Education, Bureau of Planning, Research, Development and Evaluation Services.

Conclusion—Previous published studies by academicians have found a relationship between expenditures and student achievement (Hedges, Laine and Greenwald, 1994; Parcel and Dufur, 2001). However, other studies suggest that once certain characteristics are controlled for, such as family background, results suggest funding does not provide proof of increased student achievement (Hanushek, 1989).

The original study completed by the IDE found an inverse correlation between achievement and expenditures. In order to more closely examine this phenomenon, expenditures and achievement of general and special education were broken out and re-analyzed. This follow-up study of Iowa districts per pupil expenditures suggests that there does not appear to be a relationship between district expenditures and the average achievement level of 11th graders. It would be false to interpret these findings to suggest that school expenditures do not impact achievement or that funding for schools does not matter.

In order to better understand what this means, it is important to put Iowa's funding formula into context. This paper will not go into the details regarding the Iowa school aid formula. However, it is important to understand that the formula incorporates a uniform levy, state foundation percentage level and additional property tax formula components to create equalization of funds available to districts. The formula takes factors such as property tax rich and property tax poor districts into account in order to level the playing field. For more information regarding education finance, the Iowa Legislative Services Agency publishes a guide which can be found on their website at *http://www.legis.state.ia.us/Central/Guides/.*

These findings suggest that the Iowa school aid formula is successful in creating equity across the state in how funding impacts achievement. Additionally, this suggests the school finance funding formula constructs parity in the amount a district is able to receive in funding per year and thus spend on student instruction. Further, this study also implies that in Iowa there is more to achievement of 11th grade students than the overall amount a district spends per pupil.

A summary of this research published by the Brookings Institute (Burtless, Ed, 1996) suggests that perhaps it is not the dollar amounts that make a difference but how the funds are used. Possible future studies by the IDE could examine this issue more closely in order to see if an association exists between how a district spends it money and its impact on achievement levels. Further, other kinds of capital, such as family and school resource capital could be examined to determine if there is a relationship with student outcomes as suggested by Parcel and Dufur (2001).

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