

**Jefferson County Treasurers Office
Financial Analysis Research Paper**

**Colorado's Twenty Largest School Districts
Public Education: How Much 'Bang'
Does Colorado Get for its 'Buck'?**
(Fiscal Years 2001 and 2002)

By Mark Paschall, Jefferson County Treasurer

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Colorado's Twenty Largest School Districts: How Much 'Bang' Does Colorado Get for its 'Buck'?

(Fiscal Years 2001 and 2002)



Prepared by the Office of Jefferson County Treasurer

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EXECUTIVE SUMMARY

A new methodology for quantifying and appraising school performance was developed in "Colorado's Twenty Largest School Districts: Funding and Performance Analysis, Including Jeffco R-1," published by Jefferson County Treasurer's office, October 1, 2004. The data source for the 20 districts, 159 high schools (527,064 students, 74.5% of all Colorado students) evaluated was from Colorado Department of Education's website (www.cde.state.co.us). Readily available and comprehensive financial data and education performance information are posted on their "School Accountability Report." Its description of school performance was in terms of Excellent, High, Average, Low and Unsatisfactory. These in turn came from CSAP, Colorado Student Assessment Program, scores where students are rated in four categories: Advanced, Proficient, Partially Proficient and Unsatisfactory. The school performance descriptions were turned into common numeric form more suitable for rigorous data analysis, in the familiar context of Excellent-100%, High-85%, Average-70%, Low-55% and Unsatisfactory-40%.

A new 2-year comparison analysis became possible with Fiscal Year 2002, and previously-unpublished Fiscal 2001 data available. This financial analysis research paper compares the two years for correlations or trends of money spent to increased (or decreased) performance.

An overall student-weighted evaluation of all 20 districts showed the average \$394 per student increase resulted in a 0.42 higher performance score; or 5.94% more dollars resulted in 0.55% higher performance. By this data, a full point increase would cost \$938 per student, or \$492 million for the 20 districts.

Average Change, per Student	Fiscal 2001-2002 Perf. Score
\$394	0.42 pt
5.80%	0.55%

Increase in Dollars per Student Spent, and Change in Performance Scores, Fiscal 2001 to Fiscal 2002, for Colorado's Twenty Largest School Districts			
Rank	by Performance Score	Additional \$/Student	Performance Score Change
1	Academy 20	\$704	-0.05
2	Littleton 6	\$272	-0.12
3	Poudre R-1	\$707	7.59
4	Douglas Co RE 1	\$210	3.01
5	Boulder Valley RE 2	\$506	0.17
6	Cherry Creek 5	\$327	-0.15
7	Thompson R-2J	\$475	-0.37
8	Jefferson Co R-1	\$468	0.34
9	Colorado Springs 11	\$315	2.53
10	St Vrain Valley RE 1J	\$307	2.79
11	Mesa Co Valley 51	\$356	0.89
12	Pueblo Co R 70	\$250	0.57
13	Widefield 3	\$198	0.27
14	NorthGlenn-Thornton 12	\$410	-3.77
15	Weld Greeley 6	\$ 45	-0.90
16	Harrison 2	\$310	8.67
17	Pueblo City 60	\$653	0.79
18	Adams-Arapahoe 28J	\$481	-3.11
19	Denver County 1	\$340	-1.81
20	Westminster 50	\$241	0.00

Four graphical and tabular analyses by 1) decreasing district performance, 2) by district size, 3) by percent change in district performance and 4) by percent changes in dollars per student, showed no correlations or predictive properties between increased funding levels and performance. Trend line analyses were similarly inconclusive, 5) by decreasing numbers of students, 6) by performance score, 7) by productivity values, and 8) by increasing dollars per student.

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September 20, 2005

Note: See also "Comments and Limitations," Page 15. If you feel sufficiently familiar with the previous "20-Schools" report, save time, go directly to "The Big Picture," page 9.

Note: Fiscal Years 2001 and 2002 public school districts financial data for this research paper were from School Accountability Reports (SARs), Colorado Department of Education web site, cde.state.co.us.

Colorado's Twenty Largest School Districts: How Much 'Bang' for Colorado's Education 'Buck'?



(Fiscal Years 2001 and 2002)



Prepared by the Office of Jefferson County Treasurer

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New Metrics to Judge Colorado Public School Districts Cost Efficiencies and Performance

The Jefferson County Treasurer's Office broke new ground with the financial analysis research paper, "Colorado's Twenty Largest School Districts: Funding and Performance Analysis, Including Jeffco R-1" (October 1, 2004). That paper developed a methodology that provides a way for citizens to apply a "compared-to-what" type of reasoning in order to answer the question most consumers ask, i.e., "Do I really need to spend this money and am I getting the most for the money I spend?" This analysis assesses public K-12 Academic Performance and Education Efficiency (costs per student), then formulates the result into a single comparable and judgment value of Productivity. That analysis was for Fiscal Year 2001-2002, the only year Colorado Department of Education data was posted on the web.

Two is Better Than One

What if a second, prior year of a similar analysis were available, with another complete set of data? What trends, if any, could be revealed among the top twenty school districts between two fiscal years? That is not only possible, but available in this report.

One of the key goals of the twenty school district analysis was to publish it concurrent to the data being fully available on the CDE website, www.cde.state.co.us. By the time the trial run fiscal 2000-2001 methodological development and analysis were accomplished and the report complete, the CDE website data was completely replaced with new data as it always is in December. With that came a new mission to start all over— research, develop, analyze and report once again. Though the initial paper was not formally published, it served as a prototype and guide to refine the analytical techniques with multi-year data.

New possibilities of comparing differences in costs (always increases) versus changes in performance (varied, plus and minus), and effects on productivity, became obtainable. On a macro and individual district scale, how much performance improvement, if any, is realized

when provided additional money per student? Does more money equal higher performance and/or productivity? Do larger districts do a better job than small? What is the threshold of incremental dollar increases per student to assure higher performance? With only two years data and one set of differences, the results may be preliminary. Yet, they may be helpful to begin to understand the impact and power of money on the quality of the delivery of education.

The original paper analyzed the impact and interaction of money on one year of education outcomes, based on Colorado Department of Education judgments of the four CSAP student testing outcomes—Advanced, Proficient, Partially Proficient and Unsatisfactory, to their adjudged and published results on school district education performance—Excellent, High, Average, Low, Unsatisfactory. Several views were taken by ranking district data in terms of numbers of students, efficiencies, performance and productivity.

That paper went into sufficient detail to be able to understand what data and information is available, where to get it, and how to process, analyze and interpret it.

A Look Back to Get a Better Understanding Forward

High schools of the twenty largest Colorado school districts were selected for the following reasons: “1) to limit the amount of units to analyze [which turned out to be 159 high schools], and 2) because this is the ending of K-12 education of these students. All that remains educationally for the student is at or near its end.” In 2002, interestingly, there were 165,299 high school students in the top-20 districts. They comprise a 20-district population of 527,064 students in 2003, 74.5% of Colorado’s 707,202 school age public school students. The remaining 158 Colorado school districts have the other 180,138, or 25.5% of students for 2002.

The Colorado Department of Education (CDE) assessed the school-by-school performance based on their Colorado Student Assessment Program (CSAP) scores. The test results were characterized, judged and reported by CDE on their website, www.cde.state.co.us, for every public school in the State of Colorado. To access, go to “Accountability” on the home page, and then to “School Accountability Reports” (SARs). Select the county you seek information for, then click on any school and go to “see detailed report,” to obtain the six-panel “School Accountability Report.” That shows CDE’s appraisal of the district’s performance for the current year, and financial information including dollars per student for the prior year, and much more individual school information. With that data and information, the next step was to turn the school district verbal descriptions into numeric form more suitable for rigorous data analysis.

The high schools-only performance figures were characterized in numbers by assigning familiar grade school test values to CDE’s school performance labels, e.g., Excellent-100%, High-85%, Average-70%, Low-55%, Unsatisfactory-40%. All high schools in each district were so analyzed and characterized, and weighted by numbers of students, to assure the most representative district test results.

The two important numbers so realized in Table 1 are performance and dollars per student. Dividing performance by student cost gives a single metric description, defined as the productivity value. For instance, for fiscal 2002, Jefferson County’s weighted high school

performance score was 80.64 at \$7,288/student (times 1,000), giving a productivity value of 11.06. Productivity values by themselves cannot reveal much meaning until one asks, "Compared to what?" The best performing school for fiscal 2002, as in 2001, was Academy 20 in El Paso County, with a performance score of 96.55, at \$6,867 per student cost, giving a productivity value of 14.06. A mid-range performance was earned by Mesa County Valley 51, performance score of 76.95, at

\$6,495 per student, for a resulting productivity value of 11.85. Since schools today are judged on performance only and not productivity, Table 1 tells the "Compared to what?" story in order of decreasing performance. Academic Performance is the key result, but to make the presentation more complete, also shown are Productivity Value, Dollars per Student and Numbers of Students in the district for Fiscal 2002.

Dollars Per Student vs Academic Performance: Does More Money Buy Better Education?

A fundamental question is, does more money spent per student produce a better education result? Information for Fiscal 2002 in Table 2 attempts to answer that question. The data is arranged from least efficient (highest cost per student) Denver at \$8,149, with performance at 60.10, to most efficient (least cost per student) Pueblo County R 70, \$6,087, with performance score 72.39.

A plot of the data in Figure 1 seems to indicate a slight downward appearing curve of the Performance Scores with the downward

Table 1. Colorado's 20 Largest Schools, by Performance, Fiscal 2002

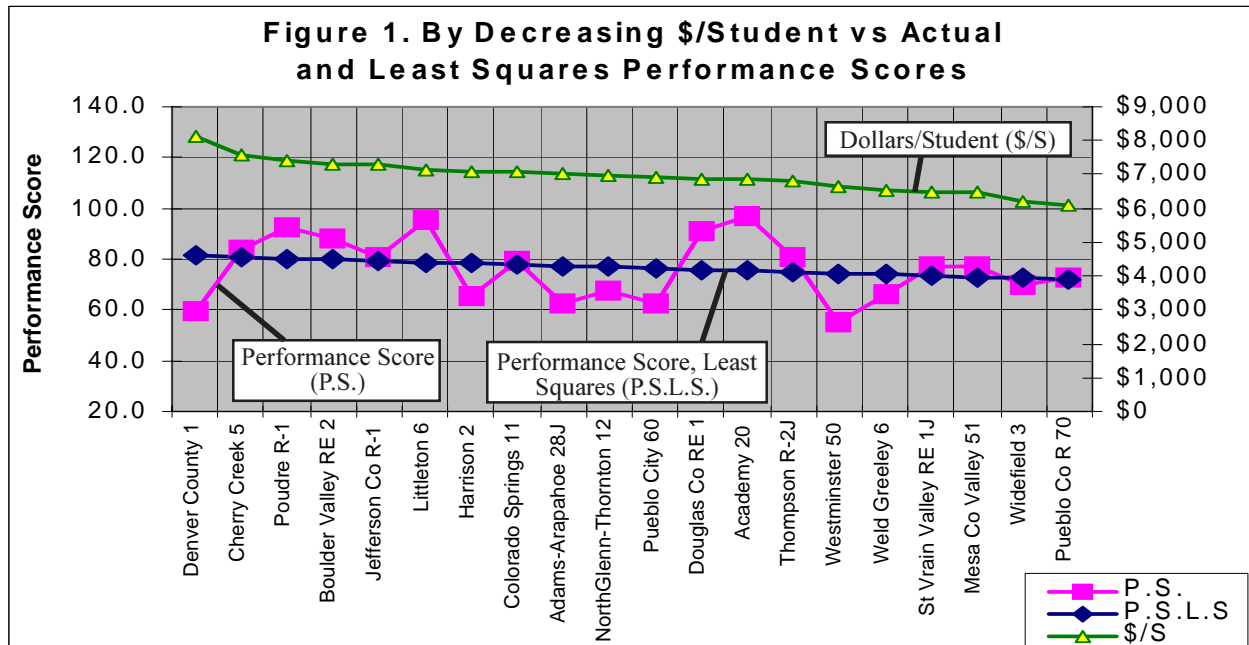
Rank	Academic Performance	Perf Score	Prod Value	\$/Student	# Students
1	Academy 20	96.55	14.06	\$ 6,867	17,350
2	Littleton 6	95.66	13.43	\$ 7,124	15,922
3	Poudre R-1	92.78	12.49	\$ 7,431	23,358
4	Douglas Co RE 1	90.89	13.22	\$ 6,874	35,808
5	Boulder Valley RE 2	88.35	12.08	\$ 7,316	26,718
6	Cherry Creek 5	83.69	11.02	\$ 7,597	42,141
7	Thompson R-2J	80.89	11.86	\$ 6,822	14,335
8	Jefferson Co R-1	80.64	11.06	\$ 7,288	84,765
9	Colorado Springs 11	78.92	11.19	\$ 7,053	31,152
10	St Vrain Valley RE 1J	77.14	11.88	\$ 6,495	19,213
11	Mesa Co Valley 51	76.95	11.85	\$ 6,495	19,032
12	Pueblo Co R 70	72.39	11.89	\$ 6,087	7,221
13	Widefield 3	69.48	11.24	\$ 6,180	8,311
14	NorthGlenn-Thornton 12	67.72	9.70	\$ 6,984	29,727
15	Weld Greeley 6	65.83	10.07	\$ 6,539	16,007
16	Harrison 2	65.01	9.18	\$ 7,081	10,504
17	Pueblo City 60	62.70	9.09	\$ 6,897	16,863
18	Adams-Arapahoe 28J	62.28	8.85	\$ 7,039	29,803
19	Denver County 1	60.10	7.38	\$ 8,149	68,066
20	Westminster 50	<u>55.00</u>	<u>8.30</u>	<u>\$ 6,629</u>	<u>10,771</u>
	Average	76.15	10.99	\$ 6,947	26,353
	(Total) High	96.55	14.06	\$ 8,149	(527,064)
	Low	55.00	7.38	\$ 6,087	

Table 2. Performance Score vs Cost/Student

School District	\$/Student	Performance Score
Denver County 1	\$8,149	60.10
Cherry Creek 5	\$7,597	83.69
<u>Poudre R-1</u>	<u>\$7,431</u>	<u>92.78</u>
Boulder Valley RE 2	\$7,316	88.35
Jefferson Co R-1	\$7,288	80.64
<u>Littleton 6</u>	<u>\$7,124</u>	<u>95.66</u>
Harrison 2	\$7,081	65.01
Colorado Springs 11	\$7,053	78.92
Adams-Arapahoe 28J	\$7,039	62.28
NorthGlenn-Thornton 12	\$6,984	67.72
Pueblo City 60	\$6,897	62.70
<u>Douglas Co RE 1</u>	<u>\$6,874</u>	<u>90.89</u>
<u>Academy 20</u>	<u>\$6,867</u>	<u>96.55</u>
Thompson R-2J	\$6,822	80.89
Westminster 50	\$6,629	55.00
Weld Greeley 6	\$6,539	65.83
St Vrain Valley RE 1J	\$6,495	77.14
Mesa Co Valley 51	\$6,495	76.95
Widefield 3	\$6,180	69.48
Pueblo Co R 70	\$6,087	72.39

(Performance Score over 90.0 underlined)

Education Efficiency curve. One way to characterize the curve is to evaluate it with a least squares analysis. That can give a slope and constant to the equation $y = mx + b$, as well as a quantification of how true the derived least squares line is to the data, called the coefficient of



determination, r^2 . If r^2 is between 0.9 and 1.0, the raw data are representative and faithful to the curve. If not, the correlation is weak, very weak or non-existent.

P.S.
P.S.L.S.
D.S.

Assessing the performance is more functional in table form rather than graphical form. For instance, evaluating the dollars-per-student efficiency data with least squares regression analysis shows high correlation with a coefficient of determination of 0.91, within the bounds of consistent and predictable data. However, the Performance Scores were much less consistent, therefore less predictable with a coefficient of determination of 0.05, hence; correlation is non-existent. Knowing that, to get a sense of curve direction the curves were plotted anyway, and are shown in Figure 1, with the performance least squares line in a smoothed data trend line.

The Denver School system again, is statistically an outlier, with significantly higher dollars per student and lower performance. Removing Denver from the analysis in another least squares regression analysis, gave a coefficient of determination, r^2 , up slightly to 0.15 for the remaining 19 school districts, still far below the necessary 0.9 to 1.0 range for high correlation. Hence, it can be said statistically, that there is no correlation between dollars per student and demonstrated district performance.

District Size vs Academic Performance: Is Bigger Better?

Economic theory suggests possible “economies of scale,” whereby a larger district can get major discounts in life and health insurance, purchase of textbooks, equipment, instruments and supplies, and in more moneys available for a higher caliber of personnel—teachers, administrators

and support people. These districts would theoretically be able to get higher student and educational delivery performance for the dollars spent. The data available from the past study can indicate the extent to which this is true.

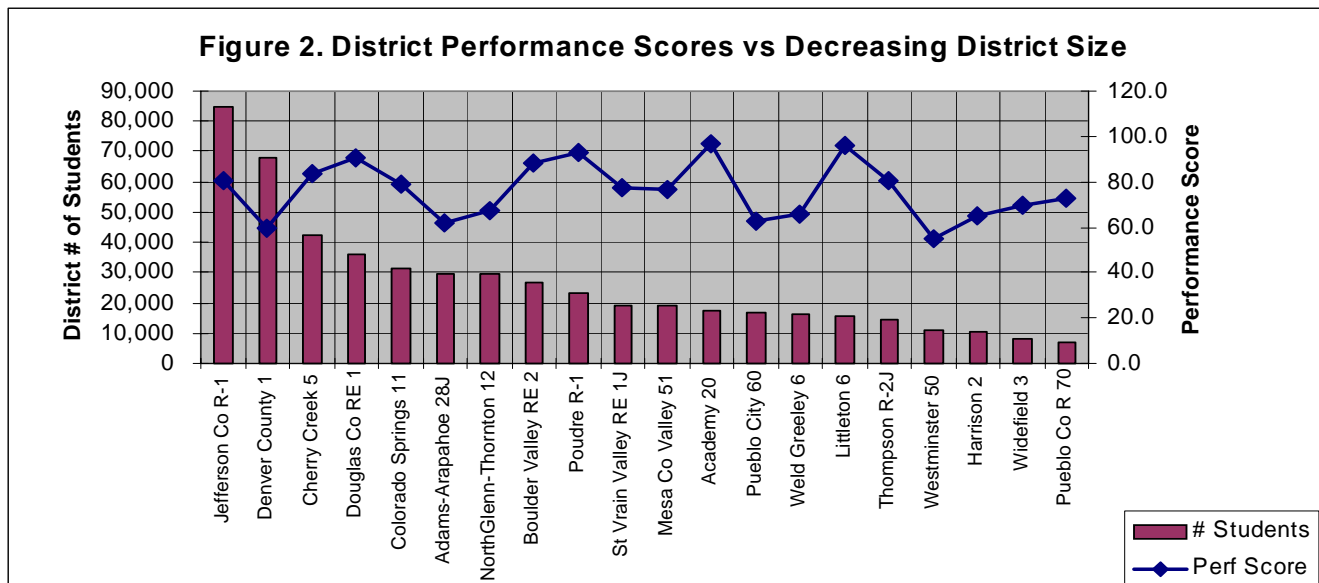


Figure 2 shows performance scores by decreasing district size for Colorado’s twenty largest school districts. Obvious to the eye, there is virtually no correlation between district size and Performance Scores. The statistics are not encouraging. The curve, if valid, would be $y = mx + b$, where slope m is -0.41 and b is 80.42 . The data are so scattered that the coefficient of determination, r^2 , is 0.04 , even farther from the 0.9 to 1.0 , indicating *there is no correlation between public school district size and demonstrated performance*.

These results prove that any case for good or poor district performance cannot be found in district size.

One-By-One Performance Review: Fiscal Years 2001 and 2002

We first glance at the two sets of composite data presented in the Executive Summary of each of the prior reports, shown as Table 3 (fiscal year 2001) and Table 4 (fiscal year 2002). Each one provides a brief overview and first look at the data. Ranking is made on the Performance Score from highest to lowest, the score having been determined as described. Productivity has heretofore not been a known or defined value, so the derived productivity value is shown for reference and additional comparative information only. Both Executive Summary tables are presented as they appeared in the original reports, in chronological order.

New questions arise in comparing both sets of data. How much did Academic Performance increase or decrease for any given district, and how many dollars per student (Education Efficiency) were spent to achieve the result? What performance improvement, if any, can one project with a given increase in dollars per student (reduction in efficiency)? What shifts in productivity were made, at what cost, and with what differences in performance?

Significant findings are apparent in Table 3 and Table 4, considering that all districts received substantially more money the second year. The good news is that the number of districts receiving “A” grades doubled from two to four. The bad news is that in spending considerably more money, those districts earning a “D” grade increased from five to six. The B’s shifted from six to four, the C’s from five to four.

These new possibilities of increasing costs versus changes in performance, and effects on productivity, become obtainable. On both macro and individual district scales, does more money equal higher performance and/or productivity? What is the threshold of incremental dollar increases per student to assure higher performance? With only two years data and one set of differences, the results may seem cursory and incomplete. Yet they may be helpful to begin to understand the impact and power of money on the efficacy and quality of the delivery of education.

This paper explores, analyzes and describes the impact and interaction of money on education outcomes, based on Colorado Department of Education judgment of the four CSAP student testing outcomes—Advanced, Proficient, Partially Proficient and Unsatisfactory, to their adjudged results on school districts education performance—Excellent, High, Average, Low, and Unsatisfactory.

Furthermore, the analysis goes into sufficient detail to be able to understand the available data and information as well as how to access, analyze and interpret it.

Table 3. Performance Summary, Fiscal Year 2000-2001

Executive Summary: ACADEMIC PERFORMANCE Ranking for Colorado Twenty Largest Public School Districts, 2001, Including also By-District Productivity Values, Revenues/Student, Student Size and Rank							
Rank	PERFORMANCE	Score	Grade	Productivity Value	Revenue \$/pupil	Size #pupils	Rank #pupils
1	El Paso Academy 20	96.60	A	15.67	6,163	16,922	13
2	Arapahoe Littleton 6	95.78	A	13.98	6,852	15,863	14
3	Boulder Valley RE 2	88.18	B	12.95	6,810	26,343	8
4	Douglas Co RE1	87.88	B	13.19	6,664	33,335	4
5	Larimer Poudre R-1	85.19	B	12.67	6,724	23,046	9
6	Cherry Creek 5	83.84	B	11.53	7,270	40,869	3
7	Thompson R-2J	81.26	B	12.80	6,347	14,180	16
8	Jefferson Co R-1	80.30	B	11.77	6,820	85,043	1
9	Colorado Springs 11	76.39	C	11.34	6,738	31,243	5
10	Mesa Co Valley 51	76.06	C	12.39	6,139	18,778	10
11	St. Vrain Valley Re-1	74.35	C	12.02	6,188	18,233	11
12	Pueblo Co R 70	71.82	C	12.30	5,837	6,907	20
13	Northglenn-Thornton 12	71.49	C	10.87	6,574	28,288	7
14	El Paso Widefield 3	69.21	D	11.57	5,982	8,203	19
15	Greeley 6	66.73	D	10.28	6,494	15,462	15
16	Adams Arapahoe 28	65.39	D	9.97	6,558	28,908	6
18	Pueblo City 60	61.91	D	9.92	6,244	16,946	12
17	Denver County	60.44	D	7.74	7,809	66,732	2
19	El Paso Harrison 2	56.34		8.32	6,771	10,348	18
20	Westminster 50	55.00		8.61	6,388	10,831	17
Averages		75.21		11.49	6,569	25,824	

Table 4. Performance Summary, Fiscal Year 2001-2002

Executive Summary: ACADEMIC PERFORMANCE Ranking, Score, Grade for Colorado Twenty Largest Public School Districts, Fiscal 2002, Including also By-District Productivity Values, Revenue \$/Student, Student Size and Rank							
Rank	ACADEMIC PERFORMANCE	Score	Grade	Productivity Value	Revenue \$/pupil	Size #pupils	Rank #pupils
1	Academy 20	96.55	A	14.06	\$ 6,867	17,350	12
2	Littleton 6	95.66	A	13.43	\$ 7,124	15,922	15
3	Poudre R-1	92.78	A	12.49	\$ 7,431	23,358	9
4	Douglas Co RE 1	90.83	A	13.21	\$ 6,874	35,808	4
5	Boulder Valley RE 2	88.35	B	12.08	\$ 7,316	26,718	8
6	Cherry Creek 5	83.69	B	11.02	\$ 7,597	42,141	3
7	Thompson R-2J	80.89	B	11.86	\$ 6,822	14,335	16
8	Jefferson Co R-1	80.64	B	11.06	\$ 7,288	84,765	1
9	Colorado Springs 11	78.92	C	11.19	\$ 7,053	31,152	5
10	St Vrain Valley RE 1J	77.14	C	11.88	\$ 6,495	19,213	10
11	Mesa Co Valley 51	76.95	C	11.85	\$ 6,495	19,032	11
12	Pueblo Co R 70	72.39	C	11.89	\$ 6,087	7,221	20
13	Widefield 3	69.48	D	11.24	\$ 6,180	8,311	19
14	NorthGlenn-Thornton 12	67.72	D	9.70	\$ 6,984	29,727	7
15	Weld Greeley 6	65.83	D	10.07	\$ 6,539	16,007	14
16	Harrison 2	65.01	D	9.18	\$ 7,081	10,504	18
18	Pueblo City 60	62.56	D	9.07	\$ 6,897	16,863	13
17	Adams-Arapahoe 28J	62.28	D	8.85	\$ 7,039	29,803	6
19	Denver County 1	60.10		7.38	\$ 8,149	68,066	2
20	Westminster 50	55.00		8.30	\$ 6,629	10,771	17
Average		76.15		10.99	\$ 6,947	26,353	

The Big Picture: Differences from Fiscal 2001 to 2002, in District Size, Efficiency, Performance, Productivity

In the context of the big picture, the first question is, “How much additional money was spent and what difference did it make in the education delivery performance of the districts?” This is easily and briefly answered for Colorado’s twenty largest school districts.

The overall student-weighted average difference in dollars per student for Fiscal Year 2002 over Fiscal Year 2001 was \$394, an increase of 5.80%, as detailed in Tables 5 and 6, below. That resulted in an overall average increase in performance score of 0.42 points (out of 100), or 0.55%. This appears to be a substantial amount of money for limited performance improvement. Using only the margin of change minimizes the impact of these numbers.

When the dollars of increase and actual total dollars spent are taken into account, the gravity of the situation comes more into focus. On a statewide level for only the twenty largest school districts, the total dollar increase is \$207,543,533, which is the 5.80% indicated in the box, of the \$3,785,692,132 Colorado taxpayers spent on these districts for fiscal 2002. Some districts had appreciable increases in performance, but others had significant decreases. By these data, for these districts on average to raise their performance score one point would require \$938 per student, a \$492 million one-year increase for Colorado’s twenty largest public schools, and nearly three-fourths of all Colorado public school students.

Average Change, \$/Student	Fiscal 2001-2002 Perf. Score
\$394	0.42
5.80%	0.55%

Table 6. Changes in Performance with Higher Expenditures per Student from Fiscal 2001 to Fiscal 2002 for Twenty Largest Colorado Public School Districts

Rank	Districts by Performance	Performance Scores			Dollars per Pupil			# Students	Perform. Wtd Diff.	Perform. Total	Dollars Wtd Diff.	Dollars Total
		Fsc 2001	Fsc 2002	Change	Fsc 2001	Fsc 2002	Change					
1	Academy 20	96.60	96.55	-0.05	\$6,163	\$6,867	\$ 704	17,350	-867	1,675,143	12,214,400	119,142,450
2	Littleton 6	95.78	95.66	-0.12	\$6,852	\$7,124	\$ 272	15,922	-1,911	1,523,099	4,330,784	113,428,328
3	Poudre R-1	85.19	92.78	7.59	\$6,724	\$7,431	\$ 707	23,358	177,287	2,167,155	16,514,106	173,573,298
4	Douglas Co RE 1	87.88	90.89	3.01	\$6,664	\$6,874	\$ 210	35,808	107,782	3,254,589	7,519,680	246,144,192
5	Boulder Valley RE 2	88.18	88.35	0.17	\$6,810	\$7,316	\$ 506	26,718	4,542	2,360,535	13,519,308	195,468,888
6	Cherry Creek 5	83.84	83.69	-0.15	\$7,270	\$7,597	\$ 327	42,141	-6,321	3,526,780	13,780,107	320,145,177
7	Thompson R-2J	81.26	80.89	-0.37	\$6,347	\$6,822	\$ 475	14,335	-5,304	1,159,518	6,808,888	97,789,959
8	Jefferson Co R-1	80.30	80.64	0.34	\$6,820	\$7,288	\$ 468	84,765	28,820	6,835,442	39,669,973	617,766,591
9	Colorado Springs 11	76.39	78.92	2.53	\$6,738	\$7,053	\$ 315	31,152	78,814	2,458,508	9,812,849	219,714,351
10	St Vrain Valley RE 1J	74.35	77.14	2.79	\$6,188	\$6,495	\$ 307	19,213	53,603	1,482,052	5,898,238	124,785,188
11	Mesa Co Valley 51	76.06	76.95	0.89	\$6,139	\$6,495	\$ 356	19,032	16,938	1,464,512	6,775,392	123,612,840
12	Pueblo Co R 70	71.82	72.39	0.57	\$5,837	\$6,087	\$ 250	7,221	4,116	522,728	1,805,250	43,954,227
13	Widefield 3	69.21	69.48	0.27	\$5,982	\$6,180	\$ 198	8,311	2,244	577,414	1,645,479	51,358,890
14	NorthGlenn-Thomton 12	71.49	67.72	-3.77	\$6,574	\$6,984	\$ 410	29,727	-112,069	2,013,079	12,187,865	207,609,876
15	Weld Greeley 6	66.73	65.83	-0.90	\$6,494	\$6,539	\$ 45	16,007	-14,406	1,053,741	720,315	104,669,773
16	Harrison 2	56.34	65.01	8.67	\$6,771	\$7,081	\$ 310	10,504	91,065	682,833	3,256,085	74,375,284
17	Pueblo City 60	61.91	62.70	0.79	\$6,244	\$6,897	\$ 653	16,863	13,322	1,057,310	11,011,539	116,304,111
18	Adams-Arapahoe 28J	65.39	62.28	-3.11	\$6,558	\$7,039	\$ 481	29,803	-92,687	1,856,131	14,335,243	209,783,317
19	Denver County 1	61.91	60.10	-1.81	\$7,809	\$8,149	\$ 340	68,066	-123,199	4,090,737	23,142,270	554,665,760
20	Westminster 50	55.00	55.00	0.00	\$6,388	\$6,629	\$ 241	10,771	0	592,394	2,595,763	71,399,633
Date: 12/19/03	Average	75.28	76.15	0.87	\$6,569	\$6,947	\$ 379	26,353	221,770	40,353,698	207,543,533	3,785,692,132
Rev 4: 3/4/05					Diff. \$379		20-D Stdts	527,064	0.42	76.56	\$394	\$7,183
							20-D Stdts	527,064	0.55%	Wtd Perf Sc	5.80%	(Wtd \$/Pupil)

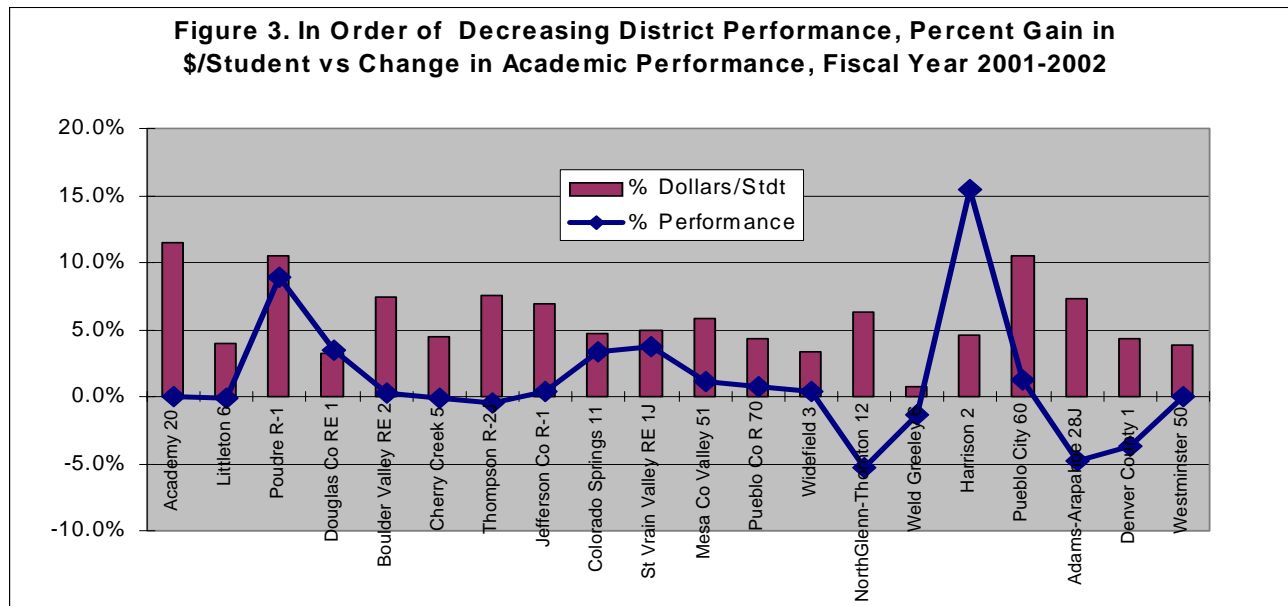
(Based on All Twenty School Districts and all of their 527,064 Students)

The Smaller Picture: Individual District Comparative Results

The next area of interest is a finer breakdown of the individual school districts. These are ranked in descending order of Performance Score. The accompanying Table 5 provides individual district marginal cost and performance data for Fiscal Year 2002 over Fiscal 2001.

Notice the performance score of the best performing district in Tabor 5, Academy 20, dropped slightly despite an infusion of over \$700 per student. Yet with a much lower increase of \$210, Douglas County RE 1 performance increased an impressive three points. El Paso County Harrison 2 performance increased a whopping 8.6 points with \$310 more per student. Despite over \$400 increase per student for Northglenn-Thornton and Adams-Arapahoe, both dropped three points. There is no consistent or predictable effect on performance attributable to increased dollars per student for this two-consecutive-year period. No pattern is evident.

Expressing numbers graphically can help to show any trends, expected or unexpected information, or that there is no correlation or sense to be made of the data. This type of analysis of the data in Table 5 is shown in Figure 3.



Going from the highest performance school district to the lowest of the 20 largest Colorado school districts shows no correlation, cause-and-effect or stimulus (of more money). Taxpayers paid more money, in some cases, lots more money—especially over their whole school system, with few or no demonstrably beneficial results.

Looking for Correlations in Places that can be Analyzed

District performance percent changes with respect to percent change in dollars spent per student were inconclusive. The data in this analysis makes it possible to seek and analyze existing correlations or patterns, in addition to these results by decreasing district performance. The questions to be answered are “what can be learned by ordering presentation by decreasing district size, by decreasing percent change in district performance, and by decreasing percent change in dollars per student?”

Figure 4 shows the data in order of percent changes in performance and percent change in dollars per student by decreasing district size, highest left, and lowest, right. The bigger schools got more money with increased percent of dollars per student spent and the same or lower percent performance scores, some negative. There is no order to the data.

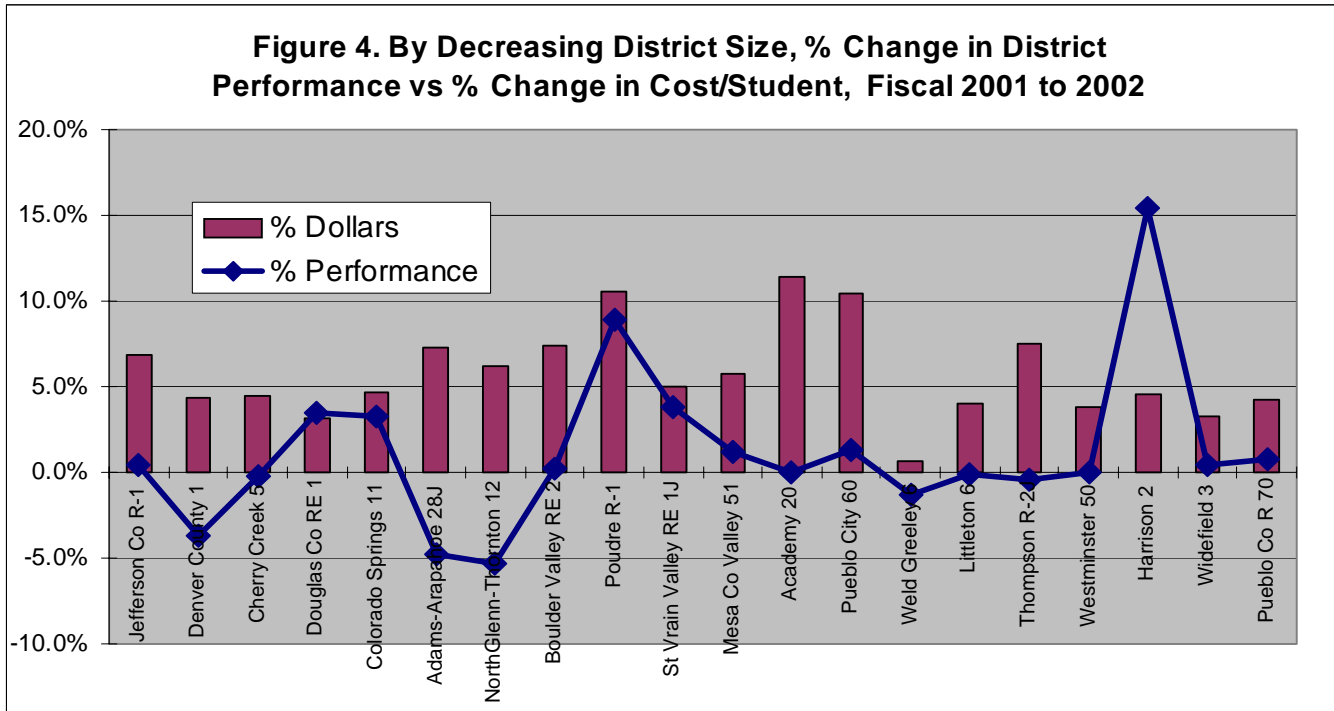


Figure 5 shows the data by decreasing percent change in district performance, with no correlation apparent. They get and spend more money but do not necessarily score higher with it, while others score lower.

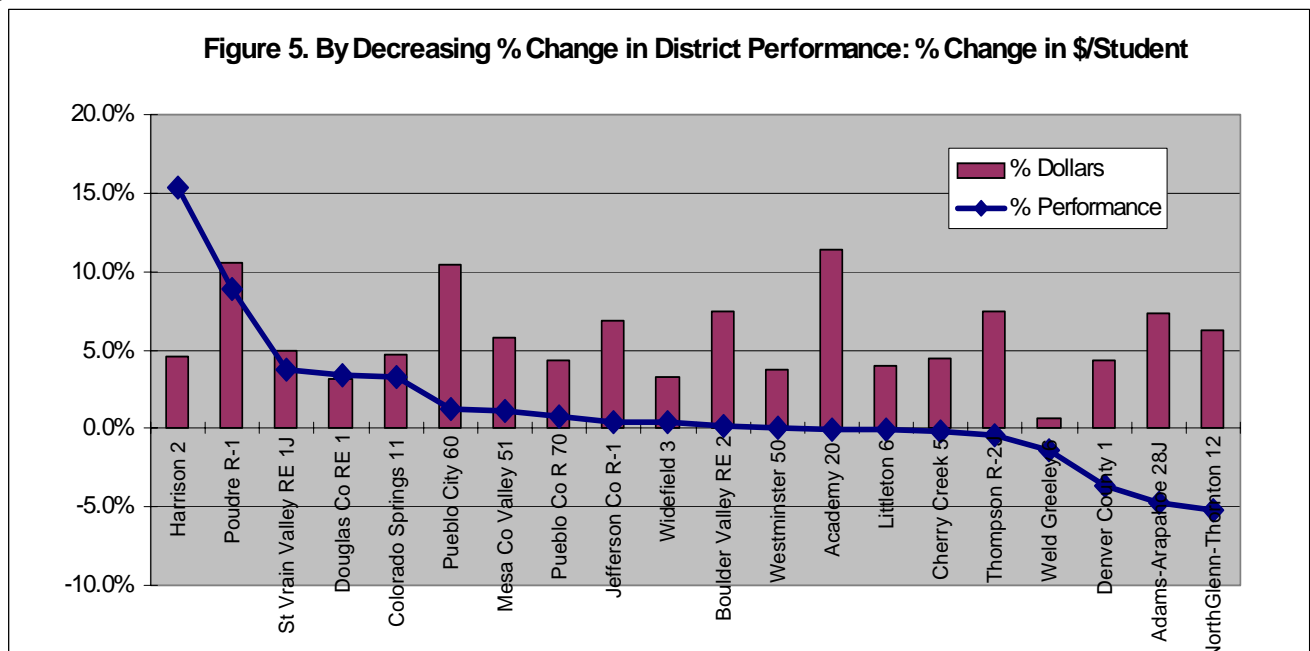
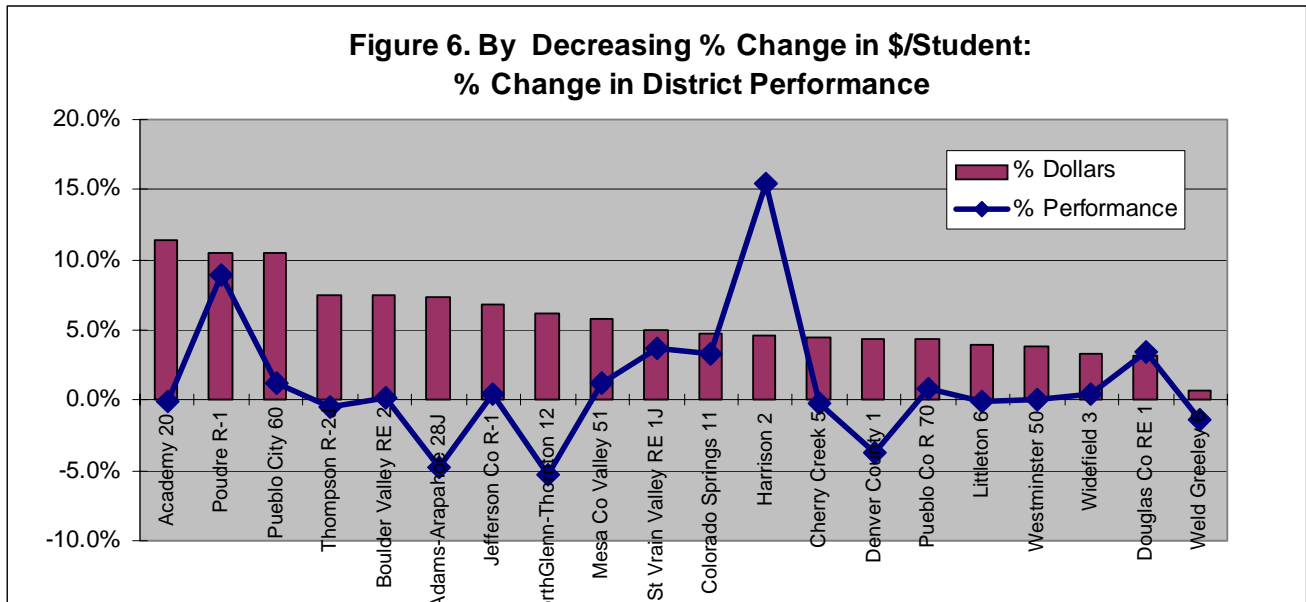
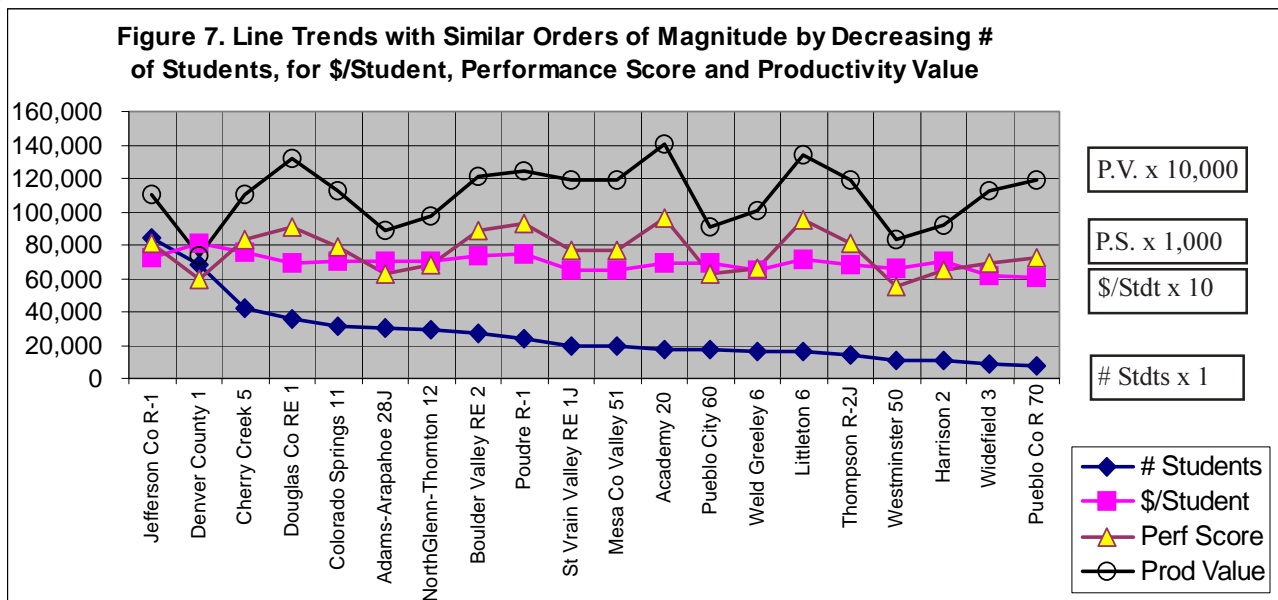


Figure 6 arranges the data by decreasing percent change in dollars per student and percent change in district performance. Again, no pattern is evident.



Does Line Trend Analysis Tell a Different Story, or any Story at All?

Line trend analysis may be helpful in seeking further information from the variables. It treats data with multipliers to put it in a same order of magnitude for comparisons similar to those just examined. For example, Jefferson County data are in terms of numbers of students (84,765), dollars per student (\$7,288), performance score (80.64) and productivity value (11.06). To get the last three variables to the same order of magnitude as the first, they are multiplied by 10, 1000, and 10,000, respectively, to get 72,880, 80,640 and 110,648. These derived values are then charted to detect trends as in Figure 7. One correlation by definition is that between productivity and performance score because the latter is the numerator in the formula of the former. Efficiency in dollars per student, however, does not track with either. More dollars don't similarly track.



There appears to be little change in dollars per student or performance score trend lines as the numbers-of-students value decreases, while the productivity score trend line appears to oscillate.

Figure 8 shows line trends by increasing dollars per student (decreasing efficiency), for performance scores, productivity values and numbers of students. The performance score trend line fluctuates above and below the cost per student as it gradually increases. Number of students also appears to gradually increase while productivity fluctuates up and down. One subtle detectable trend shows that as cost per student trends upward, so do numbers of students, ie., bigger school districts cost more per student—*no economies of scale here*.

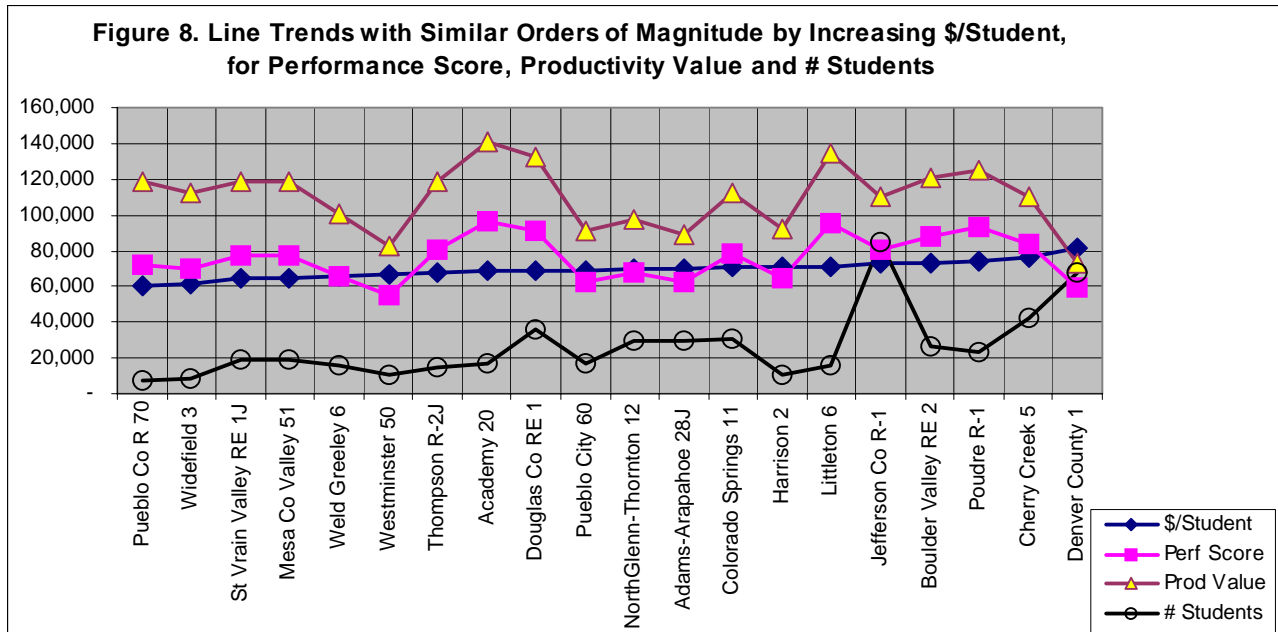


Figure 9 shows trend lines by decreasing performance scores, with productivity values, by definition, following a similar trend. Dollars per student dip and rise slightly. Numbers of students trendlines are all over the chart.

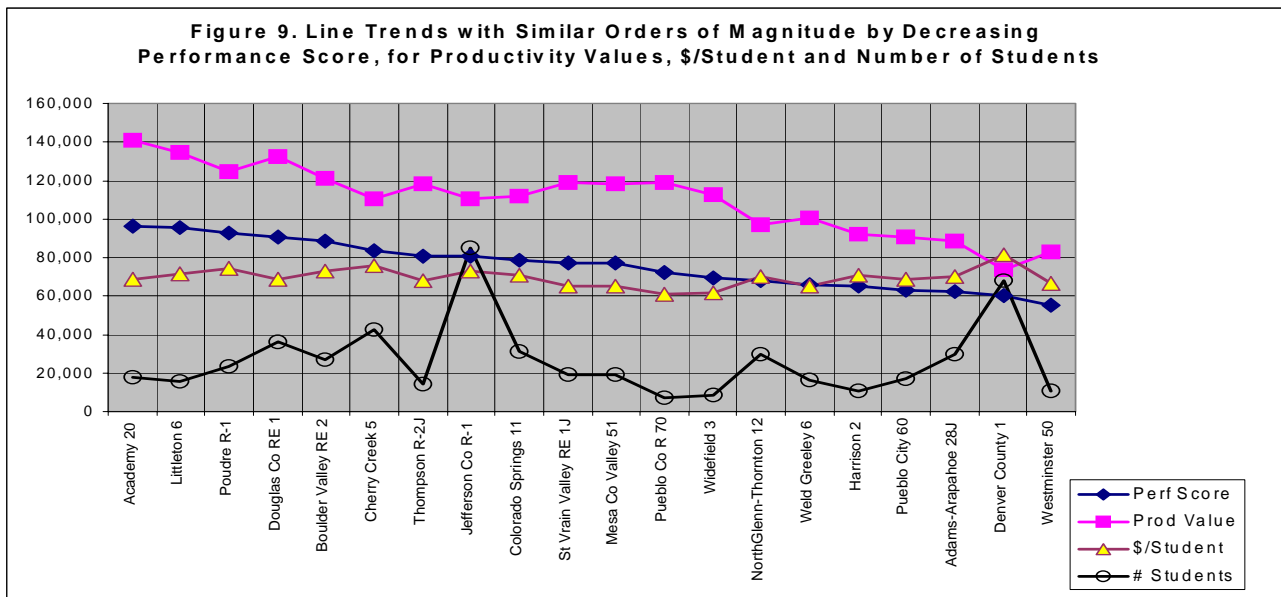
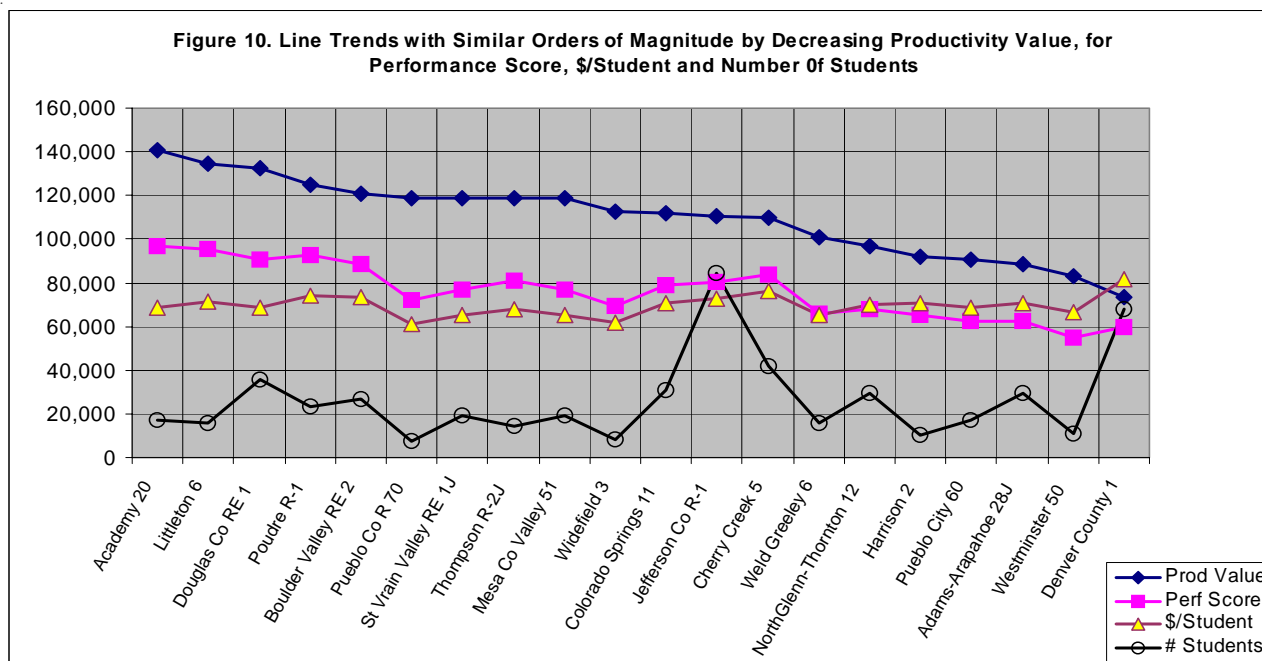


Figure 10 shows trend lines by decreasing productivity values with also unsurprising decreasing performance values (those in the numerator, over cost per student in the denominator). Again, not surprisingly, the other two trend line values show no signs of predictability based on productivity.



Conclusions and Recommendations

Colorado’s public school system is an unpredictable and lumbering colossus. Funding in terms of dollars per student (efficiency) but with little or no improvement, and little or no consistency or predictability. The fiscal years ending 2001 and 2002 were studied with results tabulated in terms of efficiency (cost per student), performance (based on web-accessible CDE student accountability reports) and a calculated productivity value based on these numbers. The aggregate results for the twenty schools studied showed an average \$394 per student increase resulted in an average 0.42 performance score improvement; in percentage terms, a 5.48% funding increase boosted average performance scores 0.55%. These are the “little numbers.”

The “big numbers” are those multiplied by numbers of students whereby you are talking real money. The difference in cost for this one year set of increases cost Colorado taxpayers \$207.5 million, totalling a cumulative increase to \$3.786 billion spent on these 20 school districts, and 527,064 of Colorado’s 707,202 public school students in 2002. By these results, a full point performance score improvement would require an average annual increase of \$938 per student, or \$494 million for students in Colorado’s 20 largest school districts, three-fourths of all Colorado public school students.

It seems no matter how the data were grouped, sequenced, positioned or otherwise plotted, there was no correlation or predictive properties. Those 20 school districts tested for fiscal years 2001 and 2002 were non-correlative and/or non-predictive for the following criteria:

1) In order of decreasing district performance, best-to-worse, percent gain in dollars per student versus change in academic performance,

2) By decreasing district size, percent change in district performance versus percent change in cost per student,

3) By decreasing percent change in district performance, percent change in dollars per student, and

4) By decreasing percent change in dollars per student: percent change in percent district performance.

A different approach, that of trend line analysis was attempted, but also did not provide any predictability or correlation, in these modes, line trends with similar orders of magnitude:

5) By decreasing numbers of students, for dollars per student, performance score and productivity value,

6) By increasing dollars per student, for performance score, productivity value and number of students,

7) By decreasing performance score, for productivity values, dollars per student and number of students, and

8) By decreasing productivity value, for performance score, dollars per student and number of students.

With little or no gain in basic knowledge or understanding, *it appears that performance improvements are caused by factors other than more money.* Fiscal discipline, accountability, district leadership and management control, along with factors of teaching technology application, personnel attitudes, parental and guardian educational commitment are likely factors. The best approach remains to investigate why the good districts are successful and emulate their methods.

These numbers, and those upcoming October, 2005 for all three Fiscal Years 2001-2002-2003, will offer an opportunity to analyze one more year, for a total of three. It is possible that more definable conclusions may be made with more, better and more recent data.

Limitations and Comments

Like the 20-district study that preceded it, not included in this study are those items of information not audited and verified (as is the CDE data), and other subjective appraisals of the value and level of performance of education; hence, no judgments of these are made. It is the same for class size, socio-economic status of children and their parents or guardians, race, religion, sex, geographical dispersion, etc. It is recognized that the meaning of education and performance thereof is different depending upon the audience or individual's point of view.

This study attempts to enhance the general public's ability to access educational information, while introducing a new measurement of our public school system.

Virtually all of Colorado's twenty largest public school districts (except the Western Slope's Mesa County Valley) are located along the I-25 corridor. Cost-of-living differences among the twenty were not deemed statistically significant.

This study's findings should not be construed to be applicable to the 158 smaller, more rural, school districts. Rural school districts should be evaluated separately, as population densities substantially impact revenues, expenditures and district operations.

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