

The Efficient Use of Teachers

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Prepared for the American Enterprise Institute and Thomas B. Fordham Institute conference,
“A Penny Saved: How Schools and Districts Can Tighten Their Belts While Serving Students
Better,”
January 11, 2010

The collected papers for this conference can be found at <http://www.aei.org/event/100164>.



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This book asks: In a time of recession, how can schools cut costs while boosting outcomes? Any serious appraisal of the question must begin with teachers, for spending on teachers represents a school district's single largest expense—in 2006, 45 percent of total expenditures in public education.¹ While other sectors have increased productivity, improving outcomes while reducing labor costs, schools have done the reverse. From 1980 to 2006, student enrollment grew by 17.9 percent, while total school employment grew by 47.9 percent.² In 1955, there was one teacher for every twenty-seven students; by 1997, there was one for every sixteen.³

Yet achievement results have remained flat. American seventeen-year-olds, at the end of their public education, performed barely better on the National Assessment of Educational Progress (NAEP) tests of reading and math in 2008 than in the early 1970s.⁴ In international comparisons of student achievement, even though the United States spent more per student than any other country, the performance of oldest students continues to be undistinguished.⁵ American fifteen-year-olds performed worse than their peers from all but five of the thirty Organisation for Economic Co-operation and Development (OECD) countries in the most recent Trends in International Mathematics and Science (TIMSS) math assessment; in science, they performed worse than students from all but nine nations.⁶

Could teachers be deployed more effectively in American schools, boosting achievement while lowering costs? In this chapter, I consider reform initiatives that would decrease teacher compensation cost—the overwhelming expense in any district—while improving academic outcomes. By better deploying faculty, ensuring that all students in a class have mastered precursor skills, judiciously substituting instructional technology for labor, equipping teachers with intellectual property that provides detailed and coherent designs for teaching and learning, and launching a comprehensive human capital initiative, districts can not only cope with

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punishing revenue declines but emerge as leaner and higher-performing organizations. I estimate the potential financial impact of these initiatives on a mid-sized urban school district.⁷

Bellevue Public Schools¹ is an urban school system in the Northwest that educates 29,500 students in thirty-seven elementary schools, eleven middle schools, five high schools, and six alternative programs. Fifty-nine percent of its students are from low-income families. It employs 1,944 teachers, who account for 74 percent of the district's total of 2,637 employees. Total salaries and benefits account for 84 percent of the district's total spending of \$326 million.

At its September 2008 board meeting, the district's superintendent said he would not make extensive cuts to school programs; instead he would wait to see how the state legislature "fully funds basic education." If the legislature does not bail out the district, it will need to cut spending in the face of declining state and local revenues by 8 percent over two years, or \$26.1 million.

Deployment of Instructional Staff and Technology Initiatives

Initiative	Annual Savings
1. Increase Class Size	\$17.6 Million

By increasing student-teacher ratios, with a commensurate increase in class size, from 15.3 students to 17.3 (from 13.2 to 15.2 in kindergarten through fifth grade, and from 17.5 to 19.5 in grade six through twelve), the district could save \$17.6 million annually in teacher salaries and benefits. Additional savings would accrue from reduction in facility costs, utilities, and other non-compensation costs. The savings from this modest increase in class size (on average, two students per class) would alone provide for more than three-quarters of the required savings.

The reform may seem heretical, as Bellevue, like many other districts, has spent heavily over the last quarter century in class size reduction, and as smaller classes are popular with

¹ Not the district's actual name.

parents and students alike. But the drive to reduce class size has been extraordinarily costly. From 1955 to 2005, the student-teacher ratio in public schools nationally tumbled from 26.9 to 15.6.⁸ During the seventies and eighties, this decline alone accounted for an astonishing 85 percent of the \$25 billion increase in annual instructional spending over the same period.⁹

Does the evidence justify sustaining this investment?

Class Size Reduction

Throughout the 1990s and continuing today, the American education establishment has pressed for smaller class sizes in public schools, promising achievement gains. The NEA, for example, “recommends an optimum class size of 15 students in regular programs, especially in the early grades, and a proportionately lower number in programs for students with exceptional needs.” The AFT concurs: “Compelling evidence demonstrates that reducing class size, particularly for younger children, will have a positive effect on student achievement overall and an especially significant impact on the education of poor children.”¹⁰ The American Educational Research Association, the professional association of educational researchers, concurs: “Small classes rank near the top of the list” it stated in 2003 “in the stockpile of educational policy initiatives that are worth finding resources for.”¹¹

Smaller classes made intuitive sense: teachers, with fewer children to handle, would be able to devote more attention to individual students. The public was persuaded, and reducing class size became the most popular education reform strategy. A 1998 poll found that 88 percent of parents favored further class-size reduction in K–3.¹² Class-size reduction, as Douglas Harris has noted, is popular with parents because it is tangible, immediate, and intuitively attractive.¹³

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President Clinton proposed to decrease class size in the early grades to an average of eighteen students.¹⁴

Advocates of small classes cite the Project STAR (student-teacher achievement ratio) experiment conducted in Tennessee in the mid-1980s. Students in kindergarten through the third grade were randomly assigned to three types of classes, one of a typical size (twenty-two to twenty-five students) with a single teacher, a second of the same size but with a teacher's aide, and the third with only thirteen to seventeen students. While students in typically sized classes with an aide performed no better than those without, students in the smaller classes for three years posted tests scores of up to 0.22 standard deviations, depending on the subject, higher than students in regular-sized classes.¹⁵ This effect is the equivalent of a student who begins at the 50th percentile on a nationally normed test moving up 8 percentile points to the 58th percentile. The effect was considerably greater for black and low-income students, which may be due to the greater impact of additional resources in schools serving children from poverty.¹⁶ Students who were taught in small classes were also slightly more likely, later research found, to take college entrance tests and state that they planned to go to college. Nearly 44 percent of students who were educated in smaller classes sat for the SAT or ACT test, compared with 40 percent of students in regular classes.¹⁷

But even these modest gains have been questioned. Because no baseline tests of students in the three groups were performed, it is impossible to confirm that class assignments were truly done at random. Parents strongly prefer smaller classes for their children, and in each school in the experiment students in large classes were educated across the hall from students in small classes. If parents of more capable students were able even occasionally to have their child assigned to the more advantaged setting, it would fully account for the effect. That the benefit of

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small classes was one-time—the gap in performance between the two groups did not increase, as might be expected, as students remained in small classes—supports this concern.¹⁸

Indeed, later critiques of STAR found that sorting of students within and between schools obscured any causal relationship between class size and achievement effects. Moreover, other studies contradict the STAR findings. In her research on class size and achievement, Harvard economist Caroline Hoxby selected an experimental design that permitted the effects of smaller classes to be examined apart from other factors that may infect explicit experiments like STAR, including the assignment of particular teachers or students to the smaller classes, the “Hawthorne effect” (where individuals temporarily increase their productivity when they are being evaluated), and the existence of incentives to obtain results that might not exist if the policy were broadly enacted. (The schools may perceive that a class size reduction policy would not be enacted if the experiment fails to demonstrate gains.) Examining natural variations in class size—in the range of ten to thirty students per class—in 649 Connecticut elementary schools (where teachers were unaware of the experiment), Hoxby found no statistically significant effect of class size on student achievement.¹⁹

In 1996, after California’s fourth-graders tied for last place in reading among thirty-nine states participating in the NAEP, the state enacted legislation that gave districts a financial incentive to reduce class sizes in grades K–3 to twenty students.²⁰ The state’s student-teacher ratio had been calculated prior to 1996 at 29:1. From 1998 through June 2003, 99 percent of districts participated in the reform. The cost in 2003 was \$906 for every full-day K-3 student in the program.²¹ The cost to the state exceeded \$1.6 billion for the 2002-2003 school year.²² Yet a major study of the class size reduction (CSR) initiative, conducted over four years for the California Department of Education, reported that although parents of children in reduced-size

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classes had “far higher” levels of satisfaction, researchers found “only limited evidence” linking gains in student achievement to the smaller classes.²³ In fact, urban districts had been damaged by the hiring of thousands of unqualified teachers to staff new classrooms. A “school-level analysis finds no relationship between CSR exposure and student achievement,” the report concludes flatly. “For many people, the lack of a clear relationship between CSR and student achievement will be disappointing.”²⁴ The report notes the failure of California to duplicate the gains of the STAR experiment, but also points out that California’s goal was a class size of twenty, substantially larger than those studied in STAR.²⁵

A recent analysis of the STAR initiative by Christopher Jepsen and Steven Rivkin finds fault with the research designs of Hoxby and other CSR skeptics and finds modest achievements gain from the California initiative. Jepsen and Rivkin attempt to isolate statistically the effects of teachers who entered the workforce as a result of the dramatic increase in teaching jobs from the California mandate (many of whom lacked experience and were less effective), from the effects of an approximately ten-student drop in class size. In a simulation exercise, the authors estimate that the long-term benefits of CSR are 0.167 standard deviations in mathematics and 0.099 standard deviations in reading.²⁶ These findings are not dissimilar from those of other researchers, who report positive achievement effects from small classes. (Angrist and Lavy found a ten-student reduction in class size would yield 0.17 standard deviations in the fifth grade in Israel; Krueger reported gains in test scores of 0.20 standard deviations in Tennessee’s kindergarten classrooms, and Rivkin, Hanushek, and Kain estimate an increase in fourth-grade scores in Texas of approximately 0.1 standard deviations from a reduction of ten students per class.²⁷) But Jepsen and Rivkin acknowledge that the statewide implementation of CSR makes its effects difficult to isolate from other major policy changes, including the imposition of

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performance standards and accountability, test score inflation, and the advent of charter schools.²⁸ They also recognize the extraordinary price tag of CSR, concluding that “an important question is whether the benefits justify the substantial cost.”²⁹

Consider just how expensive smaller classes are. Not only must vast numbers of new teachers be hired (California increased its teacher workforce from 62,226 to 91,112 in three years, between 1995-96 to 1998-99),³⁰ but additional classrooms must be built, equipped, and maintained. Hoxby has estimated the cost of a 10 percent reduction in class size at \$615 per pupil, in 2001 dollars, when average spending was \$8,157.³¹ To achieve a reduction in class size commensurate with the STAR program would require a 37.5 percent decrease, or \$2,306 per pupil, or nearly 30 percent of total educational spending.³²

These conclusions are just as apposite to districts wrestling with spending cuts as to policymakers evaluating increased investments in education. Courageous district leaders will ask whether the benefits of small classes justify their extraordinary costs. As teachers are the single largest expense in schools, class size and teacher assignments are far and away the most powerful lever for controlling costs and increasing productivity.

Even the largest increases in average class size that a district might consider would be a fraction of the STAR experiment and would therefore yield, as we have seen, an indiscernible effect on student achievement. In fact, implemented in conjunction with other delivery reforms that it would fuel, class size increases could have a strongly *positive* effect on student attainment.

Certainly a look at the performance of school systems internationally lends little support to an American reform strategy based on smaller classes and high teacher-student ratios. In an analysis of class size and student achievement in eighteen countries (using data from TIMSS, the largest international study of student performance), Ludger Wössmann and Martin West found

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little support for reducing class size. That three of the five highest-performing countries (Singapore, Korea, and Japan) had average class sizes greater than thirty students (Korea's averaged more than fifty) might alone give one pause. The study aimed to look deeper, by examining the relationship between class size and performance within the countries themselves. There were statistically significant benefits in student performance from smaller classes in only two countries, Greece and Iceland. In these two nations, average student performance is low (much lower than Singapore, Korea, and Japan, despite much smaller classes), and school spending is substantially below the average of countries without class-size effects. Teacher salaries are also low. From salary and teacher education data, the authors speculate that these countries' teachers are less skilled and better able to manage smaller classes than larger ones. They conclude,

Thus, the evidence on class-size effects presented in this paper suggests the interpretation that capable teachers are able to promote student learning equally well regardless of class size (at least within the range of variation that occurs naturally between grades). In other words, they are capable enough to teach well in large classes . . . It may be better policy to devote the limited resources available for education to employing more capable teachers rather than to reducing class sizes.³³

Further evidence that the nearly universal drive to reduce class size is misguided comes from top-performing charter schools. The first ten years of the charter school experiment, launched in Minnesota in 1991, fostered a broad range of designs that, perhaps unsurprisingly, performed on the whole little better than the traditional district schools. But then emerged a particular model of schooling that posted striking results. The Knowledge is Power Program began with two schools serving students from low-income families, in Houston and the Bronx, and now counts eighty-two small schools in nineteen states and the District of Columbia, with a total enrollment of some 20,000 students.³⁴ Nearly 95 percent of KIPP eighth-graders matriculated to college-preparatory high schools in 2008, according to the organization.³⁵ On

national norm-referenced tests, KIPP fifth-graders began on average at the 41st percentile in math and the 31st percentile in reading; after four years, these students are performing on average at the 80th percentile in math and the 58th percentile in reading.³⁶ Two other fast-growing networks, Achievement First and Uncommon Schools, are also posting achievement-gap closing results. The educational methods of the three organizations are strikingly similar. Highly educated, driven, and generally young teachers lead their students in a rigorous academic program, tightly aligned with state standards, that aims to set every child on the path to college. The approach has been dubbed “No Excuses” schooling because founders and staff steadfastly reject explanations from any quarter for low achievement, whether a district apologist’s appeals to demographic destiny or a child’s excuse for failing to complete an assignment. Small classes are not a feature of the No Excuses approach. In fact, KIPP believes its focus on rigorous academics and orderly environment permits large classes (occasionally with as many as forty-five students) to be effective. KIPP co-founder David Levin explains, “Class size is not an issue if teachers know how to manage kids.”³⁷

Initiative	Annual Savings
2. Eliminate Teacher Aides above Kindergarten	\$6.4 Million

By eliminating teacher aides in all classes above first grade, Belleview could save \$6.4 million annually.

Eliminating teacher aides (except in special education and in kindergarten, where they play an important role in helping students adapt to formal instruction) is a sensible additional savings initiative. The STAR experiment found only minimal achievement benefits from placing aides in classes; above the first grade, any effect was statistically insignificant.³⁸

Class Formation

A principal reason districts cite increasing staffing ratios—whether by adding teacher aides, instituting team teaching, or lowering class size—is the challenge of “differentiating instruction” to meet the needs of an educationally heterogeneous population in each class. But a far more effective—and less costly—solution is to change how classes are formed.

While much attention has been given to the size of classes, almost none has been directed to how they are formed. Classes are not chance aggregations of pupils; at least in principle, they are composed of students who have mastered the prerequisite skills and knowledge to function in the class. But in most American schools students are assigned to classes based on age—regardless of whether they have demonstrated such mastery. As students move up the grades, their teachers confront an increasingly unmanageable array of undiagnosed knowledge gaps among their students; these gaps impede the acquisition of new skills and explain the dismaying fall-off in student performance in the middle and high schools grades that is a hallmark of American schools. Exhorting teachers to address these gaps through “individual attention” or, to use the current buzzword, “differentiated instruction” is a fool’s errand.

The SABIS model of class formation proposes an alternative. The SABIS International Charter School in Springfield, Massachusetts enrolls 1,574 students in kindergarten through twelfth grade and has the largest waiting list, nearly 2,700 students, of any Massachusetts charter school. Tenth graders from low-income families outperform their peers in the Springfield district schools by 45 percentage points on the state’s respected MCAS test (92 percent proficient or advanced, compared to 46 percent) in English and 50 percentage points in Math (83 percent versus 33 percent proficient or advanced) and for the past seven years every SABIS Springfield high school graduate has been admitted to an institution of higher learning.³⁹ The school has

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literally closed the achievement gap by race and income; tenth-graders in the low-income and African-American NCLB subgroups outperform the average student statewide. In 2008, *Newsweek* named the school just one of three urban “top U.S. high schools” in Massachusetts.⁴⁰

Students are placed in grades by skills level, not age. From phonics in kindergarten through AP classes in high school, students are taught each learning objective to mastery. Through electronic assessment tightly keyed to the curriculum, their teachers are alerted immediately when they fail to demonstrate mastery of a skill they have just been taught. Rather than move forward, their teacher re-teaches the concept or arranges for tutoring of individual students by their peers so that knowledge gaps do not form that undermine later learning. A schoolteacher can no more successfully introduce algebra to students who have not mastered division than a college professor can teach an advanced chemistry class to students who have not completed basic courses in the subject.

So equipped, SABIS teachers routinely succeed with classes of thirty students. Ralph Bistany, SABIS’s founder, sees it as SABIS’s mission to demonstrate that a world-class education can be delivered affordably and scoffs at those who claim thirty children cannot be taught effectively in one classroom. “First, we need to define the word ‘class,’” he says. “Every course has a prerequisite—concepts that the course is going to use but not explain. That list of concepts determines who belongs in the class and who doesn’t.” If the course is German, and one student is fluent and others cannot speak a word of the language, the students obviously should not be taught together, he explains. At SABIS, students in a class have the same background but neither, he hastens to say, “the same ability nor the same knowledge.” So formed, it doesn’t matter whether the class has ten students or fifty. “In fact, fifty is better,” he adds. “We have worked with classes of seventy in countries where it is allowed, and it has worked like a charm.”

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Students have a responsibility to their classmates to pose questions pertinent to the concepts being taught, not material that the class has already mastered. “Anybody who asks a question that is not legitimate is wasting the rest of the class’s time,” says Bistany. The often-promised “individual attention” of small classes is doomed to fail, he says. “In a class of twenty, it means five minutes for every child. And before you can help him, you have to find out what his problem is. That is not teaching. That is a study hall.” Conversely, large classes do not impede the progress of the brightest students. A yearlong course might encompass four hundred concepts; usually some one hundred of these are “essential concepts” that all students must master. “The weaker students must know the ‘essentials.’ The brightest will know 90 percent of the others” by the end of the course, Bistany explained.⁴¹

Were he speaking of higher education, and not of primary and secondary education, Bistany’s description of class structure would be familiar and his argument self-evident. There, no one would think it practical—let alone normative—to educate a classroom of students with widely diverse preparation and precursor skills. Students would be expected to master fundamental skills before being instructed in more advanced ones. But as applied to American K-12 education, his plan seems radical, even repellent. SABIS’s approach may encounter initial resistance from parents but is a far more rational way to organize schools to produce high levels of student achievement than reducing class size.

Initiative	Annual Savings
3. Complement Teacher-Led Instruction with Instructional Technology	\$16.2 Million

By allocating one-quarter of instructional time to independent learning with instructional technology, the district would save \$16.2 million. In a hybrid instructional model, students at every level of school—elementary, middle, and high—would spend one-quarter of their time in a Learning Lab, using select, state-of-the-art instructional technology. At each of the district’s

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schools, this would result on average in a 8 FTE (full time equivalent) reduction in teachers, offset by the hiring of two full-time Learning Lab Specialist Teachers (at each school), annual debt service on amortized technology and software acquisition costs (\$390,000 per school), and professional development expenses (including vendor-delivered training and district professional development coordinators).

In the Learning Lab, students focus on their individual learning needs. Online and client-server software is rigorously curated by central district staff and includes educational web sites, computerized assessment, and research-validated learning software. Special software manages each student's skill deficits and his or her portfolio of software applications; each time a student logs into the lab, the software steers him or her to the appropriate content.

Independent Learning and Instructional Technology

The productivity of American schools has steadily declined as per-pupil costs have soared, ratios of teachers to pupils have increased, and educational outcomes have remained flat or modestly increased. In nearly every other sector of the economy, the substitution of technology for labor, made possible through technological advances, has steadily increased productivity. Education has been an exception. For four decades, entrepreneurs and educational technology enthusiasts have promised that technological innovations would imminently transform schooling. Educators have every reason to be skeptical of the industry's latest claims. But today's commercial learning products are less fanciful than in the past and the technology more advanced. Focused deployments of current technology can now yield, in concert with other reforms, demonstrable learning gains.

Rocketship Education, a nonprofit school network, has posted impressive early results from a hybrid model of conventional instruction and independent learning. Every student spends one hundred minutes each day in a learning lab addressing specific skill deficits. The lab combines computerized curriculum, independent learning, and enrichment programs. The approach saves each school \$500,000 a year, which in turn the schools invest in higher teacher pay, individualized tutoring, a full-time academic dean, and a full year of training for principals.⁴² At the Rocketship Mateo Sheedy Elementary School in San Jose, California, 78 percent of students are from low-income families and 73 percent are English Language Learners. In 2009, the school posted the highest scores among schools the state classifies as serving primarily low-income students in San Jose and Santa Clara, and the third highest of all such schools in California.⁴³

For more on the cost savings from the substitution of technology for labor, see John E. Chubb's "More Productive Schools Through Online Learning" in this volume.

Teacher Quality and Compensation Initiatives

At Belleview, as at most districts where the supply of strong teachers is limited, CSR initiatives by districts and states exacerbated the scarcity of good teachers in schools. To fill the new teaching slots from the pool of available teachers, districts had to be less selective about whom they hired. Yet virtually every study of class size has found that effects of class size reduction are dwarfed by variations in teacher quality.⁴⁴

Studies have documented the dramatically different trajectories of students who are taught by capable teachers and those who are not. One of the most noted involved students in Tennessee, where all students in the state in grades 2 through 8 were tested annually. From these

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data, teacher value-added effects could be calculated. Teachers were categorized into five quintiles of effectiveness. Eighth graders who had benefited from a progression of teachers over three years who were all in the top quintile of teacher effectiveness performed on average more than 50 percentiles higher than students who were educated by a progression of teachers who were in the lowest quartile of effectiveness. This is in contrast to the benefits of smaller class sizes, which, as noted above, resulted in an 8 percentile point advantage at the very most. Other studies reach similarly dramatic conclusions. The achievement penalty of having a low-performing teacher is especially severe for primary school students, for their educational losses are rarely later overcome. Third-grade results are a powerful predictor of later achievement, including obtaining a college diploma.⁴⁵

If the quality of teachers is paramount, what can districts do to elevate it? School districts, like any other organization pressured to improve performance with dwindling resources, should engage all four levers to improve the talent pool: dispense with their poorest performing teachers, improve the instructional performance of those who remain, attract the most capable new talent, and retain their star teachers. For skilled leaders, fiscal austerity does not inhibit reform, it begets urgency.

Four actions are indicated. Some generate savings and others carry a cost. But these investments would consume only a fraction of the savings that would be generated by disinvesting in failed strategies like class size reduction.

Initiative	Annual Savings
4. Terminate Chronically Ineffective Teachers	\$6.4 Million

Like most medium to large districts, Belleview continues to employ a significant number of teachers whom no school wants. Some lack basic work discipline and are manifestly uncommitted to their jobs; others are demonstrably incompetent teachers, and a few have a

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pattern of physically or emotionally abusing their students. Cowed by the cost and expense of attempting to terminate these teachers, the central office instead meticulously rotates these approximately eighty teachers (5 percent of teachers, after class size increase) among the schools each year, so that no one school is unduly burdened. Terminating these teachers saves the district \$6.4 million annually. This initiative should be undertaken as part of a concerted effort to improve teacher quality.

Underperforming Teachers

Much attention has been given over the last twenty years to the consequences of policies that make it virtually impossible for districts to terminate chronically low-performing teachers. In many states, districts are constrained by both statutory tenure laws and collective bargaining agreements that make terminating a teacher for poor performance impracticable. For decades, districts have reported that it takes two years and \$100,000 to \$200,000 in legal fees to rid themselves of a chronically incompetent teacher. Instead, districts either assign them to “rubber rooms” where they have no teaching responsibilities but continue to draw their full salaries or they assign them to schools in a planned rotation. Fortunately, recent lurid accounts of such policies have alienated even longstanding union supporters and, for the first time in a half century, leaders at both the district and state level finally have a chance at reforming them.⁴⁶

Districts could seize this period of scarce resources to devise a thoughtful, modern, and rigorous annual evaluation system, where the academic progress of their students is the foremost criterion. (The task is well suited to a major management consulting firm, many of which are eager to work with districts on either a paid or *pro bono* basis.) Today, most evaluation systems are farcical; virtually all teachers are rated “superior” or “excellent” by their principals, and

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hardly any are deemed “unsatisfactory”—in part, because principals know that nothing is to be gained in granting low marks to their weakest teachers (they cannot be terminated) and much is to be lost (the action breeds resentment and invites union grievances). Each year in Chicago, only 0.3 percent of teachers are rated “unsatisfactory” and over a four-year period 88 percent of the city’s six hundred schools had not awarded a single “unsatisfactory” rating to teachers, a 2007 study by The New Teacher Project found.⁴⁷

Superintendents should consider budgeting a substantial sum to prosecute a series of high-profile terminations that embolden principals and show that the district is newly serious about ridding itself of staff who are incompetent or worse. Meanwhile, superintendents need to work in association toward fundamental tenure reform, including eliminating prohibitions in some jurisdictions on the use of test data in evaluating whether or not to grant tenure. If this remains politically impossible, superintendents might consider an alternative approach proposed (but not realized) by Chancellor Michelle Rhee in the District of Columbia schools. Under Rhee’s plan, teachers could elect to either remain within the tenure-protected system, with its overriding promise of job security, or to forgo such protections (including tenure and seniority rights that allow them to bump more junior teachers out of their job) in exchange for the opportunity to make substantially more money (\$100,000 annually instead of \$62,000, funded through philanthropy) and assume greater responsibility for the performance of their students. Teachers who chose the new track would retain their jobs only if they improved their students’ scores and passed an annual evaluation.⁴⁸ It is probable that many ambitious and confident teachers will choose the latter, to both their and the district’s benefit.

Initiative	Annual Savings
5. Invest in Codified Skill Professional Development	\$1.8 Million

Typical of districts nationally, Belleview spends approximately 3 percent, or \$9.8 million of its budget on professional development.⁴⁹ As with most districts, professional development programs are a hodgepodge of brief and facile trainings for which there is no evidence of improvements in teacher skill or student outcomes. The district would save \$4.9 million by reducing spending on such legacy training programs by 50 percent, and then could reinvesting \$3 million, or the majority of these savings, in a new centrally coordinated training program designed to equip every Belleview teacher with exemplary classroom culture and pedagogical practices. Over the next four years, one-fourth of the faculty could participate each year in the program. Based on the path-breaking program of Teacher U at Hunter College in New York City, developed in association with KIPP, Achievement First, and Uncommon Schools, the program codifies and imparts the specific techniques of exemplary teachers. This program would cost \$3,600 per trainee annually; each trainee would also receive a \$5,000 stipend for the extended hours required by the program.

Professional Development

The professional development programs of most districts are scattershot, poorly linked to the curriculum, and of little or no demonstrable value in improving teacher proficiency or student outcomes.⁵⁰ In the rare case that a district holds a coherent theory of effective instructional practice, it is unwilling to assert it, as this would be seen as an incursion on teacher discretion and autonomy. With curricular decisions largely left to individual schools, instructional approaches are scattershot. It is no accident then that professional development dollars are dissipated on topics at the periphery of instruction, like team-building, enrichment programs, or the latest education school vogues, like “differentiated instruction” or “multiple intelligences.”

Districts should take advantage of fiscal pressures to insist that professional development be devoted entirely to improving the core skills of teachers—their ability to control their classroom, build an effective culture, minimize lost time, devise well-crafted lessons, and deliver engaging and effective instruction. So-called “no excuses” schools that are beginning to close the achievement gap, such as those run by KIPP, Uncommon Schools, and Achievement First, intensively train their staff not in the education school canon of Piaget, Vygotsky, and other theorists, but rather in the nuts and bolts of instructional technique: discrete classroom management and instructional skills that, strangely, are neglected by teacher training programs yet are consistently practiced by the best teachers. Classroom management and culture-building skills include teaching students how to pass out and collect papers efficiently (the minutes saved add up to days of instruction over the course of a year), “least invasive interventions” (how to avoid issuing verbal corrections to individual students and instead progress through a specific sequence of less disruptive alternatives, beginning with non-verbal signals), and “narrating the positive” (where the “teacher talk” builds a joyful momentum in the classroom by constantly describing what is going well and what the class is together accomplishing). Instructional techniques include the effective use of cold calling, “right is right” (teachers break the ubiquitous habit, when calling on students, of endorsing incorrect answers), and “stretch it” (where teachers reward “right” answers by asking follow-up questions that extend student knowledge). Each of these skills can be taught and practiced; together, they can lift a classroom from mediocrity to excellence. By codifying these techniques, perhaps for the first time, Doug Lemov, Norman Atkins, and David Steiner (newly appointed Commissioner of Education for New York State), are reinventing teacher preparation at Teacher U. Tuition and fees for the two-year part-time

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masters program is \$14,670; a school district could expect to devise an in-service program with similar objectives for one-quarter this cost.

Initiative	Annual (Cost)
6. Establish a Teaching Fellows Program	(\$5.0 Million)

Recognizing that teacher quality is paramount, Belleview should contract with the New Teachers Project to establish a Teaching Fellows Program modeled after those in New York City, Chicago, and Boston. The program could be expected to cost \$5 million annually and source one-third of the district's new hires. The highly selective program could combine nine weeks of preservice training in the summer, in partnership with an area university, and ongoing training and mentoring during the first two years, during which the fellows earn a master's degree.

Recruiting and Teacher Training

America's education system sources its teachers from its least successful students. The problem has worsened over the decade; in the period from 1964 to 1971, 20 to 25 percent of female teachers scored in the top decile of high school achievement tests; by 2000, less than 13 percent did.⁵¹ By contrast, countries that consistently score at the top of the two respected international assessments, TIMSS and PISA, such as Finland, South Korea, Singapore, and Hong Kong, draw their teachers not from the bottom third of their high school classes, as in the United States, but from the top five to thirty percent, depending on the country.⁵²

Nearly every country requires teachers to embark on their careers with a period of formal teacher training. Most nations, including the U.S., do little to restrict access to these programs; teacher training is an option for those students who lack others. Because the quality of students is low, so is the quality of courses; professors at schools of education are famously the least

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respected faculty at universities. Teaching becomes a low-status profession, and far more students earn education degrees than are employed as teachers. Top-performing countries, in contrast, restrict access upfront to teacher training programs. In Singapore, for every one hundred applicants for teacher training programs, only twenty are selected, and of these eighteen are employed as teachers.⁵³ Money devoted to training is spread over a much smaller pool; so far more is spent developing each teacher. Subject teachers also receive vastly more content-area training than in the U.S. and teachers are less likely to teach outside of their content area.⁵⁴ Training programs are prestigious and teaching a high-status profession.

District leaders in the U.S. cannot affect selection policies at teacher colleges, but the most innovative have created alternative paths to teaching that emulate the practices of top-performing countries. The New York City Teaching Fellows program, Chicago Teaching Fellows, and the Boston Teacher Residency all aim to recruit top graduates and experienced individuals who want to teach, and guarantee a teaching position to those who enter the training program. The New York program drew 2,100 applicants in its first year and selected 325.⁵⁵ Seventy percent of fellows attended a “more” or “most” selective undergraduate institution.⁵⁶ By 2008, there were 17,000 applicants for the program, and fellows accounted for one-third of the district’s new math teachers.⁵⁷ The 2009 class was the most selective ever, with only one in ten applicants selected.⁵⁸ Rather than being required to obtain a degree in education, which deters many gifted prospective teachers, teachers receive brief but intensive preservice training and work toward their certification while teaching. Other school districts can readily emulate these programs while working with lawmakers to eliminate the requirement for coursework at schools of education altogether.

Initiative	Annual (Cost)
7. Raise Teacher Pay and Institute Differential and Merit Pay	(\$13.8 Million)

Belleview could invest \$13.8 million of the savings from staffing initiatives to fund compensation reforms. Teachers in the top quintile of effectiveness of the district's faculty who agree to extend their reach to a larger number of students will receive a 50 percent salary premium, for a cost of \$8.8 million. Another \$5 million will fund a differential pay plan (paying more for teachers in short supply, such as high school math and science teachers, teachers of distinguished academic backgrounds and verbal skills, and those who commit to work in the most challenging schools) for newly recruited teachers who agree to forgo traditional job protections in exchange for higher compensation.

Compensation Reform

Better teacher deployment policies would result in a smaller workforce, which in turn would permit the district to increase teacher salaries and better recruit and retain star talent. But rather than raising salaries across the board, districts should undertake a wholesale redesign of compensation policies. The "step and lane" compensation system is obsolete. For decades, districts have paid teachers strictly in proportion to two attributes, neither of which has any demonstrable relationship to teacher quality or student achievement: degrees and education credits, generally earned from schools of education (the "lane"), and seniority (the "step"). There is little to no evidence that teachers with a master's degree perform better than those without, or that a teacher with a doctorate in education is a better instructor than one with a baccalaureate from a selective college. Master's degrees in education bear no relationship, on average, to student achievement. Yet the "master's bump" in compensation accounted, according to a 2007 study, to 2.1 percent of all education expenses, or \$174 per student annually.⁵⁹ The rationale for paying for seniority is equally deficient. The evidence shows that although a fourth-year teacher

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is on average more effective than a novice teacher, there are no benefits, as a statistical matter, from additional experience.⁶⁰

If the goal is to improve productivity, districts should invest in what they actually need: teachers of subjects and grades who are scarce and in demand, and teachers who demonstrably produce results. As Frederick M. Hess and Martin West have argued, “Teacher pay should reflect the scarcity and value of teachers’ skills, the difficulty of their assignments, the extent of their responsibilities, and the caliber of their work.”⁶¹

Once again, we have much to learn from countries with superior education systems. High-performing nations not only recruit capable people to the profession, they attract them with a high starting salary. The average starting salary in South Korea, as a percent of GDP per capita, is 74 percent higher than that in the U.S. Hong Kong’s is 20 percent higher, and Finland’s and Singapore’s are both 17 percent higher.⁶² In exchange for a longer school day and year (similar to those of nearly all gap-closing “no excuses” charter schools), more planning time (for grade-level team meetings and the development of high-quality, detailed lesson plans), more professional development time (at least three weeks of rigorous training in August), and freedom from debilitating work rules (to permit greater flexibility in assignments and duties), districts should award higher starting salaries. Without these reforms, increasing starting pay would be unwarranted, as current compensation levels, adjusted for the contractual work day (6 hours and 20 minutes in New York City) and summers off, are competitive with that of other professions.⁶³

Differential Pay. Administrators, especially in urban schools with low-income student populations, are much more likely to report difficulty in filling math or physical science positions than in filling elementary positions.⁶⁴ College graduates majoring in math, science, and technology are in great demand outside of schools, and non-teaching jobs pay them much more

than teaching jobs would. The problem is getting worse, for recent growth in teaching salaries has been no match for that of highly skilled non-teaching professions. The pay scales of current collective bargaining agreements tie principals' hands in making salary offers to scarce qualified candidates.

Districts should adopt “differential pay plans” that pay teachers in short supply—such as high school math and science teachers—a premium. Higher pay, bonuses, tuition assistance, tax credits, housing subsidies, and loan forgiveness have all been used by states and districts to attract teachers in high-need subject areas. Similarly, districts should pay teachers in the most challenging schools more than those in less demanding and more affluent schools.⁶⁵

Schools should also pay more for teachers whose education in a selective college, high grade-point average, verbal skills, and other objective attributes are in demand by academically ambitious schools. Unionization flattened teacher pay, and today graduates of selective admission colleges make no more than graduates of the lowest-tier schools. Prior to the spread of collective bargaining, districts sensibly paid more to teachers from prestigious universities. As schools drive to develop in their students not only literacy and numeracy but also critical thinking skills, principals may find that their scarcest resource is intellectually agile individuals, whom pay policies drive away to other professions.⁶⁶ Pedagogies that foster comprehension and critical thinking, like “guided reading” in elementary school and “inquiry learning” in high school, depend on teachers as interlocutors, devising searching questions in real time.

Merit pay. The case for merit pay is clear: Paying bad teachers as much as good ones makes it harder to attract and retain good teachers, which in turn penalizes students by saddling them with inferior instructors.⁶⁷ The idea is not new, as Thomas Toch has noted. A 1955 commission to President Eisenhower urged that “every effort...be made to devise ways to reward

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teachers according to their ability without opening the school door to unfair personnel practices.”⁶⁸ Unions have portrayed pay-for-performance plans as an assault on teachers, but survey results suggest teachers feel otherwise.⁶⁹ A 2003 Public Agenda survey of teachers found that substantial majorities believed that “it is easy to spot who the truly great teachers are,” thought that the teachers in their building “could pretty much agree on who... [they] are,” and supported giving additional pay to their peers “who consistently work harder ... than other teachers” and those “who consistently receive outstanding evaluations from their principals.”⁷⁰

Yet getting merit pay right is notoriously difficult. Poorly designed plans can seem to teachers capricious and unfair, and small bonuses broadly awarded do nothing to boost performance. Merit pay developers have learned from past mistakes, and emerging evidence points to significant student gains in well-conceived plans that are predictably implemented from one year to the next. One of the most-watched performance pay initiatives is Achievement Challenge Pilot Project in Little Rock, Arkansas, where early evidence points to 7 percentile point gains on standardized tests. Unlike in other merit pay designs, the study found no damage to the school climate or rise in counterproductive competition between teachers; teachers reported that their work environment was more positive than those reported by comparison teachers.⁷¹ As with any incentive system, its architects must take utmost care to make sure it rewards what the organization wants, as financial rewards can powerfully affect staff efforts. As James Guthrie and Patrick Schuermann have noted, teachers may work hard to achieve the goals that are rewarded, but slight others that are equally vital. Plans must balance the need for transparency, on which acceptance by teachers rests, but also accuracy and fairness in measures of student performance, which may necessitate complexity. Teachers must be engaged in the

development of plans and a far-reaching effort must be made to explain the plan and gain their support. Lastly, fluctuations in annual appropriations cannot result in fluctuating incentives.⁷²

3X Teachers. This approach, proposed by Emily and Bryan Hassel of Public Impact, begins with the recognition that teachers in the top quintile of effectiveness produce on average three times the learning gains of bottom quintile teachers. It ought to be the district’s urgent goal to identify such “3X” teachers and to extend their reach through initiatives like those described in these pages. 3X teachers should be relieved of non-teaching duties, focus on concept exposition (rather than leading students through practice), be responsible for the learning of a large number of students, and extend their reach through technology. In recognition of their exceptional impact and the number of students they affect, districts should pay 3X teachers substantially more money—I suggest 50 percent more.⁷³

Initiative	Annual Savings
8. Align Benefits with Private Sector Standards	\$7.6 Million

The cost of Belleview’s employee benefits plan, like those of other districts, is unsustainable. Bringing the district’s total current contributions to employee benefits in line with private sector employers will save at least \$7.6 million annually.

Employee Benefits

While reforming teacher pay, districts should also tackle the debilitating costs of employee benefits and teacher absenteeism. Pension costs, in particular, are unsustainable. Retirement benefits afforded teachers are exceptionally generous compared to those of private sector professionals. Whereas most sectors now offer “defined contributions” plans, where the employee makes a fixed contribution per year to the employee’s retirement account, public sector employees continue to participate in “defined benefit” plans, fully funded by the

employer, which pay a fixed amount (approaching full salary, for a fully vested employee) for life. Michael Podgursky has noted that as of 1995, the average age of retirement for teachers was fifty-nine; for new retirees collecting Social Security it was sixty-four.⁷⁴ In 2008, private employers contributed 10.4 percent of employee earnings to retirement benefits; school districts contributed 14.6 percent.⁷⁵

Healthcare costs also make up a larger share of districts' total compensation costs than of private sector employers'. Both sectors have seen the cost of coverage more than quadruple over the last three decades, but rising costs have hit school districts especially hard because districts are locked into unsustainably lavish plans. While most private sector plans require employees to pay 15 percent or more of their health coverage costs, school district plans rarely do. Most districts also pay the entire cost of retirees' health benefits, while private sector employers do not.⁷⁶

Initiative	Annual Savings
9. Reduce Teacher Absenteeism	\$2.9 Million

Through a combination of policy changes and financial incentives for exceptional attendance, Belleview can close 75 percent of the gap between the district's rate of absenteeism by teachers and aides and the rate of employers nationally. After the cost of incentives, the district would save \$2.9 million annually.

Teacher Absenteeism

The high cost of teacher absenteeism has gone largely unnoticed. According to the Bureau of Labor Statistics, professional and managerial employees in the private sector are absent for 1.7 percent of annual hours. By contrast, in 2001, the New York City schools reported that teachers were out on average 11.3 days a year, or 6.3 percent of the school year.⁷⁷ Many of these absences

are discretionary, and changes in policy, such as requiring teachers to report their absences directly to their principal or offering financial incentives (rewards for exceptional attendance or buy-back of unused sick days) would reduce them. Were absenteeism reduced to private sector levels, the savings on substitute teachers would be dramatic, and students would lose fewer days of learning.⁷⁸

Program Initiatives

Initiative	Annual Savings
10. Establish Robust Pre-referral Programs to Special Education	\$2.5 Million

By bolstering pre-referral programs to special education, strengthening regular education, and improving remedial interventions, Belleview would reduce special education enrollment from 13.3 percent to 11.3 percent, for an annual savings of \$2.5 million.

In many urban districts, schooling defects—a weak school culture and poor instruction, especially in the early grades—cause some students to be referred to special education who could be educated successfully in the regular classroom. Some are labeled as “learning disabled” or “emotionally disturbed” when their failure to progress in regular education is not the result of an innate disability. African-American students in particular are over-represented in categories of special education, such as specific learning disabilities, where diagnostic criteria are not consistently applied and it is possible to identify almost any underachieving child as learning disabled.⁷⁹ Black students are 50 percent more likely to be identified as emotionally disturbed as well; schools fail to distinguish between behavioral characteristics associated with the cultural context in which the children are raised and an actual disability.⁸⁰ Managing behavior explicitly in the early grades toward developing self-management skills in students and offering effective instruction to students who are “at risk” in regular education will obviate many referrals.

By tightening pre-referral policies (required under the federal special education law) and ensuring that effective remediation is available to students prior to evaluation, districts would gradually reduce the number of students who are enrolled in special education programs. A modest drop in special education enrollment—15 percent, for instance—is a realistic target for many urban districts.

Conclusion

Districts coping with fiscal pressures from the recession would be wise to consider disinvesting in class size reduction, the primary and staggeringly expensive reform of the last several decades. Districts should instead attend to how classes are formed and student skills gaps are identified and filled, and to equipping teachers with effective instructional systems. CSR's promised returns in student performance will prove chimerical. Other monies can be freed up by eliminating general education instructional aides above kindergarten, adopting a hybrid educational model that complements teacher-led instruction with instructional technology, cutting wasteful professional development costs, terminating chronically ineffective teachers, aligning employee benefits with industry averages, reducing faculty absenteeism, and strengthening referral programs to special education.

These savings, if achieved, would more than compensate for declining revenues. The remaining savings should be allocated to strengthening the capacity of regular education teachers to achieve exceptional results even with the addition of two students to their classrooms. The two categories of essential investments are human capital initiatives (to boost the capacity of the faculty) and acquisition of carefully chosen intellectual property (that equips teachers of average skill to achieve exceptional learning outcomes for their students).

Table 1. Summary of Belleview Savings Initiatives

Initiative		Savings/(Cost)
	Target Savings	\$22,835,600
1	Increase Class Size	\$17,607,483
2	Eliminate Teacher Aides above First Grade	\$6,369,644
3	Complement Teacher-Led Instruction with Instructional Technology	\$16,246,348
4	Terminate Chronically Ineffective Teachers	\$6,437,322
5	Invest in Skill-Based Professional Development	\$1,883,289
6	Establish a Teaching Fellowship Program	(\$5,000,000)
7	Raise Teacher Pay and Institute Differential and Merit Pay	(\$13,800,814)
8	Align Employee Benefits with Industry Averages	\$7,573,641
9	Reduce Faculty Absenteeism	\$2,924,313
10	Establish Robust Pre-referral Programs to Special Education	\$2,501,106
	Total	\$42,742,331

The impact of these savings initiatives for the Belleview district is summarized in Table 1. When fully implemented, they would result in annual savings of \$42.7 million, nearly twice that required by the anticipated 7 percent reduction in district revenues. Embarking on these actions now would not only address the district’s fiscal challenges in fiscal year 2011, it would deliver the savings required for fiscal year 2012, when revenues are likely to tumble further.

The philanthropic community could be invaluable in assisting and emboldening districts to undertake these urgent reforms. Many district officials assume that labor contracts are far more restrictive than they actually are. A national center for specialized legal and technical support to districts could help districts overcome apparent constraints in law or contract and prevail in administrative hearings and courts when challenged. Such a center could also serve as a clearinghouse for districts to share broadly their expertise and successes as they implement these bold initiatives to more effectively deploy instructional staff, reduce costs, and bolster productivity.

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