Teacher Resource Use Within New York State Secondary Schools

David H. Monk
Brian O. Brent
Christopher F. Roellke

About the Authors

David H. Monk is chair of the Department of Education and Professor of Educational Administration at Cornell University. He earned his Ph.D. at the University of Chicago, and has taught in a visiting capacity at the University of Rochester and the University of Burgundy in Dijon, France. Monk is the author of *Educational Finance: An Economic Approach* (1990), as well as numerous articles in scholarly journals. He is a Senior Research Fellow for the Consortium for Policy Research in Education (CPRE) and serves on the editorial boards of *The Economics of Education Review*, *The Journal of Educational Finance*, and *The Journal of Research in Rural Education*. He recently chaired the technical study group appointed by the New York State Board of Regents to examine alternative revenue sources for New York State public schools. He consults widely on matters related to educational productivity and the organizational structuring of schools and school districts and is a past president of the American Educational Finance Association.

Brian O. Brent is an Assistant Professor of Educational Leadership in the Warner Graduate School of Education and Human Development at the University of Rochester. He earned his Ph.D. at Cornell University. Professor Brent is a Certified Public Accountant who also holds a Master's Degree in Taxation from Arizona State University. He is interested in revenue issues of public school finance.

Christopher F. Roellke is an Assistant Professor of Education at the University of Richmond, where he teaches educational policy, curriculum theory, and applications of technology to classroom teaching. He was formerly a Research and Teaching Support Specialist at Cornell University and a research assistant for the Consortium for Policy Research in Education (CPRE). His research interests are in the politics and economics of education and secondary school reform. He is the recipient of the 1997 outstanding doctoral dissertation award of the American Education Finance Association (AEFA), The Politics of Education Association (PEA), and Division A of the American Educational Research Association (AERA).

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Introduction

More conventional research dealing with education finance in general and resource allocation in particular has focused on the raising of revenues at Federal, state, and local levels and the subsequent apportionment of these resources across schooling systems, typically school districts. It is becoming increasingly clear, however, that concerns about both productivity and equity cannot be adequately addressed solely at the district level. The purpose of this paper is to establish the importance of understanding resource flows at micro-levels of educational systems and to report on the progress made in New York to measure these flows. The findings presented here are part of a multi-state effort being made by the Consortium for Policy Research in Education (CPRE) Finance Center to gain insight into the allocation of educational resources at a variety of organizational levels.

This paper begins with an overview of a diverse set of policy debates that has drawn attention to resource allocation patterns at sub-district levels. The relevant policy issues are divided into two categories: productivity concerns and equity concerns. Both of these categories are discussed in detail. This discussion leads to a report on a series of empirical analyses used to gain insight into the allocation of educational resources at a variety of organizational levels.

In the next section, we describe briefly the data and methodology that underlies this line of inquiry. We deal with both the conceptualization of a "resource flow," and the identity of background and

NOTE: CPRE is a consortium of universities and operates two research centers, one of which is focused on matters of educational finance and productivity. The work of the Finance Center is supported by grant #R117G10039 from the U.S. Department of Education, Office of Educational Research and Improvement. The other states that are under examination are California, Florida, and Minnesota. See Picus, Tetretault, and Hertert (1995) and Nakib (1995).

structural features of school systems that are likely to affect internal resource flows.

The third section reports the results of cross sectional and longitudinal analyses of district resource allocation patterns in New York State's public schools for 1991–92. Utilizing data obtained from New York State's Education Department, we examine the allocation and use of professional staff across elementary, secondary, and administrative levels of schooling. Particular attention is given to distribution of both teachers and students to different areas of the curriculum. We also examine trends in the allocation and use of professional staff in school districts with different structural characteristics, including school district size, spending, fiscal capacity, and incidence of poverty.

The fourth section reports findings from a series of case studies that permit us to explore resource allocation phenomenon at more micro-levels than is customary in education finance research. Our quest for more refined measures of instructional resource uses prompted us to develop and apply a micro-level cost allocation model to six secondary schools within four districts in New York State. This model enabled us move beyond aggregated measures of the use of instructional resources and characterize all of the uses to which teachers put their time, including study halls and preparation periods.

Current efforts to understand more about productivity and the use of educational resources are demonstrating the importance of using refined measures of how resources flow within schools and classrooms.

The final section addresses the policy implications of the findings reported in this paper. These analyses all involve the adaptation of personnel data into a resource allocation framework. This adaptation raises a number of interesting data collection issues and these are discussed in conjunction with our findings. The section closes with a discussion of future directions for micro-level resource use inquiry.

Policy Relevance of Teacher Resource Allocation Information

A remarkably diverse set of policy debates has drawn attention to resource allocation at micro-levels of education systems, and we use this section to provide an overview of the kinds of issues that are prompting this attention. The relevant policy issues can be divided into two broad categories: 1) concerns over productivity or efficiency in education; and 2) concerns over equity and adequacy in the distribution of educational opportunities.

Productivity Concerns

Current efforts to understand more about productivity and the use of educational resources are demonstrating the importance of using refined measures of how resources flow within schools and classrooms. For example, there has been a growing awareness of the importance of resources flowing from either parents or peers. Some studies have focused on the direct effects of resources supplied in the home or by peers on pupil performance (Coleman 1988, 1991). Some on-going demonstration projects have also placed emphasis on the importance of parent and peer influences and are reporting successes (Comer 1980, 1988; Levin 1989, 1994). Others have considered home and peer influences in the context of their effects on grouping and tracking decisions within schools (e.g., Gamoran, 1993). In all of these cases, more refined measures of resource flows within schools, and classrooms are being found to have impact on pupil performance.

Similar conclusions are being drawn by researchers dealing with alternative indicators of teacher effectiveness. A common finding in this line of research has been that global measures of teacher education are not dependably related to pupil out-

comes. More recently, researchers have succeeded at disentangling teacher attributes into more refined measures of either what teachers actually know about the subject being taught (Hanushek et al. 1992) or teachers' level of subject area preparation (Monk and King, 1994). The results of these studies are encouraging and suggest that part of the key to understanding more about the effectiveness of teachers and teaching lies in the utilization of more refined measures of what teachers know and are capable of accomplishing in classrooms.

Progress is also being made toward understanding the impact of curriculum on pupil performance through the use of disaggregated data. It has been shown, for example, that high school course taking behavior is related to educational outcomes, and that students who take more advanced courses in a given area perform at higher levels (Meyer 1988; Lee and Bryk, 1988; Gamoran 1987). These studies employ relatively refined measures of the kind of curricular resources that flow directly to students. They are far removed from earlier and largely unsuccessful efforts that measured exposure crudely in terms of the broad measures of how much time students spend in school.

Cooper and Sarrel (1991) have been prominent among those who have attempted to disentangle resource flows at micro-levels so that flows to classrooms and instruction can be isolated from flows to more centralized administrative services.

In addition, the courts have been showing increasing amounts of interest in the effects of differences in district expenditure levels on the actual provision of educational services for students (Benson 1991). The so-called "third wave" litigation has become more prescriptive and has moved well beyond simple dollar valuations of inputs provided at the district level. Both the New Jersey and Kentucky Courts, for example, assessed educational opportunities in fiscal terms, as well as in terms of measures of services and programs available to children.

Finally, district resource allocation flows have also been at the center of recent controversies surrounding alleged mismanagement of educational systems. Cooper and Sarrel (1991) have been prominent among those who have attempted to disentangle resource flows at micro-levels so that flows to classrooms and instruction can be isolated from flows to more centralized administrative services. More recently, the accounting firm of Coopers & Lybrand has joined this effort and there has emerged a Finance Analysis Model (see Speakman et al. 1995; and Coopers & Lybrand, 1995). The goal has been to provide a tool that school officials at the district level can use to understand more about the division of resources across alternative uses.

Equity Concerns

There is a parallel, highly diverse set of policy issues where the goal is to address equity or adequacy problems in the distribution of educational opportunities. Here, also, we find a growing awareness of how important it is to obtain highly detailed measures of resource flows at disaggregated levels.

A Special Commission carried out a study of how internal school district spending practices have evolved in New York between 1979 and 1992 (Lankford and Wyckoff 1993; 1995). While this report dealt with efficiency, as well as equity issues, one of its most striking findings involved the rapid growth that has taken place in the funding of special education relative to other kinds of education. According to Lankford and Wyckoff's results, additional expenditures for disabled students totaled over a third of the increase in real per pupil expenditures between 1980 and 1992 (Lankford and Wyckoff, 1993). The recently released Economic Policy Institute's longitudinal analysis of spending in nine nationally representative school districts between 1967 and 1991 found that their sampled districts spent four percent of total resources

on special education, and that this figure had increased to 18 percent by 1991 (Rothstein with Miles, 1995). Both the Lankford and Wyckoff and the Rothstein studies raise a number of important equity and productivity questions. Their micro level analysis provides much needed empirical evidence for policymakers.

There have also been a number of recent school finance court decisions where the focus has been on equity at levels that are more disaggregated than is customary in school finance litigation. For example, there has been litigation in Los Angeles that focused on inequalities in spending levels among schools within the district (*Rodriguez et al. v. Los Angeles Unified School District et al*., 1992). The agreement that was finally reached called for the district to: 1) equalize basic norm resources, teacher experience, and teacher training among schools; 2) provide all students with maximum access to teachers with experience and training; and 3) mitigate the consequences of limited teacher experience and training wherever equalization cannot be achieved. In addition, by the 1997–98 school year, all of the regular schools within the district are expected to receive an equal dollar amount per pupil (within $100 per pupil). Beginning in 1992–93, the district must assign the teachers with high levels of training and experience to schools in the lower third of faculty training and experience.

Researchers are also beginning to examine resource inequalities across different areas of the curriculum.

Researchers are also beginning to examine resource inequalities across different areas of the curriculum. Oakes (1990) examined the differential allocation of resources to students within secondary schools, and drew attention to the effects of track placement on students' access to learning opportunities. Monk and Haller (1993) conducted a series of studies of the role school size plays in the allocation of resources to different areas of the secondary school curriculum. They examined divisions across both subject areas (e.g., mathematics versus English) and types of courses (e.g., remedial versus advanced).

Concern over one or another public policy issues coupled with a growing realization that progress in the debate is aided by the availability and use of more refined and less aggregated measures of resource flows connects this highly diverse set of studies on both the efficiency/productivity and equity/adequacy sides of the policy divide. It does not follow that greater disaggregation is always preferable to less, but it does seem clear that moving beyond gross district level depictions of resource uses offers many advantages.

Conceptual Issues and Methodology

Conception of a Resource Flow

We recognize three broad dimensions which resource allocation phenomena in education can be characterized. Specifically, we distinguish among the origination, disposition, and utilization of educational resources. The term "origination" refers to the size and nature of the resource streams that enter schooling systems. In a system of fiscal federalism, ambiguities quickly arise over precisely what point each type of revenue enters (e.g., Federal, state, and local level), but it is clear that the resources enter at different levels and can carry different stipulations. The origin itself can have implications for subsequent decisions that are made about the resources in question. In this paper we do not address issues related to the origination of resources. Detailed discussions of these findings are available in Monk, Roellke, and Brent (1996). The term "disposition" refers to decisions officials at various levels of the system make that allocate resources. For example, a resource might be allocated to the secondary science curricular

area or it might be allocated to a specific grade level within an elementary school. The term "utilization" moves the analysis deeper into the educational system (and closer to the point at which resources are transformed into educational outcomes) by explicitly introducing the allocation of student time and effort. As the discussion below makes clear, the chief difference between the disposition and utilization of resources involves a difference in the type of resource being allocated. Disposition pertains to the allocation of purchased and hired schooling resources while utilization involves the allocation of pupil time and effort and the attendant combination with teacher effort.

Data and Methods

State Collected Data. The general strategy for our analyses was to begin by using state collected data and then move progressively toward more micro-level indicators of resource allocation and use. Thus, there were multiple sources of data for our analyses. First, our analyses began with an examination of data collected by the New York State Education Department (SED) for the 1991–92 school year. For both the cross-sectional and longitudinal analyses we restricted our inquiry to "regular" K–12 school districts in New York by excluding operating institutional school districts, special residential school districts, and those districts operating only an elementary or secondary program. A separate analysis is conducted for the Big 5 city districts (Buffalo, Rochester, Syracuse, Yonkers, and New York City). In addition to being fiscally dependent school districts, these five city districts are substantially larger than all other districts within the state (nearly one-third of the pupils within the state are from New York City alone).

The general strategy for our analyses was to begin by using state collected data and then move progressively toward more micro-level indicators of resource allocation and use.

These exclusions left us with a sample size for the 1991–92 school year of 650 districts. The School Financial Master File (SFMAST), the Institutional Master File (IMF) and the Personnel Master File (PMF) of the Basic Education Data System (BEDS) were used for revenue, expenditure, enrollment, and staffing information. Figures reflecting the percentage of pupils qualifying for free and reduced-price lunch (FRPL), property wealth per pupil, and income per pupil came from the State Education Department's education finance research data base.

Within the core subject areas of the secondary school curriculum, we differentiate between "advanced," "regular," and "remedial" type offerings.[1] We relied on the course titles listed in the assignment code manual of BEDS to determine the type of course offering. We counted, as advanced courses, those subjects described in the manual as "advanced," "honors," "accelerated," or "college-credit." We counted, as remedial, those courses described as: "basic," "remedial," "practical," "developmental," or "corrective" (not special education). In cases in which the type of offering could not be determined by the course title, we relied on teachers' descriptions of the type of pupils within the class. If the teacher reported a homogeneous class of "advanced placement" or "honors" pupils, we counted that offering as advanced. Heterogeneous classes with generic course titles were counted as regular offerings.

In our within school disposition analysis, we report findings in several ways. First, we calculated full-time equivalent teacher staffing levels on a per 1,000 district pupil basis. For example, we calculated the number of full-time-equivalent elementary, secondary, and administrative professional staff per 1,000 pupils in the district. We also calculated the number of full-time-equivalent teachers in specific secondary school subject areas per 1,000 district

[1] We define the core curriculum as English, mathematics, science, social studies, and foreign language.

pupils. These per 1,000 pupil indicators provide insight into the intensity of resources that are made available within the school. We also consider the degree to which these intensities are related to background structural features such as district spending levels, district size, district property wealth, district income wealth, and district performance.

Inequalities in these resource intensities can arise from two sources: 1) there can be differences in the size of the overall pool of resources; or 2) there can be differences in how districts divide a given pool of resources across the various competing sub-units. For example, we might find a large difference in the teacher resources devoted to mathematics in two districts. The difference might be that the two districts have different sized pools of resources to allocate; or, they might have the same pool to work with but decide to divide it in very different ways. Given this interest in internal resource allocation practices, it is important to examine directly the decision to divide the pool of resources in one fashion rather than another. In addition to the staffing level per 1,000 district pupils indicator, we provide the percentage share of the teaching resource pool that specific subject areas receive. This calculation of teacher time excludes consideration of "non-academic" teaching responsibilities such as study hall duty, cafeteria duty, and other unassigned teacher time.

In this report, we have relied upon a ratio of the two percentages as our measure of resource utilization.

To address our interest in the utilization of resources we used class-specific enrollment information to generate a series of subject-specific indicators that tell us the percentage of the pool of student-time resource that is devoted to each area of the curriculum. The numerator in this calculation is total number of students enrolled in specific subject area courses. The denominator in this calculation is the total number of students enrolled in all subject area courses. This excludes "non-academic" allocations of pupil time for study halls, lunch, or otherwise unassigned student time. With these two percentage share indicators in hand (percentage teacher time and percentage pupil time) it becomes possible to generate an index of resource utilization. In this report, we have relied upon a ratio of the two percentages as our measure of resource utilization. The teacher resource share appears in the numerator of the ratio, so a figure of 1.3 for a given subject area suggests that 30 percent more teacher resources than pupil resources are devoted to the subject in question. Thus, low readings on this indicator suggest that the teacher resource in question is facing relatively heavy demands.

Case Study Data. In the next section we present case study findings based on data collected at four districts across New York State. The four districts chosen for this research have been coordinated with the ongoing work of the Finance Center of the Consortium for Policy Research in Education (CPRE). In selecting the districts, CPRE has made efforts to obtain a diverse sample based on district wealth (property value and income per pupil), district enrollment, and state regional representation. Within the two larger districts, a sub-sample of secondary schools was randomly selected for the intra-district analyses.[2]

In the case study analyses we applied a micro-level cost allocation model to six secondary schools within the four case study sites. The first step in the development of a micro-level resource allocation model requires the specification of the unit of analysis. As noted, we are interested in characterizing and applying a dollar metric to all of the uses to which

[2] For detailed descriptions of the sites see Monk, Roellke, and Brent (1996).

teachers put their time. Our unit of analysis, therefore, reflects the various components that comprise direct classroom instruction. Direct classroom instruction can be sub-divided into instruction-regular and instruction-special education. Within these subdivisions the unit of analysis is further disaggregated into instructional programs (e.g., English, history, and art), and again into individual course offerings (e.g., English 9 honors, AP American history, and studio art). By specifying the unit of analysis along these dimensions, the distribution of resources can be measured along a continuum of more refined activities. In the aggregate, the model measures the costs of offering individual program types (e.g., regular/special education). At its most micro-level the model yields information concerning the per pupil cost of offering a specific course at a given site.

The second step in the application of the micro-level resource allocation model requires the allocation of instructional costs to the unit of analysis. Instructional costs are comprised of the salaries, wages, and fringe benefits of personnel whose work can be directly traced to the unit of analysis. To allocate these costs among the unit of analysis, a two-step procedure was employed. First, relying on employee payroll schedules, salaries, wages, and related benefits of those individuals properly classified as instructional costs were aggregated.[3] The result of this process was to generate a schedule which detailed the instructional costs (i.e., actual salary plus benefits) for each of the teachers and teachers' aids in the districts. Next, utilizing staffing data and a master course schedule, instructional costs were assigned to the unit of analysis. In doing so, we were able to measure the instructional costs of a particular course or portion of the curriculum, by applying the actual salaries that were being paid to the teachers and aides involved.

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Findings Using State Collected Data

The Disposition of Resources

Breakdowns by School Level and Administration. Table 1 provides insight into the disposition of professional staff members' time across various areas of the school district's operations. For example, on average, New York State districts provide roughly comparable teacher/pupil staffing levels for their elementary programs relative to their secondary programs (33.57 professional staff per 1,000 pupils at the elementary level versus 34.59 at the secondary level, including special and vocational education). Administrative positions are staffed at a rate of 10.58 positions per 1,000 pupils. These administrative positions comprise 13.4 percent of all the total staffing investment on the part of the district, but it is important to note that this is a broad administrative category that includes building level administrators. Table 1 clearly indicates that the largest administrative sub-category was special education administration.

Breakdowns by Secondary School Subject Areas. Table 1 also provides insight into the disposition of staffing resources across subject areas within secondary schools. We can see that the investment in the academic area of the curriculum involves 27.57 teachers per 1,000 pupils or 79.71 percent of all teaching resources devoted to the secondary school program (grades 7–12). In contrast, the vocational and special

[3] Benefits include provisions for state retirement, teachers retirement, social security, workmen's compensation, life insurance, disability insurance, dental insurance, employee assistance, hospital insurance, and unemployment reserve.

Table 1.—District-wide instructional and administrative staffing patterns professional staff per 1,000 district pupils: School years 1991–92

Staffing category	State totals*	Big 4 cities**	New York City
Elementary Education			
Elementary regular	29.9	26.8	21.84
Elementary special education	3.67	5.66	4.73
Total elementary instruction	33.57	32.46	26.57
Secondary Education			
English	5.48	4.49	3.67
Mathematics	4.65	4.18	3.52
Social studies	4.19	3.22	2.66
Science	4.23	3.03	2.39
Foreign language	2.55	1.50	1.41
Music and art	2.93	1.89	1.12
Physical education and health	2.56	2.03	1.61
Other academic	0.98	2.18	2.02
Total academic education	27.57	22.52	18.40
Vocational			
Trade	2.28	2.91	1.07
Business	1.17	2.09	3.05
Other vocational	0.34	0.55	0.30
Total vocational education	3.79	5.55	4.42
Special Education			
Resource room	1.29	0.94	1.07
Special classes	1.67	3.65	4.05
ESL	0.16	0.44	0.85
Other special	0.11	0.23	0.32
Total special education	3.23	5.26	6.29
Total secondary education	34.59	33.34	29.11
Central administration	1.18	1.07	0.90
School administration	2.50	4.61	3.24
Special administration	5.36	5.06	4.67
Subject administration	1.54	3.27	3.56
Total district administration	10.58	14.02	12.37
Total professional staffing	78.74	79.85	68.05

* Excluding the Big 5 City districts.
** Buffalo, Rochester, Syracuse, and Yonkers.
SOURCE: Basic Educational Data System (BEDS), New York State Department of Education.

education areas comprise 10.96 percent and 9.34 percent of the teacher resource base, respectively.[4]

In addition, table 1 also provides information about subject specific breakdowns. In particular, we can see that the resource intensities are highest in the English and mathematics areas of the curriculum, 5.48 and 4.65 teachers per 1,000 district pupils, respectively. The figures for social studies and science courses are slightly smaller at 4.19 and 4.23, while the teaching resources devoted to foreign language courses are relatively low at 2.55. Allocations to specialized academic offerings like art and music and physical education and health are on the order of what we see for foreign language instruction.

Comparisons with the Big 5 City Districts. The right hand columns in table 1 permit comparisons between statewide average for the non-Big 5 city school districts in New York with the results for New York City in particular, as well as with the remaining Big 4 city districts (Buffalo, Rochester, Syracuse, and Yonkers). These comparisons reveal some striking differences. In particular, in most areas of the curriculum, the teacher resource intensities in the core academic curriculum are lower in the Big 5 City districts than they are elsewhere in the state. Some of the differences are large and as a general rule the resource intensity levels are lowest in New York City. For example, in English the resource intensity level for New York City is 3.67; the comparable figure for the Big 4 districts is 4.49 and it is 5.48 for the remaining districts in the state. In mathematics the resource intensity level for New York City is 3.52. The analogous number for the Big 4 is 4.18 and for the rest of the State it is 4.65. In science the resource intensity level are 2.39 for New York City, 3.03 for the Big 4, and 4.23 for the rest of the state. The pattern holds for social studies and foreign language allocations.

In English and mathematics, we found that a larger allocation of teacher resources goes to remedial rather than to advanced course offerings.

The administrative staffing intensity measures are also interesting for the cities. Compared with the state as a whole, it is clear that the number of administrators per pupil is higher in the city districts, but most of the extra staffing is found at the school rather than the central level of the administrative structure. In particular, the city districts register relatively high levels of administrative staffing at the building and subject area levels.

Breakdowns between Course Levels. We also examined more refined breakdowns of the core academic areas of instruction. Specifically, we looked separately at advanced and remedial courses in the English, mathematics, social studies, science, and foreign language areas of the curriculum, what we called the core academic curriculum. Table 2 reports these results.

In English and mathematics, we found that a larger allocation of teacher resources goes to remedial rather than to advanced course offerings. More than twice the level of resources goes to remedial relative to advanced offerings in these areas. In English, for the non-Big 5 state averages, the intensities are .86 teachers per 1,000 district pupils for remedial courses compared to .33 for advanced courses; in mathematics, the comparable figures are .96 versus .45. A similar distribution can be found in the Big 5 city districts.

Quite a different pattern can be found in the science, social studies, and foreign language areas of the core academic curriculum. In these areas, larger shares of the teaching resources devoted to the subject

[4] These data measure only vocational and special education courses that are offered directly by the individual school district. Courses offered through regional cooperatives, called BOCES in New York State, are not reflected in these data.

Table 2.—Secondary school (7–12) instructional staffing patterns refined core academic subject area breakdowns professional staff per 1,000 district pupils: School years 1991–92

Staffing category	State totals*	Big 4 cities	New York City
English Total	5.48	4.49	3.67
Advanced	0.33	0.27	0.22
Regular	4.29	3.29	2.70
Remedial	0.86	0.94	0.75
Mathematics Total	4.65	4.18	3.52
Advanced	0.45	0.29	0.23
Regular	3.25	2.70	2.19
Remedial	0.96	1.20	1.10
Social Studies Total	4.19	3.22	2.66
Advanced	0.29	0.30	0.20
Regular	3.81	2.87	2.40
Remedial	0.10	0.05	0.06
Science Total	4.23	3.03	2.39
Advanced	0.34	0.21	0.19
Regular	3.84	2.80	2.17
Remedial	0.05	0.02	0.03
Foreign Language Total	2.55	1.50	1.41
Advanced	0.13	0.11	0.09
Regular	2.42	1.40	1.31
Remedial	0	0	0
Total advanced	1.54	1.18	0.93
Total regular	17.6	13.05	10.78
Total remedial	1.96	2.21	1.94
Total core academic	21.1	16.44	13.65

* Excluding the Big 5 City districts.
NOTE: Figures are weighted by district enrollment.
SOURCE: Basic Educational Data System (BEDS), New York State Department of Education.

in question are allocated to advanced courses. Again, the pattern is the same in the Big 5 city districts.

The bottom of table 2 provides insight into the aggregate division of resources among advanced, regular, and remedial course offerings regardless of the subject being taught. The results indicate a tendency to provide more resources to remedial rather than to advanced offerings. However, it is important to keep in mind that these measures of resource allocation are based on counts of all pupils in the district. The allocation of student time across course types is also relevant and will be considered later when the focus shifts to the utilization of resources.

Breakdowns by Selected District Structural Characteristics. We were also interested in making comparisons among districts on the basis of structural characteristics such as school district fiscal capacity, spending levels, size, and the incidence of students living in poverty. One of the most interesting results of this comparative analysis is the finding that resource intensity levels are remarkably flat across large differences in school district spending levels. More specifically, we found that the number of teachers per 1,000 district pupils remains essentially flat across the first four spending quintiles. It is only among the highest spending districts in the state that we began to find an increase in the number of teachers allocated to subjects on a per pupil basis. This result holds true across all areas of the academic curriculum. This is a new and intriguing result. It suggests that as spending levels rise through the first four quintiles of districts, the additional resources are devoted either to salary increases for existing staff, to other non-personnel uses, or to other areas of the curriculum.

...resource intensity levels are remarkably flat across large differences in school district spending levels.

We also examined the impact of spending levels on the division of resources within a given core academic subject area between advanced and remedial types of courses, and found some interesting results. It is clear that the percentage share of advanced courses increases with spending levels. In other words, higher spending districts tend to devote a larger share of their core curriculum resource base to advanced rather than to remedial offerings. What this suggests is that the students in advanced classes in high spending districts are doubly advantaged. Not only is there a larger base level of resource available to them, but they receive a larger share of the base. For students in remedial classes, being in a high spending district has two conflicting effects. On the one hand, the higher spending districts have higher resource levels. On the other hand, remedial classes receive smaller shares of the resource base in the higher spending districts. On balance, the smaller percentage share is the dominating effect such that the absolute level of teacher resources is lower for the students in the remedial classes in the highest spending districts than it is for the students in the remedial classes in the lowest spending districts.[5]

Comparisons of the Disposition of Resources Over Time. Finally, we examined resource disposition over time, and there are a number of key findings. For instance, despite declining enrollments during the period, overall staffing levels in the state increased substantially between 1983–92. As table 3 indicates, growth has not been linear as rapid growth took place between 1983–88 and only modest growth took place between 1988–92. One possible explanation that this growth has plateaued is the recent reductions in state aid, coupled with budget defeats at the local level.

[5] See Monk, Roellke, and Brent (1996) for a more detailed treatment of these results.

Table 3.—District-wide instructional and administrative staffing patterns (number of FTE professional staff per 1,000 district pupils) state totals, big 4 city districts, and New York City: School years 1982–83, 1987–88, and 1991–92

Staffing category	State totals 1983 n=621	State totals 1988 n=644	State totals 1992 n=645	Big 4 cities 1983 n=4	Big 4 cities 1988 n=4	Big 4 cities 1992 n=4	New York City 1983 n=1	New York City 1988 n=1	New York City 1992 n=1
Elementary Education									
Elementary regular	22.83	28.25	29.90	22.46	26.93	26.80	17.25	23.15	21.84
Elementary special education	2.89	3.28	3.67	5.11	6.45	5.66	4.97	5.01	4.73
Total elementary instruction	25.71	31.53	33.57	27.57	33.38	32.46	22.22	28.16	26.57
Secondary Education									
English	5.69	5.88	5.48	4.37	4.88	4.49	4.22	3.94	3.67
Mathematics	4.46	4.90	4.65	3.76	4.54	4.18	3.36	3.57	3.52
Social studies	4.23	4.20	4.19	3.29	3.47	3.22	2.63	2.78	2.66
Science	3.99	4.42	4.23	2.66	3.29	3.03	2.44	2.56	2.39
Foreign language	1.77	2.49	2.55	0.95	1.40	1.50	1.18	1.54	1.41
Music and art	2.69	3.02	2.93	1.67	2.08	1.89	1.36	1.41	1.12
Physical education and health	2.77	2.82	2.56	2.19	2.41	2.03	1.74	1.90	1.61
Other academic	0.92	1.04	0.98	0.97	1.57	2.18	0.99	1.61	2.02
Total academic education	26.52	28.77	27.57	19.86	23.64	22.52	17.92	19.31	18.40
Vocational									
Trade	1.81	2.52	2.28	2.96	3.52	2.91	1.39	1.45	1.07
Business	1.68	1.44	1.17	1.32	1.18	2.09	1.12	0.90	3.05
Other vocational	1.12	0.47	0.34	1.25	0.62	0.55	0.61	0.38	0.30
Total vocational education	4.61	4.43	3.79	5.53	5.32	5.55	3.12	2.73	4.42
Special Education									
Resource room	0.97	1.20	1.29	1.05	1.36	0.94	0.63	1.12	1.07
Special classes	1.05	1.51	1.67	2.67	4.17	3.65	3.21	4.28	4.05
ESL	0.07	0.12	0.16	0.37	0.56	0.44	0.70	1.11	0.85
Other special	0.00	0.02	0.11	0.00	0.48	0.23	0.00	0.03	0.32
Total special education	2.09	2.85	3.23	4.09	6.57	5.26	4.54	6.54	6.29

Table 3.—District-wide instructional and administrative staffing patterns (number of FTE professional staff per 1,000 district pupils) state totals, big 4 city districts, and New York City: School years 1982–83, 1987–88, and 1991–92, continued

Staffing category	State totals			Big 4 cities			New York City		
	1983 n=621	1988 n=644	1992 n=645	1983 n=4	1988 n=4	1992 n=4	1983 n=1	1988 n=1	1992 n=1
Total secondary education	33.22	36.05	34.59	29.49	35.54	33.34	25.58	28.55	29.11
Central administration	1.11	1.23	1.18	1.26	1.44	1.07	1.02	1.03	0.90
School administration	2.30	2.54	2.50	3.85	4.64	4.61	3.10	3.39	3.24
Special administration	4.18	4.90	5.36	3.71	5.02	5.06	3.57	4.13	4.67
Subject administration	3.60	1.57	1.54	4.48	3.67	3.27	4.02	3.24	3.56
Total district administration	11.19	10.23	10.58	13.29	14.77	14.02	11.71	11.79	12.37
Total professional staffing	70.12	77.81	78.73	70.35	83.69	79.82	59.51	68.51	68.04

SOURCE: Basic Educational Data System (BEDS), New York State Department of Education.

Secondary schools have hired more professional staff relative to student enrollment than elementary schools. The increased high school graduation requirements as outlined in the *Regents Action Plan* (1984) may help explain why personnel growth in secondary schools has outpaced the growth in elementary schools. The growth in secondary school staffing appears to have been at the expense of administrative staffing areas. These findings are important because they suggest that school districts configure staffing resources through a combination of adding new staff members and reallocating existing resources.

Table 3 also reveals several noteworthy findings regarding the general staffing patterns in the big cities. Overall professional staffing levels in New York City have consistently trailed the levels in the other big cities and in the State as a whole. These differences are found at both the elementary and secondary level. Because the study is limited to an analysis of certified, professional staff, it is possible that these low staffing levels in New York City are due to a large number of non-professional and para-professional staff members being used in place of certified classroom teachers.

Another interesting finding is that big city staffing commitments to administrative areas have consistently outpaced the staffing commitments made to administration in the state as a whole. As indicated earlier, the higher administrative staffing levels in the large urban areas tend to be at the building and subject area levels. One can only surmise as to why these administrative levels are higher in the big cities. It is possible that the administrative burdens, such as student discipline, are greater at the school level in urban areas than in non-urban areas. The large size associated with urban schools may also contribute to the growth in subject area administration. This explanation is consistent with the breakdowns by district size where the largest districts are found to have the highest staffing commitments to subject area administration.

Table 3 also displays staffing pattern findings by secondary school subject areas. English maintains the highest resource intensity level of the core subject areas, although English also saw the greatest decline in resource commitments during the period. Of the core subject areas, foreign language experienced the greatest growth in staffing (+44 percent). Staffing commitments to special education increased substantially during the period (+55 percent), while staffing levels in vocational areas of the curriculum declined (-18 percent). In addition, special education has become the most resource intensive instructional category within the big cities. Mathematics and science, two areas of the curriculum which have received considerable attention in the reform literature, experienced growth in staffing intensity levels between 1983–88 and slight declines between 1988–92. Staffing levels remained steady in social studies.[6]

The Utilization of Resources

These disposition findings need to be viewed in light of information about the allocation of student time. A finding that there are 5.48 secondary English teachers per 1,000 pupils of district enrollment is difficult to interpret in the absence of parallel information about the allocation of student time to English. Is 5.48 too high, too low, or just about right? A normative question like this will never be easy to answer, but some insight can be gained by seeing how the allocation of the teaching resource base compares to the allocation of the student resource base, and this is the focus of our analysis of resource utilization.

...across the state [of New York] English receives 15.84 percent of the teacher resource that is available within the school.

Table 4 begins to provide some of the relevant information about the utilization of resources on a subject specific basis within secondary schools. The columns marked TT report the total number of teachers allocated to a particular subject area relative to the total number of teachers present within the secondary school. It can be interpreted as the percentage share of the teaching resource that has been allocated to the indicated subject areas.

The column marked PT reports the total number of student-hours spent within a given subject area relative to the total possible number of student-hours for the secondary school as a whole. It can be interpreted as the percentage share of the pool of student time that is allocated to the indicated subject area. These student time allocations are by-products of course selection decisions made by students, their parents, and perhaps their guidance counselors.

For example, table 4 indicates that across the state English receives 15.84 percent of the teacher resource that is available within the school. The table also indicates (in the PT column) that English receives 16.57 percent of the total number of student-hours available within the school, for a ratio of 0.96 (column TT/PT). It follows that English receives a smaller share of the available teacher resource than it receives of the available student resource.

Notice that the ratios in the right-hand column of table 4 for all the named academic subject areas are less than 1.0. What this means is that the share of the teacher resource that is allocated to the subject area is *smaller* than the share of the pupil resource base that has been allocated. The fact that the named academic areas have ratios that are less than 1.0 implies that there are other areas of the curriculum with ratios that are greater than 1.0. As we might suspect, the special education portion of the curriculum shows ratios that are significantly greater than 1.0. The resource room heading shows a

[6] For more on these longitudinal analyses, see Roellke (1997).

Table 4.—District-wide secondary school (7–12) instructional staffing patterns for regular New York State school districts and the Big 5 cities: School years 1991–92

Staffing category	State*			Big 4 cities			New York City		
	TT* %	PT* %	TT/PT	TT* %	PT* %	TT/PT	TT* %	PT* %	TT/PT
English	15.84	16.57	0.96	13.60	15.67	0.87	12.61	14.72	0.86
Mathematics	13.44	14.22	0.95	12.62	14.92	0.85	12.09	14.88	0.81
Social studies	12.11	14.97	0.81	9.70	12.99	0.75	9.14	12.72	0.72
Science	12.22	12.38	0.99	9.10	11.21	0.81	8.22	11.24	0.73
Foreign language	7.37	8.22	0.90	4.48	5.35	0.84	4.83	7.04	0.69
Music and art	8.47	8.99	0.94	5.67	7.15	0.80	3.85	4.92	0.78
Physical education and health	7.40	7.84	0.94	6.10	7.50	0.81	5.52	6.78	0.81
Other academic	2.83	2.24	1.26	6.64	4.45	1.49	6.93	8.82	0.79
Total academic education	79.71	85.43	0.93	67.91	79.23	0.86	63.19	81.12	0.78
Trade	6.59	7.17	0.92	8.69	9.22	0.94	3.69	4.28	0.86
Business	3.38	3.26	1.04	6.19	4.14	1.50	10.50	5.76	1.82
Other vocational	0.98	0.84	1.17	1.65	1.14	1.45	1.03	0.81	1.27
Total vocational education	10.96	11.27	0.97	16.53	14.50	0.88	15.22	10.85	1.40
Resource room	3.73	0.98	3.81	2.81	0.73	3.85	3.68	0.89	4.13
Special classes	4.83	1.94	2.49	10.76	4.54	2.37	13.92	4.23	3.29
ESL	0.46	0.24	1.92	1.31	0.92	1.42	2.91	2.83	1.03
Other special	0.32	0.13	2.46	0.68	0.06	11.33	1.10	0.08	13.75
Total special education	9.34	3.29	2.84	15.56	6.25	2.49	21.61	8.03	2.69
Average pupil load per FTE		83.43			78.49			98.21	

NOTE: TT=Percentage share of total teacher-hours; PT=Percentage share of total pupil-hours. Both the TT and the PT percentages are figured on the total resource base for secondary instruction.

SOURCE: Basic Educational Data System (BEDS), New York State Department of Education.

3.81 while the special classroom heading shows a 2.49.

Comparisons with the Big 5 City Districts. Table 4 also provides the breakdowns for the Big Four city districts and New York City. The TT/PT figures for New York City are consistently lower in the academic areas than the Big 4 Cities and the state as a whole. This suggests that academic professional staff in New York City faces relatively high resource demands.

Breakdowns by Course Level and Selected District Structural Characteristics. Next we examined this kind of utilization data by using the advanced versus remedial breakdowns, and also selected district structural characteristics that were introduced earlier (see Monk, Roellke, and Brent, 1996). Recall that the distribution of resources to advanced areas of the curriculum in the core academic areas increases with district spending levels. Some of these increases are relatively dramatic. For example, the overall investment in advanced courses (pooling all areas of the academic curriculum) moves from 2.82 percent of the teacher resource base in the lowest spending districts to 6.36 percent of the teacher resource base for the highest spending districts. But, the percentage share of students enrolled in these advanced courses also increases, rising from 2.69 to 6.86 percent, so that in the net the ratio of the teacher resource share to the pupil resource share drops from 1.05 to 0.93 percent. This means that the increase in the share of the teaching resource does *not* keep pace with the increased student demand for advanced classes. On balance, it means that class sizes in the advanced areas of the curriculum increase with district spending levels. There is a parallel phenomenon transpiring for the remedial classes. Here the shares drop with spending levels, and the teacher share drops by more than the student share so that once again there are net increases in class size for remedial offerings as school district spending increases.

...despite some internal variation within these academic areas, the overall shares of teaching and pupil resources devoted to the core curriculum remain steady.

Comparisons of the Utilization of Resources Over Time. Our longitudinal findings, reported in table 5, suggest that the greatest variation in the utilization ratios in academic areas occurred in foreign language and music/art. The overall utilization ratio for the academic portion of the curriculum, however, remained remarkably consistent. This suggests that despite some internal variation within these academic areas, the overall shares of teaching and pupil resources devoted to the core curriculum remain steady.

Although the highest ratios were found in the special education area of the curriculum, it should be noted that ratios have declined consistently over the period. Because there have been consistent increases in the allocation of pupil time in special education over the period, this finding indicates that increases in pupil demand for special education are not matched with an equal increase in teacher supply. Conversely, student enrollments in vocational offerings have declined over the period. The declining ratios in vocational areas indicates that decreases in the allocation of teacher resources are outpacing the decreases in pupil time in vocational areas.

Summary of Key Findings

Key Findings Regarding the Disposition Analyses

- New York State districts provide roughly comparable teacher/pupil staffing levels for their elementary programs relative to their secondary programs.

Table 5.—Percentage teacher time/percentage pupil time in secondary schools state totals minus the Big 5 cities

Staffing category	1983 n=621	1988 n=644	1992 n=645
Academic			
English	0.91	0.95	0.96
Mathematics	0.93	0.96	0.95
Social studies	0.84	0.83	0.81
Science	0.96	0.98	0.99
Foreign language	1.01	0.92	0.90
Music and art	1.00	0.94	0.94
Physical education and health	0.96	0.93	0.94
Other academic	1.27	1.32	1.26
Total academic education	0.94	0.94	0.93
Vocational			
Trade	1.15	0.95	0.92
Business	0.93	0.97	1.04
Other vocational	1.10	1.21	1.17
Total vocational education	1.05	0.98	0.97
Special Education			
Resource room	4.57	4.10	3.81
Special classes	3.67	2.62	2.49
ESL	2.10	3.00	1.92
Other special education	—	6.00	2.46
Total special education	3.93	3.12	2.84
Course Level*			
Advanced	0.95	0.98	0.98
Regular	0.88	0.88	0.87
Remedial	1.44	1.49	1.58
Total core	0.92	0.93	0.92

* Core subject areas only.

SOURCE: Basic Educational Data System (BEDS), New York State Department of Education.

- The investment in the academic area of the curriculum comprises 79.71 percent of all teaching resources devoted to the secondary school program (grades 7–12). Excluding BOCES services, the vocational and special education areas comprise 10.96 percent and 9.34 percent of the teacher resource base, respectively.

- In most areas of the curriculum, the teacher resource intensities in the core academic curriculum are lower in the Big 5 City districts than they are elsewhere in the state, with the lowest staffing intensity levels found in New York City.

- There is a tendency in the state to provide more resources to remedial rather than to advanced offerings.

- Resource intensity levels are remarkably flat across large differences in school district spending and wealth levels. It is only among the highest spending and wealthiest districts in the state that we began to find an increase in the number of teachers allocated to subjects on a per pupil basis.

Key Findings Regarding the Utilization of Education Resources

- In all named academic subjects the share of the teacher resource that is allocated to the subject area is *smaller* than the share of the pupil resource base that has been allocated. Areas of the curriculum in which the teacher resource share is greater than the pupil resource share are special education and portions of the vocational curriculum.

- Greater percentages of student time allocations in advanced courses are found in higher spending and wealthier school districts.

- Greater percentages of student time allocations in remedial courses are found in lower spending and poorer districts.

- As district spending increases, the share of the teaching resource does *not* keep pace with the increased student demand for advanced and remedial classes.

Case Study Findings

Disposition Patterns by Secondary School Subject Area

In the disposition analysis, we report findings in several ways. First, we calculated the instructional costs per pupil for each curricular program area across the six sites. For example, we calculated the instructional personnel costs incurred by each school to support a given program area and divided this figure by the total number of students enrolled in courses within that area. This measure provides insight into the intensity of teacher resources made available to different program areas within and between schools. Table 6 summarizes the instructional costs per pupil by program area for each school.[7]

...we calculated the instructional personnel costs incurred by each school to support a given program area and divided this figure by the total number of students enrolled in courses within that area.

Several things can be noticed immediately if we look at the results presented in table 6. First, instructional costs per pupil by program area vary greatly among districts. For example, the Small Poor and Large Poor districts spend significantly less on mathematics than their wealthier counterparts. Similar spending patterns emerge between poor and

[7] School A and School B are used to differentiate between individual schools within districts that contain two high schools.

Table 6.—Instructional costs per pupil by program area in dollars: School years 1994–95

Program area	Small poor ($)	Large poor School A ($)	Large poor School B ($)	Large wealthy School A ($)	Large wealthy School B ($)	Small wealthy ($)
English	364	395	437	612	548	416
Social studies	419	325	332	484	449	362
Mathematics	300	410	471	588	633	555
Science	440	589	554	635	571	863
Language	611	377	448	781	663	530
Business	344	283	301	686	532	419
Health	261	152	200	198	215	250
Physical ed.	119	136	112	467	471	211
Art	472	386	502	728	524	319
Music	866	568	476	702	1,114	404
Driver ed.		388	232			
Special ed.*	3,551	1,494	820	3,404	3,695	2,020
Teacher duties	N/A	N/A	N/A	N/A	N/A	N/A

* These figures do not include district expenditures to Boards of Cooperative Educational Services (BOCES) for the provisions of special education services. BOCES are voluntary, cooperative associations of school districts in a geographic area, which have banded together to provide educational or business services more economically than each could offer by itself. There are 41 BOCES regions in New York State.

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conference of the National Center for Education Statistics, Washington, DC.

wealthy districts in the English, science, and social studies programs areas, although the disparities are much less pronounced.

One explanation for disparities in the per pupil instructional costs across schools is that "price-level" differences in the costs of resources exist across districts. In other words, it would not be surprising to find that wealthier districts pay their teachers higher salaries, thereby inflating the instructional costs per pupil in these schools. Although there are indexes to adjust for differences in instructional costs across districts, these indices are at early stages of development and subject to many challenges. It is interesting to note, however, that in this study the average teacher salaries are higher in the districts labeled as "wealthy." This finding suggests that differences in per pupil instructional costs in core program areas are at least partially explained by differences in salary structures across district types.

Price level differences, however, cannot explain variances in instructional costs per pupil across program areas within the same school or district. As evidenced by table 6, there are large disparities in the amount of resources that districts devote to different program areas within the same school. For example, across all schools, either foreign language or science have the highest instructional costs per pupil of the core program areas. Other high spending program areas are music and special education. In contrast, physical education and health consistently spend the lowest amount per pupil on instructional costs.

Table 7 further highlights disparities in resource use within schools by displaying instructional costs per pupil within the core curricular areas by course level. The table reveals that the Small Poor school offers no advanced courses in the core program areas. In contrast, with a single exception, advanced courses are offered in all other schools in the English, social studies, math, and science areas. Table 7 also reveals that per pupil instructional costs are often highest in the remedial areas of the core curriculum. This holds particularly true in the large wealthy and small wealthy schools.

Differences in these program-specific resource intensities can arise from two sources. First, there can be differences in the personnel costs of individuals assigned to different program areas. For example, all else being equal, if more senior teachers (i.e., higher paid) were assigned to a given program area, we would expect relatively higher instructional costs per pupil. Second, differences in class size directly influence the per pupil cost figures. In this case, one would expect higher instructional costs per pupil in programs areas with relatively small class sizes, all else being equal.

In order to disentangle the effect these phenomena have on district spending patterns, we re-analyzed the data using average teacher salary figures for each district. In other words, we assumed that all district personnel earn the same salary. Table 8 displays the results of this simulation by program area for the Large Poor schools.

The second column of table 8 reports the instructional costs per program when salary levels are held constant. The figures reported therein reveal that variations in the resources devoted to specific areas of the curriculum still exist. Interestingly, spending patterns similar to those reported in table 6 emerge. For example, across both schools, science and foreign language still have the highest instructional costs per pupil of the core program areas. Moreover, music, art, and special education maintain high spending levels while health and physical education spend the lowest amount per pupil on instructional costs. The findings suggest that much of the difference in per pupil expenditures are the result of variations in class size, not salaries.[8]

Given our interest in internal resource allocation practices, it is important to examine directly the decision to divide the pool of resource in one fashion rather than another. To this end we introduce a second type of resource allocation indicator that looks exclusively at the share of the available pool that is allocated to each area of the curriculum. Thus, for each area of the curriculum we provide the percent of total instructional costs that are devoted to the program area.

...when program instructional costs are expressed as a percent of total instructional costs, the resources devoted to specific areas of the curriculum are quite similar across schools.

Table 9 reveals that when program instructional costs are expressed as a percent of total instructional costs, the resources devoted to specific areas of the curriculum are quite similar across schools. This is particularly true of schools within the same district. For example, with few exceptions, the percentage of instructional resources devoted to the core program areas (English, social studies, math, science, and foreign language) vary only slightly across districts. This suggests that, while the size of the district's pool of resources may vary among districts, in general, districts assign similar priorities to program types when dividing this pool. There are, however, some exceptions to this general trend. Most notably, the comparatively high percentage of resources devoted to the science program areas in School A of the Large Poor district and

[8] Similar patterns emerged in the other three sites.

Table 7.—Instructional costs per pupil by core program area in dollars: 1994–95

Program area	Small poor	Large poor School A	Large poor School B	Large wealthy School A	Large wealthy School B	Small wealthy
English						
Advanced		234	276	258	395	336
Regular	251	237	260	379	379	319
Remedial	242	321	311	1,294	794	
Social studies						
Advanced		303	310	484	493	298
Regular	269	240	211	348	314	277
Remedial	231	295	246	857	683	
Mathematics						
Advanced		277		347	325	742
Regular	206	262	287	378	386	778
Remedial	237	295	375	505	683	301
Science						
Advanced		294	476	160	138	437
Regular	380	457	447	340	382	330
Remedial	208	342	261	616	513	652
Foreign language						
Advanced				549	507	
Regular	611	390	477	435	353	530
Remedial		199	220			

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conference of the National Center for Education Statistics, Washington, DC.

Table 8.—Percentage change in instructional costs due to salary differentials: School years 1994–95

Program area	School A: Instructional cost per unit actual salary	School A: Instructional cost per unit average salary	School A: Percent change (%)	School B: Instructional cost per unit actual salary	School B: Instructional cost per unit average salary	School B: Percent change (%)
English	395	416	5	437	412	-6
Social studies	325	319	-2	332	338	2
Mathematics	410	414	1	471	436	-7
Science	589	512	-13	554	556	0
Foreign language	377	425	13	448	462	3
Art	386	468	21	502	443	-12
Music	568	490	-14	476	414	-13
Business	283	278	-2	301	346	15
Health	152	206	36	200	225	13
Pysical education	136	130	-4	112	111	-1
Driver's education	388	317	-18	232	200	-14
Special education	1,494	1,524	2	820	934	14

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conference of the National Center for Education Statistics, Washington, DC.

Table 9.—Instructional costs by program area as a percent of total program instructional costs: 1994–95

Program area	Small poor	Large poor School A	Large poor School B	Large wealthy School A	Large wealthy School B	Small wealthy
English	14	12	14	14	13	12
Social studies	13	13	13	12	13	12
Mathematics	8	11	12	11	12	13
Science	10	16	13	13	13	19
Language	8	6	8	10	10	10
Business	6	8	9	7	7	7
Health	2	1	1	2	2	2
Pysical education	5	10	8	9	9	5
Art	6	4	4	7	7	4
Music	9	6	6	4	5	5
Driver's education		2	1			
Special education*	9	8	7	6	7	4
Teacher duties	12	4	4	5	2	7

* The percent of resources allocated to special education versus regular program areas is much less than has been reported in other research efforts. For example, in a recent study of exenditures across New York State school districts, Lankford and Wyckoff (1995b) estimate the percentage of instructional resources allocated to special education to be approximately 20 percent. The significant gap between the percentages reported here and those found by Lankford and Wyckoff are partially explained by the exclusion BOCES related special education costs and the focus on secondary school only.

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conferenece of the National Center for Education Statistics, Washington, DC.

the Small Wealthy district. In both cases it was found that these schools offer general level courses within each sub-discipline of the core science curriculum (e.g., general physics), thereby increasing the instructional costs of this program area. Similarly, the comparatively low percentage of teacher resources devoted to language in School A of the Large Poor district is explained by the low salary levels of newly hired teachers in this program area.

Our micro-level examination of instructional costs per program area also gave us the opportunity to quantify teacher to resource uses that have received virtually no attention in the literature: time devoted to duty periods and time devoted to class preparation.

Teachers are often required to monitor study halls and corridors, or perform cafeteria duty. Table 9 reports that the percentage of total instructional costs devoted to these non-instructional duties range from 2–12 percent. It also reveals that smaller districts require their teachers to devote significantly more of their time to the performance of non-instructional duties than their larger counterparts.

In addition to direct classroom instruction and teacher duties, teachers are also assigned a number of preparation periods. For our purposes, all periods for which teachers were not assigned to direct classroom instruction or duties were counted as preparation periods. Teacher preparation time does not include

the contracted time set aside for teachers to eat lunch. Table 10 presents teacher preparation time per program area as a percent of total instructional costs per program area.

Table 10 reveals that, in general, teacher preparation time is quite varied across program areas and schools. A more interesting finding, however, is the amount of teacher resource use that is devoted to preparation time. These figures suggest that, on average, teachers are allocated between 2–3 preparations periods per an 8-period day. Again, these figures do not include contracted time for lunch.

The Utilization of Teaching Resources Within Secondary Schools

To address our interest in the utilization of resources, we first made a calculation of the pupil-time resource. In other words, we generated a series of program specific indicators that tell us the percentage of the pool of student-time resource that is devoted to each area of the curriculum. With the percent teacher time and percent pupil time in hand it became possible to generate an index of resource utilization. In our analyses, we relied upon a ratio of the two percentages as our measure of resource utilization. The teacher resource share appears in the numerator of the ratio, so a figure of 1.3 for a given subject area suggests that 30 percent more teacher resources are devoted to the subject area in question. Thus, low readings in on this indicator suggest that the teacher resource in question is facing relatively heavy demands. Table 11 displays the results of these calculations.

The fact that some teacher resource shares are larger than the corresponding student resource share suggests that there will be balancing subject areas where the opposite will be true.

This analysis revealed several striking results. First, with the exception of Special Education, the highest indices often occur within the music area of the curriculum. The utilization indicators for music exceeds 1.00 in all districts, measuring as high as 1.87 in the Small Poor district. Again, a value of 1.87 suggests that the supply of teacher resource is 187 percent larger than the supply of student resources to the curricular area in question. Another area of the curriculum where the teacher resource share exceeds that of the student resource is foreign language.

The fact that some teacher resource shares are larger than the corresponding student resource share suggests that there will be balancing subject areas where the opposite will be true. Our findings indicate that these balancing areas occur in English, social studies, art, physical education, and health.

While we have distinguished sharply between the disposition and utilization aspects of the resource allocation process, it is clear that these two types of phenomena can be closely linked. Students' willingness (both real and perceived) to utilize resources can have strong effects on disposition decisions. Similarly, students' responses are likely to be sensitive to the types of resources that are made available. It would be interesting to explore, for example, whether staffing patterns are structured to provide student's with equal access to curricular opportunities. While district fiscal reports provide insight into the distribution of resources across expenditure categories across districts, limits inherent in the use of district financial reporting documents prohibit more informative analysis of resource allocation patterns. Indeed, district level reports provide only limited insight into the internal decision making processes that produce any given distribution of resources.[9]

[9] For more qualitative analyses of the process by which staffing allocations are made, see Roellke (1996).

Table 10.—Teacher preparation time per program area as a percent of total instructional costs per program area

Program area	Small poor	Large poor School A	Large poor School B	Large wealthy School A	Large wealthy School B	Small wealthy
English prep	36	33	36	23	33	31
Social studies prep	34	32	38	26	34	30
Mathematics prep	31	36	36	23	36	32
Science prep	31	30	30	30	36	24
Language prep	33	27	38	28	34	33
Business prep	28	24	21	21	35	29
Health prep	38	29	38	15	14	23
Pysical education prep	32	22	41	19	27	18
Art prep	33	36	34	26	27	17
Music prep*	81	62	67	46	25	76

* Due to limitations in the data sources, it was not possible to distinguish between periods devoted to individualized lessons from periods devoted to preparation. Therefore, the percentage of instructional costs allocated to music preparation time is overstated.

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conference of the National Center for Education Statistics, Washington, DC.

Table 11.—Instructional costs per pupil by program area in percent/percentage of total students enrolled in program area

Program area	Small poor	Large poor School A	Large poor School B	Large wealthy School A	Large wealthy School B	Small wealthy
English	0.86	1.11	1.21	1.00	0.93	0.83
Social studies	0.83	0.91	0.92	0.80	0.76	0.73
Mathematics	0.65	1.15	1.30	1.20	1.08	1.11
Science	0.95	1.47	1.50	1.00	1.00	1.73
Language	1.32	1.06	1.24	1.25	1.11	1.06
Business	0.74	0.79	0.83	1.12	1.00	0.84
Health	0.57	0.43	0.55	0.29	0.33	0.50
Pysical education	0.28	0.38	0.31	0.75	0.82	0.42
Art	1.02	1.08	1.39	1.12	0.88	0.64
Music	1.87	1.60	1.32	1.33	1.67	1.01
Driver's education		1.09	0.64			
Special education	7.68	4.19	2.27	6.00	7.00	4.05

SOURCE: Brent, Brian O. and Monk, David H. 1995. "The Distribution of Resources within New York State Public School Systems: A Micro-Level Analysis." Paper presented at the annual data conference of the National Center for Education Statistics, Washington, DC.

Summary of Key Findings

- The Small Poor and Large Poor districts spend significantly less on math than their wealthier counter parts. Similar spending patterns emerge between poor and wealthy districts in the English, science, and social studies program areas, although the disparities are much less pronounced.

- Across all schools, either foreign language or science have the highest instructional costs per pupil of the core program areas. Other high spending program areas are music and special education. In contrast, physical education and health consistently spend the lowest amount per pupil on instructional costs.

- When program instructional costs are expressed as a percent of total instructional costs, the resources devoted to specific areas of the curriculum are quite similar across schools. This is particularly true of schools within the same district. This suggests that, while the size of the district's pool of resources may vary among districts, in general, districts assign similar priorities to program types when dividing this pool.

- The percentage of total instructional costs devoted to non-instructional duties range from 2–12 percent. Smaller districts require their teachers to devote significantly more of their time to the performance of non-instructional duties than their larger counterparts.

- On average, teachers are allocated between 2-3 preparation periods per an 8 period day. These figures do not include contracted time for lunch.

- With the exception of Special Education, the highest utilization indices occur within the music area of the curriculum. Another area of the curriculum where the teacher resource share exceeds that of the student resource is foreign language.

Implications for Policy and Future Research

These findings represent early and still quite incomplete attempts to characterize the allocation of resources at micro-levels of educational systems. For example, it must be noted that the empirical findings presented here are limited to analyses of professional staff only. Local education agencies purchase many hired resources which are not considered here (custodial workers, cafeteria workers, clerical staff, etc.) Similarly, these analyses do not consider allocations of capital resources (physical plant, supplies, texts, computers, etc.). The omission of these important pools of resources limits the ability to gain a comprehensive understanding of resource allocation phenomenon.

...contributions to new conceptions of educational equity can be made through the analysis of more refined indicators of instructional opportunities for students.

Despite this limitation, this type of resource allocation study has much to offer educational theory and practice and can make several contributions to the field. First, contributions to new conceptions of educational equity can be made through the analysis of more refined indicators of instructional opportunities for students. Second, this type of study can inform current policy debates regarding education reform, particularly those aspects of reform which involve the re-configuration of teaching and other human resources. Indeed, the findings as they stand invite many important questions that are rich in implications for public policy. The following represent just a few possibilities:

- Why does “administration” represent 13.4 percent of school districts’ professional staff, and

is it appropriate for special education administration to constitute more than 50 percent of the staffing resources devoted to administration?

- Why is the discrepancy in the allocation of resources between "regular" and special types of offerings (i.e., advanced and remedial) as large as it is and should it be smaller/larger?

- Why are the staffing intensity levels so much lower in the Big 5 City districts than they are elsewhere in the state?

- How appropriate are the investments in teacher preparation and duty periods and why do these allocations vary so widely across subject areas?

- What is the justification for discrepancies between the share of teacher and student time resources devoted to particular subject areas and to what degree are these conscious efforts on the part of school officials to assign high and low priorities to specific areas of the curriculum?

Questions of this sort are much easier to ask than to answer, but having the New York research results provides useful base-line data and permits the formulation of the questions. The results bear on important policy debates over the proper distribution of resources between elementary schools, secondary schools, and administrative uses. They also provide new insights into the internal allocation of resources across subject areas within secondary schools. The comparisons between urban and other kinds of districts are relevant to important equity arguments currently being made in New York and elsewhere, and the breakdowns according to district structural characteristics reveal some surprising results that can throw light on the underlying forces that give rise to resource allocation behaviors. For example, it is quite intriguing to learn that staffing levels within core academic subject areas at the secondary level are relatively flat across wide ranges of school district spending levels.

The case study analyses permitted us to reach even more deeply into school and school district resource allocation practices. The micro-level resource allocation model gave us the opportunity to quantify two uses of teacher resources which have received virtually no attention in the literature: 1) the time teachers spend on preparation; and 2) the time teachers devote to non-instructional duties.

While our work in New York using state collected data demonstrates progress in the area of micro-level resource allocation, there are numerous opportunities for researchers in educational administration to extend these analyses. A logical extension of this work is to trace the flow of human resources to even deeper points within the educational system. We do not explicitly address, for example, the allocation of actual student effort in the classes in which they are enrolled. Another important extension of this work involves gaining a deeper understanding of how these resource allocation patterns relate to measures of student performance. While it is important to understand how resources are allocated and used for equity purposes, concerns about the efficient use of these resources can only be addressed through a more thorough analysis of how these resources are translated into student outcomes. Fortunately, these research programs are all complementary, and we hope this paper stimulates further interest in this type of work.

...concerns about the efficient use of these resources can only be addressed through a more thorough analysis of how these resources are translated into student outcomes.

References

Benson, C. S. 1991. "Definitions of Equity in School Finance in Texas, New Jersey, and Kentucky." *Harvard Journal on Legislation*. 28(2): 401-422.

Coleman, J. S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology*. 94: S95-S120.

Coleman, J. S. 1991. *Parental Involvement in Education*. U. S. Department of Education. Washington, DC: U.S. Government Printing Office. (GPO Order # 065-000-00459-3).

Comer, J. P. 1980. *School Power*. New York: Free Press.

Comer, J. P. 1988. "Educating Poor Minority Children." *Scientific American*. 259(5): 42-48.

Cooper, B. S. and R. Sarrel. 1991. "Managing for School Efficiency and Effectiveness: It Can Even Be Done in New York City." *National Forum of Educational Administration and Supervision Journal*. 8(3): 4-17.

Coopers & Lybrand L.L.P. and the Center for Workforce Preparation. 1995. *The Finance Analysis Model*. Author: 203 North La Salle Street, Chicago, Illinois 60601-1296.

Gamoran, A. 1987. "The Stratification of High School Learning Opportunities." *Sociology of Education*. 60: 135-55.

Gamoran, A. 1993. "Alternative Uses of Ability Grouping in Secondary Schools: Can We Bring High-Quality Instruction to Low-Ability Classrooms?" *American Journal of Education*. 102(1): 1-22.

Hanushek, E. A., J. B. Gomes-Neto, and R. W. Harbison. 1992. "Self-Financing Educational Investments: The Quality Imperative in Developing Countries." typescript, University of Rochester.

Lankford, H. and J. Wyckoff. 1993. *Putting Children First: Volume II: Where Has the Money Gone?* New York State Special Commission on Educational Structure, Policies and Practices, Albany, NY, December 14.

Lankford, H. and J. Wyckoff. 1995. "Where Has the Money Gone? An Analysis of School District Spending in New York." *Educational Evaluation and Policy Analysis*. 17(2): 195-218.

Lee, V. E. and A. S. Bryk. 1988. "A Multi-level Model of the Social Distribution of High School Achievement." *Sociology of Education*. 60: 172-192.

Levin, H. M. 1989. "Financing the Education of At-Risk Students." *Educational Evaluation and Policy Analysis*. 11(1): 47-60.

Levin, H. M. 1994. *The Necessary and Sufficient Conditions for Achieving Educational Equity* in *Outcome Equity in Education*, edited by Robert Berne and Lawrence Picus. Newbury Park, CA: Corwin Press, pp. 167-190.

Meyer, R. H. 1988. "Applied versus Traditional Mathematics: New Econometric Models of the Contribution of High School Courses to Mathematics Proficiency." Forthcoming as a Discussion Paper from the Institute for Research on Poverty, University of Wisconsin at Madison (October 1991).

Monk, D. H. and E. J. Haller. 1993. "Predictors of High School Academic Course Offerings." *American Educational Research Journal*. 30(1): 3-21.

Monk, D. H. and J. A. King. 1994. "Multi-Level Teacher Resource Effects on Pupil Performance in Secondary Mathematics and Science: The Role of Teacher Subject Matter Preparation" in *Contemporary Policy Issues: Choices and Consequences in Education*, edited by Ronald G. Ehrenberg. Ithaca, NY: ILR Press, pp. 29-58.

Monk, D. H., C. F. Roellke, and B. O. Brent. 1996. *What Education Dollars Buy: An Examination of Resource Allocation Patterns in New York State School Systems*. ERIC Reproduction Service Document (In Process).

Nakib, Y. A. 1995. "Beyond District Level Expenditures: Resource Allocation and Use in Florida's Public Schools." Paper presented at the annual meeting of the American Education Finance Association, Savannah, GA.

Oakes, J. 1990. *Multiplying Inequalities: The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science*. Santa Monica, CA: The RAND Corporation.

Picus, L. O., D. Tetreault, and L. Hertert. 1995. "The Allocation and Use of Education Dollars at the District and School Level in California." Paper presented at the annual meeting of the American Education Finance Association, Savannah, GA.

Rodriguez et al, v. Los Angeles Unified School District et al. 1992. Consent Decree, No. C 611358, May 5.

Roellke, C. F. 1996. *The Local Response to State Initiated Education Reform: Changes in the Allocation of Human Resources in New York State Schooling Systems, 1983–1995*. Doctoral dissertation, Department of Education, Cornell University.

Rothstein, R. and K. H. Miles. 1995. *Where's the Money Gone?* Washington, DC: Economic Policy Institute.

Speakman, S. T., B. S. Cooper, R. Sampieri, J. May, and H. Holsomback. 1995. "Where Did the $8 Billion Go?" Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.