

Rethinking the Allocation of Teaching Resources: Some Lessons From High-Performing Schools

Karen Hawley Miles

Education Resource Management Strategies

Linda Darling-Hammond

Teachers College, Columbia University

Although a great deal of debate surrounds the level and allocation of resources to public schools, very little research addresses how schools might organize teaching resources more effectively at the school level. This article describes case studies of five high-performing public schools that have organized professional resources in innovative ways. The study sought to detail alternative ways of deploying instructional resources in order to provide concrete alternatives to traditional organization of teachers and to quantify objectively the ways in which these schools use resources differently depending on their instructional goals and strategies. Although the schools studied looked very different from one another, they shared six principles of resource allocation that are outlined in this article. The article develops a framework for examining the use of resources and a methodology that may be used to measure the extent to which schools use their resources in focused ways to support teaching and learning.

School reform proposals aimed at improving student achievement range from developing new standards and curriculum to personalizing student-teacher relationships and increasing time for teacher planning and learning. Research over the last 30 years consistently shows that student results are better in schools where students are well known to their teachers (for reviews, see Braddock & McPartland, 1993; Darling-Hammond, 1997; Lee, Bryk, & Smith, 1993). Meanwhile, reformers continually note that teachers need substantial time together in order to create new practices and engage in shared problem-solving (see, for example, Darling-Hammond, 1997; Little, 1993; Sizer, 1992). Studies of teacher development in other countries, notably China and Japan, point out how teachers become more proficient from continually working on curriculum, demonstration lessons, and assessments together (National Commission on Teaching and America's Future, 1996; Stigler & Stevenson, 1991). The new curriculum reforms in the United States require substantial teacher learning that is, ideally, content-based and collaboratively

pursued in tight connection to teachers' ongoing classroom work (Ball & Cohen, in press).

In an era of belt-tightening and rising student enrollments, finding the resources for these reforms will require schools to reexamine the use of every dollar. Much publicity has surrounded efforts to redirect dollars from administrative functions back to the classrooms. New Jersey's governor has even refused to reimburse district administrative costs above a fixed percentage that is lower than many districts currently spend. However, little attention has been given to rethinking the use of existing instructional resources, especially teachers—schools' most important and expensive resource.

On the surface it would seem that schools should have the needed resources to create more individual time for students and increase professional time for teachers. From 1960 to 1992, the number of pupils per teacher dropped from 26 to 17.6. Furthermore, schools employ one adult for every nine students (National Center for Education Statistics, 1994). Despite these apparently generous ratios, class sizes exceed 25 for most students most of the time, stu-

dent loads are well over 100 for most teachers in secondary schools, and teacher planning time is both minimal and conducted in isolation from other teachers. The basic structure of schools has remained essentially the same across districts and over time, with new resources added largely around the regular classroom rather than into it (Miles, 1997a). And despite recent calls for “restructuring,” a number of surveys suggest that public schools rarely engage in major reallocations of resources (Rettig & Canady, 1993).

How might existing resources be used to personalize student-teacher relationships and provide teachers time to plan and work more closely together? Can these goals be met in ways that also support student learning for all students, including those with special needs? With so few examples of public schools organized in different ways, there is little empirical research on these questions. Furthermore, researchers have not had common ways to describe and measure different models. This study aims to begin to fill these gaps by describing in detail how five schools have reallocated resources while supporting high levels of student learning. The sample is too small and the schools too unique to claim a causal connection between their organizational designs and their students’ successes.¹ However, the schools do demonstrate that it is possible to support student achievement at extraordinarily high levels by managing instructional resources to maximize individual attention for students and learning time for teachers.

We sought to identify the elements of organization and resource use that seem most important in these schools and to quantify the ways in which they use resources differently than traditional schools. We also aimed to learn from these examples about the conditions that facilitate or hinder resource restructuring. Although the schools look very different from one another, they share six principles of resource allocation implemented in different ways depending on their specific educational goals and strategies. In what follows, we describe their approaches, present a framework for examining resource allocation and use, and develop a methodology that may be used to measure the extent to which schools use their resources in focused ways to support teaching and learning.

Opportunities for Fundamental Reallocation of Resources

It is unlikely that schools can find ways to create

more individual time for students or more shared planning time for teachers without prohibitively raising costs unless they rethink the existing organization of resources. In this article, we focus primarily on the assignment and use of teaching staff because it is the most sizable and the most underexplored area for potential resource reallocation. As we noted above, pupil-teacher ratios have dropped substantially, and real expenditures have nearly doubled over the last 30 years. A recent analysis of staffing and spending patterns from 1967 to 1991 in nine very different districts across the country found that few new teachers were deployed to reduce class sizes for regular-education students; most went to provide small classes to the growing number of students in special programs and to add a modest amount of time for teachers to be free from instruction during the school day (Miles, 1997a, 1997b; Rothstein & Miles, 1995).

As instructional staff have increased, the proportion of teachers has declined. Since 1950, the proportion of school staff who are classified as teachers—of whom all are not classroom teachers—has dropped from 70% to 53%. Overall, about 43% of staff are regularly engaged in classroom teaching (National Commission on Teaching and America’s Future (NCTAF), 1996). By contrast, 60% to 80% of education staff in most European countries are classroom teachers (Organization for Economic Cooperation and Development (OECD), 1995).

An analysis of the allocation of teaching resources in Boston Public Schools identified six reasons for the gap between the potential and the reality in U.S. schools (Miles, 1995). Many of these organizational practices are so widespread that Tyack and Tobin (1994) describe them as the “grammar of schooling,” while Sarason (1982) calls them “school regularities.” These practices form the basis of our conceptual framework for understanding and quantifying the use of teaching resources in both traditional and nontraditional schools. Below, we briefly describe the impact of each on the use of teaching resources.

Specialized Programs Conducted As Add-Ons

In most school districts, a large portion of teachers work outside the regular classroom with special populations of students in categorical programs such as special education, Title 1 compensatory education, bilingual education, remedial education, or gifted education. Such programs for special stu-

dent populations absorbed 58% of the new dollars devoted to education from 1967 to 1991 (Rothstein & Miles, 1995). Most of these programs operate under federal, state, or district regulations and sometimes collective bargaining agreements that prescribe how teachers may be used and students may be grouped. Most districts operate these programs using a “pull-out” model in which students leave the regular classroom for portions of the day for instruction in small groups. In 1991 in Boston, teachers in specialized programs working outside the regular classroom represented over 40% of the teaching force.² Not only are pull-out strategies extremely costly, but they also segregate students in sometimes stigmatizing ways and provide services that are often ineffective because of their fragmentation and lack of connection to the student’s classroom experience (Commission on Chapter 1, 1992, p. 2; Soo Hoo, 1990). Schools rethinking resources might consider how remedial, special education, Title 1, and bilingual education resources could work together in an integrated plan to benefit all students in “regular education” settings.

Isolated, Instruction-Free Time for Teachers

Currently, most school districts provide teachers with short periods of time free from instruction, while using other classroom teachers to give instruction at these times. At the elementary level, teachers often have a 45-minute, duty-free period four or five times a week that is covered by specialists in art, music, or physical education. In 1991, this represented 9% of Boston’s elementary teaching resources. At the secondary level, a teacher might teach five of seven instructional periods, using one for planning and the other for lunch or duties (monitoring hallways, the lunchroom, or study hall). Other teachers cover instruction during the portion of the student’s instructional day in which the teacher is not teaching. Although secondary teachers have more preparation time than elementary teachers (about four or five hours per week as opposed to three), the short blocks of individual non-instructional time do not allow much substantive planning or collaboration. These activities require longer blocks of uninterrupted time that is coordinated with other teachers. Given the significant resources devoted to instruction-free time, schools rethinking their use of resources should consider ways of creating longer periods of time for teachers to plan and develop curriculum together.

Formula-Driven Student Assignment

In administrators’ search for efficiency and standardization, American schooling processes have been broken into segments, like grades and tracks, through which students are expected to move at an even, uniform rate. Districts use formulas to assign students to classrooms in a regularized fashion by age, subject, and program. These practices are costly because the uneven allocation of teachers over grades, small programs, and undersubscribed subjects contributes to unplanned differences in class size that do not reflect educational strategies. These practices may also preclude approaches such as multi-age or multi-ability grouping that can be more effective when teachers are prepared to engage in them (Anderson & Pavan, 1993; Slavin, 1990).

Using formulas to allocate students to classrooms by age can create huge variation in class sizes. For example, Boston Public Schools cap elementary class sizes at 28. When the 29th student enters a school with only one class in that grade, a new teacher must be added. Thus, the class-size average falls dramatically from 28 to 14.5. In 1991, regular elementary class sizes in Boston’s 645 elementary classrooms varied from 15 to 31. Class sizes could vary by 8 or 9 students from one grade to another in the same school. The more separate programs and subjects a school has and the more constrained by age grading or tracking practices, the more often this kind of unplanned variation in allocation of resources occurs. Schools looking to better match resources to student needs might consider assigning students to groups based on educational strategies rather than standard classifications. Schools may also strategically vary group sizes and the daily schedule for particular kinds of lessons or skill work.

Fragmented High School Schedules and Curriculum

The problems of age grading are compounded in high schools by tracking, schedules with large numbers of short periods (typically 45 to 50 minutes), and teacher and subject specialization. One unfortunate effect of this fragmented approach to schooling is its impact on teachers’ pupil loads. With five classes of 25 to 30 students each, most secondary teachers work with 125 to 150 students per day. Reducing teaching loads without dramatically increasing costs can be accomplished by reducing the number of different groups teachers teach, ei-

ther by combining traditionally separate subject areas, lengthening the duration of classes, or having smaller groups of students work intensively with teachers in smaller numbers of subjects, as in universities (Carroll, 1994). Research shows that these practices can improve student achievement (Gottfredson & Diager, 1979; Lee et al., 1993; Lee & Smith, 1994, 1995).

Large High Schools

Secondary schools average nearly twice the size of elementary schools (NCES, 1994) and frequently exceed 2,000 students. The conventional justification is that larger enrollments create economies of scale by distributing administrative and operating costs and offering a more diverse curriculum cost effectively. Most studies have found that, all else being equal, above about 800 students, larger schools produce lower student achievement and lead to increased alienation, higher dropout rates, and larger numbers of administrative staff, thereby deflecting resources from classroom instruction. Furthermore, beyond about 400 students, there are few if any gains in curriculum quality (for reviews, see Darling-Hammond, 1997; Lee et al., 1993).

Inflexible Teacher Workday and Job Definition

In Boston, like in many other cities, the teacher contract specifies the required hours of work, starting and ending times, and how teachers can be assigned throughout the day. This makes it difficult to stagger starting times in order to make the best use of staff time or to meet student needs more fully. The contract prevented one high school from changing the work hours of its guidance staff to start and end later in the day so that students' meetings with counselors would not conflict with their courses. The contract also requires that planning time be spread out over the day; this makes it difficult to combine instruction-free periods to create longer, shared blocks of time.

The use of part-time teachers is forbidden if they substitute for potential full-time positions. While it is intended to discourage management from substituting lower cost and potentially lower-quality teachers for dedicated full-time ones, this regulation limits affordable solutions to coverage for teachers' non-instructional time. One way to create common planning time for groups of teachers, for example, is to schedule coverage for them by hiring a larger number of part-time specialist teachers during this time. Finally, rigid definitions of the

workday exclude individuals who would be willing to work at times beyond the typical school hours. Schools looking to better match resources to student and staff needs may want to consider the use of highly skilled staff in part-time positions and on varied job schedules.

The strategies observed in schools that have sought to change these conditions can be described by six principles of resource reallocation:

- Reduction of specialized programs to provide more individual time for all in heterogeneous groups;
- More flexible student grouping;
- Structures that create more personalized environments;
- Longer and varied blocks of instructional time;
- More common planning time for staff; and
- Creative definition of staff roles and work schedules.

These kinds of changes can create opportunities for realigning teaching resources to school goals (Miles, 1995). Our observations in schools suggest, however, that altering any one practice alone may not free enough resources to significantly change the possibilities for student or teacher learning.

Study Methods and Analytic Framework

Sample

To create a sample of schools that could offer insight into the possibilities and challenges involved in rethinking the allocation of instructional resources, the study sought elementary and secondary schools that

- Had engaged in a significant rethinking of resources touching on at least four of the resource principles listed above;
- Used no significant extra resources above the school system average per pupil except start-up or training grants;
- Served a diverse student population in terms of income, ability, language background, and special needs;
- Had used a new model of organization for at least two years; and
- Had evidence of strong and improving student performance.

To find such schools, we surveyed experts involved in reform networks nationwide. The five schools we selected represent different educational

strategies. Three of the schools started from scratch with a new design in mind and had considerable flexibility in hiring staff and creating programs. The other two schools restructured existing programs and staff. We selected three elementary schools and two secondary schools.

Quebec Heights Elementary School, Cincinnati, OH. It had, at the time of the study, 500 students in grades K–6, with 15% classified as having special-education needs and 70% eligible for Title 1. Quebec Heights eliminated age- and program-based instructional grouping and put students in smaller, multi-aged, heterogeneous groups that remain together for three years. The school created reading groups of 8 or smaller each day. Teachers have common planning time each day and pursue professional development in the school's priority areas during the school day. Cohort analysis of student performance data shows that both special-education and regular-education students have improved faster than the Cincinnati average.

Douglass Elementary School, Memphis, TN. It had 475 students with 17% classified as requiring special education and 88% qualifying for Title 1 support. At the time of the study, the school was in its third year of implementing the "Success for All" program, which restructured school resources to allow 90 minutes a day of reading plus daily individual tutoring for first- and second-graders who did not meet grade-level standards. In addition, Douglass was working to integrate its special-education students and teachers fully into the regular classroom. After the second year of implementing the program, the percent of second-graders (the only students with two years of the new model) above the median in language arts climbed from 17% to 59%. In addition, the school's evaluation of special-education integration showed these students continuing to progress academically and socially.

Mary C. Lyons Model Elementary School, Boston, MA. It had 90 students in grades K–5, 60 of whom were classified as regular education and 30 of whom had severe emotional disturbances that previously required placement in highly restrictive settings. Over 80% of students qualified for Title 1. The school fully integrated all special-education students into regular classes of 15 or smaller, each with a teacher and instructional assistant. Lyons created extended school hours lasting from 7:00 a.m. to 5:15 p.m. using outside contractors to provide instruction. The variety of different staffing arrangements included paraprofessionals, teacher

interns, part-time workers, and staggered shifts. The school was one of 15 (out of 115) Boston schools to have a waiting list for every race for both special-education and regular-education slots for three years in a row. Achievement scores for both special-education and regular-education students improved faster than the Boston average, and 100% of the students were reading on grade level.

Central Park East Secondary School, New York City. It served 450 students in grades 7 through 12, about 25% of whom qualified for special education and 60% for free or reduced-price lunch. All students are integrated into heterogeneous classrooms. The school restructured the typical secondary schedule to create two-hour blocks of instructional time in both the humanities and math/science. Teachers have more than seven hours each week of common planning time in addition to their daily individual preparation period. To reduce academic group sizes, Central Park East (CPES) allocates nearly all of its positions for teaching, rather than hiring guidance counselors and various administrative staff. All professional staff members serve as advisors to about 12 to 15 students each year. The school hires some teachers on a part-time basis for electives like foreign languages. Central Park East has been nationally heralded for its consistently exceptional outcomes. Each year since its first graduating class, more than 90% of its students have graduated, and more than 90% have been accepted to college.

International High, New York City. It is an alternative school of 475 recent immigrant students in grades 9 through 12. Only students who have been in the United States less than four years and who score below the 20th percentile on an English-language proficiency exam are admitted. At the time of the study, over 75% of the students were eligible for free or reduced-price lunch. International integrates all state-mandated subject matter into an interdisciplinary curriculum taught in multi-aged heterogeneous groups. Teachers work with no more than 75 students a term and spend 70 minutes or more with them each day. The teachers have nearly six hours each week of common planning and professional development time. All staff members lead a small advisory group that meets weekly to discuss issues of personal, academic, and social growth. Despite its "high-risk" population, the school's dropout rate was less than 1% in 1993–1994 as compared to 30% citywide, and both the graduation rate and college acceptance rates ex-

TABLE 1
Resource Reallocation Strategies Used by Sample Sites

Strategy	Lyons	Quebec	Douglass	International	CPESS
Reduction of specialized programs	X	X	X	X	X
More flexible student grouping	X	X	X	X	X
Structures to create more personal environments	X	X	X	X	X
Longer and varied blocks of instructional time	X	X	X	X	X
More common planning time	X	X	X	X	X
Creative definition of staffing roles and workday	X			X	X

X = Sample school implements strategy.

ceeded 95%. For more than a decade, these rates have exceeded 90% annually (Darling-Hammond, Aness, & Falk, 1995; International High School (IHS), 1995).

Table 1 summarizes the resource-allocation strategies used in the five sample schools. It shows that each school implemented many strategies for allocating teachers and teaching time to address student needs and create planning time. Only the three alternative schools—Lyons, Central Park East, and International—created new teaching roles by contracting with other providers for teaching or by restructuring some teaching positions.

Data Collection and Analytic Framework

To understand the resource-allocation practices in each of the five schools, we collected information about school expenditures, staffing, and student scheduling. We collected comparable data for traditional schools, along with district-level budget and staffing information. We conducted interviews with administrators and teachers and examined available written material at each school to understand the school’s organization and its link to educational purposes and outcomes.

In addition to describing the strategies each school used, this study created measures that allow comparison of resource-allocation patterns between these school models and traditional schools. The measures were developed by taking each resource-allocation principle, hypothesizing the quantifiable impact it might have on resources, and then testing this impact by using indices that are (a) descriptive of practices in both traditional and nontraditional schools, (b) easy to understand, and (c) replicable.

Creating measures that accurately portray practices in the fluidly organized sample schools yet allow comparison to traditional schools creates a tension between the use of measures that are easily understood and calculated and those that can pro-

vide meaningful description. The subtleties involved can be seen through one example: the attempt to measure the impact of the principle “reduction of specialized programs to create more individual time for all.” In a traditional school, regular class size provides a useful gauge of how much access to individual attention a student might have. But regular class size does not reflect the student’s experience in some innovative schools because it does not describe the way these schools organize by subject and throughout the course of the day. For example, the regular class sizes of 24 at Quebec Heights school do not reflect the fact that all students spend 90 minutes a day in groups of 8 for reading. To capture the additional individual time for all students, a measure of average instructional group size, rather than regular class size, is used. This measure relies on greater descriptive knowledge of a school, but it more accurately reflects student experience.

Table 2 summarizes the measures used for each resource allocation principle. The first principle, “reduction of specialized programs to create more individual time for all in heterogeneous instructional groups,” should lead to smaller average instructional groups for all regular-education students and more even distribution of resources between regular and special-program students. Three measures helped assess the extent to which innovative schools differed from traditional schools here.

Students per teacher. This number includes all teachers and students in the school from all programs. Our sample elementary schools had similar numbers of students per teacher. However, a school can reduce its functional student-to-teacher ratio by converting typical non-teaching slots to teaching roles, as Central Park East School did. The index of students per teacher indicates only the opportunity to create small, flexible instructional groups. It does not reflect the actual size of the

groups in which most students spend time.

Weight average group size. This measure calculates the weight average size of the instructional group that a typical student experiences throughout the day for academic subjects. It incorporates the time spent in different group sizes during the day. For example, if students in a classroom of 24 spent 90 minutes a day (25% of their school day, not including lunch) in reading groups of 8, then the weight average group size would be 20 ($0.75 \times 24 + 0.25 \times 8$). In a traditional school, the average group size and the regular class size would be the same. This measure may offer a clearer sense of how much access to individual attention most students in the school have.

Percent of teachers in regular-education instructional groups. This figure divides the number of teachers who work with regular-education students (including classroom teachers, subject specialists, and other teachers who work all day instructing groups that include regular-education students) by

the total number of teachers in the school. The figure gives a sense of the extent to which a school has concentrated its resources on core classroom functions as opposed to pull-out programs of various kinds.

The second principle, *more flexible student grouping*, should allow educators to create instructional groupings that more closely match instructional needs. Formulas that mandate the size of groups and classrooms can create situations where group sizes vary for no educational reason. When teachers can create their own groups using criteria linked to educational strategies, they can reduce these unplanned variations and create a strategy that maximizes the use of limited resources. The percent of *regular-education students* in targeted group sizes represents the extent to which a school has minimized random variation in class size. In schools where no group size target existed other than the contractually defined class-size maximums, we measured how many students were in classes that

TABLE 2
Measuring Resource Allocation Patterns: Staff Allocation

Resource allocation principles	Expected impact on resources	School measure
Reduction of specialized programs to create more individual time for all	Smaller sized regular education instructional groups More even distribution of resources between regular and special program students	Students per teacher Average size of regular education instructional groups Percentage teachers in regular instructional groups
More flexible student grouping by school professionals	Smaller instructional groups in focus areas Less unplanned variation in class sizes	Percentage students in target regular education size groups Average size of group in focus area
Structures to support more personal relationships	Lower teacher student loads More adults involved in instruction Smaller teams of teachers and students Multiyear relationships between students and teachers	Teacher student loads per day Percentage adults instructors/advisors Size of teacher/student clusters Length of student/teacher relationship
Longer and more varied blocks of instructional time	Longer instructional periods for academic subjects	Average length of instructional period for academic subjects
More common planning time	More minutes of common planning Longer periods of time for planning	Common planning minutes/week Length of longest planning period
Creative definition of staffing roles and workday	Use of part-time or contract staff Use of interns or paraprofessionals for instruction Staggered work schedules	Not applicable

were within 5% of the average size. More flexible student grouping also allows teachers to create smaller groups for target subject areas. The *average size of instructional groups in focus area* measures how schools focus resources to create more individualized attention in subjects where they do so. If some regular-education students spent time in much smaller instructional groups, this would be reflected in the average by calculating the percentage of students receiving such support.

Four aspects of the third principle, *structures to support more personal relationships between teachers and students*, lend themselves to measurement. First, a primary indicator of a teacher's opportunity to build relationships with each student is the academic teacher's *student load*. A second indicator of a school's effort to maximize personal relationships might be the *percent of professionals who serve as instructors or advisors* to regularly scheduled groups of students in an ongoing fashion. Thus, an assistant principal who worked with occasional discipline problems or a guidance counselor meeting once with each of 200 students to ensure compliance with graduation requirements would not be included. Although these singular contacts with students can be important, they do not aim to build long-term, personal relationships between school professionals and students. The *average size of teacher and student teams or clusters* provides a third measure of the opportunity to create a more personal educational environment. For this measure, student-teacher teams had to be self-managing and self-contained. This means that virtually all instruction occurs within the cluster and that the cluster has primary responsibility for curriculum, grouping, discipline, and evaluation of its students. A final strategy schools might use to create personal relationships would be to keep teachers and students together for longer than the typical year. Thus, we include a measure of the *number of years teachers and students stay together*.

The extent to which sample schools created *longer blocks of instructional time* is measured by the average scheduled *length of instructional period* for academic subjects in secondary schools. In some of the schools studied, teachers vary the length of instruction from the schedule to suit a particular lesson. These variations were not calculated here.

Finally, two measures are used to understand how sample schools create *more useful common planning time for teachers*. The *number of minutes of*

common planning time is defined as the amount of time each week that is shared with other teachers and spent on collaborative planning regarding curriculum, students, or school practices. A second indicator of the usefulness of the planning time is the *length of the longest planning period*. For some kinds of planning and development, teachers need time periods longer than the typical 40 to 50 minutes.

Each innovative school is compared with a typical school in the same district with a similar student population. Meaningful comparisons must include an adjustment for the mix of students eligible for special services because schools typically receive additional resources to serve them. Adjusted for student mix, the schools in this sample used no greater resources than traditional schools on an ongoing basis. In two cases, no "traditional" school existed in the district that served the same mix of students as our sample sites. Lyons Elementary School in Boston draws a large percentage of its population from special-education students typically served by private schools. In this case, a hypothetical comparison was created based on the assumption that these students were served in separate, self-contained classrooms of four each, the smallest existing class size, and that social services and other support staff were the same as at Lyons.

The International School in New York City serves a unique population of limited-English-speaking students. Traditional schools serve such students through bilingual programs and ESL courses offered separately from the rest of the high school curriculum, but do not typically have 100% of their population requiring such services. To create a comparison to International, we used the New York City staffing allocation formula to determine the number of teachers the school would have received for these special-needs students; we assumed the additional resources would be used to fund separate bilingual or ESL classes. Although this generous assumption about universal ESL services to limited-English-proficient students does not hold true in many of New York's traditional schools, it offers a best-case scenario for the allocation of resources in a traditional model.

These calculations are intended to provoke discussion and to provide an objective way of comparing schools with each other. Obviously, other factors that are not incorporated into these measures contribute to the opportunity for individual attention and shared teacher time. For example, a

teacher in a class of 24 may use sophisticated grouping practices that allow her to provide targeted individual or small-group instruction to students throughout the day. These grouping strategies are not incorporated into this measurement scheme unless the entire school uses the strategy. The existence of planning and development time does not guarantee that it is used to improve teaching quality. Further, many schools find common planning time for teachers outside the school day on a volunteer basis. Thus, these measures are intended to be used in conjunction with a descriptive understanding of the way a school has organized itself to match resources to student needs and to provide opportunity for teacher growth.

Study Findings

We discuss our findings concerning elementary and secondary schools separately because they begin with such different organizational structures. With their relatively small teaching loads and self-contained multi-subject classrooms, elementary schools already allow more flexible, individual instruction. But their simple structures, with limited teacher time free from instruction, do not offer the same opportunities for freeing time and resources as secondary schools. Because of these simpler daily schedules, reducing the use of pull-out programs for special education, language, and Title 1 instruction becomes a primary lever for creating smaller groups for all in elementary schools. In contrast, traditional secondary schools, with their short periods, multiple classes, large teaching loads, and greater amounts of non-teaching time, offer more ways to reconfigure their resources.

Elementary Schools

Table 3 presents the resource-allocation measures for the three elementary schools. In the three urban districts studied, the traditional schools served regular-education students in age-graded, self-contained classrooms. About 75% of the teachers worked with regular-education students; the other 25% worked with Title 1 and special-education students outside the regular classroom (Table 3, "Average size of instructional group in reading"). Because all of these schools are in urban areas with high concentrations of students living in poverty, even the traditional schools were using at least some of their Title 1 resources to add regular classroom teachers. Thus, their regular-education class sizes averaged between 19 and 22 ("Average size of regular-education in-

structional group). Class composition and class size stayed the same all day for all subjects, except when students were pulled out for special education or Title 1 instruction. The elementary classroom teacher instructed in all subjects except in specialties like art, music, and gym, which were taught by specialists during the classroom teacher's free period. Teachers had 45 minutes three to five times a week free from instruction in addition to short lunch periods. These times were not coordinated with other teachers in any systematic way.

Reduction of specialized programs. In departing from this organization, all of the sample schools increased to above 90% the percentage of teachers who worked with heterogeneous groups of students (see Table 3.) The comparable percentages in the traditional schools ranged from 28% to 77%. The only teachers in the restructured schools not working with heterogeneous groups of students were teachers of special-education students in separate classrooms at Quebec Heights.

Each elementary school used different levers for matching instructional resources to student needs, depending on its educational goals. First, Quebec Heights decided to use multi-age grouping to respond more effectively to diversity in student skill levels. Students were assigned to multi-age clusters, called "families," containing three to four teachers and 75 to 85 students in grades one to three or four to six; the families remain together for three years. Students may work with any instructor within the family during the day, but each has a homeroom teacher who has primary responsibility for a class of 22 students for the full year. Rather than divide the curriculum by age level, all students in the family study the same basic topics during the year, but at their own developmental level.

Second, Quebec Heights eliminated separate Title 1 programs and used these resources to reduce the size of reading groups for all students. Third, special-education students and teachers were fully integrated into the families. In the primary grades, the special-education resource teacher works as one of four teachers in a team responsible for a group of 85 students.

The Douglass Elementary School in Memphis used its Title 1 budget as the primary lever for rethinking resources to improve student performance. Because 97% of its students qualify for Title 1 assistance, Douglass has long been free to use Title 1 dollars across the school. At approximately \$250,000 dollars per year, these resources repre-

TABLE 3
High Performing Versus Traditional Elementary Schools

Resource allocation principles	School measure	Quebec Heights		Douglass		Lyons	
		Average	Traditional	Average	Traditional	Average	Traditional
Reduction of specialized programs	Students per teacher Average size of regular education instructional group Percentage of teachers in regular education instructional groups	15 19 91%	15 21 77%	16 26 95%	16 22 76%	11 13 100%	7 19 28%
More flexible student grouping by school professionals	Percentage of students in target-size instructional groupings Average size of instructional group in reading	100% 7	65% 21	100% 20	60% 22	NA 6	NA 19
Structures to support more personal relationships	Student loads for primary classroom teachers Length of time students stay with teacher	22 3 years	21 1 year	24 1 year	19 1 year	13 1 year	19 1 year
More common planning time for teachers	Common planning minutes/week Length of longest planning period	325 45	100 45	135 45	0 45	405 105	45 45

sent nearly 20% of the school budget. Douglass restructured resources using an existing model for improving student performance, the “Success for All” program. Following this model, Douglass uses Title 1 dollars to hire reading teachers to work as one-on-one tutors with students who do not meet reading standards in the first and second grades. These teachers, and all special-education teachers, combine with regular classroom teachers to reduce the size of instructional groups from 24 to about 17 for 90 minutes of reading a day for all students.

The Douglass example illustrates why simple measures of class size do not provide enough information about how resources follow instructional goals. Before implementing Success for All, Douglass used Chapter 1 dollars for regular classroom teachers and had classes averaging 17 students across the school. As Principal Myra Whitney commented, “We had slowly reduced all class sizes over the years with no plan for how anything in the classroom would change. It wasn’t working; our students were still at the bottom in reading.” To implement Success for All, Douglass raised class sizes for all other subjects in order to reduce group sizes for reading and provide targeted one-to-one tutoring assistance to ensure all students are reading by the third grade. Douglass also redirected resources from grades three to six to the early grades. The decision to take resources away from some students and teachers to focus on others can produce tension. Douglass’s use of a proven model that included clear staffing requirements minimized this friction. As one teacher put it, “Everything is specified by ‘Success for All’; we didn’t consider quarreling with it because research shows this works.”

Douglass used Success for All as a catalyst for including its special-education teachers and students in regular classrooms. By the third year of the program, all students and teachers from previously self-contained classrooms and resource rooms spent most of their time in heterogeneous groups. During the daily 90 minutes of reading time, special-needs students worked in heterogeneous groups based on their reading-skill levels. The integration of special-education students was made easier by the fact that cooperative learning plays a large role in Success for All classrooms. Assigning special-education teachers their own reading groups that included students from all programs further reduced the size of reading groups for all students. During most of the rest of the day, special-education teach-

ers team-taught with regular-education teachers. They used approximately one quarter of their time for performing individual assessments and working with students needing more targeted help outside the regular classroom.

While Quebec Heights redesigned traditional age-grading practices and Douglass rethought its use of Title 1 resources, the Mary Lyons School used the reallocation of special-education dollars as a redesign lever. By including special-education students, who were previously educated in a private setting at a cost of over \$30,000 each per year, with regular-education students, Lyons created a unique, individualized environment for students and teachers. Mary Lyons is open to all students from 7:15 a.m. to 5:00 p.m. daily. Each classroom had 15 or fewer students—10 “regular” education students and 5 students with severe emotional/behavioral issues—and was staffed by a teacher, a teacher intern, and an after-school teacher. The pairs of six classroom teachers and six teaching interns included three teachers with regular-education certification and three with special-education certification. This unusual integration of special-education students and teachers is driven not by finances but by a belief that schools must meet children’s academic and emotional needs at their level of development. The teaching staff is hired to ensure attitudes, skills, and expertise to meet a broad range of academic, social, and behavioral considerations. They work closely as a team to analyze the effectiveness of their instructional efforts. Academic teachers have close to two hours daily of common planning time.

Virtually all teaching resources at Lyons supported this design, including Title 1 funds and funds that would have paid for subject specialists in traditional schools. A typical Boston elementary school has four subject specialists (in art, music, physical education, and computers) who supplement instruction and cover planning time for classroom teachers. Instead of this costly arrangement, Lyons pooled these dollars to contract with outside teachers for the provision of art and music and part of the after-school program.

In summary, each elementary school used its resources from special programs to support its core design. Quebec Heights and Douglass raised regular-education class sizes and redirected funds to reduce reading group sizes. Lyons used funds freed from eliminating separate programs to lower teacher-student ratios dramatically all day. In each

case, staff organization depended on the educational strategies and approach the school had adopted. The organization of resources and the educational goals in these schools were inextricably intertwined because the organization enabled the schools to implement new teaching strategies.

More flexible student grouping. Perhaps the most striking difference between the sample elementary schools and traditional schools is the proactive, strategic way in which teachers adapted instructional grouping to student needs. In a traditional school, administrators assign students to programs and classrooms according to bureaucratic rules and categories that stay constant over time and subject. Teachers in sample schools used their knowledge of student needs, rather than a student's program classification or age, to assign each to a regular homeroom class and to manage their instruction throughout the day.

In sample schools, reading groups were significantly smaller than in traditional schools. Lyons and Quebec Heights organized staff to allow groups of six and seven, respectively. Lyons used the classroom teacher and teaching intern to create reading groups of six. Quebec Heights rotated Chapter 1 teachers and instructional assistants through regular classrooms so that each classroom had three instructors for 90 minutes of reading time per day. The primary classroom teacher determined the composition of the groups and content of lessons daily based on consultation with the expert reading teachers and review of students' progress in specific areas. Some lessons divided students into groups based on areas where they needed further skill development; others grouped students heterogeneously to discuss reading content. This concentration of resources on the reading rotation meant that homeroom class sizes were one student larger on average than the traditional model.

At Douglass, all students spent 90 minutes per day in reading groups of 15–17 as compared to 22 in traditional schools. The composition of these reading groups varied each day and over the course of the year, depending on the teachers' assessment of student needs. A team including the teachers, reading specialists, and the Success for All facilitator assigned students to skill-based reading groups across grades using formal assessments every six weeks. Because assignment to groups indicated skill level as opposed to age or a static assignment of aptitude, the student moved on once he or she demonstrated these skills. Students not mastering

skills by agreed-upon times received one-on-one tutoring for 20 minutes each day from one of the three reading specialists. About 15% of first- and second-grade students received tutoring at any one time, but the students receiving tutoring varied over the year depending on who needed extra assistance in particular skill areas.

This continuous assessment and regrouping of students required significant time and joint effort. A full-time "instructional facilitator" helped teachers conduct, analyze, and act on the assessments. The facilitator received in-depth training in using Success for All reading assessment tools and worked with a districtwide expert in Success for All who had further expertise. In pulling this facilitator from the classroom, Douglass once again traded general regular-education class sizes for a strategic use of resources that supported its school design. In this case, the facilitator enabled a more careful matching of instruction to student needs as well as a more effective use of joint planning time.

Traditional schools experience variations in class sizes driven by formulas and enrollment swings. Boston's school choice plan allowed Lyons to cap the number of students by grade through the student assignment process. Mixed-age grouping at Douglass and Quebec Heights allowed teachers to control group sizes. For example, if Douglass had used age-based grading, class sizes in the first and second grade would have been 24 and 26, respectively, with class sizes declining as the student moved toward sixth grade. Instead, the Douglass staff combined grades to create smaller groups of 23 in the first three grades and 26 in the intermediate grades. Thus, sample schools exerted more control over class sizes by combining ages and programs so that all students were in targeted class sizes rather than the 60% to 65% who would have been in such group sizes using traditional age grading.

Structures to support more personal relationships. Quebec Heights' family structure aimed to strengthen relationships between teachers and students by keeping teachers with the same family of 85 students for three years, usually with the same homeroom class. This meant that some teachers received as few as nine new students each year. As an intermediate teacher stated, "It's hard to overestimate how much time this saves us. We get started quickly in the new school year; students know the rules and boundaries, and I know what they can do."

The Lyons School's small size and intense staffing ratios created a highly personal environment for all students. The staff also created time to discuss each student's progress as a team. All of the professionals working with each group of students—the classroom teacher, intern, a special-education evaluation specialist, the after-school director, and a social worker—met weekly for 45 minutes. Together, they identified problems, discussed possible strategies, and shared successes and frustrations.

More common planning time. All three schools created more common planning time, but the constraints of time and collective-bargaining agreements meant that only Lyons made dramatic changes (Table 3). Both Douglass and Quebec Heights increased common planning time using the conventional method of scheduling specialists to allow meeting time for small groups of teachers. Lyons's academic teachers shared a 30-minute lunch period followed by one hour and 15 minutes of common planning time, while students had lunch and recess and received instruction from their instructional intern and after-school teacher. In combination with the "student support" team meetings described above, teachers met together for a total of 405 minutes weekly, in contrast to no more than 60 minutes in a traditional school.

Creative definition of staff roles and workday. The Lyons school was able to create so much more planning time because it redefined teaching roles throughout the day. Whereas in a traditional school, only the classroom teacher or subject specialists assume responsibility for classroom instruction, Lyons had a master teacher and a highly trained and supervised "instructional assistant trainee" in each classroom. In contrast with often poorly trained paraprofessionals, the Lyons "trainees" were college-educated students working on their master's degrees in special education at Wheelock University. To do this, Lyons negotiated with the Boston Teachers Union to convert paraprofessional slots to "instructional assistant trainee" positions. As part of their program, the Wheelock students work in schools for stipends of \$10,000 per year and participate in intensive coursework over holidays and the summer. Wheelock sends a faculty member every two weeks to observe and discuss the trainee's practice with the master teacher. The trainee's stipend costs less than the \$18,000 in salary and benefits for a paraprofessional. The savings allowed the school to give each teacher an "instructional

assistant trainee." Where possible, the new instructional assistants were recruited from the existing paraprofessional staff. While the trainee position represented a short-term cut in pay, this position led to full-fledged certification as a special-education teacher for these staffs.

In addition, Lyons contracted with teachers to cover "schoolwide" planning time. The "after-school" teachers overlapped the regular school day by one hour. During this time, they managed the classroom along with the instructional assistant trainee. In addition to providing regular teachers with planning time, this overlap provided a chance for after-school teachers to transition from the regular academic day along with someone who had been with the students all day, thus allowing more continuity and better care for the children. The eight after-school teachers, who were provided through a contract with a private nonprofit organization, specialized in behavior management and brought a wide range of experience with emotionally disturbed as well as gifted students. The principal worked closely with the contractor to specify the qualifications of these teachers, and the contract was contingent on the hiring of such exceptional teachers.

Secondary Schools

The traditional high school, with its departmentalized instruction and highly segmented school day, offers many more opportunities for rethinking resource allocations than do elementary schools. We examined a typical comprehensive high school in New York City serving about 3,300 students.³ The school is considered a "good" school, serving a largely middle- and working-class population of students. It had nearly as many special needs and Chapter 1 students as Central Park East Secondary School (CPESS) and was in the process of beginning to restructure its programs. At the time of the study, however, it used traditional staffing and scheduling practices.

As Table 4 shows, the sample high schools looked very different from the traditional high school on virtually every dimension measured. Although our analysis is focused on the use of instructional staff, it is worth noting that the traditional high school had many more non-teaching staff members than the two restructured schools. Not including custodial and food-service workers, more than 40% of its total staff had non-teaching assignments. Staff assignments included 1 principal, 9 assistant prin-

TABLE 4
High Performing Versus Traditional Secondary School

Resource allocation principles	School measure	Central Park East	International	Traditional
Reduction of specialized programs	Students per instructional staff member	10.2	10.2	14.7/13*
	Students per full-time teacher	13.3	15.8	23.6
	Average size of regular instructional group	18	25	33.4
	Percentage teachers in regular instructional groups	89%	100%	70%
More flexible student grouping	Percentage students in target-size grouping	100%	100%	60%
	Average size of advisory group	15	12	29 (homeroom)
Structures to support relationships	Student loads per term	36	75	167
	Percentage professional staff serving as instructors/advisors	100%	100%	65%
Longer and more varied blocks of instructional time	Average length of instructional period	120 minutes	70 minutes	42 minutes
More common planning time	Common planning minutes/week	450 minutes	350 minutes	0 minutes
	Length of longest planning period	120 minutes	140 minutes	42 minutes

*A traditional high school that had a 100% limited-English-proficient pupil population like that at International would receive additional staff to reduce its student/teacher ratio for those students to 13:1.

cipals, 13 secretaries, 10 school-based services specialists (social workers, psychologists, etc.), 3 librarians, 17 security guards, 22 non-teaching school aides, and 14 classroom-based paraprofessionals. In the restructured schools, just over 25% of staff had non-teaching assignments, and most of them taught at least part-time (Darling-Hammond, 1997).

The traditional high school had one instructional staff person for every 14.7 students, and New York City staffing allocations would reduce the student load to 13 for a population of students like that at International High School.⁴ Because fewer than two thirds of these instructional staff members taught full-time, however, class sizes averaged about 33. Special-education, bilingual education, English As a Second Language, and Title 1 programs were administered separately, with generally smaller class sizes. The typical student attended school from 8:05 a.m. to 2:13 p.m., participating in seven different 42-minute classes with seven different teachers, plus one lunch period. Teachers taught five instructional periods a day, with two periods free from instruction: one used for planning and the other for

rotating “building assignments,” such as cafeteria duty or hall duty or other administrative or program responsibilities. Excluding these special duties, teachers routinely saw about 167 students per day.

By contrast, the two sample high schools began with resources roughly similar to the traditional school and ended with dramatically smaller group sizes and teacher loads. As noted, the first difference was in allocating a greater share of resources to instructional staff rather than administrative and support staff. The second was in assigning almost all instructional staff to work directly with students. As a consequence, all students experienced much smaller class sizes (18 at CPESS and 25 at International), while their teachers also had much more planning and professional development time. Because teachers taught a smaller number of longer periods, pupil loads were also reduced: Teachers at Central Park East saw 36 students, and those at International saw 75 students in a given term. The schools achieved this by reducing specialization, reorganizing student groups and teaching structures,

and investing heavily in professional development. The strategies the two schools used reflected their instructional purposes and philosophies.

Reduced specialization. Central Park East Secondary School reduced specialization in a host of ways in order to create smaller teacher-student loads and focus resources on academic subjects. CPESS follows the principles embraced by the Coalition of Essential Schools, one of which is that “less is more.” Instead of aiming for broad coverage of content, CPESS organized its curriculum around five “Habits of Mind” that encompass the abilities to weigh evidence, take varying viewpoints into account, see connections and relationships, speculate about possibilities, and assess value. These goals are reinforced in every course and in a comprehensive portfolio assessment system. The school concentrates its resources on a common core curriculum in grades 7–10 and uses college and community resources to expand curriculum options in the upper grades.

At the time of the study, all students took academic subjects in heterogeneous groups of about 18. Students in divisions I and II (grades 7–10) took two, two-hour academic courses each day—humanities and math/science plus a foreign language offered in a shorter period before school. All full-time teachers in these grades, with the exception of two special-education resource room teachers, taught one of the two interdisciplinary courses. The resource room teachers helped students with their regular classroom work, thereby reinforcing rather than fragmenting students’ learning. Students and teachers told us that the extraordinary outcomes achieved at CPESS were made possible by these small class sizes and the continuity provided by (a) having a team of teachers stay with the same students for two years and (b) providing extra help to special-needs students connected to their regular classroom work. In addition, teachers were grateful for opportunities to extend their disciplinary knowledge by planning together in subject-area teams and to extend their knowledge of students by also working together in “house” teams organized around the teaching of shared groups of students (Darling-Hammond et al., 1995).

In the Senior Institute (grades 11–12), the school reduced its need for specialization by working out advanced course-taking opportunities for students at local colleges to supplement required courses and electives offered in the school. All students took at least two college courses during their last two years

of high school, along with an internship in a local business or community organization. These strategies expanded students’ academic and vocational opportunities while freeing staff time for the one-on-one advisement needed to support students in completing extensive research projects and the other portfolio entries they would defend before their graduation committees.

Language instruction and some electives were provided through outside contracts. Although students could opt to take more advanced courses in specific subjects, there was no tracking, no separate Title 1 program, and no separate bilingual program. Instead of hiring guidance counselors, each teacher was responsible for counseling 12 students during scheduled advisory periods. The small size, personalization, and team organization also eliminated the need for attendance officers, deans of discipline, assistant principals, and supervisors—roles that deflect resources from teaching positions in traditional high schools.

The organization of resources at International High School also followed its educational mission—the education of recent immigrants—and its philosophy, which includes the following principles:

- Language skills are most effectively learned in context and when embedded in a content area;
- Successful educational programs emphasize rigorous standards couple with effective support systems;
- Attempts to group students homogeneously preclude the way in which adolescents learn best (i.e., from each other); and
- The carefully planned use of multiple learning contexts in addition to the classroom (e.g., learning centers, career internship sites, field trips) facilitates language acquisition and content-area mastery.

The existence of clear school goals and a consensus about strategies enhanced International’s ability to design a coherent, carefully configured organization. The school reorganized its programmatic resources around 12 interdisciplinary themes. Six self-managing instructional teams, called “clusters,” were composed of four to six teachers plus guidance and paraprofessional staff who developed two thematically based courses of study (e.g., *motion, visibility*), which integrated four subject areas (e.g., literature, global studies, mathematics, and physics). The team took responsibility for the total

educational experience of about 75 students during a 13-week course of study. Students chose three of these thematic courses each year.

All teachers taught heterogeneous groups of students that included all native languages and all grades, economic levels, and ability levels. The faculty integrated English As a Second Language techniques into their content-area courses, while providing students with opportunities to develop further their language skills with instructors outside the core curriculum and in learning contexts such as internships outside of the school. The success of this strategy is illustrated by the fact that virtually all International students pass the New York State competency tests in English as well as other subjects, and virtually all are accepted to college before graduation.

Teachers designed the cluster schedule because they felt that planning and teaching in interdisciplinary teams would enable them to have more influence on student learning. They found that the school's first cluster experiment produced much greater levels of student success than had independent classes because teachers' efforts were jointly planned and cumulative and teachers could deal with students' needs and problems in a concerted fashion (Darling-Hammond et al., 1995).

In both schools, the integration of previously specialized resources, along with the investment of greater resources into teaching positions rather than non-teaching positions, translated into much lower pupil loads and more opportunity for individual student attention than in the traditional school. In addition to focusing resources on instructional positions, the sample schools used most of their teaching resources in one core academic program in which all students participated, rather than using special program resources for add-on remedial or special-education programs. Central Park East used 89% of teaching resources in its core instructional program, while International used all staff in the core program, as compared to roughly 70% of

teachers working in regular instruction in the traditional high school.

Smaller class sizes were also achieved by creating a broader role for professional staff in the restructured schools, rather than using specialists to perform "non-classroom" functions. Staff acknowledged this trade-off in a set of "understandings that underlie professional staff work at CPESS," which includes the following statement:

In return for smaller class sizes (maximum 20) and smaller total student rolls, teachers will work with students for a total of 22 hours a week in classes, advisories or tutorials, conducting seminars, overseeing projects, giving lectures, or advising and coaching individual students (CPESS, 1991, Appendix A).

More flexible student grouping. Reducing the number of programs, courses, and levels made it easier for the sample schools to control the size of instructional groups. As Table 5 shows, although 64% of all classes in the traditional high school had 29 to 34 students, 21% of classes were smaller than 25. Class sizes were higher in regular-education academic classes than in nonacademic classes (New York City Board of Education, 1993, pp. 82–92). In contrast, Central Park East and International place all of their students in target-size groups.

Even more flexible grouping strategies were found in Central Park East's Senior Institute (grades 11–12), where teachers and students focused substantial attention on preparing the graduation portfolio and applying to colleges. Time was allocated to allow teachers to provide coaching and support for independent study. A typical teacher would teach two classes over about 12 hours per week. He or she would also spend 4 to 5 hours a week supervising independent projects, another 4 to 5 hours in advisory working with his or her 12 advisees on academic and personal concerns, and another 3.5 hours per week for one-on-one help to students. Class periods varied in length depending on their purpose. While students took courses and

TABLE 5
Class Sizes in the Traditional High School

Size of class	Academic	All classes
0 to 19	6%	8%
20 to 24	7%	13%
25 to 28	13%	13%
29 to 34	72%	64%
More than 34	3%	3%

completed internships outside the school, teachers got time to work and plan together.

Structures to create personal relationships. The sample schools were organized more like elementary schools than most secondary schools, featuring small teaching units and closer, more sustained relationships between teacher and student. In addition to the smaller class sizes, both sample schools used “advisory groups” as a key strategy for maintaining ongoing relationships with students. Each professional staff member worked with a group of 12 to 15 students and their families. The use of all professional staff, not just teachers, allowed advisory groups to be smaller than average class sizes. Advisory groups met for approximately four hours a week at Central Park East and for about two hours weekly at International. Teachers and advisors used the time for individual study; to discuss health, social, and ethical issues; and for individual and group advising and counseling. The advisor served as the “expert” on the student, meeting regularly with the family and other teachers to discuss the student’s needs and progress, coordinating parent conferences, and the preparation of narrative assessments of student work.

Whereas all professionals in the two restructured schools worked on a regularly scheduled basis with groups of students, only 65% of the professional staff at the traditional high school had regularly scheduled contact with a continuing group of students. While guidance counselors and other support personnel worked intensively with some students, they did so on a reactive, usually sporadic basis that was not designed to create close, long-term relationships.

Longer and more varied blocks of instructional time. In contrast to the traditional high school’s seven 42-minute periods each day, both restructured high schools created longer periods and more flexible schedules to accommodate more ambitious kinds of work and to allow more time for teachers to support student learning. At Central Park East, students in grades 7–10 had two, two-hour blocks of humanities and math/science each day. Because these two teachers worked together as a team, they could vary the split of time between the two to accommodate daily lesson plans. In addition, one morning a week, students spent two and one half hours in a community service project while their teachers were engaged in curriculum planning. Other coursework, such as language instruction, took place in smaller (usually one-hour) blocks of

time. In the Senior Institute, classes varied in length from one to two hours, while advisement sessions, internships, and independent work time were scheduled for longer blocks of time to allow students to undertake extended work with adequate coaching and time for research.

At International, students typically had four courses, each of which met for 70 minutes four times per week. They also had a two-hour internship and an hour-long seminar each week. Because each cluster of four teachers controlled their shared students’ entire time schedule during a 13-week cycle, they could vary time across classes each day as needed for the work in which students were engaged.

More common planning time. Both sample high schools created structures that demand and allow much more common planning time. In addition to individual “prep” time, Central Park East teachers spent, on average, seven and one half hours per week in scheduled common planning time. CPESS used four strategies to create this time. First, teachers met with their disciplinary teams for two and one-half hours of weekly curriculum planning while students were in community service placements. Second, while teaching fellows and other professionals provided coverage, teachers had from one and one half to three hours each week to meet with fellow “house” teachers and with students individually. Third, students’ hours were increased during the week so they could be dismissed at 1:00 on Fridays to create time for a weekly two-hour staff meeting. Finally, as its governance plan states, “the full staff agrees to meet during hours when the students are not in attendance to complete necessary business” (CPESS, 1991, Appendix A). In addition to the Friday meeting, teachers attended a regular Monday meeting from 3:00 to 4:30.

At International, teachers had 140 minutes each week to plan with their cluster while students participated in college courses and other activities. During a half day each week set aside for club activities for students, teachers staff-initiated professional development. In addition, teachers had a 70-minute individual planning period each day that often coincided with that of other members of their team. These models offer stark contrast to the traditional high school model in which teachers had one or two separate 42-minute periods free from instruction, one often devoted to non-academic duties and the other organized as an individual preparation period.

Creative definition of staff roles and workday.

Both of the sample schools have made many changes to the roles of teachers and the typical organization of the teacher workday in ways that enable greater personalization for students. They focused teaching resources on core academic subjects by contracting with outside providers for electives and non-academic subjects. Central Park East increased resources for teachers by incorporating counseling and advising into the teaching role. In both schools, teachers are involved in curriculum and assessment development, hiring and evaluation of staff, schoolwide decision-making, and staff development. These broader professional roles not only reduce the need for non-teaching specialists assigned to manage and oversee teaching, but they also enrich teachers' knowledge and skill by giving teachers continuous opportunities to reflect on their teaching and learn from one another, thus expanding the expertise available in the school (Darling-Hammond, 1997).

Policies, Regulations, and Contractual Issues

To accomplish these things, the sample schools directly challenged policies, regulations, and collective-bargaining agreements. First, most of the schools changed the contractually defined teacher workday and contractual rules for such matters as seniority transfers. Second, in breaking down barriers between programs, age groupings, and subjects, they confronted staffing formulas, program administration rules, and, sometimes, teacher licensing categories. Third, many of these schools redefined both teaching and non-teaching positions to create new jobs that do not fit neatly into existing contractually defined categories.

Collective-bargaining agreements in most districts clearly define the teacher workday, outlining the hours teachers are required to work and limiting the number of required afternoon and evening meetings. Most go further to specify the number of minutes teachers must have free for lunch and planning activities, and some limit the number of hours in a row teachers can be involved in instruction, making it difficult to create connected blocks of planning time. It is easy to understand the reasons for these provisions, but it is also clear that new strategies are needed for schools in which teachers jointly develop curriculum and manage their own and students' time.

As teaching jobs are broadened, schools can run into state, district, and collective-bargaining restric-

tions. Using teachers across subjects or programs can require waivers. Lyons's use of three special-education teachers and three regular-education teachers to teach integrated classrooms of special-needs and regular-education students required waivers from the Boston teachers contract and Massachusetts state certification laws. The principal argued that she knew how to identify individuals with experience and disposition to handle both special-education and regular-education students. She developed a plan to create a team structure that took advantage of teachers' diverse skills and a professional development plan for each teacher and for the entire school so that they would develop the skills they needed.

Schools also can run into certification problems in moving to interdisciplinary instruction because many collective-bargaining agreements and state regulations require teachers to hold certification in more than one subject to teach humanities or math/science in middle or high schools. Finding individuals with the subject and pedagogical knowledge to combine these subjects effectively is obviously critical to successful interdisciplinary instruction. Although certification in both fields is one indicator of this ability, it is not the only means for developing expertise in a second field. At Central Park East, teachers with a background in one field plan in curriculum teams (a math/science team and a humanities team) that provide the additional disciplinary expertise they need to handle the breadth the core courses require.

New job positions and hiring arrangements also confront some collective-bargaining agreements and traditional allocation guidelines. For example, Lyons Elementary and Central Park East Secondary created a different kind of "instructional assistant" by using teaching interns—graduate students who are preparing to become teachers—instead of paraprofessionals or untrained support staff. In addition, three of the sample schools received waivers from collective-bargaining agreements to use outside contractors for specific kinds of instruction.

Greater flexibility in staffing arrangements appears to be a critical ingredient for successful school design. Many districts treat staff as interchangeable when they make assignments and move staff on seniority transfers. Other districts have solved this problem by creating alternative personnel tracks for specially designated schools. Cincinnati has done this for Paidea and Montessori schools. In Boston, schools negotiate control over the hiring

process on a position-by-position basis. In New York, recent contract negotiations have allowed for teams of teachers, including principals and union representatives, to select their new colleagues in the growing number of schools that have a distinctive missions. With the recent creation of over 100 new small schools in the city joining the substantial number of longer-standing alternative schools, this provision paves the way for widespread use of new staffing models.

Finally, teacher contracts, district policies, and state regulations often define class-size maximums by program, grade level, and sometimes subject. State guidelines specify the size of classroom for students at each level of special-education classification. Schools can depart from these regulations if parents, teachers, and special-education professionals agree to an individual education plan that educates the student in a larger, more inclusive setting. Designs like that used at the Lyons school require intense communication with students and parents to create understanding of the new approach and strategies to ensure appropriate additional support for the students. They also demand that state and district officials work with schools to allow educationally sound designs.

District student and teacher assignment policies can frustrate attempts to use teachers differently. In the sample districts, schools moving students from more restrictive special-education settings into the regular classroom sometimes faced a potential loss of teachers because special-education staff were allocated based on the number of students requiring separate education. If schools integrate students back into the regular classroom and resources are therefore reduced, the regular teacher in whose class the special-education student now spends most of his time receives no extra resources and no reduced student load. In these cases, schools can find that regular-education classrooms grow more unruly and crowded while the caseloads of special-education teachers decline. Over time, schools should find ways of shifting resources back into the classroom without losing special-education expertise. To respond to this problem, Boston has adjusted its staffing formula to allow schools to use the resources for special-needs students in inclusive settings.

Conclusion

Although these five high-performing schools look very different from one another, they have all redesigned the way they allocate teaching resources

to meet student needs and to create the time teachers need to implement a new vision of schooling. They demonstrate how schools can reallocate resources to implement new designs. The framework presented here aims to provide researchers and practitioners with a way to examine systematically the possibilities for reallocation and to measure their impact. These examples show that changing school organizations to better fit an instructional vision will require schools to confront tradition and a host of state, district, and union policies and practices. These barriers can loom large, but the biggest constraint may be lack of vision about the concrete changes in school organization that can create a more professional organization and improve student achievement. This article aims to provide some clear, detailed examples schools might use to develop such a vision, including goals for student achievement along with educational strategies and an organization to accomplish these goals.

The variety of models presented here suggests that resource reallocation and the design of an instructional vision and strategy are intertwined. There is little rationale for restructuring resources without an underlying educational design. As these models and others are tested against evidence of improved student performance, one could imagine states and districts working with schools to adopt proven designs, through a conscious process of changing resource allocations, practices, and regulations at each level. As part of the process of choosing an appropriate design, schools might undertake a comprehensive review of how their practices, resources, knowledge, and skills would need to change to implement a new model. Principles of resource allocation and indicators of their use could form the basis for tools that help schools and districts understand their progress. Districts could then organize their work to support these plans and develop strategies for helping schools make changes. This would include changes in state and district policies that may produce obstacles to alternative forms of organization.

The schools studied here have only touched the surface of opportunities for rethinking the way school resources are used; they have largely worked within existing salary structures and have not much explored the use of technology in the classroom. Nevertheless, they foreshadow the many ways schools may rethink existing resources to create more personalized education for students and more professional responsibility and growth for teach-

ers.

Notes

We thank the staff at the five schools we studied for sharing with us their successes and frustrations. Special thanks to Patrick McNeeley, principal at Quebec Heights Elementary School in Cincinnati, Mary Nash at the Mary Lyons School in Boston, Myra Whitney, principal of Douglass Elementary School in Memphis, Paul Schwarz at Central Park East Secondary School, and Eric Nadelstern and Ruth Ellen Weiner at International High School. We also thank Lori Chajet and Peter Robinson who helped collect much of the secondary school data as part of their research with the National Center for Restructuring Education, Schools, and Teaching.

¹Some large-scale quantitative studies do, however, suggest that student achievement is correlated with school designs that enable teachers to spend more extended time with smaller numbers of students and that allow teachers to make instructional decisions in teams (Darling-Hammond, 1997; Gottfredson & Daiger, 1979; Lee et al., 1993; Lee & Smith, 1995).

²A similar analysis quantifies the impact of these practices in three other districts: Fall River, MA, Middletown, NY, and East Baton Rouge, LA (see Miles, 1997a).

³In a related study (Darling-Hammond, 1997), Darling-Hammond also examined a smaller, more affluent suburban high school of about 1,600 students. However, the large difference in student populations between this school and the redesigned schools in New York City made this school inappropriate for the current analysis.

⁴Because International High has a unique student population composed of 90% Chapter 1—eligible and 100% limited-English-proficient students, an analogous traditional school could not be found for comparison. Instead, we used the New York City staffing guidelines, as outlined in the New York City publication *Comparative Analysis of the Organization of High Schools, 1992–93* to estimate staffing for students identified for special-needs programs (New York City Board of Education, 1993).

References

- Anderson, R. H., & Pavan, B. N. (1993). *Nongradedness: Helping it to happen*. Lancaster, PA: Technomic Publishing.
- Ball, D., & Cohen, D. (in press). Developing practice, developing practitioners: Toward a practice-based theory of professional education. In L. Darling-Hammond & G. Sykes (Eds.), *The heart of the matter: Teaching as the learning profession*. San Francisco: Jossey Bass.
- Braddock, J. H., & McPartland, J. M. (1993). The education of early adolescents. In L. Darling-Hammond (Ed.), *Review of research in education* (Vol. 19, pp. 135–170). Washington, DC: American Educational Research Association.
- Carroll, J. M. (1994). Time for the Copernican plan. *Phi Delta Kappan*, 76, 104–114.
- Central Park East Secondary School. (1990, May). *Basic governance plan*. Unpublished manuscript.
- Central Park East Secondary School. (1991, August). *Understandings that underlie professional staff work at CPESS*. Unpublished manuscript.
- Commission on Chapter 1. (1992). *High performance schools: No exceptions, no excuses*. Washington, DC: Author.
- Darling-Hammond, L. (1997). *The right to learn: A blueprint for creating schools that work*. San Francisco: Jossey Bass.
- Darling-Hammond, L., Aness, J., & Falk, B. (1995). *Authentic assessment in action: Studies of schools and students at work*. New York: Teachers College Press.
- Gottfredson, G. D., & Daiger, D. C. (1979). *Disruption in 600 schools*. Baltimore: The Johns Hopkins University, Center for Social Organization of Schools.
- International High School (IHS). (1995). *International High School 1993–94 end of year evaluation report*. New York: Author.
- Lee, V. E., Bryk, A., & Smith, J. B. (1993). The organization of effective secondary schools. In L. Darling-Hammond (Ed.), *Review of research in education* (Vol. 19, pp. 171–267). Washington, DC: American Educational Research Association.
- Lee, V. E., & Smith, J. B. (1994, Fall). High school restructuring and student achievement: A new study finds strong links. *Issues in Restructuring Schools*, 7, 1–5, 16.
- Lee, V. E., & Smith, J. B. (1995). *Effects of high school restructuring and size on gains in achievement and engagement for early secondary school students*. Madison: Wisconsin Center for Education Research, University of Wisconsin.
- Little, J. W. (1993). Teacher development in a climate of educational reform. *Educational Evaluation and Policy Analysis*, 15(2), 129–151.
- Miles, K. H. (1995). Freeing resources for improving schools: A case study of teacher allocation in Boston Public Schools. *Educational Evaluation and Policy Analysis*, 17, 476–493.
- Miles, K. H. (1997a). *Spending more at the edges: Understanding the growth in public school spending from 1967 to 1991*. Ann Arbor, MI: UMI Press.
- Miles, K. H. (1997b). Finding the dollars to pay for 21st century schools: Taking advantage of the times. *School Business Affairs*, 63(6), 38–42.
- National Center for Education Statistics. (1994). *The digest of education statistics*. Washington, DC: Government Printing Office.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. New York: Author.

- New York City Board of Education. (1993). *Comparative analysis of the organization of high schools, 1992–93*. New York: Author.
- Organization for Economic Cooperation and Development (OECD). (1995). *Education Indicators*. Paris: Author.
- Rettig, M. D., & Canady, R. L. (1993). Unlocking the lockstep high school schedule. *Phi Delta Kappan*, 70, 310–314.
- Rothstein, R. (with K. H. Miles). (1995). *Where's the money gone?* Washington, DC: Economic Policy Institute.
- Sarason, S. B. (1982). *The culture of school and the problem of change*. Boston: Allyn & Bacon.
- Sizer, T. (1992). *Horace's school: Redesigning the American high school*. Boston: Houghton Mifflin.
- Slavin, R. E. (1990). Achievement effects of ability grouping in secondary schools: A best evidence synthesis. *Review of Educational Research*, 60(3), 471–500.
- Soo Hoo, S. (1990). School renewal: Taking responsibility for providing an education of value. In J. L. Goodlad & P. Keating (Eds.), *Access to knowledge: An agenda for our nation's schools* (pp. 205–222). New York: College Entrance Examination Board.

Stigler, J. W., & Stevenson, H. W. (1991). How Asian teachers polish each lesson to perfection. *American Educator*, 15, 12–42.

Tyack, D., & Tobin, W. (1994). The “grammar” of schooling: Why has it been so hard to change? *American Educational Research Journal*, 31(3), 453–479.

Authors

KAREN HAWLEY MILES is director of Education Resource Management Strategies at 3705 Euclid Avenue, Dallas, TX 75205. Her specialties are school organization and management and finance.

LINDA DARLING-HAMMOND is the William F. Russell Professor in the Foundations of Education and executive director of the National Commission on Teaching and America's Future at Teachers College, Columbia University, Box 86, New York, NY 10027. She specializes in research on education policy, teaching and teacher education, and educational quality.

Manuscript received June 26, 1997

Revision received November 1, 1997

Accepted November 13, 1997