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Accounting for Resource Use at the School-level and Below:
The Missing Link in Education Administration and Policy Making

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Abstract

A long standing debate among policymakers as well as researchers is whether and how funding affects the quality of education. Often missing from the discussion is information about the costs of providing education at the school level and below, yet such information could impart a better indication of the linkages between outcomes and resources than is available with more macro-level data. In addition, because No Child Left Behind (NCLB) and state accountability systems often require reporting of performance at the grade or school level, micro-level cost information would be useful to school administrators as they try to allocate resources productively.

In this paper, we analyze the challenges involved in establishing a system to track costs at the school, grade, and subject level that will fit the needs of both internal and external users. To begin, we review the literature on cost accounting that is relevant to micro-level costs and the research that analyzes sub-district level resources. Next, we describe general challenges that arise in reporting at the level of the school and below and we then discuss school-level reporting in practice. We follow with a case study of an improved reporting system that links resource use, student demographic characteristics, and student outcomes at the school, grade and subject level. We conclude with recommendations for states when constructing such systems.

I. Introduction

A long standing debate among policymakers as well as researchers is whether and how funding affects the quality of education. Often missing from the discussion is information about the costs of providing education at the school level and below, yet such information could impart a better indication of the linkages between outcomes and resources than is available with more macro-level data. In addition, because No Child Left Behind (NCLB) and state accountability systems often require reporting of performance at the student, grade, or school level, micro-level cost information would be useful to school administrators as they try to allocate resources productively.[1]

In order for cost information to be relevant to the decision making process, it has to meet users' needs, and in education there are several likely users, each with somewhat different objectives.[2] When one asks about the school-level costs of education, it is important to ask: who wants to know and what are their objectives for knowing? For purposes of analysis in this paper, we separate users into two broad groups: external users, who include researchers and state and federal policy makers, and internal users,

[1] Researchers have used micro-level *student* data from a few states for the purpose of studying and analyzing education policies. For example, the Texas School Finance Project, the North Carolina Education Research Data Center, and the state of Florida have all facilitated numerous studies of their state's schools and policies based on student data. Data on individual *teachers* are sometimes available as well, as in New York, Florida, and North Carolina. When students are linked to teachers and schools over years, the effects of teachers, peers, and student mobility on student performance can be evaluated. (See Hanushek, Kain and Rivkin, 2004, on mobility; Clotfelter, Ladd and Vigdor, 2005, on teacher distributions; Sass, 2006, on charter schools; Rockoff, Kane and Staiger, forthcoming, as well as Lankford, Loeb and Wyckoff, 2002, both on teacher performance) Yet, without detailed resource information at school, grade, and subject level, the costs of policies and alternative input configurations cannot be accurately determined.

[2] For example, economists, researchers and policy makers, for example, when deciding how to analyze the economic repercussions of a decision, are interested in marginal costs, replacement costs, total costs and opportunity costs. Auditors are interested in expenditures that are reported in the financial statements as defined by generally accepted accounting principles, while local policy makers and school board members want to track budgets to insure that allocations are used as appropriated. Administrators, such as superintendents and principals, desire to have a better understanding of costs in order to allocate resources more efficiently and effectively.

who include administrators and school board members.[3] The information needed for internal management purposes generally differs from the information needed to facilitate external accountability and evaluation research.

More specifically, internal users who implement programs and run schools or educational systems need to know about the costs under their control. Principals, for example, must track resources at the school level in order to monitor the impact of decisions under their purview. External users, however, generally desire a system for tracking costs at the school level, even if they originate at the district or state level. On the surface it may appear easy enough to build a comprehensive system to the track cost data needed for both internal and external users. Yet, the task is more complicated than it first seems because accounting systems that are flexibly enough designed to meet disparate objectives can easily become too cumbersome and expensive to operate.

In this paper, we analyze the challenges involved in establishing a system to track costs at the school, grade, and subject level that will fit the needs of both internal and external users. To begin, we review the literature on cost accounting that is relevant to micro-level costs and the research that analyzes sub-district level resources. Next, we describe general challenges that arise in reporting at the level of the school and below and we then discuss school-level reporting in practice. We follow with a case study of an improved reporting system that links resource use, student demographic characteristics, and student outcomes at the school, grade and subject level. We conclude with recommendations for states when constructing such systems.

[3] These groupings are not meant to be definitive as some typically internal users (such as school board members) might at times be considered external and visa versa.

This paper adds to our knowledge on sub-district fiscal reports by reviewing how such reports are currently used, presenting what kinds of data are now available and how these data are constructed, and describing a cost-effective way to obtain an improved and integrated fiscal and performance reporting system for both internal and external users at the school, grade and subject level.

II. Literature Review

The relevance to schools of management's quest for cost information

Organizations' processes for collecting cost information generally focus on data required for financial reporting and budget allocations. Despite an abundance of account and budget codes, these accounting systems often fail to package costs in a meaningful, user-friendly way for management decisions on such issues as how to improve productivity or price products.

In response, some firms implement a second cost tracking system. Since the mid-1980s, activity-based costing has been especially popular and has been recommended for use by public organizations (see Cooper and Kalpan, 1991).[4] Activity-based costing employs cost drivers that target activities of production to assign overhead costs to produced outputs. While there are many success stories about applications of activity-based costing, critics argue that activity-based costing involves too many allocations of non-direct/overhead costs and is expensive in terms of time and resources to implement (Armstrong 2002). Organizations less reliant on product pricing are generally perceived to benefit less from detailed activity-based accounting systems (Estrin, Kantor, and Albens 1994). Public organizations have had a particularly difficult time with their

[4] The literature on ABC is voluminous. Cooper and Kalpan (1991) is a good place to start.

venture into activity-based costing, as documented by case studies at the federal and local levels where such systems were judged to be modest successes at best (Brown et. al 1999; Martinson 2002, Mullens and Zorn 1999).[5]

Denison and Standora (2005) offer governments an alternative to activity-based costing that saves time and resources because it relies on micro data already generated by the accounting system.[6] They suggest a process that classifies expenditure data into controllable and non-controllable costs. Controllable costs are those that result from decisions under the control of management, such as salaries and staff assignments. Non-controllable costs arise from factors outside the management process, such as the rate of inflation or unanticipated increases in clients served. For the terms "controllable" or "non-controllable" costs to be meaningful, a frame of reference must be determined, as all costs are controllable at some level. For school-level decision making in education, for example, a reasonable option would be to consider controllable costs as those under a principal's responsibility.

Researchers' use of school-level cost data

School-level costs have been a topic of interest to school finance researchers for over a decade. For example, a number of authors have studied the equity of intra-district distributions in Ohio, California, Chicago, New York City, and a few other cities (Rubenstein, 1998; Moser, 1998; Peternick and Sherman 1998; Stiefel, Rubenstein and Berne, 1998; Goertz and Stiefel, 1998; Owens and Maiden, 1999; Betts, Rueben and

[5] Contrary to the U. S. experience, however, Bjornenak (2000) applied activity-based costing methods to schools using data from the four largest cities in Norway. He concluded that "activity analysis provides disaggregated data to better understand differences in the use of resources. Benchmarking the cost of activities in the public sector may be used both for performance measurement and to identify and adopt better ways to organize and execute activities."

[6] Non-profit organizations encounter many of the same issues around overhead allocation as do governments. See Hager, 2003 for an example involving allocation of fundraising expenditures.

Danneberg, 2000; Iatarola and Stiefel, 2003; Roza and Hill, 2003). Nakib (1996) used similar school-level data in Florida to look at patterns of resource allocation across districts and time, finding that patterns by function were and remained remarkably similar. Summers and Wolfe (1976) and Schwartz and Stiefel (2003) used school-level data in Philadelphia and New York City, respectively, to assess the distribution of resources by the racial, income or immigrant composition of schools. Finally, Stiefel, Schwartz, and Rubenstein (2005) measured the efficiency of schools in producing outputs, such as test scores, based on New York City data. Most of these studies took the data as given; data issues, when mentioned, tended to focus on the difficulty and cost of collection, accuracy, validity, comparability and usefulness (Picus, 2001).

Several studies, however, have examined the relevance of school-level fiscal data systems to decision makers and analysts. In a review of school-level financial data from Ohio and Texas, Sherman, Best and Luskin (1996) found that these systems provided data for major functions (instruction, support services, non-instructional services) and for instructional programs but did so primarily by allocating existing district-level expenditures downward. Issacs et al. (1997) looked at the *Schools and Staffing Survey* (SASS) to evaluate the opportunities and problems in collecting both staffing and expenditure data at the school level and found that the main beneficiaries from using SASS would be educational researchers and analysts, not administrators in schools and school districts. Chambers (1999) compared two different approaches to measuring school resources: the accounting approach (using expenditure data from existing educational accounting systems) and the resource cost model (identifying resources in programs—staff and non-personnel items—and placing prices, actual or standardized, on

these resources to determine the costs of the programs). He concluded that the resource cost model provided more accurate and useful information for decision-making, although it required new data collection.

Hartman, Bolton, and Monk (2001) undertook a synthesis of the accounting approach and the resource cost model. They reviewed the elements of the data cycle for three main groups of stakeholders—school and district administrators, researchers and policy analysts, and state and national policy makers—to examine their separate data needs and how they interacted with one another. In a synthesis of the two approaches, the accounting approach was recommended to report and analyze expenditures at the school level, while the resource cost model was proposed for comparative staffing analyses. In both cases, costs for centralized functions were recommended to remain at the district level and not be allocated to schools. By contrast, Roza and Swartz (2007) developed a model that allocates district expenditures (including traditionally labeled overhead expenditures) to schools. These overhead expenditures appear to be assigned either by identifying drivers such as special student populations or by digging into district records to see where personnel actually spend their time and effort.

III. Challenges in Creating School, Grade, and Subject Fiscal, Performance and Productivity Reports

In this section, we describe challenges encountered when constructing a system to provide data at the school level and below. These challenges are categorized as "tractable" when they are relatively easy to address and "less tractable" when they are more difficult. While the challenges generally apply to both the school and grade levels,

for brevity, the challenges are illustrated with examples from either the school or grade level.

Relatively Tractable Issues

Shared resources: Some resources, especially teachers in subjects such as art and music or reading specialists, are shared by schools. Generally, however, districts have time or assignment records for these teachers so their salaries can be distributed accurately, and with little extra effort, across buildings. A similar situation occurs when teachers work with students in multiple grade levels.

Non-professional staff: "Classified" or non-professional personnel that work in schools (e.g. aides, custodians, secretaries, food service staff) may work full-time or part-time and on a different schedule than the professional staff, and patterns vary across districts. Standardizing the non-professional personnel to full-time equivalents, based on a defined workweek and year (e.g. 40 hours per week, 36 weeks per year) is a way to account accurately for these personnel in a comparable manner across schools.

Fringe benefits: Fringe benefits are generally recorded at the district level as a pool, but applying a percentage proportional to salaries at schools will generally be a good enough approximation for school-level reporting, as long as school-level salaries are based on actual building salaries and not district averages.

Inclusion of student outcomes: The benefit of fiscal reports is enhanced when student outcomes are presented along with them. The advent of NCLB has made it considerably easier than in the past to obtain such data on test scores for grades 3 to 8 and one high school grade, but it is misleading to assume that a simple metric or productivity measure can completely capture school performance. It is particularly misleading when

performance metrics are compared across dissimilar schools and districts. At a minimum, differences in student and community backgrounds are helpful to note. Furthermore, scholars have demonstrated methods for "value-added analysis" using cohorts of students. The NCLB regulations now allow some states to utilize growth models for students' progress and, with the use of some simple regression models, more nuanced measures can be developed.

Less Tractable Issues

Capital Asset Expenditures: Capital assets by definition have useful lives over several "accounting periods" and generally over several years. This feature presents at least two problems.

First, some capital assets are paid from and charged to the operating budget, but are used for multiple purposes or grades. Even when the capital assets are clearly associated with a group of the students, it is still difficult to interpret them appropriately if purchases are made on a "take your turn" basis, but accounted for in one year.[7]

Second, depreciation expenses for capital assets are generally tracked at the district level and are not reported with the budgetary expenses associated with a school. Maintenance expenses, however, often are tracked at the school level. Problems occur since older schools likely require more maintenance compared to new schools, while new schools have higher depreciation expenses, but these latter are not recorded as school-level charges.

[7] More specifically, for example, a large expense associated with textbooks used exclusively by the fourth graders may be used for several years. If paid for out of the current operating budget all of the expense appears to go to the fourth grade for one year making fourth graders look expensive that year. In the following year, the school may purchase textbooks for the fifth grade, making fifth graders appear more expensive per student and fourth graders looking substantially less costly compared to the preceding year. A similar situation occurs if a district funds capital improvements in the schools on a take your turn basis.

District-wide Expenditures: Some school fiscal reporting systems either allocate to schools all district-level expenditures that are not directly used by schools on a per-pupil basis or, conversely, report these expenditures only at the district level and do not allocate them to schools. Examples of such expenditures are the office of the superintendent or the evaluation unit or the budget office, but others such as transportation, utilities, and food service are often treated in these ways as well. For internal users interested in analyzing school-level costs, the more relevant costs are those for which they are responsible and do not include district-wide expenditures. For external users, however, including district-level costs in an analysis is important and requires a standard method for allocating these costs. For external users, the functions left at the district level need to be the same across districts, otherwise school reports will not be comparable. Thus, a state that wants a dataset for all schools will need to be explicit about how to handle each type of district-level expenditure.

Special Services and Students: Uniformly tracking spending for specific programs and students, such as special education, is particularly difficult because districts employ instructional programming policies that are treated differently in the accounting system and yield different cost reporting results.

As encouraged by federal and state policymakers, many districts utilize integrated classrooms, in which special education and regular education students are taught by the same teacher(s). In these classrooms, the resources for special education are mingled with the resources for regular education and cannot be separated easily. In addition, not all schools use the integrated approach to the same extent; most schools continue to have some separate special education classes. If there were accessible records on the numbers

of students and classrooms that used each model in each school, percentages could be applied to expenditures in order to separate the jointly-delivered services, but these kinds of statistics are not collected regularly.

Additionally, some districts "contract out" with external organizations for the provision of some of their special education services and these contracted-out services can be physically provided either in district facilities or outside the public schools. The district office does the contracting and generally does not account for the resulting expenditures at the school level. In such circumstances, expenditures for schools that provide special education services in-house will be reported at the school level, while expenditures for the schools that contract the services will be reported at the district level. Even the district-level special education costs may not be comparable to an aggregation of in-house school-level special education costs since the contracted costs of special education generally include the administrative and support costs of the provider, which then mixes instructional costs with non-instructional costs.

Another factor that makes it difficult to assign special education costs to schools is that some the costs are intertwined with other functional expense classifications. For example, travel expenses for special education students can be significantly higher than for other students and yet all transportation costs are generally lumped together. Or there are often higher maintenance expenses associated with facilities and equipment to provide special education services, but these are not separately identified.

Vocational education services, offered primarily at high schools, are another example of some of these same issues – jointly offered classes and some contracting out—albeit at a lower overall level of total expenditure.

Finally, data on the number of students served by special programs are not always available at the school level, especially if the expenditures are partly or wholly accounted for at the district level.

IV. School-level Fiscal Reporting in Practice

The complexities of generating fiscal data are illustrated through a recent (2000) Pennsylvania legislative initiative, Your Schools Your Money (YSYM).[8] Pennsylvania is the seventh largest school system in the U.S., with 501 school districts and just over 1.8 million students. YSYM was an ambitious attempt to collect school-, grade-, and subject-level data by expanding the account codes for the various expenditure functions down to the school level. The initiative required all school districts to submit detailed sub-district level data to the Pennsylvania Department of Education (PDE). More specifically, at the school-level, YSYM required information to be reported for five broad groups of operations: classroom instructional costs, instructional student support costs, facilities and maintenance costs, as well as grade level costs for elementary schools, and subject matter costs for middle and high schools.

During its development by the PDE, YSYM received extensive input from a range of school district practitioners and aspired to be the solution for school-level cost data. After only four years, however, the effort was suspended, in part because the new account codes required to track the cost detail at the school level ballooned well beyond anyone's capacity for implementation (See Shrom and Hartman, 2008)[9]. As a result of

[8] Act 16 of the Pennsylvania legislature, 2000.
[9] This ballooning of account codes is not unique to schools or even governments. In a recent article, Fernandez (2008) discusses the challenges of overwhelming account codes for larger firms desiring to segment costs by programs and subsidiaries.

the massive accounting overload, many districts simply allocated total school level expenditures to the YSYM categories on an equal per-student basis. This severely compromised the validity of the data and removed within-school variation in pupil costs across grades or subject matter areas, which were primary objectives of YSYM.

In addition to implementation concerns, YSYM experienced challenges to the usefulness of the data. For example, the individual school and district YSYM reports were published electronically at the state level to provide parents and taxpayers with more information about their local school system. The reporting format, however, presented the information for a single school site one year at a time, and without context about the school to assist in interpreting the results.

Despite the challenges of producing school-level data, a few states have developed cost systems to report these data. Two states, Florida and Ohio, have a long tradition of making available state-level fiscal data for all their public schools.[10] Table 1 summarizes the criteria used by Ohio and Florida in addressing each of the challenges associated with reporting school level data. Their approaches to dealing with the less tractable issues differ in substantial ways from the Pennsylvania research-based approach that is discussed later.

Ohio addresses the tractable challenges primarily by using building level salaries as a cost driver. The Florida model also uses building level salaries for the shared resources and fringe benefits. In Florida, non professional staff expenses that are not directly linked to a school (i.e., custodial staff, food service, general administration) are allocated to schools based on either the number of teachers in a program area, full-time

[10] Texas also has available school-level data, although accessing it is considerably more difficult than in Ohio or Florida.

equivalent students, or time/space bases, which may vary by program. For example, allocations of food service and guidance staff are based on school enrollment while allocations of staff for school maintenance are based on instructional time and space usage.

Ohio and Florida deal similarly with capital assets -- maintenance expenses are assigned to the school level, but capital assets and debt service payments are not allocated. District-wide expenditures in both states are allocated back to the school level using an appropriate cost driver, such as staff full-time equivalents, program enrollment, or space/time usage. Both states use similar cost drivers to allocate costs for special services. The methods of Florida and Ohio might be summarized as an allocation approach where the end objective is for all indirect costs (except for capital and debt service expenses) to be allocated to the school level or below.

IV. Case Study: School, Grade, and Subject Reporting in Pennsylvania

In this section, we describe a case study of Pennsylvania school districts[11] to suggest an improved and more relevant reporting system compared to the traditional allocation method of producing school, grade and subject-level data. The research on the case studies of four Pennsylvania school districts was managed by a team of four academic researchers (the authors of this paper) and five district business managers, advised by a board of three national finance experts, who worked together to construct useful information for both internal and external decision makers. The school districts were selected based upon their willingness to participate in the experiment and all had skilled business office staff. The penultimate models were presented to district personnel,

[11] The reporting system was also successfully applied in three districts in New York State.

school business officers, and academics at a variety of professional and academic conferences and the final models incorporated the feedback from these forums.

The research team developing the Pennsylvania case studies used the following seven principles:

1. Provide an expanded information and reporting system: The ultimate goals of constructing reports were to provide a tool that would allow internal users to make use of resource information to improve student performance and that would be useful as well to external users. To this end, four separate types of data were deemed essential to juxtapose (expenditures, personnel, student demographics, and student outcomes) so that resources could be compared to student outcomes, the latter adjusted for student characteristics that affect costs of education.

2. Use the school site as unit of analysis: To be functional for internal users, the reports needed to focus on activities that administrators provide and mimic the way that those administrators make their decisions. Since in most school districts, principals are responsible for budgets, operations and student results of individual schools, the school was chosen as the unit of analysis. Further, existing school data systems for reporting expenditures, personnel, and students can identify data records by individual school, but not always at lower levels of aggregation, such as programs, grades, or students. Finally, data for research are available for districts but are rarely available at lower levels for entire states, so that school-level data would be a substantial contribution for research purposes.

3. Focus on available data from districts and the state: The strong emphasis on available data came from the prior experience of all the team's school business managers,

who had participated in Pennsylvania's unsuccessful YSYM initiative several years earlier. Not one of them thought the additional school data beyond what were readily available would be worth the costs of setting up new accounting codes to capture additional information. Further, most of the data for professional personnel, student characteristics, and student outcomes were already sent electronically by districts to the state education department and, thus, could be obtained centrally.

4. Do not allocate resources unless they are directly identifiable at the school level: The decision to include only those data elements directly identifiable at the school level was adopted to match administrative needs. The team's business managers were adamant that their principals should be able to "recognize" their schools in the reported data. No allocations from central office or other indirect costs were included in the school models, but these indirect costs were captured elsewhere so that external users could easily allocate them to schools.

This decision is in contrast to the recommendations by Roza and Swartz (2007), who advocate that central expenditures be allocated to schools, and in contrast to the policies in Ohio (Ohio Department of Education, revised September 2005) and New York City in their school based expenditure reports, where all system expenditures are put at a school-site, even if some are "assigned" by per-pupil or other formula. Business officers saw no value in assigning these expenditures by formula and researchers realized that if they wished, they could assign these expenditures based on pupil counts, square footage, meals served or other appropriate drivers used in cost accounting systems.

5. Reconcile all district expenditures with those directly in schools: The use of only school-level data did not mean that the other expenditures were lost. A reconciliation

procedure accounted for district-wide expenditures such as central administration (school board, superintendent, and assistant superintendent), business office, curriculum, transportation, and debt service.

6. Include multiple years: Multiple years were presented in the reports to examine what, if any, school-level resource reallocation decisions were being carried out and if any changes were correlated with performance changes. In addition, knowledge of trends counter tendencies to make resource allocation decisions on the basis of single year anomalies, and trends help researchers reach more reliable conclusions.

7. Create comprehensive reports: Business managers reported that their principals felt overwhelmed with data, reports, printouts, memoranda, etc., while much of the most important data for decision making by school-level administrators were missing. The information avalanche was off target and counter-productive. In particular, a way to see school performance trends in relationship to Annual Yearly Progress goals, together with the resources assigned to various groups of students, was critically important to improving resource allocation decisions. Thus, reports included a simple one-page summary for the school that displayed the key data elements and formatted the report in an easy-to-read layout. More detailed data to explore issues highlighted in the summary report were provided in backup reports. Additionally, a district-wide report that compared all schools within a district was particularly helpful to internal users in analyzing resource allocation decisions and student performance results.

These seven principles lead to the development of a school-level cost model that is different from the traditional allocation models used by Florida and Ohio. Table 1 presents a summary of how the challenges of constructing school-level fiscal and

information reports were addressed in the Pennsylvania case study (with comparison to Florida and Ohio). Since Pennsylvania is typical of many states in the types of data that are currently being collected, this information may guide other states in developing a process to produce school-level cost reports.

Similarly to Florida and Ohio, the tractable challenges were largely resolved through utilizing personnel data. Data were available from the state and district files in Pennsylvania and applied in reasonable ways to provide missing data elements.[12] The district-wide fringe benefit rate was obtained from the district's annual financial report that was filed with the state and applied to all personnel salaries at the school level.

The data for school-level and grade-level student outcomes and student demographics were the easiest to obtain since the state had an extensive data collection and reporting system in place to meet the mandates of state testing, Annual Yearly Progress (AYP), and NCLB. These were not linked to either school expenditures or staffing data, however. As a result, the primary contribution in this area was to combine the information from the different data systems into a single reporting structure.

The relatively intractable issues were largely structural in nature and related to resources managed at the district level or cases where differences in district organization or treatment of certain programs and their related expenditures differed from one another. For example, like Ohio and Florida, the accounting for capital assets (debt service, primarily, or depreciation) is done at the district level without identification with an

[12] For example, for shared teaching and instructional support personnel, the Pennsylvania Department of Education (PDE) already collected individual staff information that included the total salary and percentage of time each person was assigned to each site. Additionally, while non-professional staff data were kept at the district level, they were available through payroll records, and in this case, the district business managers pulled the relevant information from their existing files and organized it by school

individual school. As a result, expenditures related to capital assets were not included in school-level expenditures, but maintained at the district level.

The more general case of district-wide expenditures is dealt with through a reconciliation process that keeps district-wide expenditures from being automatically allocated to schools but also makes sure they are accounted for uniformly. The exclusively district-level expenditures, such as those for central administration, business office, transportation, and food service, were defined uniformly across the participating districts and not included in the school-level reports. The remaining expenditures are in areas in which some of the expenditures are incurred at the school level and others at the district level, but these are a small percentage of total district-wide expenditures.[13]

A reconciliation analysis was conducted to verify the assignment of expenditures to appropriate categories and to determine how much of the district's total expenditures were accounted for at the school-level. As an example, the reconciliation for one district showed the district's total expenditures were $37.2 million and, of these, 77%, or $28.6 million, were classified as school-level expenditures and were included as direct costs in the school-level analysis. Similar results were found in the other two Pennsylvania pilot districts after adjusting the school-level and district shares for the differences in debt service (maintained at district level) borne by the districts. Thus, the reconciliation verified a relative consistency in practice across the districts, which were quite dissimilar in size, wealth and suburban/urban/rural nature

[13] The small percentage of remaining expenditures includes both instructional, support, and non instructional expenditures. Even in the instructional programs, regular education, special education and others, not all of the expenditures are incurred at the school level, but include some district-wide expenditures made and accounted for at the district level. Support expenditures often have a mixture between school and district locations; examples include pupil health with school nurses and the district health office, or plant services with custodians at the school level and maintenance staff serving all schools, or administration with the principal's office included in the school level reports and the superintendent's office and school board retained at the district level.

The remaining challenge was to provide data for programs, such as special education or vocational education, which districts treat differently in their operating arrangement and subsequent accounting procedures. The major difference is between districts that operate their own programs (in-house) and those that contract for services (or some portion of them) to outside vendors, such as other districts, intermediate educational units, or outside organizations.[14] Since these programs generally have substantial expenditures, it becomes difficult for external users to make a valid comparison across schools where one district operates its own programs in-house (and records those expenditures to the operating school sites) with districts that contract the same type of programs (and keep the expenditures at the district level). The problem is fundamental and unsolvable without some arbitrary allocations of district contract costs to individual schools. This may be appropriate for researchers trying to compare expenditures across districts but is unnecessary and confounding for internal users making resource allocation decisions within a single district. At present, the most prudent approach seems to be to explain or footnote which approach the district uses for informational purposes.

Table 2 displays the data elements needed for the reports as well as whether these data are generally found at the state or district level in Pennsylvania. As in other states, Pennsylvania requires districts to send many types of data to the state education department each year. These data have indicators for their school-level locations and,

[14] For the programs that are operated in-house, the instructional expenditures can be identified by the school in which they reside and are part of the school's overall expenditure level. However, for programs that are contracted out their expenditures are normally shown as district-level costs and not allocated or assigned to schools. Within a single district, this does not cause a substantial problem since the costing procedures are consistent across schools, either part of the schools' expenditures or excluded from the schools' reported expenditures

although the data are not intended to be used for school fiscal reports, they can be put to that purpose. As shown in Table 2, such data in Pennsylvania include numbers of students by grade in lower schools and subject in upper schools and by each of the NCLB subcategories; numbers and salaries of professional staff by grade or subject taught, and by percent of time spent in each building; and test scores by grade and subject and student subgroup. Only non-professional staff information is unavailable in records at the state level. With such complete data centrally located, districts need contribute little additional information in order to construct school-level fiscal reports.

With these data at the state-level in Pennsylvania, plus non-professional salaries and non-personnel expenditures (purchased services, supplies, equipment) from existing district records, separate reports were created for elementary, middle, and high schools to recognize differences in school organization and operation. The elementary school report has *grade level* information for students, staffing, expenditures, and standardized test scores (since standards tests are given in Grades 3-8 currently). Conversely, the high school report has information for these data categories by *subject matter* to reflect that teachers, programs, and courses are organized and operate by subject matter. The middle school report incorporates both grade level and subject matter categories depending on the school's organization; for example grade level for students in grade six and subject matter for students in grades seven and eight.

Table 3a provides an example of an elementary school summary report. This report combines information on students, staffing, spending and student outcomes over four years into a one page summary, allowing for straightforward analysis of the mix of school inputs (personnel, expenditures), student characteristics, and outcomes.

Table 3b shows an example of grade-level reporting. The information included is similar to the school-level table, but reports the data for Grade 5 only. In reviewing the report over the four years, several aspects stand out. The total number of students has fluctuated and grown, with most of the increase coming from white and Asian/Pacific Islander students. Staffing levels indicate the actual number of classroom teachers at grade 5 grew from two to three midway through the four years, average salaries grew steadily, the new hire had fewer years of experience (average years for the Grade 5 teachers went down after the new position was added), the education level (5.0 = Masters) held steady, and the class size dropped substantially with another teacher but then rose again the following year as more students enrolled. The other instructional staff full-time equivalent (FTE) positions represent the proportional share of these personnel allocated to the grade based on student enrollment and their numbers vary across the years. The expenditures are for salaries and benefits of professional staff only; the jump from 2003-04 to 2004-05 reflects the new teacher. Student outcomes show the number of students taking Pennsylvania's standardized test (PSSA), and the percent and number reaching Advanced and Proficient levels (A&P) in the major subject areas; these amounts have increased, although they went down again in the last year.[15] Subject level reporting, for high schools, is not shown but is available from authors.

The grade –level report also includes a set of adjusted performance measures (APMs) that take into account student and community characteristics factors that impact student outcomes—educationally disadvantaged, gender, and race. (See Stiefel, Schwartz, Bel Hadj Amor and Kim, 2005, and Moser Deegan, Stiefel and Denison, 2008, for more on APMs.) These were included to reduce risk of inappropriate media

[15] The last year for reported outcomes is 2006-07 because of data availability at the time of the paper.

comparisons and public misunderstanding of unadjusted student outcomes compared to spending per pupil. As shown in Table 3b, the sample school performed better than predicted in reading and math for the 2006-07 year. The higher than expected test scores may be due to the increase in classroom teacher and other instructional staff time that were allocated to Grade 5 in the last two years, although the class size after going down initially went back up somewhat in the last year.

V. Implications for the Future of Regularly Collected School Resource Data in the States

As this paper suggests, there are many complications that arise when creating a micro-level school, grade and subject fiscal information system. If internal and external users are to have a better understanding of the relationship between resources and outcomes, however, it is essential that accurate systems be developed that are useful to both groups. The process we developed in this paper differs from the few existing efforts in that it is based on a set of transparent principles that allow reports to be used by internal or external users, it is cost-effective in that it draws on information that many state education departments already collect, and it provides data even below the school level—for grades in elementary school and subjects in high school. There is great interest in going further to generate comprehensive cost information for within school programs and grade-levels. Our model provides some guidance in this effort, but reporting within school data systems is fraught with challenges that could require a significant increase in software and administration costs to expand the current data systems. For that reason, ways to account for programs within schools cost-effectively remains a challenge for future research.

Based on this research, we have developed six concrete conclusions about constructing school reports that could help states develop such reports.

Available Data

First, because time and resource constraints make new data collection efforts difficult and costly, any new micro level cost information system should focus on data that are already being collected and used. Practitioners will be more willing to cooperate with the implementation process if they are familiar with the data and the data collection requirements do not overburden personnel by creating an entirely new system.

Communication

Second, communication is an important component of building a micro-level cost information system. The failure of YSYM was due, to some extent, to the lack of attention that was paid to internal users' concerns at the local level. Creating a complex data system, with engagement from multiple participants, requires real communication at the early stages of development. In addition, these users will work to produce cost information that is more consistent and reliable if it is seen as helpful by principals, district administrators, and state officials for management purposes.

Broad Reporting Focus

Third, the concept of school, grade and subject-level cost reports should be broadened to include student demographics and student outcomes. Fiscal data alone present an incomplete and possibly misleading picture of school performance. This is a particular concern when the reports are used to compare schools across districts or statewide. Student outcome measures, however, should not be compared across districts

without being adjusted to control for social economic status and other exogenous factors outside schools' control.

Directly Identifiable School-level Costs

Fourth, costs included in school-level reports for internal users should include those expenditures directly identifiable with an individual school. No allocations of district-level expenditures should be included. Allocations obscure actual operating costs of schools, diminish understanding and responsibility for the results, and add no discriminatory power for assessing school performance. This practice is contrary to the common approach to allocate all costs to the school level.

Major Cost Categories

Fifth, at the school level, the most difficult cost allocations often arise in just a small portion (3-10%) of the total expenditures. A focus on salaries and benefits, supplies, books and equipment will comprise all but a small portion of the total expenditures at the school level. Collection of these data from existing data systems will be sufficient for most resource allocation analyses and decisions.

Consistency in Accounting Procedures

Sixth, the variation in education production among schools produces multiple cost structures, making cross-school comparisons difficult. Nevertheless, to be useful, such comparisons are essential. It is better to keep a clearly defined and consistent list of district-wide functions at a central level (unallocated to schools) in order to achieve consistency. In situations where total costs need to be assigned to the school level, the district costs may be allocated by the user employing appropriate criteria consistently applied across jurisdictions.

The debate about whether and how funding affects the quality of education will continue for the foreseeable future. Data that facilitate the linking of outcomes and resources at the school-level is a sound first step to provide information missing from these conversations. The desire for data on school-level costs stems from both internal and external users' perspectives. This article provides hope that cost systems can be developed that meet the needs of multiple perspectives. Data that meet the needs of multiple users have an additional advantage that the data are used more frequently, and data that are used generally contain fewer arbitrary allocations and reporting errors. For those who are developing policies that improve the management of schools and that aid researchers, school-level cost accounting presents many trials and challenges, some more tractable than others. But, using data already collected by most states, reports and data systems useful to both internal and external users are possible to construct with minimal inconvenience to district providers and in cost effective ways.

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Table 1: Comparison of Approaches in Addressing the Challenges of Producing School-Level Reports

Challenges of Producing School-level Reports	**How Challenges Resolved by State of Ohio**	**How Challenges Resolved by State of Florida**	**How Challenges Resolved in Pennsylvania Pilot Districts**
Tractable Challenges			
Shared Resources	Districts report salaries by building to Ohio education department (ODE)	Districts report salaries by building and program area	Districts report salaries by buildings (including shared buildings) to PA education department, allowing distributions between buildings
Non professional staff	Same as above	Estimated based on one of three factors:program enrollment size; staffing; and space/time usage	Districts provided data from payroll records for these staff
Fringe Benefits	Prorated by ODE based on salaries at building level	Prorated based on salaries at building level	District fringes prorated based on salaries at building level
Include outcomes and student demographics for complete reports	Not included in reports, but available elsewhere by building	Not included in reports, but available online as measure of Return on Investment/School Efficiency	NCLB test data and student enrollment data, by subgroup, obtained on line from state report cards or other state sources
Less Tractable Challenges			
Capital Assets	ODE allocates maintenance when districts do not assign; rest not included	Districts allocate maintenance but not debt service or depreciation to the school level	Defined list of functions kept at district level, including maintenance, debt service, and depreciation.
District-wide expenditures	ODE allocates based on one of five drivers: building square feet; percent of total students bused by building; percent of total meals served by building; percent of total certified salaries by building; percent of total classified salaries by building	Districts allocate all as indirect, linked to programs within schools based on staff program needs, program enrollment, or space/time usage of program	Defined list of functions kept at district level, including central office, transportation, food service, contracted out expenditures. District- wide expenditures in Annual Financial Report (AFR) reconciled by summing up of school expenditures plus functions left at district level.
Special Services and Students	ODE allocates contracted services; other personnel salaries assigned to buildings by districts	Districts allocate by program within buildings based on staff, student, and space factors	Not an issue for single district analyses. Note differences in districts' practices and adjust cross-district analyses as necessary

Ohio Sources: *Reporting School District Revenue and Spending per Pupil* (Formerly *Expenditure Flow Model Handbook*), Ohio Department of Education, revised September 2005; *EMIS Reporting Manual*, Chapter 4: "Reporting District and Building Data," Ohio Department of Education, August 15, 2006.
Florida Source: *Financial and Program Cost Accounting and Reporting for Florida Schools* (Redbook 2001), Florida Department of Education.

Table 2 Sources of Data for Pennsylvania School-level Reports

SCHOOL LEVEL DATA ELEMENTS	DATA SOURCES	
	STATE	DISTRICT
Students		
All students	PDE website	
Ethnicity	PDE website	
Economically Disadvantaged	PDE website	
Grade Level by Building	PDE website	
Course Enrollments: Secondary Students	PDE website	
Staff		
Elementary/Secondary Professional Personnel (ESPP)		
Building Assignment(s)	ESPP report from PDE	
% Employed (used to determine FTE)	ESPP report from PDE	
% Time in Each Building	ESPP report from PDE	
Grade Level Assignment(s)	ESPP report from PDE	
Job Assignment (Level, Program, Subject, etc.)	ESPP report from PDE	
Years Experience	ESPP report from PDE	
Education Level	ESPP report from PDE	
Function Codes	Assigned	
Classified Employees		
Building Assignment(s)		District records
Job Assignment(s) (type of aide, clerical, etc.)		District records
Function Codes		District records
Total School Staff	Calculated	
Spending		
Elementary/Secondary Professional Personnel		
Salary	ESPP report from PDE	
Benefits	Calculated from Annual Financial Report	
Classified Employees		
Hours per week (used for FTE		District records
Wage ($ per hour)		District records
Non-personnel Expenditures (by object)		District records
Classroom Expenditures	Calculated	
Other Instructional Expenditures	Calculated	
Total Instructional Expenditures	Calculated	
Support Expenditures (by object)	Calculated	Calculated
Total School Expenditures	Calculated	
Classroom Expenditures $/Student	Calculated	
Other Instruction Expenditures $/Student	Calculated	
Total Instruction $/Student	Calculated	
Support Expenditures $/Student	Calculated	
Total School Expenditure $/Student	Calculated	
Student Outcomes		
Math % Advanced and Proficient (A&P)	PDE website	
Reading % A&P	PDE website	
Writing % A&P	PDE website	
Students Taking Tests By:	PDE website	
Building	PDE website	
Grade Level	PDE website	
Ethnicity	PDE website	
Gender	PDE website	

Table 3a Example of School Summary Report for Sample Elementary School

Students	2002-2003	2003-2004	2004-2005	2005-2006
All students	367	387	404	423
Ethnicity: White, non-Hispanic	341	358	368	381
Ethnicity: Black, non-Hispanic	5	7	3	3
Ethnicity: Latino/Hispanic	2	2	5	5
Ethnicity: Asian/Pacific Islander	19	20	27	33
Ethnicity: Am. Indian or Alaskan Native	0	0	1	1
Economically Disadvantaged	21	18	19	19
Staff FTE	2002-2003	2003-2004	2004-2005	2005-2006
Regular Classroom Teachers	21.1	21.1	23.1	22.7
Other Instructional Staff	5.9	5.9	6.6	5.4
Itinerant	0.0	0.0	0.0	0.0
Title I	3.0	3.0	3.0	3.0
Special Ed	2.9	2.9	3.6	2.4
School-wide Professional Support Staff	5.0	5.0	6.0	4.5
Classified Employees	10.0	10.3	12.2	12.8
Total School Staff	42.1	42.2	47.9	45.4
Spending	2002-2003	2003-2004	2004-2005	2005-2006
Classroom Expenditures	$1,403,597	$1,544,516	$1,754,257	$1,762,088
Other Instructional Expenditures	$478,185	$574,039	$676,085	$654,094
Itinerant	$0	$0		$0
Title I	$236,300	$3034,854	$284,536	$324,826
Special Ed	$241,885	$269,185	$391,549	$329,267
Total Instruction Expenditures	$2,025,694	$2,272,671	$2,612,639	$2,618,899
Support Expenditures	$737,355	$891,845	$1,089,897	$956,182
Total School Expenditures	$2,763,050	$3,164,516	$3,702,536	$3,575,081
Classroom Expenditures $/Student	$3,825	$3,991	$4,342	$4,166
Other Instruction Expenditures $/Student	$1,303	$1,483	$1,673	$1,546
Total Instruction $/Student	$5,520	$5,873	$6,467	$6,191
Support Expenditures $/Student	$2,009	$2,305	$2,698	$2,260
Total School Expenditure $/Student	$7,529	$8,177	$9,165	$8,452
Student Outcomes	2002-2003	2003-2004	2004-2005	2006-2007*
Grade 3 Math % Advanced and Proficient (A&P)	n.a.	n.a.	98%	96%
Grade 3 Reading % A&P	n.a.	n.a.	93%	94%
Grade 5 Math % A&P	74%	83%	95%	85%
Grade 5 Reading % A&P	79%	87%	98%	90%
Grade 5 Writing % A&P	n.a.	n.a.	n.a.	86%

*data for outcomes reported for 2006-2007 in order to allow calculation of adjusted performance measures in 3b, below, which were done for this latter year.
n.a = data not available

Table 3b: Example of Fifth Grade Summary Report for Sample Elementary School

Students	2002-2003	2003-2004	2004-2005	2005-2006
All students	77	61	67	87
Ethnicity: White, non-Hispanic	73	56	66	79
Ethnicity: Black, non-Hispanic	1	1	0	0
Ethnicity: Latino/Hispanic	0	1	1	1
Ethnicity: Asian/Pacific Islander	3	3	0	7
Ethnicity: Am. Indian or Alaskan Native	0	0	0	0
Economically Disadvantaged	4	3	3	4
Professional Staff FTE	2002-2003	2003-2004	2004-2005	2005-2006
Regular Classroom Teachers	2.0	2.0	3.0	3.0
Averages: Salary	$57,388	$61,638	$61,551	$64,337
Years of Experience	17.0	18.0	13.7	14.7
Educational level	5.0	5.0	5.0	5.0
Class Size	38.5	30.5	22.3	29.0
Other Instructional Staff (Allocated)	2.0	1.5	1.9	2.2
Itinerant	0.8	0.6	0.8	1.1
Title I	0.6	0.5	0.5	0.6
Special	0.6	0.5	0.6	0.5
Total Instructional Staff	4.0	3.5	4.9	5.2
School-wide Support Staff (Allocated)	1.0	0.8	1.0	0.9
Grand Total	5.0	4.3	5.9	6.1
Professional Staff Salaries	2002-2003	2003-2004	2004-2005	2005-2006
Regular Classroom Teachers (Allocated)	$146,912	$157,792	$234,290	$244,174
Other Instructional Staff	$136,836	$113,121	$152,058	$180,669
Itinerant	$47,971	$39,658	$63,866	$81,070
Title I	$46,043	$38,063	$42,299	$55,030
Special Ed	$42,822	$35,401	$45,892	$44,568
Total Instructional Staff	$244,268	$231,340	$386,348	$424,842
School-wide Support Staff (Allocated)	$85,283	$70,502	$96,875	$91,783
Grand Total	$329,551	$301,842	$483,223	$516,626
Student Outcomes	2002-2003	2003-2004	2004-2005	2006-2007*
Total Students	77	61	67	87
PSSA Math # Scored	76	60	60	85
% A&P	74%	83%	95%	85%
# A&P	56	50	57	83
PSSA Reading # Scored	76	60	60	85
% A&P	79%	87%	98%	90%
# A&P	60	52	59	80
PSSA Writing # Scored	n.a.	n.a.	n.a.	85
% A&P	n.a.	n.a.	n.a.	86%
# A&P	n.a.	n.a.	n.a.	73
Predicted Performance controlling for background Grade 5 Math % A&P	n.a.	n.a.	n.a.	80%
Predicted Performance controlling for background Grade 5 Reading % A&P	n.a.	n.a.	n.a.	76%

* The actual and predicted values are for 2006-07 because of data availability. The predicted value is the A&P score adjusted for the following factors: prior test scores; school enrollment; percent IEP; percent ELL; percent economically disadvantaged; percent black; percent Hispanic; percent multiethnic. In this case both the adjusted scores based on the regression model are less than the actual A&P meaning the school is performing better than expected.

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