

A Cost Allocation Model for Shared District Resources:
A Means for Comparing Spending Across Schools

Lawrence J. Miller, *Research Analyst, University of Washington*
Marguerite Roza, *Research Assistant Professor, University of Washington*
Claudine Swartz, *Research Consultant*

information contact

Lawrence J. Miller
206.616.4792
ljmiller@u.washington.edu

September 2004

The views expressed herein are those of the author(s) and do not necessarily represent those of the Center on Reinventing Public Education (CRPE), the Evans School, the University of Washington, or project funders. CRPE Working Papers have not been subject to the Center's Quality Assurance Process.

Author's note:

We thank Dr. Jerry Wartgow, Superintendent at DPS and his staff for their help in gaining access to the district's budget detail. We also thank Paul Hill, Dan Goldhaber, and Leslie Breitner for their helpful comments on earlier drafts. Any and all errors, however, are solely the responsibility of the authors.

Earlier versions of this paper were presented at the 2004 AEFA conference in Salt Lake City, UT and at the 2004 NCES summer data conference in Washington, DC.

The Bill and Melinda Gates Foundation funded this research. We thank them for their support but acknowledge that the findings and conclusions presented in this report are those of the authors alone, and do not necessarily reflect the opinions of the Foundation.

A Cost Allocation Model for Shared District Resources: A Means for Comparing Spending Across Schools

Abstract

Recent policy changes at the state and federal levels have made schools the focus of accountability. However, under current district budgeting practices, it is difficult to assess how resources are distributed between schools and whether every school is afforded the same opportunity to meet its educational goals. This paper addresses one key driver of spending variation between schools: shared district resources. Shared resources, including programs, staff, and funds managed by the central office for the purpose of educating children, are not reported in school budgets despite the fact that they can represent a substantial portion of the total resources which benefit any one school. To capture these funds and gain an understanding of how they are distributed, a cost allocation for shared district resources is presented here. Application of the model to Denver Public Schools increased reported school-level spending by one-third. A spending comparison of two middle schools demonstrates how spending from shared resources varies significantly from one school to another. As a result, simple measures of spending, such as school-based resources, often miss important sources of spending variation.

Introduction

According to figures reported by the Cross City Campaign for Urban School Reform (2001), school-level budgets in ten-districts consume between 38 to 95 percent of total district appropriations (see Table 1). With such enormous variation, one is left wondering whether the differences reflect drastically different spending patterns or simply reflect different accounting methods. In either case, the data fuels the mounting concerns about how to report spending among our nation's schools (Educational Testing Services 2004). Centrally reported expenditures can represent a significant portion of a district budget, but we have relatively little sense of how these dollars are distributed among or benefit different schools.

[Insert Table 1 here]

Schools receive many shared district resources, which can be important drivers of variation in school spending. Shared resources are the people, equipment, grants, and services housed or supervised by the central office that directly service and benefit schools in their efforts to educate students. Shared resources are reported centrally despite the fact that much of these resources are deployed outside the central office and inside schools. For example, services for non-English speaking students are often delivered by a team of centrally managed specialists, despite the fact that students receive these services within their own building. Gifted and talented programs are often controlled centrally, many of which include specialists that teach pullout programs within schools. Other central services deployed outside the school building also benefit schools and students. For instance, many districts have centrally run professional development programs aimed at building teaching skills at low performing schools. Because shared resources are centrally reported, rather than accounted for at the school-level, it is difficult to compare spending on shared resources from school to school.

There are at least four reasons why lack of clarity around how shared district resources are distributed among schools is problematic. First, fully accounting for spending by school is critical for accountability reforms. Unmeasured and unreported variations in school resources call into question whether all schools are provided equal resources to meet accountability requirements. Second, the courts have not tolerated inter-district inequity and, given that recent studies show significant variation in spending between schools, districts should be similarly concerned about legal remedies in intra-district inequity cases (Iatarola and Stiefel 2003; Rubenstein, Schwartz, and Stiefel 2004). Third, district managers and board members currently rely on insufficient school-level accounting data to inform resource allocation decisions. Incomplete school-level funding data increases the probability of misalignment between spending decisions and district strategy. Fourth, the findings of resource effectiveness studies rely on data that, in some districts, captures as few as one-third of the dollars actually spent in the school. New studies that utilize data that more fully account for school-level spending may find a stronger relationship between resources and student outcomes.

To improve our understanding of school spending, a model to fully account for shared resources at the school level is developed here. The model both accounts for resources by schools and classifies resources according to type of students served. The model repairs outdated budgeting and accounting practices, bringing them into alignment with new policies where schools, not districts, are the focus.

Background

Two ways of measuring resources at the school level are currently utilized: a resource-based approach and an accounting approach. The resource-based approach classifies district funds according to the non-monetary resources purchased (e.g., teacher characteristics, teacher-

pupil ratios) and can facilitate answering questions about the effectiveness of different combinations of resources including teacher qualifications, length of the instructional day, and class size (Chambers, 1999). The accounting approach records resources in terms of their cost in dollars. Several researchers have used the accounting approach to compare spending across schools, examining different portions of district spending (Roza and Hill 2004; Rubenstein, Schwartz, and Stiefel 2004; Iatarola and Stiefel 2003). The accounting approach lends itself well to addressing questions involving comparisons of total resources across schools, because it provides a single metric (dollars per pupil) by which to compare all resources.

Districts use the accounting approach to meet the financial reporting requirements of regulators, private creditors, and other external stakeholders (Fowler 2001; Chambers 1999; Hartman, Bolton, and Monk 2001). Such external pressure has resulted in widely available district level financial information, but there has been little pressure to report much of this spending at the school level. As a result, we often know how much is spent district-wide on instructor salaries and text books, but fail to know how these resources are distributed among schools. Efforts to address weaknesses in school-level data have resulted in some improvements as, for example, twenty states now require school budgets that enable some degree of school-level comparisons (Fowler 2001). However, school budgets do not include many centrally reported resources that instead appear in consolidated central department budgets, making it unknown which schools ultimately benefit from them.

One plausible explanation for why school budgets do not reflect the full cost of educating students, including shared resources, is the lack of consensus on the primary objective of school-level information. Researchers have proposed several different school budget models, each with a different objective in mind. For example, school budgets that reflect educational strategies

report information in a format that facilitates the comparison of school reform models, instructional strategies, and resource deployment (Odden et al. 2003). Another model uses the locus of control to define expenditures allocated at the school level, including only those resources over which the school has budgetary authority (Odden and Busch 1998). As a result a school's budget includes teacher salaries only if the school is given recruiting and staffing authority. While these approaches accomplish their stated objectives, neither seeks to fully account for school-level spending.

Other models suggest a trend toward accounting for more spending at the school level. One model, developed by Coopers & Lybrand, accounts for a greater share of district resources at the school level by allocating costs based on the face-to-face principle. With this model, only the cost of personnel that physically work within schools is reported at the school level, while administration and operations costs associated with central services remain centrally reported (Coopers & Lybrand L.L.P. 1994). While this strategy enables us to report a greater portion of shared resources at the school level than is typically reported, it excludes indirect costs and effectively under-prices the marginal cost of shared resources delivered at the school site¹. As a result, when school based resources are compared to shared resources, shared resources appear more cost effective than they actually are and some intra-district variation is lost.

A recent NCES publication calls for districts to allocate *all* spending to schools, including district administrative and school board costs. The rationale states that “the provision of educational services through operation of schools is the only product of a school district [and] the allocation of these costs is necessary to full costing of the schools and their programs” (National Center for Education Statistics 2003). No cost allocation model has yet been developed to execute the recommendation.

In sum, although different accounting models have been proposed to allocate more resources to school budgets, none of them are designed to fully capture shared resources in a way that allows for comparing spending differences between schools. The next section proposes a model by which typical school budget data is supplemented with spending on shared district resources in order to gain a more complete picture of district spending on each school.

Shared District Resources Cost Model

New methods for accounting for district resources inevitably involve numerous decisions about how and where to record resources. The model proposed here has been developed specifically to facilitate meaningful spending comparisons among schools within a district. Toward this end, we use a set of principles to guide the design of the model. Most importantly, the model must properly account for resources in terms of the *schools* that they benefit. In addition, the model must generate comparable data (to enable resource comparisons) and thus must convert resources into a common metric (dollars). Moreover, the conversion must use real, instead of average costs, as average costs mask spending variations between schools (Roza and Hill 2004). Finally, the model must account for spending by student need in order to facilitate spending differences among schools with differing student needs.

Using these guiding principles, the model outlined here follows three structured steps: First, we identify shared central resources that benefit different schools and thus ought to be included in spending comparisons across schools. Second, we allocate those costs (in real dollars) to the schools that receive them. Third, we classify expenditures based on student need.

Step 1: Identify Shared Central Resources to Allocate

There are no widely accepted guidelines for determining which expenditures to report at the district versus the school-level. Historically, expenditures have been classified as one of two

types, central or school-based. The vague term “central” necessitates further clarification as it includes resources used to benefit students (sometimes unevenly) among schools. We divide central expenditures into two categories in order to identify resources relevant to spending differences among schools and those that are not: shared district resources and resources for district leadership and operations (see Figure 1). The addition of typical school site budgets to the combination of these two types of central expenditures rounds out a district’s overall spending framework: 1) school budgets; 2) shared district resources; and 3) resources for district leadership and operations.

[Insert Figure 1 here]

School budgets generally report site-based costs including the cost of the teachers and administrators who work there. Examples of school budget costs include classroom teachers, principals, librarians, and instructional aides. Other site-based costs sometimes reported in school budgets include facilities, operations, supplies, and materials.

Shared district resources, as defined here, include the people, equipment, grants, and services housed and supervised by the central office and used to directly service and benefit students and schools by central office managers or the school board. Shared resources are currently reported in a consolidated fashion, typically in line item, department, and/or program budgets. Examples of shared resources include itinerant art and music teachers, centrally run gifted programs, professional development, psychologists, and curriculum services.ⁱⁱ

Resources for district operations and leadership, in contrast to shared district resources, do not include services for specific schools or students. District leadership and operation costs are composed entirely of indirect support services that are not used at the school level, e.g., the office of the superintendent, governance costs such as the board of education, and capital and

risk management expenses. Indirect services can only be allocated to schools formulaically, typically on a per-pupil or per-school basis. For instance, because the superintendent's office (in medium and large districts) does not typically direct its services toward one school versus another, these costs could only be allocated to the school level by allocating them in an equal dollar amount per pupil. Such information adds little to our understanding of actual between school spending variations. For this reason, our model keeps these costs consolidated.

Step 2: Allocating Shared Resources

Reporting shared district resources by schools is challenging for two reasons: First, in contrast to site-based costs, shared resources generally serve multiple schools, which often necessitates data collection activities to trace the schools, students, or school-based personnel on which the resources were ultimately brought to bear. Second, overhead costs related to shared district resources must be disentangled from district leadership and operations costs in order to allocate the full cost of shared services.

While there is no one approach to dividing shared resources among multiple sites, the practice is common in other public and private sectors (Horngren, Data, and Foster 2002; Cooper and Kaplan 1999). For this model, various cost accounting practices were adapted to create a seven-step process to guide the allocation of shared district resources: 1) identifying the shared resource cost objects to be allocated e.g., labor hours, program materials, grant dollars; 2) segregating the direct costs of each cost object; 3) identifying indirect costs of each cost object; 4) defining how to allocate indirect costs, e.g., flat rate, per-pupil weighting; 5) computing the indirect cost rate; 6) computing the direct cost rate; and 7) totaling direct and indirect costs for each shared resource. Additional information and examples of each step are outlined in Table 2.ⁱⁱⁱ

Some discussion of direct and indirect costs can clarify the above steps. *Direct costs* are costs that can be traced directly to the schools where they are used. For a gifted program, the cost of itinerant gifted teachers is a direct cost because each of their labor hours can be traced directly to a school. “Labor hours” then becomes the “cost object.” Other examples of cost objects might be the number of students participating in a centrally offered program, and number of school personnel participating in professional development or receiving support services. Undoubtedly, tracking costs by these new “cost objects” will require additional data collection in some cases.

Shared district resource costs that cannot be traced directly to a school are referred to as *indirect costs*. In the gifted program example, the cost of the administrator and support staff necessary to run the program are classified as indirect costs because staff time is not traceable to individual schools. What makes the allocation of indirect costs for shared resources unique in this model is that they have direct costs to guide their allocation, which markedly improves the accuracy between reported and actual spending.

[Insert Table 2 here]

Step 3: Classify Costs According to Student Need

The final step in the model is to classify shared district resources based on the student needs they intend to serve. We do so by classifying resources as categorical or non-categorical. Categorical expenditures are earmarked to serve specific student needs, and are further classified according to the common student identifiers of poverty, minority, bilingual, gifted and talented, and vocational education.^{iv} Categorizing funding allows for comparison of schools with different school populations and an assessment of whether they receive greater, or less, than the district

average expenditure for that type of student need. By default, expenditures not labeled categorical are classified as non-categorical expenditures.^v

Application of the Model

The shared resources cost allocation model was applied to an existing dataset of school-level financial data collected from the Denver Public Schools (DPS) during the 2002 – 2003 school year. DPS is a large urban district serving approximately 72,000 racially and economically diverse students in its 148 schools.

The model was applied to the Denver dataset according to the steps outlined above: 1) resources were classified using the district spending framework; 2) shared resources were allocated to the schools utilizing them, and 3) shared resource costs were segmented according to student need. For illustrative purposes, this paper also reports how application of the model illuminates spending differences (by accounting for shared district resources) in two DPS middle schools (School A and School B). The schools were selected for comparison because of their similar demographics and size (summarized in Table 3), and state academic rating (both were labeled “low academic performers”).

Step 1: Identify DPS's Shared District Resources

In DPS, school budgets represented 45 percent of operating expenditures while 55 percent of operating expenditures were reported as central expenditures. Twenty-five percent of these centrally reported expenditures were identified as shared district resources and allocated to the schools that received them^{vi}. Where district data was insufficient or unavailable, we were not able to allocate shared district resources to schools highlighting a significant portion of district resources that are not tracked by student or school.

Step 2: Allocating DPS Shared Resources

After allocating a portion of shared district resources in DPS, school-level resources increased by nearly one third, relative to the original amount reflected in school budgets. The distribution of shared resource costs in DPS allowed us to gain information about how an additional \$92M was spent from school to school. On average, it added an additional \$1,058 in per pupil expenditures, but these resources were not distributed evenly. The maximum gain from shared resources at a school was \$1,985 per pupil, while the maximum loss was \$666 per pupil, a \$2,651 range^{vii}.

Comparing two middle schools (see Table 3), Middle School A and B, before the allocation of shared resources, we found that the former received \$8 per pupil (\$6,728 total) less than the district average and the latter received \$117 per pupil (\$84,708 total) more than the district average. In short, comparing school budgets alone, it appears that the district spent \$125 more per pupil (\$91,436 total) on Middle School B than on Middle School A.

When we looked at how School A and B fared after shared resource costs were allocated by student need, a new picture emerged. Middle School A received \$331 more per pupil (\$278,371 total) than the district average while Middle School B received \$549 less per pupil (\$397,476 total) than the district average. Comparing the combined resources of school budgets and shared resources reversed our original assessment; a greater share of district resources was expended on Middle School A, which actually received \$880 per pupil (or \$675,847) more than Middle School B.

[Insert Table 3 here]

Step 3: Classifying DPS Costs According to Student Need

Shared resource expenditures were classified as categorical (e.g., bilingual, gifted) or non-categorical as described in Table 3. Classifying expenditures in this way illuminated variation by student type. We found that the additional resources received by Middle School A were concentrated in two categories: non-categorical and poverty. Conversely, those same two categories represented where Middle School B was shortchanged most of its shared resources. We identified similarities as well; both schools received less than the district average per pupil expenditure on bilingual education.

District Implementation

Just how likely is district implementation of a shared resource cost allocation model? This question raises issues about demand for the model, cost of implementation, and other key challenges. As earlier acknowledged, there are clear benefits to measuring shared resource costs, but district demand for this level of information is not clear. The practice of maintaining central control over a large portion of district resources is widely accepted and the will to untangle, and account for, this money is not now evident. It is likely that demand will only surface with external pressure from interest groups, researchers, and parents who are interested in understanding whether resources are equitably distributed.

Accounting for shared resource costs will require some up-front investment, in part to modify current financial software and reporting systems. More significant, perhaps, would be the costs of tracking spending by the new “cost objects.” For instance, recording how itinerant staff spends time between schools and how district administrators allocate services school-to-school creates an additional workload and, consequently, expense for the district.

Furthermore, for the model to be useful, districts must ensure that all, or a majority of, shared district resources are measured. Sidestepping accounting challenges by over categorizing

resources as “district operations and leadership” will hinder efforts to capture more spending in school cost comparisons. As evidenced by school based, and student based, budgeting formulas, funding equity cannot be assessed if only a small portion of resources are examined (Miles and Roza 2004). As evidenced by our analysis of DPS data here, it is not possible to make unequivocal statements about equity when only 25 percent of central office shared resources were allocated.

Conclusion

A shared resource cost allocation model enables more meaningful school-level spending comparisons in that a greater portion of district spending is captured in the school’s allocation. Application of the model in DPS allowed greater understanding of how 25 percent of the central office budget was utilized; we know which schools received shared resources and we know how those resources were spent by student type. A comparison of two schools demonstrates significant variation in school spending caused by the inequitable distribution of shared district resources.

There is a clear need for a methodology that accounts for shared district resources and tracks the distribution of these funds. This model has the potential to inform resource allocation decisions as it reveals a more complete school-by-school funding picture. Such information can inform discussions about the variance between intended, and actual, school funding levels and help decision makers as they grapple with the tradeoffs of funding one program over another. Additionally, within-district equity analysis has the potential to become more reliable with a greater understanding of how to account for central office resources. Lastly, with this kind of accounting, researchers and policy makers can better compare the cost of different types of schools including charters, magnets and alternatives, with better insight into their access to

shared resources. Without establishing and implementing a model to include shared resources in school-level analysis, researchers, policy makers, and practitioners will continue to see an eclipsed view of the resources directed to our schools.

References

- Berne, Robert, and Leanna Stiefel. 1994. Measuring Equity at the School Level: The Finance Perspective. *Educational Evaluation and Policy Analysis* 16 (4):405-21.
- Chambers, Jay G. 1999. Measuring Resources in Education: From Accounting to the Resource Cost Model Approach. Working Paper Series: American Institutes for Research (CRESS), Kensington, MD.[BBB04123].
- Cooper, R., and R. S. Kaplan. 1999. *The Design of Cost Management Systems*. Upper Saddle River: Prentice Hall.
- Coopers & Lybrand L.L.P. 1994. Resource Allocation in the New York City Public Schools. New York City.
- Educational Testing Services. 2004. *Survey: Americans Seek Fairness in Public School Funding* [Website] 2004 [cited August 17 2004]. Available from <http://www.ets.org/news/04070101.html>.
- Fowler, William J. 2001. Financial Reporting in the New Millennium. In *Education Finance in the New Millennium. Yearbook of the American Education Finance Association, 2001*, edited by S. Chaikind and W. J. Fowler: Eye On Education, Larchmont, NY.
- Hartman, William T., Denny G. Bolton, and David H. Monk. 2001. A Synthesis of Two Approaches to School-Level Financial Data: The Accounting and Resource Cost Model Approaches. In *Selected Papers in School Finance, 2000-01*, edited by W. J. Fowler, Jr. Washington, DC: National Center for Education Statistics (ED).
- Horngren, Charles T., Srikant M. Data, and George Foster. 2002. *Cost Accounting: A Managerial Emphasis*. 11th Edition ed. Upper Saddle River, NJ: Prentice Hall.
- Iatarola, P., and L. Stiefel. 2003. Intradistrict equity of public education resources and performance. *Economics of Education Review* 22 (1):69-78.
- Miles, Karen H., and Marguerite Roza. 2004. Understanding Student-based Budgeting as a Means to Greater School Resource Equity: Working paper.
- National Center for Education Statistics. 2003. Financial Accounting for Local and State School Systems: 2003 Edition. Washington, DC: U.S. Department of Education.
- Odden, Alan, Sarah Archibald, Mark Ferminick, and Betheny Gross. 2003. Defining School-Level Expenditure Structures That Reflect Educational Strategies. *Journal of Education Finance* 28 (3):323-56.

Odden, Allan, and Carolyn Busch. 1998. *Financing Schools for High Performance: Strategies for Improving the Use of Educational Resources. The Jossey-Bass Education Series*: Jossey-Bass Inc., Publishers, 350 Sansome Street, San Francisco, CA 94104.

Roza, Marguerite, and Paul T. Hill. 2004. How Within-District Spending Inequities Help Some Schools to Fail. In *Brookings Papers on Education Policy*, edited by D. Ravitch. Washington, DC: Brookings Institution Press.

Rubenstein, Ross, Amy Ellen Schwartz, and Leanna Stiefel. 2004. From districts to schools: The distribution of resources across schools in big city school districts. In *Working paper presented at annual conference of the American Education Finance Association, Salt Lake City, UT*.

Tables & Figures

TABLE 1
REPORTED SCHOOL-LEVEL SPENDING VARIES SIGNIFICANTLY
BETWEEN DISTRICTS

School District	Total District Appropriations	Percent of District Budget Reported at School-Level
Denver	\$ 910,555,851	38%
Baltimore	\$ 881,167,245	46%
Chicago	\$ 4,400,000,000	52%
Oakland	\$ 600,000,000	53%
Seattle	\$ 610,100,000	56%
New York	\$ 14,900,000,000	63%
Philadelphia	\$ 1,900,000,000	77%
Edmonton	\$ 545,000,000	80%
Los Angeles	\$ 9,800,000,000	88%
Milwaukee	\$ 1,000,000,000	95%

Source: Adapted by authors from data from the Cross City Campaign for Urban School Reform, Annual Decentralization Progress Comparison Across Ten Cities 2001 - 2002 school year except Baltimore 1999 - 2000.

Figure 1
DISTRICT SPENDING FRAMEWORK

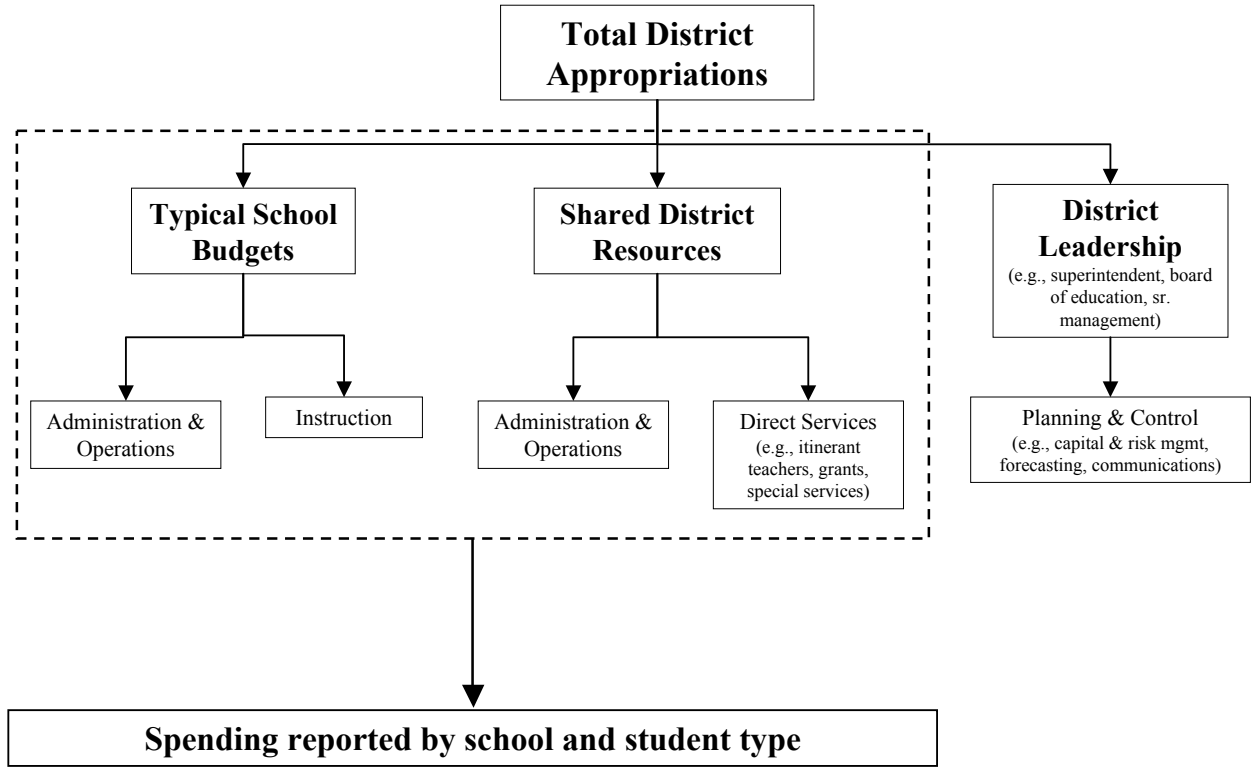


TABLE 2
SHARED RESOURCE COST ALLOCATION

Activity	Description	Examples
1. Identify cost objects	The unit of measure for the product or service the model is costing.	Service hours (e.g., psychologists, nurses, social workers, gifted teachers), pages translated (e.g., translation department), or dollars distributed (centrally controlled school grants).
2. Identify the direct costs of the service	Costs that can be traced to their recipients.	The total compensation of itinerant and substitute teachers.
3. Identify the indirect costs associated with each cost object	Costs related to the cost object that cannot be traced to that cost object in an economically feasible way.	Administration and overhead costs of shared service departments including gifted programs and psychologists, and curriculum and development.
4. Define the cost-allocation basis to use for allocating indirect costs to the cost object	There are several methods to consider, including weighting the allocation by direct cost or computing a flat rate per unit produced . Weighting the allocation by direct cost works well in departments where the cost object is heterogeneous, whereas weighting by unit produced works best when cost objects are homogeneous.	Allocating indirect costs in a gifted program can use a flat rate per hour of service because the department provides a single type of service. The curriculum and development department, with multiple service lines and programs is better served by a direct cost allocation model.
5. Compute the indirect cost rate per unit of service	Divide the indirect cost allocation by the number of units in the cost object	
6. Compute the direct cost per unit of service	Divide the direct costs by the number of units in the cost object.	
7. Compute the total cost of the service	Combine the direct and indirect costs for each unit.	

TABLE 3
A COMPARISON OF SCHOOL ALLOCATIONS TO DISTRICT AVERAGES

	Middle School A	Middle School B
School Type	General Education	General Education
Demographics		
Enrollment	841	724
Percent Minority	94%	80%
Percent LEP	28%	16%
Percent POV	93%	74%
Percent Gifted	8%	13%
Academic Performance		
	Low	Low
Financials (per pupil)		
School Budget	\$ (8)	\$ 117
Shared Resources		
Non-categorical	\$ 107	\$ (237)
Poverty	\$ 214	\$ (387)
Limited English Proficiency	\$ (127)	\$ (162)
Gifted Education	\$ 7	\$ (30)
Homeless Education	\$ (77)	\$ 204
Total Shared Resource Allocation	\$ 331	\$ (549)
Combined Allocation (School budget & Shared resources)	\$ 323	\$ (432)
Source: Computed by authors from Denver Public School Data		

Endnotes

ⁱ Indirect costs of centrally reported expenditures can be significant, for example, DPS Title I expenditures were \$22.2M in FY02-03 and \$1.7M (8%) of those expenditures were spent on the administration function.

ⁱⁱ Although most districts opt to provide such services centrally, they may also choose to decentralize and grant control to schools or procure services from outside providers.

ⁱⁱⁱ The approach describe here has been called a “peanut-butter costing approach” because it allocates indirect costs evenly across different products and services. The equivalent of an activity-based costing system would improve the accuracy of indirect cost allocation, as it would measure all costs that give rise to any activity in the system. See (Cooper and Kaplan 1999) for more on activity based costing.

^{iv} For this model, a district would use any student characteristics that would dictate additional need, such as homeless, pregnant, migrant, etc.

^v Because these dollars do not intend to serve a specific student need, we might expect them to be equally distributed to all students (Berne and Stiefel 1994).

^{vi} It is important to note that the data used here to demonstrate the significance that shared resources has on actual school spending does not represent a full and complete shared resources analysis of Denver. Of the \$371M in centrally controlled budgets, this database contains \$92M worth of shared resources that have been identified as shared resources and allocated to the schools that received them. The amount of resources present in a school that are centrally controlled and not reported in school budgets is under-reported by this data.

^{vii} Student need is controlled for in this financial analysis by calculating the district average expenditure for each student type and multiplying the district average expenditure by the number of students in the school. For example, if the district spends \$600 per pupil on children of poverty, a school serving 100 students who qualify for free or reduced price lunch would expect to receive \$60,000 in compensatory education funds. To facilitate interpretation, schools that receive the district average are set to zero; schools that receive more than the district average are reported as a positive value and schools that receive less than the district average are reported as a negative value.