Can Activity-Based Costing reform school finance and help improve student achievement?

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ABSTRACT

Financial data provided to school leaders is inadequate. Present reporting systems obstruct efforts to direct financial resources to where they will benefit student learning most. Traditional school accounting systems lack specificity about how funds are consumed, and fail to connect spending to student performance. This article reviews research on attempts to improve school reporting systems and efforts to determine if the level of financial resources, or redirection of them, improves student outcomes. It specifically addresses Activity-Based Costing's potential and whether, if paired with the relative autonomy of charter schools, it can provide the information needed to help leaders make intelligent decisions to improve student outcomes. The findings show that resources do impact student learning, and that better information provided to school management improves its ability to direct funds where they will do the most good, but that a comprehensive Activity-Based Costing system is not feasible due to implementation cost and administrative burden. Capturing school-level costs at relatively autonomous charter schools is a more practicable approach, and a potential template for doing so is outlined. Next steps for connecting that data to student outcomes as a path toward improving achievement are suggested.

Keywords: costing, schools, financial reporting, student outcomes

INTRODUCTION

Over the past 20 years, researchers have sporadically looked at financial reporting systems for schools and their capacity to provide relevant data for effective decision-making. A number of financial reporting methodologies have been developed and examined, and their relative capacity to provide improved information evaluated. One of the most vexing issues is how to unpack the financial black box presented by the traditional account classifications utilized in K-12 systems, in which more than 80 percent of costs are typically included in personnel salaries and benefits (most of that the teachers) – making it impossible to determine relative cause and effect relationships between educational inputs and student learning results (Ellerson, 2011; Perry, 2005). Even when costs are further disaggregated, the next problem becomes how results should be measured due to the difficulty of identifying and measuring output (Eger & McDonald, 2012). Services are more difficult to measure than products (Euske, Frause, Peck, Rosenstiel & Schreck, 1998), and in education it is difficult to measure outputs, or their relations to inputs.

This article reviews what has been learned so far and what is not yet known about existing and potential financial reporting systems for schools and, in addition, it takes a close look at the possibility that Activity-Based Costing (ABC) or a similar costing methodology could identify relationships between how funding is used and student outcomes. Given the increasing pressures to meet learning benchmarks and ever-present funding constraints, the importance of connecting resources with results cannot be overstated.

The literature reviewed suggests that more intelligent use of funds can impact student outcomes, but that a fully-functional ABC system is likely too burdensome and complex versus the relative value it provides over a slightly less comprehensive system that would ease administrative requirements significantly. A simpler, more easily implemented costing structure capturing school-level costs can significantly improve financial visibility with far less burden or chance of misstatement. Further, because traditional schools' campus leaders lack the authority to act on information that could be provided by an improved reporting system, and because a minority of costs are simply district allocations, capturing the school-level costs at relatively autonomous charter schools and then connecting those costs to student outcomes presents the greatest potential for improvement. A model ABC is offered here as a practical template for capturing and understanding charter schools' cost usage, and possible means for connecting those data to student results in future research are proposed.

THE PRESENT PROBLEM WITH SCHOOL FINANCE

Present financial reporting systems are inadequate and imprecise, leaving school and district decision-makers unable to understand which expenditures drive student performance (Guthrie, 2007). The present financial data has yawning gaps, and more relevant information is needed to meet ever-increasing accountability requirements for student outcomes (Sanders, 2008). The intelligent use of funds is also inhibited by the variety of separate funding streams, making it even more difficult to holistically amass schools' complete financial picture (Hill, 2008). Verstegen & Driscoll (2008) posit that present education reporting systems are obsolete and require reinvention, and further propose that, "Linking top-down standards-based reform and bottom-up school finance reform has the potential to affect American education well into the future" (Verstegen & Driscoll, 2008, p. 332).

New systems have emerged, but none seems to have gotten widespread traction. Yet, meaningful financial data is critically important to successful systemic education reform, and its meaningfulness and usefulness depend upon proper collection and management of it (Sanders, 2008).

APPROACH

This article utilizes a review of the recent research on school financial reporting and a single case of applied ABC in a charter school to assess various financial reporting models' potential to contribute to school reform and improved student achievement. To do this, Google Scholar (including selected university library links) was searched for peer-reviewed articles on school financial reporting, and then articles on the relative autonomy of charter schools versus their traditional counterparts. This yielded 39 relevant articles and publications.

First, the attributes of Activity-Based Costing (ABC) in education are described. Within this context, the various financial reporting models that have been studied and/or developed by researchers in education are examined.

Then the following questions are explored:

- What financial collection and reporting approaches have been developed to better understand how resources are used in K-12 schools?
- Does research show that the allocation of financial resources is related to student achievement outcomes?
- Can reformed reporting systems help schools to better understand where money is spent?

The relative benefit to be derived by making schools the focal point of potential costing/information systems versus implementation at the district level is then considered, and the difficulties presented by service industries such as education (versus product manufacturing) and differentiation across schools are explored.

Finally, the relative autonomy of charter schools versus their traditional counterparts, that permits charter schools to make structural changes as needed whereas traditional schools cannot, is explained.

Pulling all of this together, the focus question is asked: Can charter schools use their relative autonomy together with the knowledge about resource usage gained from an ABC or similar system to better allocate resources and improve student outcomes?

ACTIVITY-BASED COSTING (ABC): A BRIEF OVERVIEW

In short, ABC attempts to connect financial and other inputs directly to outputs and results. In traditional business environments, costs for direct materials (e.g., the engine in a vehicle) and direct labor (e.g., the individual assembling vehicles) can be traced to products fairly readily, but overhead costs (such as facility or support costs) are not so easily traced (Brewer, Garrison, & Noreen, 2016). As traditional product manufacturing has become more complex, simple methods of allocating overhead (e.g., based on direct labor costs) have increasingly caused overhead to be over-applied to some products and under-applied to others, distorting the resulting costs (Brewer, et al., 2016). ABC attempts to assign overhead more accurately than simpler methodologies by understanding the relative causes of costs more precisely (Brewer, et al., 2016). Further, ABC attempts to determine which activities (activities

that create the costs) yield more relative value versus those that do not (Kinney & Raiborn, 2009). It is these attributes that cause researchers to ask whether ABC can provide value in education.

WHAT WORKS AND WHAT DOES NOT: A REVIEW OF THE RELEVANT RESEARCH

Researchers have found a number of meaningful relationships between schools' financial inputs and their outputs (student achievement). Using three national databases in a statistical study connecting resources and outcomes, Uline & Crampton (2009) determined that dollars spent per-pupil on human, social, and physical capital accounted for a between 55.8 and 77.2 percent of achievement variation among fourth and eighth graders in English and mathematics. Of the three independent variables, human capital (defined as the district-level expenditure on instruction as a proxy for experience and teacher education level) had by far the most significant impact on student test scores, followed by infrastructure, and then social capital (Uline & Crampton, 2009). A control variable for poverty (defined as students eligible for lunch assistance) was also included as part of the study (Uline & Crampton, 2009).

Greene, Huerta, & Richards (2007) performed a similar study on resource effectiveness; but rather than using dollar amounts, they defined real resource inputs as quantity and quality of personnel (e.g., degree-level attained by faculty), materials allocations (e.g., facilities, class size), and environmental factors (e.g., feeder schools, socioeconomic status) at 303 public high schools. Greene et al. (2007) found those inputs to be significant predictors of two thirds of the variance in student outcomes which they defined as the difference, over three years, in High School Proficiency Assessment (HSPA) and Grade Eight Proficiency Assessment (GEPA) achievement scores (which control for student characteristics), and college aspiration rates. They noted, however, that socioeconomic status remained the largest predictor of the exam score differences (Greene et al., 2007).

Analyses like these are not even possible unless there is a financial data collection and reporting system available that details dollars spent and resources used at the system or school level using some reasonable categories, such expenditures on instruction, facilities, support, etc. As a result, a number of data collection and reporting systems across a range of sophistication levels have been developed to fill the information vacuum.

One of the most extensive was an ABC-like database system dubbed the Financial Analysis Model created by the accounting firm Coopers & Lybrand in which costs were segregated into the five major categorical functions and then, within each of those categories, a second level of subcategories and, finally, within each of the subcategories, a bottom-level set of detailed categories (Speakman, Cooper, Holsomback, May, Sampieri, & Maloney, 1997). This categorization enabled drill-down from major functions through each supporting level to identify their specific cost elements, and also sorting and summarizing any number or selection of categories to determine their dollar totals and per/pupil amounts (Speakman et al., 1997). For example, the top functional categories were instruction, instructional support, operations, other commitments, and leadership; the instruction function contained sub-categories of face-to-face teaching and classroom materials; face-to-face teaching was then categorized into salaries and benefits, substitute teachers, etc. (Speakman et al., 1997). This system enabled visibility from the top level summation to the bottom level details, permitting understanding of what costs were

contained at each level (Speakman et al., 1997). The study did not link the functions to student performance, but was presented as a viable tool to do so (Speakman et al., 1997).

Governmental entities have also entered into the fray. For example, Tennessee developed its own Value-Added Assessment System Database that measures student academic growth longitudinally and uses the results to evaluate school effectiveness (Sanders & Horn, 1998). Interestingly, this assessment system showed that race and socioeconomic status are less powerful determinants of student outcomes than teacher effectiveness, bolstering the argument that better financial information can positively impact managerial decisions and, hence, school effectiveness and student performance across all student populations (Sanders & Horn, 1998).

California also established two databases, the California Longitudinal Pupil Achievement Data System (CALPADS), and the California Longitudinal Teacher Integrated Data Education System (CALTIDES), each tracking student enrollment history and outcomes in the State's effort to more effectively achieve academic standards (www.cde.ca.gov). But neither of these systems incudes any analysis of school finances to associate with student performance.

In another study, an activity analysis similar to ABC provided superior managerial output compared to other systems in Norwegian primary and secondary schools, owing to its recognition of the multiple causal relationships and complexities between inputs and outcomes in the educational environment (Bjørnenak, 2000). Labor costs at the schools, representing approximately 80 percent of total costs, were allocated to cost pools, and differences among average per-pupil costs such as incremental costs for students with special needs were isolated (Bjørnenak, 2000). Bjørnenak's (2000) study was a major effort to demonstrate that, in the exceptionally complex cost environment presented by education, consideration must be given to a broader set of strategic cost drivers than typically used in the private sector, such as the level of government regulation on class size or required teaching hours. Overall, this is not dissimilar to the objective of ABC. In fact, it suggests that, in education, even an ABC approach must be adapted to envelop additional strategic cost drivers as well as the variability and causation among them.

Can Financial and Other Inputs Be Reliably Connected to Student Outcomes?

There is some debate regarding whether more money can improve student achievement. Many researchers have attempted to positively connect changes in resource levels with changes in student outcomes, such as whether a specific increase in dollars spent would cause an improvement in student performance on standardized tests (Hedges, Laine, & Greenwald, 1994).

Archibald (2006) utilized an existing expenditure reporting system from a Reno, Nevada school district that separated costs into the four categories of instruction, instructional support, leadership, and operations/maintenance to determine if differences in expenditures predicted changes student test scores in English and math, controlling for student, classroom/teacher, and school-level characteristics (Archibald, 2006). Her hierarchical linear regression analysis separated the above-categorized expenditures into those student, teacher, and school levels, finding significant variance in student results at each level (Archibald, 2006). Archibald's (2006) results showed that instruction and instructional support were positively related to students' reading achievement at the 3rd, 4th, 5th, and 6th grade levels. Archibald (2006) concluded that education reporting systems must develop the capacity to disaggregate expenditures into categories that will be more meaningful and connected to student achievement, facilitating redirection of scarce resources to where they will do the most good.

Eger & McDonald (2012) developed an alternative cost classification system and applied it in five urban school districts; they first delineated expenditures between human capital services (all payments to individuals for services such as teachers, administrative and support staff, and others on or off the school site) and other costs (all other non-human capital costs such as utilities, maintenance, and purchased goods). Then, within the human capital classification, costs were additionally separated between school-based and non-school-based costs such as administrative expenses other than at schools (Eger & McDonald, 2012). This alternative methodology for separating costs resulted in some interesting possibilities to monitor central administration costs versus school-based costs such as teachers, and also permitted comparison of relative per-student expenditures across the five districts studied, but lacked the direct connection to outputs ABC is designed to provide (Eger & McDonald, 2012). Although their purpose was not to measure student achievement, their results were still interesting because they showed that the manner in which expenditures were disaggregated impacted observed totals within each of the cost categories (Eger & McDonald, 2012). For example, in some districts studied, school- and non-school-based salaries were aggregated; in others, salaries were differentiated by school levels – the latter differentiation resulted in lower reported cost per student (Eger & McDonald, 2012). Connected to this, Eger & McDonald (2012) also noted the inherent difficulty measuring the education production function (discussed later in this manuscript) due to the lack of consensus on, and difficulty in identifying, outputs.

In another study of school-level resource allocation of eleven elementary schools in four states, resources were assigned in accordance with three well-known comprehensive instructional intervention strategies – Success for All, America's Choice, and Accelerated Schools Project – and student improvement connected with those strategies was measured (Odden, Goertz, Goetz, Archibald, Gross, Weiss, & Mangan, 2008). The manner in which dollar resources were used at some of the schools was found to be more effective than others at improving student outcomes (Odden et al., 2008). In essence, schools that had adopted one of these national programs for improvement were required to make specific fund allocations to resources such as the quantity of tutors and/or instructional facilitators, or professional development; after doing so, results showed better outcomes (Odden et al., 2008). Specifically, using the national Terra Nova norm-referenced test as a measure, cohorts of kindergarteners, 3rd, and 5th graders were pre- and post-tested at the beginning and end of three-year periods; all schools adopting one of the national instructional interventions improved student achievement (Odden et al., 2008). The fact that redirection of funds dictated by the improvement programs positively impacted student outcomes is a strong indicator that the manner of expenditure allocation has impact on learning (Odden et al., 2008).

Springer, Houck, Ceperley, & Hange (2007) examined resource allocation in small learning communities and found that innovative ways of utilizing revenues from various sources to implement magnet programs facilitated reform in large high schools. In the three high schools studied, implementation of smaller learning communities was improved by reorganizing categorization of revenues received and connecting those revenues to specific expenditures, permitting structural changes at lower costs due to the more effective allocation of funds (Springer et al., 2007). The authors noted that, "Taking time to align financial protocols on the front end will make reporting of results more transparent to educators" (Springer et al., 2007, p. 466). Springer et al. (2007) also concluded that the present manner of school reporting made it difficult to understand inflows and outflows. They cautioned that their approach did not imply a

cause-effect relationship, but suggested that the undertaking nevertheless had value in its insights for improving resource allocation (Springer et al., 2007).

Is a Fully-Functional ABC System Practicable for Schools?

Another issue is the cost in time, money, and other resources, to reinvent school reporting systems. A full-blown ABC model such as the one created by Coopers & Lybrand (discussed earlier) is a significant expense to implement that cannot be ignored. In response to this cost and complexity, some have attempted to create simpler systems that will still deliver more detailed financial reporting that can improve management and policy making.

Considering this costs versus benefits of implementing ABC, Denison, Hartman, Stiefel, & Deegan (2011) developed a reporting model for multiple types of school-level costs and performances that had lower resource requirements than other methodologies, arguing ABC has value, but that implementation costs are a concern. Their system utilized the existing accounting data, and they conducted pilot projects in Pennsylvania and New York that showed its output to be more relevant than traditional allocations (Denison et al., 2011). Although their cost categories lacked the specificity of a typical ABC approach, the use of existing available information was a significant advantage toward making the implementation manageable (Denison et al., 2011). Example categories included spending in the classroom versus elsewhere, specific identification of special education expenditures, Title I costs, and more, summing to the total school-level expenditures (Denison et al., 2011). They then calculated expenditures per-student and connected those costs to student outcomes measured by reading and math testing scores (Denison et al., 2011). Their output consisted of one-page comparative snapshots in table format, enabling managers such as principals to clearly see relationships among expenditures and test performance (Denison et al., 2011). Denison et al. (2011) were clear that they were not attempting to imply causality but, rather, creating easily digestible data for managerial action. An interesting purposeful decision in this effort was to focus only on school-level costs rather than attempting to allocate district-level expenditures; but they explicitly admitted it was only a first-step toward providing needed information currently absent from fiscal reports (Denison et al., 2011).

Do Expenditures Affect Outcomes Meta Analyses

Better reporting systems are only important if there is a relationship between resources and student outcomes. Several studies have conducted meta analyses in attempts to answer this question, with controversial results. Three different meta analyses using different methods and measures have produced opposite results; one found that there was not a consistent relationship between resources and outcomes, and the other two found consistently significant relationships. A discussion of these three analyses follows.

Hanushek (1989) accumulated the results of 38 articles and books that included 187 regression equations connecting inputs to outputs, classified them according to the inputs studied, categorized the results obtained from each as statistically significant or not and, finally, whether the impact of the input on student outcomes was positive or negative (Hanushek, 1989). In general, results showed lack of significant relationships between inputs and student outcomes (Hanushek, 1989). Out of the 187 studies, 152 used teacher/pupil ratio as an input; of these, 27 were statistically significant at the .05 level with 14 having a positive effect and 13 having a

negative effect (Hanushek, 1989). The remaining 125 insignificant results showed no strong tendency toward a positive or negative effect with 34 positive and 46 negative, respectively (Hanushek, 1989). Other inputs Hanushek (1989) investigated included teacher education and experience, expenditure per pupil, etc. Among all categories, the highest percentage of studies with significant and positive impact on student outcomes was teacher experience; nearly 30 percent of those studies demonstrated significance at the .05 level (Hanushek, 1989). Further, 80 percent of the studies in this category that showed a significant relationship indicated that relationship was positive (Hanushek, 1989). However, Hanushek (1989) pointed out that this positive teacher experience result could be due to more experienced teachers' ability to select schools with better students. He then concluded, "There is no strong or systemic relationship between school expenditures and student performance" (Hanushek, 1989, p. 47).

However, in a later study, Costrell, Hanushek, & Loeb (2008) blamed weaknesses in Hanushek's (1989) previous measurement instruments, and pointed to his use of average district-level expenditures as a serious design problem. Further, in another subsequent study, Hedges, Laine, & Greenwald (1994) simply replicated Hanushek's (1989) original work using the same data, modifying only some of the methodology, and found significance at the .05 level for all inputs tested, with the possible exception of facilities. Hedges et al. (1994) noted significant problems with Hanushek's (1989) manner of synthesizing the results of the studies and his interpretation of the results in his initial work. Major methodology modifications made by Hedges et al. (1994) included abandonment of a simple vote counting methodology (number of positive versus number of negative studies) to summarize the studies' results, implementing various additional statistical tactics such as combined significance tests and effect magnitude analyses, considering the impact of stochastic dependence among coefficients, and more. Hedges et al. (1994) obtained very different results from Hanushek (1989) after making their modifications, finding "systematic positive patterns in the relations between educational resource inputs and student outcomes" (Hedges et al., 1994, p. 8). In fact, for all of the eight input variables (property plant and equipment, teacher experience, teacher education, teacher salary, pupil/teacher ratio, teacher/pupil ratio, administrative inputs, and facilities), the null hypotheses was rejected at the .05 level. The authors concluded that, "Relying on the data most often used to deny that resources are related to achievement, we find that money does matter after all" (Hedges et al., 1994, p. 13).

The predominant result from these studies is that more sophisticated analysis does find connections between expenditures and student outcomes, but that the cost in time and dollars for system design and administration is a significant barrier to implementation.

Despite all these attempts to innovate and rethink school finance, the present reporting systems and data provided to most schools remain essentially unchanged.

IS REFORM APPROPRIATE AT THE SCHOOL OR DISTRICT LEVEL?

The Activity Based Costing accounting methodology, or any other improvement in reporting systems, cannot help school or district management unless they possess the autonomy to allocate resources based on insights gained from that improved financial analysis. Further, many school-level costs are simply central district allocations, confounding any attempt to disaggregate them (Roza & Swartz, 2007).

Schools typically lack the requisite control over costs to avail themselves of the advantages because outside regulatory bodies and policy makers control large portions of their

budgets (Moser, 1998). For example, a traditional individual school cannot change the cost of salary or benefits, or decide to relocate the school to less expensive space (Moser, 1998). Similarly, no legislative body or school board has ultimate responsibility over all funding or how it is spent; legislative, judicial, and licensing authorities, as well as citizens (through voting for bonds), school boards, and even collective bargaining agreements, each with their own goals, play a role in directing funds to specific resources (Hill, 2008).

This fragmentation of oversight and limitation on school autonomy points to the possibility that decentralization could enhance decision-making effectiveness at the school level (e.g., charter schools, discussed later in this manuscript) or, in the alternative, that discretion should be taken from the school level and placed solely at the district level (Childress, Elmore, & Grossman, 2006).

There are multiple countervailing considerations, and resultant costs and benefits, of moving all authority and responsibility up to the district or down to the school level. Hill (2008) expounds on both, in particular with respect to expected outcomes of transitioning from traditional schools to charter schools, noting that there are multiple well-equipped, politically and bureaucratically protected forces (e.g., teacher unions) with a stake in preserving the status-quo. Hill (2008) also notes that change will not come easily due to difficulties inherent in moving from a non-market-oriented to a more market-oriented structure such as charter schools. Nevertheless, regardless of efficiencies that might be gained from centralization, or innovation that might be achieved through decentralization, Hill (2008) posits that we do not know how to provide schools that will be most effective for all.

METHODOLOGICA CHALLENGES OWING TO SERVICE INDUSTRY AND SCHOOL DIFFERENTIATION

As described earlier, ABC attempts to understand expenditures better, connecting inputs to outputs and determining relative output value resulting from each input. In service industries such as schools, these connections can be opaque and difficult to establish.

In traditional manufacturing environments, a process is broken into series of activities performed to create an output (Kinney & Raiborn, 2009); think for example of a traditional production line that assembles a car. Service industries are frequently the same; think about your local Starbucks – your coffee goes through a series of predictable and easily-identified steps before it is handed to you. But many times identifying service industry processes and outputs can be more problematic and difficult to define and measure (Euske et al., 1998); think for example about the complexities of a modern hospital where an identical procedure performed on two patients can result in different outcomes due to other intervening factors. ABC results can be difficult to produce in educational organizations because ABC assumes a stable relationship between inputs and outputs, which may not exist in education (Mensah, Schoderbek, & Werner, 2009). Also education has such a large amount of its resources tied up in payroll that it may hard to disaggregate that into an effective cost analysis.

So, although the vast majority of evidence indicates better information is needed to ensure improved allocation of funds, the obscurity inherent in the education process limits the potential benefits of ABC. Additionally, research shows there are inconsistencies across and within districts and even at the school level. For example, urban schools are burdened with higher proportions of students in poverty versus their peers (e.g., Chicago, Los Angeles, and New York all with poverty rates over 70 percent), resulting in the need for higher support-service

costs (and funding) to attain Federally-mandated academic benchmarks (Brown, 2007). Other differences across districts, such as the manner in which they administer certain programs, also require adapting any ABC or similar model to local circumstances including existing data, local student demographics, and other exogenous factors (Denison et al., 2011).

Despite these challenges, studies indicate that better information regarding costs at all levels has potential to enable more effective use of limited funds (Brown, 2007)

THE SPECIAL CASE OF CHARTER SCHOOLS: MORE FLEXIBILITY AND AUTONOMY

Charter schools bear their name because they operate under contracts called charters, enjoying relative autonomy compared to their traditional counterparts although, from state to state, politics affect the degree of that autonomy in areas such as fiscal, curricular, etc. (Bulkley & Fisler, 2002). To obtain a charter, schools must submit an educational plan and strategy, setting forth the manner in which their specified learning outcomes will be achieved (Geske, Davis, & Hingle, 1997). If approved, the school is then legally independent, free from collective bargaining agreements, and more market-driven than traditional schools (Geske et al., 1997).

Typical charter exemptions from state and local regulators last for five years and then must be renewed (Finn, Manno, & Vaourek, 2001). At renewal, a charter school must demonstrate results to its granting authority, such as its state or local school board, in order to extend its charter exemption for an additional number of years (Finn et al., 2001). In essence, charter schools must comply with some district regulations and policies, but are nevertheless independent and autonomous entities from a legal and a fiscal standpoint, possessing substantial decision-making authority over who is hired and how money is spent compared to their traditional counterparts (Geske et al., 1997).

Policymakers believe charter schools' relative autonomy can contribute toward educational innovation, not only because of their flexibility, but also because of the pressures of the relatively market-driven environment in which they exist (Geske et al., 1997). Parents and students can "vote with their feet", choosing to attend or not to attend a particular charter school. Charter schools, therefore, face a competitive aspect not present in traditional schools, because charter schools need to attract students to survive (Gawlik, 2008).

Further substantiation of charters' relative autonomy can be found in Gawlik's (2008) investigation of charter school principals. Gawlik (2008) compared charter schools and traditional schools in a quantitative study utilizing a staffing survey, finding that the principals of charter schools do, in fact, possess more autonomy than their traditional school counterparts. Gawlik (2008) also noted that with that additional autonomy and empowerment also comes increased accountability.

A primary benefit of charter schools' flexibility is their ability to be innovative and tailor their programs to the specific needs of their students; any school has a unique set of student attributes and requirements, and the charter document provides a framework within which these specific needs can be addressed on a school-by-school basis (Caldwell, 2008). However, because governing bodies' policies differ with regard to the relative independence charter schools have, their resultant ability to innovate varies as well (Wohlstetter, Wenning, & Briggs, 1995). Variation in autonomy can also result from the organizational structure of the charter schools themselves (Torres, 2014). While some charter schools consist of a single school, there are also entities known as Charter Management Organizations (CMOs), consisting of multiple

schools under a single charter; these groups are perceived as being less flexible than the standalone schools, constricting their level of autonomy and, in turn, the amount of innovation teachers can achieve (Torres, 2014). In fact, teachers report feeling more autonomous in public charter schools that are standalone compared to those that are members of a larger franchise (Oberfield, 2016).

Regardless, charter schools are seen as one key element in school reform, and there are many arguments both in favor and against them as a vehicle for affecting change (Kelly, 1997). Charters are increasingly supported by academia and enjoy support of politicians as well, in part because of the relative flexibility they enjoy (Kelly, 1997).

It remains to be seen whether the charter school paradigm will be a linchpin in educational reform. Research on the effects of their decentralized governance structure is still inconclusive; they remain a viable possibility but the answer is unclear and questions remain regarding whether the charter independence is the panacea many claim it to be (Baker & Elmer, 2009).

ABC AND CHARTER SCHOOLS; IS THIS THE APPROPRIATE PATH?

Unlike the standard financial reporting categories presently utilized by schools, ABC recognizes that activities cause resource usage which, in turn, drives costs (Kinney & Raiborn, 2009). Unlike traditional K-12 schools, charter schools enjoy significant autonomy from a legal and fiscal standpoint, and possess substantial decision-making authority over who is hired and how money is spent (Geske et al., 1997). For example, charter schools can set their own compensation strategy, and are free to choose their own facilities. An intriguing question is, could ABC be a useful tool to help charter schools use their greater autonomy to improve student outcomes?

The big "black box" in the traditional educational financial reporting system is due to its conventional account groupings. As mentioned at the outset of this manuscript, the groupings that contain the majority of a typical school's expenditures are teacher and administrative salaries and benefits. These traditional groupings present a significant barrier to understanding resource use and, in turn, assessing efficiency (Narong, 2009). This means that an ABC analysis is really primarily about analyzing how teachers and administrators spend their time.

In previous work, one of the authors of this paper designed and piloted ABC at a charter school in Los Angeles (Author, 2011). Key school outputs were delineated, the processes leading to those outputs were determined, and activities (including teacher salaries) were assigned to the processes (Author, 2011). A summary-form description of this study's process and results follows.

(Note that the entire following section pertaining to the Los Angeles study charter school is sourced from the dissertation work of Author, 2011).

Activity Based Costing at a Los Angeles Charter School: The Methodology

There were six phases to this action research approach. The first step was to broadly define the school's outputs and the major processes leading to those outputs, and logical delineations for organizing the school's costs (e.g., cost pools to capture all costs such as teaching or administration costs). This was initially performed through interviews with the school's top administrators.

Next, the activities within the processes were detailed. This step entailed additional interviews with administrators and also teachers, and development of pilot time logs that a sample group of administrators and teachers completed, providing time summaries of activities included in their typical workweek. The initial process map, activities, and time logs were refined using the more detailed data from the teachers' and administrators' pilot time logs, and standard time logs to be completed by all teachers and administrators for a typical workweek were harmonized with the process maps and finalized. All administrators and teachers then completed a time log for a typical workweek, providing a clear view of where their time and efforts were spent. Average time consumption for teachers and administrators was developed from the time logs.

Then the school's total costs from the most recent financial reports were recategorized into the cost pools. For example, all teaching salaries and benefits were placed into a teaching cost pool, and administrative salaries and benefits were categorized into an administrative cost pool. School supplies and facilities costs were captured into secondary cost pools and then allocated to the primary cost pools for teaching, administration, and the school's library.

Totals from cost pools were then distributed to activities within each process in accordance with those activities' relative causation of the costs. For example, costs in the teaching cost pool were allocated in accordance with the teacher time logs, resulting in all costs contained in the teaching cost pool being assigned to an activity within one of the processes. The administration cost pool was distributed to activities in a similar manner. Once all of the primary cost pools were allocated to activities within the processes, the activities' costs were accumulated, according to the process maps, into total costs for each process output. This yielded a total cost for the student achievement process and other processes that could be broken down into the activities within those processes, permitting complete visibility of the contents and source of each activity's cost.

That final cost data was then presented to the school's top administrators for their assessment and potential redirection of existing school resources, with the goal of improving outputs. These steps are summarized below:

1. Initial interviews: Identify outputs, processes, and responsibility centers. Create rough-draft process map.
2. Expand interviews: Determine activities supporting processes and cost drivers; pilot time logs.
3. Finalize process map: Final determination of activities and processes in conformance with time logs.
4. Detailed data collection including activity time logs, review of traditional financial reports, and categorization of costs into cost pools.
5. Build Activity-Based Costing analysis: Distribute and accumulate activities and costs in to processes and outputs; sum to total cost for each process and output.
6. Debrief Activity-Based Costing budget and results with top school administrators; determine potential for improving school outputs.

A simplified example of the resulting Activity-Based Costing analysis is depicted in Figure 1 (Appendix). Costs are captured and collected into responsibility center cost pools and then allocated to activities within processes. Processes can then be summarized to their total costs, which agree to the school's total costs per its traditional financial report.

Activity Based Costing at a Los Angeles Charter School: The Results

The study school's cost pools and processes, including categorical contents of each cost pool, and the individual activities determined for, and included in, each process, are depicted in Figure 2 (Appendix).

Four primary cost pools were identified: Teaching, Administrative, Library, and Volunteers. Two secondary cost pools for supplies and facilities were also identified and costs for those allocated to the primary cost pools. (Facilities cost was allocated based on square footage, supplies based on managerial estimates.) Various applicable costs were captured in each cost pool; for example, teachers' and teacher assistants' time was captured in the teaching cost pool, administrator's time in the administrative cost pool.

Three processes were delineated: Student Achievement, Faculty Development, and Parent Engagement. The multiple activities determined to be a part of each process are shown inside the arrows within each as indicated in Figure 2 (Appendix). Teacher and administrator time was allocated to the activities within the three processes in accordance with the results of their time logs as indicated in Table 1 (Appendix).

As examples, 14.9 percent of costs in the Teaching Responsibility Cost Pool were allocated to the Lesson Planning Activity within the Student Achievement Process according to the relative amount of teacher time spent on that activity; 2.1 percent of the Teaching Responsibility Cost Pool and 9.2 percent of the Administrative Responsibility Cost Pool were allocated to the Special Education Activity in accordance with the relative amount of time spent on that activity; the Library Responsibility Cost Pool was deemed to be a stand-alone activity assigned in its entirety to the Student Achievement Process; the Volunteer Responsibility Cost Pool was allocated in accordance with volunteers' time logs.

In this manner, all costs from the four primary cost pools were allocated to their respective activities, arriving at total costs for each activity. Then, activities were summarized into total costs for each of the three processes. Because all school costs from the traditional financial reports were captured in one of the primary cost pools, the total costs of the three activities ultimately summed to the same total dollar amount as those traditional financial reports, plus the additional value ascribed to the school's volunteers. However, the costs were now organized in ABC format with complete visibility as to their source and cause.

The source of the costs for the three processes identified at this school are indicated in Table 2 (Appendix). For example, 80 percent of the Student Achievement Process costs originate from the Teaching Responsibility Cost Pool, 15 percent from the Administrative Responsibility Cost Pool, and 5 percent from the Library Responsibility Cost Pool.

Putting all of this together, the result (using sample numbers) is that school management could see clearly the total costs of its primary processes, and the source of those costs as indicated in Table 3 (Appendix).

For example, of the school's sample cost total $4,981,957, $3,731,847 was dedicated to student achievement. Of the total in student achievement, $2,976,867 originated from the teaching cost pool. And then the exact costs of the activities that made up the teaching cost pool (e.g., lesson planning of $535,816 or special ed of $76,498) were readily available. In sum, the school's financial report had been rebuilt in a fashion enabling its management to see with exceptional specificity how its available resources were being used.

Numerous supporting reports became available as well, and further isolation of any particular item's cost was possible. For example, this school's administrators were interested in

the relative cost of teaching traditional students versus special ed students. The numbers were available, and it was determined that a special needs per student cost was 48.1 percent higher than that of a non-special needs student.

When presented with a multitude of redesigned financial reports delineated by process, including per student costs of activities and more, the study school's management immediately launched into discussions of change initiatives aimed at operational improvement and reallocation of resources to increase efficiency. But given that this project was a standalone system developed (for free) as part of a dissertation, the ABC system and its benefits ended up being a one-off occurrence; the charter school did not have the resources to continue maintaining the ABC system and reporting structure.

PRESENT OBSERVATIONS FROM THE ABOVE STUDY

As stated previously, each charter school is unique in its purpose and mission, and also other attributes owing to its geographic location and resultant socio-economic environment (Author, 2011). So, despite their relative autonomy, costs of implementation and individual schools' unique attributes remain a barrier to widespread implementation of a complete ABC model – as well as the benefits to be derived from it – even at charter schools. The very flexibility afforded by the charter system is also a significant limitation preventing complete generalization of a one-size-fits-all ABC model (Author, 2011).

Although this model was specific to this charter school, requiring significant man-hours on the part of the doctoral student, the question arises, "Can a simpler model be built into a template format that would be more readily transferrable across schools? One alternative would be to capture only teacher and administrator salaries and benefits, and facilities, disregarding additional complexities (and relatively insignificant costs) that were assigned to volunteers, board members, and supplies in this analysis. Cost pools would contain salaries and facilities costs, and predetermined activities would be included in standardized processes, minimizing design and data collection specific to each school site as compared to the study school.

This simplified template could work for the majority of costs of most charter schools, providing vastly improved data for management with far less effort.

CONCLUSIONS

After this review of many published studies, analysis of many unique attempts to reform financial reporting, and multiple one-off attempts to connect expenditures to educational outcomes, the following conclusions seem evident:

1. How resources are spent does affect educational outcomes.

Despite somewhat mixed results, there is sufficient evidence that how resources are used in schools does affect student achievement.

2. Reforming financial reporting in traditional public schools is highly unlikely.

After more than thirty years of attempts to create more meaningful and widespread improvement of school financial information systems connected to student outcomes, reform remains elusive. No new construct or system has taken hold on a large scale. Problems are observed in identification of funding sources, lack of ability to conform to individual school needs, multiple stakeholders and resistance, and the opaque and complex connection between inputs and outcomes in education. At the same time, the vast majority of school costs are at the

school level, and those costs are predominantly comprised of teachers' and administrators' salaries. Finally, a number of the studies have connected dollars and teacher attributes to student achievement.

3. ABC is a powerful tool but not a fit for traditional public schools.

It appears evident that the obstacles to implementing and maintaining a full-blown ABC system render that option impracticable. This is because of the difficulty of identifying and assigning all costs in a school's cost structure, and the lack of control over significant costs at the traditional school level. There is also ample evidence that the differentiation across schools precludes an all-encompassing, uniform system at the national, state, or even district level.

4. ABC holds significant potential for charter schools that are small enough and flexible enough to employ ABC and act on the insights it generates.

Many times, one must look for elegance in simplicity, accept that which cannot be changed, and then look for maximum benefit considering what can be changed. Charter schools, including relatively localized and homogeneous CMOs, together with a focus on easily-captured school-level costs, present viable opportunity to implement an ABC-like system that can provide valuable insights for incremental improvement.

Because of the overwhelming portion of a school's budget consumed by teacher and administrator salaries, charter schools' independence from standard work rules, and the ability of charter schools to choose their facilities, the vast majority of charter schools' costs are controllable at the charter school level. The lack of comparable authority in a traditional school essentially blunts any meaningful decision-making at the local level for those entities, a level at which individual attributes are well-documented. Without the information tailored to the individual schools' situation and the authority at that level to act on the information obtained, there can be no result or benefit derived.

RECOMMENDATIONS

The now long and tangled history on trying to reform financial reporting methods in schools can be discouraging. But there are concrete steps researchers can take that can move the field forward. Here is a suggested research agenda:

1. Focus on the charter sector and develop a simplified ABC method that is customizable to individual schools and relatively small CMOs that takes analysis down to the grade level.

The charter sector is more amenable to innovative financial reporting and may even be a good setting for a simplified ABC system. Researchers and innovators should focus there. Logical next steps in developing ABC to improve school performance are to capture and report in relatively simple and straightforward terms the most significant school-level costs in a charter school setting, and then connect those costs to student performance as measured by existing test results, graduation rates, and other standard metrics. A simplified template version of the model developed at the Los Angeles charter school would be the first step to identifying the costs.

This methodology would not be overly burdensome and would lend itself to capturing any school's unique attributes, and allow for relatively accurate assignment of the vast majority of that school's costs without creation of a sophisticated standalone system or significant modification of existing systems. Periodic updates, perhaps rotating representative teachers for updating the time log of activities, could ensure the system remained substantially representative of reality at each school over time.

Although the simplified template for capturing and reporting costs above does not connect those costs to student results, it is a significant first step toward doing so – and provides relevant information for decision-making far more useful than the existing data schools possess. This usefulness was exhibited by the study school's administrators' jumping to decision-making upon seeing the case study output for their school.

As a next step, reporting inputs at grade level and student achievement from grade to grade might represent a subsequent relatively attainable goal. Although still lacking causation and not encompassing a small portion of a school's costs, output would be immensely more useful than the one existing line item of Certificated Salaries and Benefits. Over time, it is reasonable to assume patterns between certain inputs and outputs would be observed, and the charter school decision-maker would have the requisite authority to act on those observations. After all, management is an art. And good managers, with significant improvement in information, can be expected to exercise good sense and assimilate that information with other inputs they receive to effect change.

2. Once a common template is established, develop a method for tying costs to educational outcomes.

Once a common template for ABC analysis is established, a next step of linking costs to educational outcomes such as test score changes and graduation rates is possible. Particularly if a large population of charter schools employs a common ABC approach and common outcome measures, analysis of the relationship of costs and outcomes with some validity will become possible. Ultimately a sufficient body of evidence could be built to drive the development of real theoretical understanding of how to manage costs to drive student achievement.

FINAL THOUGHTS

Experience across many sectors of the economy, a small but important body of research, and simple logic say that how resources are allocated in education has to matter. As this research review shows, many progressive-thinking researchers have taken a stab at understanding and improving the system, but no widely accepted innovations have emerged. It is not time to abandon the effort. By focusing on the charter sector and building on previous pilot efforts, reform is possible.

APPENDIX

Figure 1: Simplified ABC Analysis Procedure

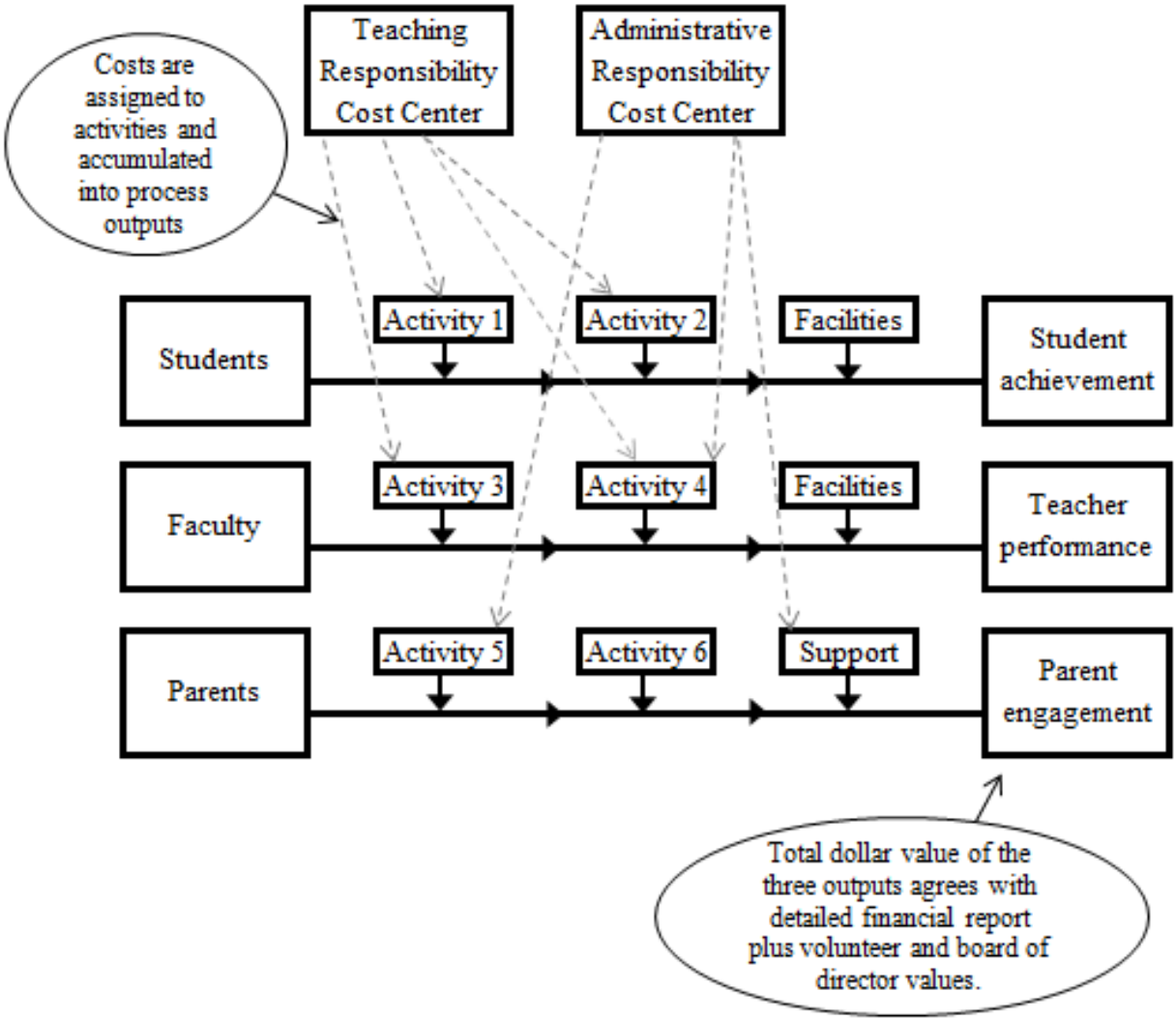

Figure 2: Map of Study School's Cost Pools, Activities, and Process Outputs

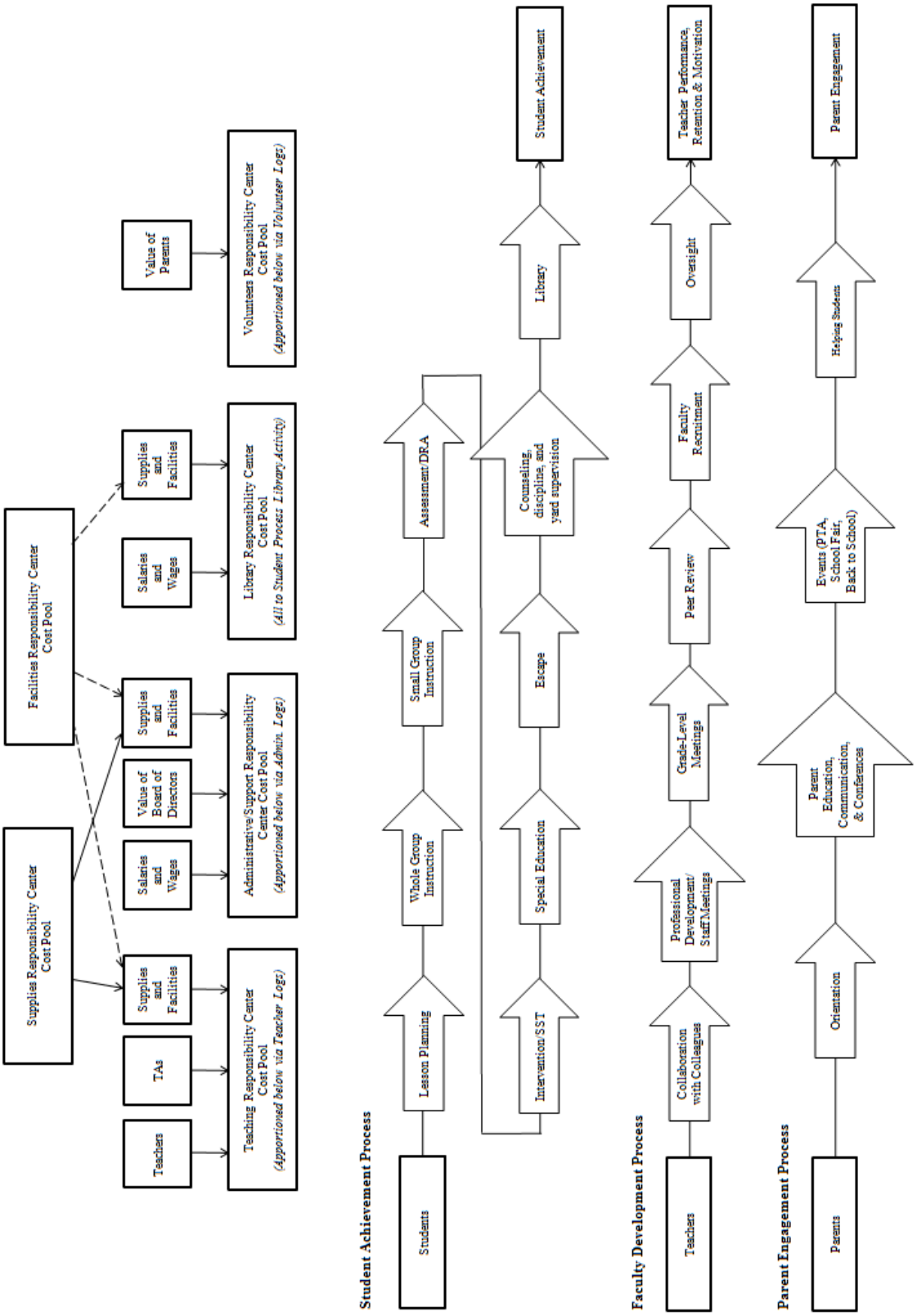

Table 1: Cost Distribution of Teacher and Administrative Cost Pools

Student Achievement Process	Teacher %	Admin %
Lesson planning	14.9%	8.2%
Whole group instruction	30.6%	7.6%
Small group instruction	19.5%	4.9%
Assessment/DRA	9.3%	1.6%
Intervention/SST	3.2%	9.2%
Special education	2.1%	9.2%
Escape	1.7%	
Counseling, discipline, & yard supervision	1.5%	8.3%
Total Student Achievement Process	**82.8%**	**48.9%**
Faculty Development Process		
Collarboration with colleagues	4.7%	9.4%
Prof. development/staff meetings	4.2%	7.6%
Grade-level meetings	2.9%	
Peer review	0.9%	
Faculty recruitment		2.9%
Oversight		8.4%
Total Faculty Development Process	**12.6%**	**28.2%**
Parent Engagement Process		
Orientation	0.1%	0.9%
Parent education, communication, & conf.	2.9%	10.8%
Events	1.4%	2.6%
Helping students		8.6%
Total Parent Engagement Process	**4.5%**	**22.8%**
Total	**100.0%**	**100.0%**

Table 2: Costs by Process

Student Achievement Process	Total
Teaching	80%
Administrative	15%
Library	5%
Volunteers	0%
Total	**100%**
Faculty Development Process	
Teaching	59%
Administrative	41%
Library	0%
Volunteers	0%
Total	**100%**
Parent Engagement Process	
Teaching	34%
Administrative	54%
Library	0%
Volunteers	13%
Total	**100%**

Table 3: ABC Cost Summary Report for Model Charter School

Student Achievement Process	From Teaching Cost Pool	From Administrative Cost Pool	From Library Cost Pool	From Volunteers Cost Pool	Process Totals
Lesson planning	535,816	91,932			627,749
Whole group instruction	1,098,708	85,379			1,184,087
Small group instruction	699,537	54,825			754,362
Assessment/DRA	335,666	18,502			354,167
Intervention/SST	115,449	102,993			218,442
Special Ed	76,498	102,993			179,492
Escape	59,850				59,850
Counseling, discipline, supervision	55,342	93,175			148,517
Library			205,182		205,182
Totals	2,976,867	549,799	205,182	-	**3,731,847**
Faculty Development Process					
Collaboration	168,238	105,617			273,855
Prof. devel., critical friends, staff mtgs.	149,515	84,944			234,458
Faculty recruitment		32,312			32,312
Grade-level teacher planning	103,221				103,221
Peer review	32,981				32,981
Oversight		94,468			94,468
Totals	453,954	317,341	-	-	**771,295**
Parent Engagement Process					
Orientation	5,279	9,591			14,870
Parent education, communication	105,792	121,267		4,646	231,706
Events	51,472	29,230		15,460	96,162
Escape				3,271	3,271
Helping students		96,143		36,663	132,806
Totals	162,543	256,231	-	60,040	**478,815**
Totals	3,593,364	1,123,371	205,182	60,040	**4,981,957**

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