6. Toward Cost and Quality Models for California’s Public Schools

by Jon Sonstelie

Summary

This essay introduces two basic conceptual tools that the state legislature could use to determine the state’s education budget. The first tool is a cost model, which lists the resources employed by a representative school, the unit cost of these resources, and thus the total cost for that school. By specifying, quantifying, and pricing these inputs, the cost model can help policymakers translate general policy goals into adequate facilities and programs.

This cost model can be applied in various ways, four of which are considered in this essay. Two applications involve teacher salaries, which are by far the largest school budget item. The first application examines the effect of regional differences in teacher salaries on school costs. The model indicates that costs per pupil range from $4,616 per year in the Sacramento area to $4,920 in Orange County. This significant difference may understate the salary necessary to attract equivalent teachers across regions.

The second application examines the effect of teacher experience and education on total school costs. Because teachers’ salaries are linked to experience and education, they are key factors in school cost differences. Districts with the most experienced and most educated teachers pay about 8 percent more in total costs than districts with the least experienced and least educated teachers. Again, this figure does not represent the extra cost of recruiting a more experienced or more educated teaching staff.
The cost model can also be used to estimate the cost of reducing California’s class sizes. Reducing the pupil-teacher ratio by 10 percent, for example, would add three teachers and three classrooms to a representative elementary school. This expansion, in turn, would increase current costs by 5 percent and capital costs by about 8 percent.

The fourth application concerns the additional cost of educating economically disadvantaged students. The empirical evidence indicates that these students are far more likely than other children to need extra resources to achieve minimum outcomes. For illustrative purposes, the report considers the cost of implementing Success For All (SFA), a reputable nationwide reading program, at a representative elementary school. Using SFA benchmarks, the model estimates an additional cost of $420,000 per year, or about $700 per pupil.

The second conceptual tool introduced in this essay is a quality model, which sets forth the best bundle of resources for a school given its unit costs and its total budget. Perhaps the best example of this tool is Oregon’s Quality Education Model, which was completed by the state’s legislative council in 1999. The council specified the resources for prototypical elementary, middle, and high schools and declared that Oregon schools with these resources could attain the state’s academic standards. Oregon’s Quality Education Model promises to provide the state’s legislature a yardstick against which it can measure the adequacy of its education budget.

For purposes of illustration, the essay calculates the extra cost of implementing Oregon’s quality model at a typical California elementary school. That cost is about $1,200 per pupil, or the amount by which current per pupil spending in California fell below spending in states such as Maryland, Michigan, Massachusetts, and Pennsylvania in 1996–1997.

The final section of the essay describes two steps that California could take toward developing cost and quality models. The first step is to develop better cost information through case studies of individual schools. The second step is to initiate a pilot quality model. For that purpose, a group of principals would be asked to describe how they would allocate a hypothetical school’s budget. Each would be presented with a variety of budget scenarios—$4,000 per student, $5,000 per
student, and so on. Their responses would be aggregated to yield a pilot model, giving the state the opportunity to assess the feasibility of constructing a quality model on a larger scale.

Introduction

When it comes to the state’s education budget, the state legislature faces a formidable task. Each year it allocates more than $30 billion to California public schools, money that then flows through various channels, ultimately reaching destinations as diverse as the 50-student Klamath River Elementary in Siskiyou County and the 1,500-student 49th Street Elementary in South Central Los Angeles. Although the channels may be murky in stretches, the flow from Sacramento is vital to the intellectual growth of children in Siskiyou County, South Central Los Angeles, and everywhere else in the state.

The complexity of this system makes budget decisions difficult. This essay introduces two tools that would assist the legislature in making those decisions and in articulating clear goals for school finance. The first is a cost model, which is a spreadsheet listing quantities of various resources employed at a school, costs per unit of these resources, and thus the total cost of the school as a function of its resources and unit costs. The advantage of such a model is that it places all resources on the table at once so that lower class sizes can be weighed against more computers, more counselors against better libraries, and so on. To illustrate the benefits of this approach, the first section of this essay outlines a cost model for a representative California elementary school using 1997–1998 data.

The second section of the essay demonstrates some uses of a cost model. One such use is to estimate the cost of policies that change school resources. As a simple example, the model is used to estimate the cost of lowering the average pupil-teacher ratio in California by 10 percent. Another use of the model is to estimate cost differences across school districts. As Chapter 5 shows, teachers’ salaries vary across regions of the state, and these variations affect school costs. They also raise the question of whether state aid should be allocated to offset these cost differences. To indicate the magnitude of these differences, the model estimates what a school with a given bundle of resources would cost in
different regions of the state. As these and other examples illustrate, a
cost model is a flexible tool that can be applied to many policy questions.
The second tool that would assist the legislature is a quality model.
A quality model sets forth the best allocation of resources for a given total
budget. For example, if an elementary school of 500 students had a
budget of $5,000 per student, how many teachers should it hire, how
many aides, how many secretaries, and so on? What is the best school
that could be assembled for a cost of $5,000 per student? What is the
best school for $6,000? A cost model is an important part of a quality
model because it indicates whether a school can afford any bundle of
resources, given its budget. A quality model goes one step further by
asking which of the many affordable bundles is best for the school.
Because we have an imperfect understanding of the relationship
between school resources and student outcomes, and because we judge
schools along many different dimensions, there is no universal answer to
the question of how best to allocate a school’s budget. As Oregon has
demonstrated, however, it is possible for knowledgeable people to reach a
reasonable consensus on that answer. Once that consensus is reached,
the legislature has an important reference point in deciding on the state’s
education budget. It also has a clearer idea about how school revenue is
likely to be spent and how the state might balance the costs and benefits
of this spending. The third section of this essay illustrates the usefulness
of a quality model by comparing the resources in Oregon’s Quality
Education Model with the resources of California schools in 1997–1998.
We do not yet have enough information about certain costs to
develop reliable models, and the ones presented here are best regarded as
outlines of what cost and quality models should include and how they
could be used. This reservation notwithstanding, these outlines clearly
demonstrate the utility of such models. In particular, California would
do well to follow Oregon’s lead by developing its own quality model.
The concluding section describes initial steps that California could take
toward that goal.

A Cost Model for California Public Schools
Building a cost model is a two-step process. The first step is to
define the appropriate resource categories and units of measurement. For
example, one resource category is classroom teachers, and the measure for that category is FTEs. The second step is to calculate a unit cost for each resource category. In the case of classroom teachers, the unit cost is the average salary of a teacher plus the cost to the district of the teacher’s health, retirement, and other benefits. The following section uses 1997–1998 data to outline a cost model for a representative California elementary school.

**Resource Categories and Unit Costs**

Most of a school’s budget is allocated to the salary and benefits of its employees. California school districts report detailed data on personnel employed in each school. The data on certified personnel come from the Professional Assignment Information Form of the California Basic Education Data System (CBEDS), and the data on classified personnel comes from the School Information Form of CBEDS. I aggregated the personnel categories from these data sources into seven resource categories for the cost model. The first is teachers engaged in the school’s general education program. This category includes general classroom teachers as well as music and art teachers. The second category is teachers engaged in a school’s special education program, including teachers in full-day classes for special education students, and specialists, such as speech therapists. The third category is paraprofessionals, who are mainly instructional aides in both general and special education programs. The fourth category is clerical support, which consists primarily of clerical workers in the main school office. The fifth category, instructional support, includes specialists who supervise instruction and develop curriculum. It also includes librarians and media technicians. The sixth category is pupil support, including school nurses, guidance counselors, and psychologists. The last category is school leadership, which includes the principal and vice principals. Resources in each of these seven categories are measured by FTE.

In Chapter 5, Rueben and Herr provide the data necessary to estimate the unit cost for teachers in 1997–1998. Their report gives the average salary schedule for teachers in California in that year as well as the average distribution of teachers across the education-experience categories of that schedule. Combining the two yields an average salary
for the state, which was $43,085. The report also estimates the average cost of various insurance benefits to be $4,455 per teacher. District-level accounting data indicate that other benefits to teachers, such as retirement contributions and workers’ compensation, averaged 12.19 percent of salary. Using these benefit assumptions, the unit cost of a teacher in 1997–1998 was $52,792. This estimate does not reflect significant increases in teachers’ salaries over the last two years. The appendix to this essay describes unit cost calculations for other personnel categories.

Schools also use a number of other important resources such as books, utilities, and janitorial services. In a number of these areas, we have data on expenditures at the district level but few measures of resources or unit costs at the school level. As a consequence, I employed a provisional approach. Using California Department of Education data from “The Average Costs of a California School, 1997–98” (hereafter called Average Cost), I classified expenditures into five categories, calculated per pupil expenditures in these categories, and then used this calculation as a measure of unit cost and students as a measure of quantity. For example, Average Cost assumes a school with 700 students and reports a cost of $383,000 for building operations and maintenance, which is a per pupil cost of $547. The cost model therefore assumes a unit cost of $547 for building operations and maintenance, which is then multiplied by the number of students to yield the total cost of the resource category. Through these resource and cost assumptions, district-level expenditures are essentially prorated to schools in proportion to enrollment.

I have used this provisional approach for five resource categories. The categories follow those in Average Cost, except that I have excluded the cost of food service in school cafeterias, the cost of county oversight, and the cost of the California Department of Education. The first category is pay for substitute teachers and teachers employed in extracurricular activities, such as coaching. The second category, supplies

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1Krop, Carroll, and Anderson (1999) also break educational spending into categories.

2I am indebted to Maria Fong for details about Average Cost.
and expenses, includes the cost of books, paper, and pencils, as well as projectors, laboratory equipment, and computers. Also included in this category are office equipment, supplies, and various contracted educational services. The third category, operations and maintenance, includes salaries and benefits for custodians, the cost of utilities, and various supplies necessary to maintain the school building. The fourth category, student transportation, includes the salaries and benefits of bus drivers and mechanics and the fuel and other expenses necessary to transport students to and from school. Finally, district administration includes the salary and benefits of the district superintendent and central administration staff and the cost of central office equipment and supplies.

A school’s resources also include its building and site. Using data on school construction projects from July 1996 to July 2000, I estimated the cost of a new elementary school, breaking total cost into two components. The first is the cost of acquiring the site and constructing the core facilities, which are administrative office space, a library, a kitchen or cafeteria, and a multi-purpose room. This cost does not vary with the number of classrooms in the building. The second component is a cost per classroom.

These costs are one-time capital outlays and thus not directly comparable to the current costs in the model, which are expressed in annual terms. To compare capital and current costs, I express capital costs in annual terms, which is the annual interest payment on a long-term loan large enough to finance a one-time cost. The result is an annualized fixed cost of $150,913 for the site and core facilities and an annual variable cost of $13,247 per classroom. The appendix to this essay describes these calculations in detail.

**Benchmarking the Model**

Cost models are frequently used to estimate the cost of changing school resources from the status quo. Because there are more than 4,000 elementary schools in California, each with its own allocation of resources, describing the status quo can be difficult. I simplify matters by focusing on a representative elementary school. Most elementary schools
are either K–5 (2,221 schools in 1997–1998) or K–6 (1,966 schools in 1997–1998). The average enrollment among those schools is 634 students. The representative elementary school is therefore assumed to be kindergarten to grade 5 with an enrollment of 634 students. The personnel employed in this school are averages for California K–5 and K–6 schools in 1997–1998. These averages are constructed using data from the Professional Assignment Information Form and the School Information Form of CBEDS.

Table 6.1 pulls together resource measures and unit costs to form a cost model. The rows of the table correspond to the resource categories. For each category, the second column gives the quantity of the resource, the third column gives the unit cost, and the fourth column gives the total cost of the resource category, which is the product of the second and third columns. For each school, costs are separated into current costs, such as teacher pay and benefits, and capital costs, which are the annualized costs of the school site and building. The fifth column expresses the total cost of each current resource as a percentage of total current cost and the total cost of each capital resource as a percentage of total capital cost.

Current costs amount to $4,881 per student. About half of those costs are the salaries and benefits of general and special education teachers. Annual capital costs amount to $844 per student, 70 percent of which is for classrooms.

The school portrayed in Table 6.1 reflects average conditions, and individual school costs may differ substantially from these averages. For example, school districts in rural areas face different conditions and are likely to have different costs.

Four Applications

To demonstrate the utility of the cost model, I apply it to four policy questions. Because of the provisional nature of the model, these applications should be regarded as illustrations rather than definitive results.
Table 6.1

<table>
<thead>
<tr>
<th>Current costs</th>
<th>Unit of Measure</th>
<th>Units</th>
<th>Cost per Unit, $</th>
<th>Resource Cost, $</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General education teachers</td>
<td>FTE</td>
<td>27.33</td>
<td>52,792</td>
<td>1,442,805</td>
<td>46.6</td>
</tr>
<tr>
<td>Special education teachers</td>
<td>FTE</td>
<td>1.13</td>
<td>52,792</td>
<td>59,655</td>
<td>1.9</td>
</tr>
<tr>
<td>Paraprofessionals</td>
<td>FTE</td>
<td>6.81</td>
<td>25,694</td>
<td>174,976</td>
<td>5.7</td>
</tr>
<tr>
<td>Clerical support</td>
<td>FTE</td>
<td>2.38</td>
<td>45,338</td>
<td>107,904</td>
<td>3.5</td>
</tr>
<tr>
<td>Instructional support</td>
<td>FTE</td>
<td>0.65</td>
<td>64,091</td>
<td>41,659</td>
<td>1.3</td>
</tr>
<tr>
<td>Pupil support</td>
<td>FTE</td>
<td>0.18</td>
<td>66,250</td>
<td>11,925</td>
<td>0.4</td>
</tr>
<tr>
<td>School leadership</td>
<td>FTE</td>
<td>1.32</td>
<td>90,069</td>
<td>118,891</td>
<td>3.8</td>
</tr>
<tr>
<td>Substitute and extracurricular pay</td>
<td>Students</td>
<td>634</td>
<td>257</td>
<td>162,938</td>
<td>5.3</td>
</tr>
<tr>
<td>Supplies and other expenses</td>
<td>Students</td>
<td>634</td>
<td>526</td>
<td>333,303</td>
<td>10.8</td>
</tr>
<tr>
<td>Operations and maintenance</td>
<td>Students</td>
<td>634</td>
<td>547</td>
<td>346,889</td>
<td>11.2</td>
</tr>
<tr>
<td>Student transportation</td>
<td>Students</td>
<td>634</td>
<td>159</td>
<td>100,534</td>
<td>3.3</td>
</tr>
<tr>
<td>District administration</td>
<td>Students</td>
<td>634</td>
<td>304</td>
<td>192,917</td>
<td>6.2</td>
</tr>
<tr>
<td>Total current cost</td>
<td></td>
<td></td>
<td></td>
<td>3,094,397</td>
<td>100.0</td>
</tr>
<tr>
<td>Current cost per student</td>
<td></td>
<td></td>
<td></td>
<td>4,881</td>
<td></td>
</tr>
<tr>
<td>Capital costs (annualized)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site and core facilities</td>
<td>Schools</td>
<td>1</td>
<td>150,913</td>
<td>150,913</td>
<td>28.2</td>
</tr>
<tr>
<td>Variable facilities</td>
<td>Classrooms</td>
<td>29</td>
<td>13,247</td>
<td>384,166</td>
<td>71.8</td>
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<tr>
<td>Total capital cost</td>
<td></td>
<td></td>
<td></td>
<td>535,079</td>
<td>100.0</td>
</tr>
<tr>
<td>Capital cost per student</td>
<td></td>
<td></td>
<td></td>
<td>844</td>
<td></td>
</tr>
</tbody>
</table>

Regional Cost Differences

Because labor market conditions, amenities, and housing prices differ across regions of the state, teachers’ salaries may also differ, implying regional differences in the cost of educating students. To explore the significance of these regional differences, I first calculated a unit cost of teachers for each region. Using data from Rueben and Herr (Chapter 5), I estimated an average salary schedule for each of 11 regions in the state and then used those schedules to determine an average salary for each region, assuming that each region had the same distribution of teacher education and experience as the state as a whole. Finally, I combined those average salaries with average benefit costs for each region to derive a
Table 6.2
Regional Differences in Current Cost per Pupil, 1997–1998,
Representative California Elementary School,
Grades K–5: 634 Students

<table>
<thead>
<tr>
<th>Regions</th>
<th>Teachers’ Salary and Benefits</th>
<th>Current Cost per Pupil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average, $</td>
<td>% of Los Angeles County</td>
</tr>
<tr>
<td>Northern California</td>
<td>48,724</td>
<td>91.5</td>
</tr>
<tr>
<td>Sacramento Area</td>
<td>48,568</td>
<td>91.2</td>
</tr>
<tr>
<td>San Francisco Bay Area</td>
<td>52,325</td>
<td>98.3</td>
</tr>
<tr>
<td>North Central Valley</td>
<td>51,261</td>
<td>96.3</td>
</tr>
<tr>
<td>South Central Valley</td>
<td>52,065</td>
<td>97.8</td>
</tr>
<tr>
<td>Central Coast</td>
<td>50,979</td>
<td>95.8</td>
</tr>
<tr>
<td>South Coast</td>
<td>53,574</td>
<td>100.7</td>
</tr>
<tr>
<td>Los Angeles County</td>
<td>53,227</td>
<td>100.0</td>
</tr>
<tr>
<td>Orange County</td>
<td>55,896</td>
<td>105.0</td>
</tr>
<tr>
<td>San Bernardino/Riverside</td>
<td>54,333</td>
<td>102.1</td>
</tr>
<tr>
<td>San Diego/Imperial</td>
<td>52,593</td>
<td>98.8</td>
</tr>
</tbody>
</table>

NOTE: See Table 5.13 for a list of counties within each region.

unit cost. These unit costs are presented in the first column of Table 6.2. The second column expresses those regional averages as percentages of the unit cost in Los Angeles County. Note that the difference between the lowest and highest regional average is nearly 14 percent.

To determine the effects of those differences on school costs, I calculated the current cost of the representative elementary school, using the unit costs for each region. The costs are displayed in the third column. The fourth column expresses those averages as percentages of the average for Los Angeles County.

Current cost per pupil varies considerably across regions. Orange County has the highest cost, about 2 percent above Los Angeles County. The Sacramento area has the lowest cost, which is about 4 percent below Los Angeles. The variance in cost per pupil is about half the variance in teacher salaries because teacher salaries are about half of current cost per pupil.

On the basis of these estimates, it is tempting to conclude that regional differences in costs are not significant. That conclusion is
premature for two reasons. First, other costs may also vary across regions in a manner similar to teacher salaries. Second, the average teacher salary in each region does not necessarily represent the salary necessary to attract equivalent teachers across regions. The salary in Orange County may be nearly 20 percent higher than in Northern California; but given differences in housing prices, that difference in salary may not be large enough to attract the same quality of teachers to schools in Orange County as are attracted to schools in Northern California. In fact, Rueben and Herr, in Chapter 5, show that the difference in teaching salaries between Orange County and Northern California is less than that among comparable workers in the private sector, indicating that the cost of teacher quality in Orange County is probably understated by the average wage of teachers.

**The Cost of Teacher Experience and Education**

Although regional variation in teacher salaries is significant, Rueben and Herr, in Chapter 5, show that variation in teacher education and experience may be a more important source of cost differences across schools. The difference in average teacher salary between Orange County and Northern California may be 20 percent, but the difference between the lowest and highest salary categories is 80 percent. A district that is growing rapidly will have many new, inexperienced teachers and thus lower costs than one that has little growth or turnover in its teaching staff.

To determine the potential importance of this factor, I calculated the average teacher salary for every district, assuming that each had the same salary schedule. Then, the only difference in average salary is due to the education and experience of the district’s teachers. Of the 839 districts for which we have salary data from 1997–1998, 10 percent had an average salary below $36,545, and 10 percent above $43,857. The difference between these two limits is about 20 percent. Because teacher salaries and benefits are roughly 40 percent of total cost, this difference in salary implies about an 8 percent difference in total current cost.

These salary differences reflect differences in costs across districts resulting from differences in the compositions of their teaching staff. They do not represent the cost to any one district of recruiting a more
experienced or more educated staff. Recruiting such a staff would entail higher costs, even given the same salary schedule, but it may also require a higher salary schedule.

**The Cost of Lowering California’s Pupil-Teacher Ratio**

Since the mid-1970s, California has fallen below other states in spending per pupil. Teacher salaries have not declined relative to other states, however, implying that the trend in spending per pupil has been translated directly into a relative increase in the pupil-teacher ratio in California. In 1996–1997, the ratio in California was more than 30 percent higher than that in the rest of the country.3

What would it cost California to reduce its pupil-teacher ratio by 10 percent? For the representative school, a lower pupil-teacher ratio implies more teachers and thus more classrooms. To reduce the pupil-teacher ratio by 10 percent, the school would have to add three teachers and three classrooms. Using the unit cost assumptions in Table 6.1, these additional resources would increase current costs by about 5 percent and capital costs by about 8 percent.

**The Additional Cost of Educating Disadvantaged Students**

Many studies have documented the positive correlation between socioeconomic status and student achievement. On average, the children of well educated and economically successful parents achieve more than their counterparts from less-advantaged families. Betts, Rueben and Danenberg (2000) confirm this relationship for California school children. Their report partitions schools into five groups according to the percentage of students in each school receiving free or reduced-price lunches. For elementary schools, the first group comprises schools in which at least 85 percent of students are receiving free or reduced-price lunches. In the fifth group, schools have less than 20 percent of students in that category. For schools in the first group, less than 25 percent of students score above national medians in math and reading tests. For schools in the fifth group, more than 70 percent score above the national median.

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3For more information and analysis, see Sonstie, Brunner, and Ardon (2000).
For the purposes of this essay, it is best to express these results somewhat differently. If we were to compare two schools with identical resources but students of different socioeconomics backgrounds, the school with less advantaged students, call it A, would have lower test scores, higher dropout rates, and generally lower student achievement than the other school, call it B. In concept, then, school A would need more resources to increase achievement to the level of school B. Those additional resources are the extra costs of educating disadvantaged students.

Although this definition may be clear in concept, it is notoriously difficult to implement in practice. The main difficulty is that we lack reliable estimates of the relationship between school inputs and student outcomes, estimates that could tell us what resources would be necessary to move achievement in school A to that of school B. In the absence of such estimates, how do we proceed? One approach is to look at the cost of programs specifically aimed at increasing achievement among disadvantaged students. One such program is Success For All (SFA), a reading program directed at disadvantaged students from kindergarten through grade 5. Based on research by Robert Slavin and Nancy Madden at Johns Hopkins University, the program began at a Baltimore elementary school in 1987 and has expanded rapidly since then. In 1999–2000, more than 1,500 schools in 48 states had adopted SFA. In California, 23 of the 51 elementary schools in the Comprehensive School Reform Demonstration Project have selected SFA as their reform model. In its review of school reform models, the American Institutes for Research found that SFA was the only elementary school reform program for which there was “strong” evidence of positive effects on student achievement.4

The core of the program is 90 uninterrupted minutes of reading instruction each day. Students are grouped across classes according to their reading level and evaluated every eight weeks. Students who fall behind are given intensive one-on-one tutoring by a reading specialist. A facilitator provides curriculum support to teachers, organizes and interprets the eight-week assessments, and regroups students according to

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4Pogrow (2000) holds a contrary view.
their reading ability. The program also creates a Family Support Team to involve parents in the program, to monitor attendance, and to address the needs of students encountering difficulties outside of school that may be interfering with their education.

The primary cost of the program is the additional personnel it requires. The facilitator is an experienced teacher with expertise in reading. In terms of the cost model in Table 6.1, the facilitator is one instructional support FTE at the unit cost of $64,091. The reading tutors are teachers. At any one time, about 30 percent of first-graders, about 20 percent of second-graders, and about 10 percent of third-graders need tutoring. For the representative school of 634 students, about 65 students would need one-on-one tutoring at any one time, a need that would require five teachers. At the unit cost of $52,792 per teacher, tutoring would cost $263,960. The Family Support Team would consist of two half-time paraprofessionals and one full-time coordinator. One paraprofessional would act as an attendance clerk, calling parents when students were tardy. A second paraprofessional would act as a parent liaison, visiting parents in their homes to involve them in the school’s program. The coordinator would supervise these activities and focus on problem cases where extensive intervention may be required. In certain cases, this could mean calling on social service agencies in the community to assist children experiencing difficult situations outside the school. The attendance clerk and the parent liaison are both half-time paraprofessionals, with a unit cost of $25,694. The coordinator is a pupil support FTE with a unit cost of $66,250. The sum of these costs is $419,995, for a per pupil cost of approximately $700 per pupil. The Success For All program also involves ongoing costs for training and materials, which amount to about $25,000 per year.

Under the New American Schools initiative, Success For All has been expanded to encompass math, science, and other subjects under the rubric Roots and Wings. Other programs also address the concerns of struggling schools, and Odden (2000) has distilled many of the common elements of these programs. I have focused on Success For All not to suggest that it is the only worthwhile approach, but rather to illustrate

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5I am indebted to Adam Berman for details about Success For All.
how a specific program might be used to approximate the cost of educating disadvantaged students. According to the SFA benchmark, the cost of educating disadvantaged students is roughly 15 percent higher than that of other students. Other programs would surely result in other estimates.

**From Cost Models to Quality Models**

In addition to providing a common framework for addressing policy questions, a cost model provides the cornerstone for a quality model, which sets forth the best allocation of resources for any given budget. Maine, Oregon, and Wyoming have recently developed their own quality models. In this section, I focus on Oregon’s model as an example of a general approach that California might employ and adapt to its unique circumstances.

**Oregon’s Quality Education Model**

Oregon’s history of school finance has much in common with California’s. In 1990, Oregonians passed Measure 5, which, like California’s Proposition 13, limited the property tax rate. As a result, the state now provides 70 percent of the funding for most school districts. In 1991, the Oregon legislature also equalized spending per pupil across the state’s school districts, much as the California legislature equalized school spending following *Serrano v. Priest* and Proposition 13.

With its important new role in school finance, the legislature appointed a legislative council to develop the Oregon Quality Education Model. As described in the council’s report, its goal was to “determine the components of a complete, quality education designed to meet Oregon’s high academic standards,” and to “develop a model to determine the costs of those components.” In the council’s words, the key question was “What is a quality education and what does it cost?”

The council consisted of 22 members, including five legislators, four superintendents or principals, and five business people. It was appointed in 1997 and issued its report in 1999.

The council carefully considered Oregon’s educational standards and how to achieve them. In the end, it addressed its key question through three prototype schools: an elementary school, a middle school, and a
high school. It described those three schools in great detail: enrollments, student characteristics, teacher experience, hours of homework per week, students per computer, attendance rates, dropout rates, and the number of serious discipline problems each year. It then listed the resources to be employed in each school.

The resource list is a spreadsheet as laid out in Table 6.1. It is much more detailed than that spreadsheet, however. For example, the elementary prototype specifies separate elements for computer hardware, computer software, texts, and other classroom materials.

**Oregon’s Model at California Costs**

Although they are neighbors, Oregon and California are decidedly different in many respects. For purposes of illustration, however, it may be useful to ask how Oregon’s quality model would translate into California terms. In particular, how much would the Oregon prototype elementary cost if it were implemented in California?

Because the Oregon prototype is so detailed, its costs can be collapsed into the more aggregate categories of the California representative school. The prototype has a smaller enrollment than the California school, however, making direct comparisons difficult. Enrollment is 340 students for Oregon’s prototypical elementary school versus 634 for its California counterpart. To compare resources across the two sizes, I scaled up the Oregon prototypes to the same size as the California school. For each resource category, I calculated either FTE or expenditure per student for the Oregon prototype and then multiplied these ratios by enrollment in the California school to yield a California-sized school with Oregon-type resources.

Table 6.3 compares this scaled-up Oregon prototype with the representative California school. For personnel categories, the second and third columns list the FTE in the two schools. As an example, for general education teachers, the Oregon prototype has 39.16 FTE as opposed to 27.33 FTE for the California school, a difference of 11.83 FTE. The fifth column lists the unit cost of teachers in California, and the sixth is the product of the FTE difference and this unit cost. Thus, at California unit costs, the additional expense of hiring 11.83 more
Table 6.3  

<table>
<thead>
<tr>
<th>Unit of Measure</th>
<th>Units Oregon</th>
<th>Units California</th>
<th>Cost per Unit, $</th>
<th>Difference in Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>General education teachers</td>
<td>FTE 39.16</td>
<td>FTE 27.33</td>
<td>52,792</td>
<td>624,520</td>
</tr>
<tr>
<td>Special education teachers</td>
<td>FTE 2.80</td>
<td>FTE 1.13</td>
<td>52,792</td>
<td>88,163</td>
</tr>
<tr>
<td>Paraprofessionals</td>
<td>FTE 9.32</td>
<td>FTE 6.81</td>
<td>25,694</td>
<td>64,492</td>
</tr>
<tr>
<td>Clerical support</td>
<td>FTE 1.86</td>
<td>FTE 2.38</td>
<td>45,338</td>
<td>–23,576</td>
</tr>
<tr>
<td>Instructional support</td>
<td>FTE 0.93</td>
<td>FTE 0.65</td>
<td>64,091</td>
<td>17,945</td>
</tr>
<tr>
<td>Pupil support</td>
<td>FTE 0.00</td>
<td>FTE 0.18</td>
<td>66,250</td>
<td>–11,925</td>
</tr>
<tr>
<td>School leadership</td>
<td>FTE 1.86</td>
<td>FTE 1.32</td>
<td>90,069</td>
<td>48,637</td>
</tr>
<tr>
<td>Substitute and extracurricular pay</td>
<td>Students 634</td>
<td>Students 634</td>
<td>257</td>
<td></td>
</tr>
<tr>
<td>Supplies and other expenses</td>
<td>Students 634</td>
<td>Students 634</td>
<td>666</td>
<td>88,760</td>
</tr>
<tr>
<td>Operations and maintenance</td>
<td>Students 634</td>
<td>Students 634</td>
<td>350</td>
<td>–124,898</td>
</tr>
<tr>
<td>Student transportation</td>
<td>Students 634</td>
<td>Students 634</td>
<td>241</td>
<td>51,988</td>
</tr>
<tr>
<td>District administration</td>
<td>Students 634</td>
<td>Students 634</td>
<td>208</td>
<td>–60,864</td>
</tr>
<tr>
<td>Total difference in current cost</td>
<td>Students 634</td>
<td>Students 634</td>
<td>304</td>
<td>763,251</td>
</tr>
<tr>
<td>Difference per pupil</td>
<td></td>
<td></td>
<td></td>
<td>1,204</td>
</tr>
</tbody>
</table>

*aThe Oregon prototype does not include substitute pay.

general education teachers is $624,467. This is the cost at California prices of achieving the Oregon standard in this resource category.

The calculations are different for the resource categories based on prorated expenditures. For those five categories, the fourth and fifth columns list expenditures per student for the Oregon prototype and the representative California school. For example, in the last row, district administration, cost per student in the Oregon prototype is $208, compared to $304 for the California school. That is, the Oregon prototype allocates $96 per student less for district administration than the California school. Multiplied by 634 students, this difference
becomes $60,864, the amount in the sixth column. That is, the Oregon prototype allocates about $60,000 less for district administration than was spent in 1997–1998 by the typical California school.

For the prorated costs, there are differences in individual categories but little difference overall. The Oregon prototype allocates $140 more per student for supplies and $82 more per student for transportation. On the other hand, the California school spent $197 more per student for maintenance and $96 more per student for district administration. The fifth category, substitute and extracurricular pay, is not comparable between the two schools because the Oregon prototype does not include that expense. As a consequence, Table 6.3 does not include a cost difference for that category.

The sum of these cost differences equals about $1,200 per pupil, or the amount by which current per pupil spending in California in 1996–1997 fell below spending in states such as Maryland, Michigan, Massachusetts, and Pennsylvania (NCES, 2000). This gap is much smaller than that between California and such states as Connecticut, New Jersey, and New York.

Reflections on Oregon’s Model

Oregon’s Quality Education Model is a considerable achievement. In actuality, it is more than a quality model, which sets forth the best bundle of resources for any given total budget. Oregon took the additional step of determining the optimal budget for its schools.

To take this step, Oregon’s legislative council had to weigh the benefits of school spending against the cost to taxpayers, a judgment that is more appropriate for the legislature. The Oregon legislature sought to avoid this issue through its definition of the council’s mission. It instructed the council to identify the elements of a school adequate to meet the state’s education standards and then to determine the cost of those elements. As Heather Rose pointed out in Chapter 3, this approach poses a major difficulty. Without a better understanding of the link between school resources and student outcomes, it is difficult to know with any precision what resources are adequate to achieve any particular outcome. To pretend otherwise may be promising too much and thus undermining the model’s ultimate credibility.
Given this state of affairs, it may be best to stop with a quality model. A quality model gives the legislature a menu of options. It tells the legislature what resources schools are likely to choose with any given budget. The menu can be supplemented with expert judgment on the likelihood of students achieving state standards with any given budget. If supplied with these options and this expert judgment, the legislature could make a more informed decision about the education budget.

First Steps for California

The cost and quality models outlined in this essay have a number of advantages. A cost model provides a common framework for analyzing a variety of school finance policies. It puts all school resources on the table at once, clarifying how policies aimed at one particular set of resources may also affect the need for other resources. It also lays the cornerstone for a quality model, which can give the legislature a clearer idea of how school funds are likely to be spent. This increased clarity can help the legislature as it weighs the benefit of increased school spending against its cost.

There are two immediate steps California might take toward developing cost and quality models. The first is to improve information about school costs. California has solid CBEDS data about personnel employed at the school level. It also has good information about teachers’ salaries and benefits. However, it needs better information about the salaries and benefits of other personnel and about the five categories in Table 6.1 for which district-level expenditures were prorated to the school level. The most efficient way to collect this information is through case studies of a number of schools.

With this information in hand, California could take the second step of constructing a pilot quality model. This pilot project would involve a small number of principals brought together for a short period of time. The group would review California’s goals for its schools and discuss how school resources should be used to address those goals. At the end of this discussion, each group member would be asked to specify how he or she would allocate resources to achieve those goals. The members would be presented with a number of scenarios, describing the school, its enrollment, the unit costs of its resources, and its total budget. They
would then be asked to list the units of each resource they would employ, given the total budget and unit costs. Each scenario would involve a different total budget, revealing how principals would prefer to spend additional funds. The responses from different group members would then be averaged to yield a pilot model, giving the state the opportunity to assess the feasibility of constructing a quality model on a larger scale.

Appendix: Definitions of Personnel Categories

Paraprofessionals. From The California Department of Education, “The Average Costs of a California School, 1997–98” (Average Cost), the average California school hired 7.2 aides at an expense of $185,000. The cost per FTE is $25,694. This cost includes salary and benefits.

Clerical Support. Average Cost aggregates the costs of clerical support together with the cost of principals in the category school leadership. According to Maria Fong of the California Department of Education, $101,000 of these costs is for the salary of 2.8 clerical workers, yielding an annual salary of $36,071 per FTE. Assuming the same benefits structure as that for teachers, total benefits would be $9,267, for a total cost of $45,338.

Instructional Support. From Average Cost, the average California school spent $141,000 for the salary and benefits of 2.2 instructional support FTE. The cost per FTE is $64,091.

Pupil Support. From Average Cost, the average California school spent $106,000 on salaries and benefits of 1.6 pupil support FTE. The cost per FTE is $66,250.

School Leadership. Districts report principals’ salaries on their School Accountability Report Cards, the results of which are summarized in California Department of Education Fact Book 2000: Handbook of Educational Information. For unified school districts with more than 20,000 students, the average salary of principals was $75,942 in 1997–1998. Using the same benefit structure as for teachers, the total cost of a principal would be $90,069.

School Facilities. The State Allocation Board in the California Department of General Services provided data on over 300 projects funded between July 1996 and July 2000. From these projects, I selected a subset that involved the construction of a new elementary school. Each
project in the subset had a complete array of core facilities: administrative office space, a library, a kitchen or cafeteria, and a multi-purpose room or gym. Using regression analysis, I then determined how the construction costs of the projects varied with the number of classrooms and used this analysis to allocate total cost to either core facilities or to variable facilities. The result is an estimated cost for core facilities of $1,020,051 and a cost per classroom of $252,326. The sites for these elementary schools averaged 10 acres, and the site cost averaged $185,448 per acre. Adding average site cost to the construction cost of core facilities, the fixed cost per school is $2,874,531, and the variable cost is $252,326 per classroom. To express these capital costs in annual terms, I used the average interest rate for state and local bonds during 1997–1998, which was 5.25 percent. Thus, the annualized fixed cost of an elementary school is $150,913 (5.25 percent x $2,874,531), and the annualized variable cost is $13,247 per classroom (5.25 percent x $252,326).