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ABSTRACT

This report examines the staffing, scheduling, and grouping practices of schools with a seventh grade, and investigates how those practices affect the academic and social development of students. Discussion focuses particularly on theories and previous research on middle grade school organization, national statistics on school organization in the middle grades, progress in improving school organization and instructional practice, and future issues. The data are derived from the principal and teacher surveys in the 1985-1986 National Assessment of Educational Progress (NAEP), which covered a representative national sample of reading, mathematics, and science teachers of seventh-grade students from schools in all regions and types of communities in the United States. The report finds that seventh-graders in middle schools with sixth, seventh, and eighth grades, in comparison to seventh-graders in junior high schools with seventh, eighth, and ninth grades, are somewhat more exposed to organizational structures and teaching practices that are in theory more appropriate for higher-order learning and social development. Approximately 70 references are listed. (RH)

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Report No. 24

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The Center

The mission of the Center for Research on Elementary and Middle Schools is to produce useful knowledge about how elementary and middle schools can foster growth in students' learning and development, to develop and evaluate practical methods for improving the effectiveness of elementary and middle schools based on existing and new research findings, and to develop and evaluate specific strategies to help schools implement effective research-based school and classroom practices.

The Center conducts its research in three program areas: (1) Elementary Schools, (2) Middle Schools, and (3) School Improvement.

The Elementary School Program

This program works from a strong existing research base to develop, evaluate, and disseminate effective elementary school and classroom practices; synthesizes current knowledge; and analyzes survey and descriptive data to expand the knowledge base in effective elementary education.

The Middle School Program

This program's research links current knowledge about early adolescence as a stage of human development to school organization and classroom policies and practices for effective middle schools. The major task is to establish a research base to identify specific problem areas and promising practices in middle schools that will contribute to effective policy decisions and the development of effective school and classroom practices.

School Improvement Program

This program focuses on improving the organizational performance of schools in adopting and adapting innovations and developing school capacity for change.

This report, prepared by the Middle School Program, examines the most recent middle school data from the National Assessment of Educational Progress to investigate how grade 6-8 middle schools differ in organizational aspects of scheduling, grouping, and staffing from grade 7-9 junior high schools.

Abstract

This report examines the staffing, scheduling, and grouping practices of schools throughout the nation that include grade 7, and investigates how those practices affect the academic and social development of students. The data are from the principal and teacher surveys in the 1985-86 National Assessment of Educational Progress (NAEP), which covered a representative national sample of reading, math and science teachers of seventh-grade students from schools in all regions and types of communities in America.

The report finds that 7th-graders in grade 6-8 (middle) schools, compared to 7th-graders in grade 7-9 (junior high) schools, are somewhat more exposed to organizational structures and teaching practices that theoretically are more appropriate for higher-order learning and social development.

There is growing agreement among educators that the most desirable learning environment for students in the middle grades is one that promotes both early adolescent *academic* and *social development*. To optimally promote academic growth, the curriculum should offer appropriate expert instruction in the more advanced subject matter characteristic of the middle grades and create activities that encourage higher-order learning as well as mastery of content knowledge and practice of basic skills mechanics. To foster optimal social development among early adolescents, the middle grades learning environment should provide an appropriate balance of adult supervision and support along with meaningful opportunities for students to develop a sense of responsibility, independence and maturity.

Research has shown that the way a school is organized, including policies on staffing, scheduling and grouping, can foster or inhibit one or both of these dimensions. This paper reviews theories and evidence on how school organization can have important consequences for middle grade learning environments, and presents new data that describes the national distribution of school organization components in schools serving the middle grades. The statistical information is drawn from new tabulations of the 1985-86 National Assessment of Educational Progress (NAEP).

Theories and Previous Research on Middle Grade School Organization

Ideas on the appropriate curriculum and human relationships for middle grade learning environments have been drawn from knowledge about the stage of human development being experienced by early adolescents and from consideration of the curriculum sequences that follow after the elementary grades.

Developmental psychologists and sociologists have shown how the student ages covered by the middle grades encompass distinctive biological, cognitive and social dimensions in human growth toward adulthood (Adelson, 1980; Simmons et al, 1979; Lipsitz, 1984; Elder, 1968; Blyth et al, 1978. Slavin and Karweit, 1982). Even though there will be wide variability in the onset and rate of these changes for students of the same age in the middle grades, each individual student will be dealing with some major biological, cognitive and social changes during most of the school grades of the middle years. Because these changes are so significant, challenging, and often unsettling, the young people who are experiencing them need an adult environment that provides supervision to minimize the serious risks to students' welfare that can occur at these ages and that provides support to encourage student growth to new levels of social competence, autonomy and responsibility. Just as the proper mixture of adult supervision and support in family relationships is important for early adolescent development, the school learning environment during the middle grades can also provide the appropriate balance of adult authority and caring in its teacher-student relationships.

The personal development of the early adolescent period includes the construction of an individual self-image. Early adolescents are defining and testing their views of themselves as persons of worth, and building their confidence in themselves to assume different responsibilities and to tackle different challenges (Carter, 1984; Elder, 1968; Hall, 1984; Hill, 1980; Seltzer, 1982). The immediate environments of family, friends, and school will provide information and feedback to be merged with earlier learning as the early adolescent reinforces, modifies, and secures these aspects of personal development. The organization of the school's middle grades can influence student opportunities to engage in useful experiences and to gather realistic information for personal development during these years.

Although early adolescence is a distinctive stage of human development, it builds upon the foundation of human capacities formed in earlier life and should contribute to the growth of

human talents and dispositions needed to be successful in later life. Accordingly, the school curriculum at the middle grades is on a continuum of content and competencies that extends from the elementary through the secondary grades. Although further introduction and practice of the mechanics of reading, writing and arithmetic continues during the middle grades, the curriculum should be moving toward more breadth of demanding content and toward more depth in understanding and using knowledge. For middle schools, this means that teachers need to have instructional command of more specialized and demanding curriculum than would be needed for the elementary grades. School organization can also be important in these aspects of the middle grade learning environment.

School organization and the middle grades learning environment

Research has suggested how school organization can contribute to the quality of curriculum and human relationships in the middle grades. We have learned that what may be best for one dimension is not always optimum for the other, but there may be ways to balance the goals or to compensate for imbalances through school organization features.

School organization and human relationships. Close adult supervision and caring adult support is more in evidence in those middle grades that control and limit the number of students for whom each teacher is responsible. In a study of middle-grade education in Pennsylvania schools (McPartland, Coldiron, and Braddock, 1987; McPartland, 1987), we found that schools with more desirable teacher-student relationships are more likely to be smaller and to organize their staffing by self-contained classes (one teacher for all major subjects) or by functioning interdisciplinary teams (teams of two to four teachers who coordinate the instruction for a shared group of students) rather than by departmentalization alone (each teacher responsible for one subject specialty). These results suggested possibilities for practice where further research is needed.

First, because the optimum situation for teacher-student relations in the middle grades occurred in the self-contained organization where each child had one teacher for most subjects, we suggested that the weaknesses of the departmentalized situation might be compensated for by a greatly strengthened homeroom advisor role. By assigning each student one key adult advisor/ mentor with regularly scheduled interactions, each student should view at least one school adult as the first person to go to with problems and as the person who will take a personal interest in watching out for the student's own needs and interests.

Second, because the optimum self-contained classroom situation frequently involved a teacher with elementary school training or experience, we speculated that much better pre-service and in-service training for teachers on how to address the early adolescents' needs for close adult supervision and support may pay dividends in the middle grades, especially when teachers can work in teams and take time to discuss individual student problems and to plan for individual student programs.

Thus, the school organization of staffing -- whether a school uses self-contained classes or functioning interdisciplinary team teaching rather than departmentalized staffing alone -- can foster more positive teacher-student relations. However, we have speculated that there may be ways of addressing the human relations weaknesses of some large departmentalized schools by strengthening the homeroom advisory functions or by better teacher training in these areas.

School organization and quality curriculum. Our previous research suggests that the quality of middle grade instruction in such specialized subjects as science and history is improved when specialized teachers teach these subjects (McPartland, 1987). Specialized teachers are those who have received extensive training in a specific content area (for example, by majoring in science in college) and those who concentrate their current teaching in the single subject (for example, by teaching only science to many different classes). There is no present evidence that teacher specialization improves middle grade instruction in language arts or reading, although we

suspect teacher subject-matter expertise would also be valuable for many English lessons that go beyond the mechanics of grammar and vocabulary, such as literature units.

In practice, instruction by subject-matter specialist teachers requires some degree of departmentalized staffing, so teachers can concentrate their lesson preparations and instruction in their fields of expertise. But the potential advantages of departmentalized staffing for quality instruction can conflict with the potential disadvantages for close teacher-student relationships when each student receives instruction from several different teachers. The potential human relations problems are further exacerbated if the previous training that orients a teacher toward a subject matter specialty deflects a teacher's orientation away from the general needs of individual students for close attention and support. In our earlier work, we contrasted the "student orientation" that often characterizes teachers from elementary school training who teach in self-contained classrooms with the "subject orientation" that often typifies teachers who have specialized training in a field and teach in departmentalized situations (McPartland, 1987).

Besides strengthening the role of homeroom advisors and providing training in teacher-student relations, semi-departmentalization may help strike a balance between quality instruction and close teacher-student relations. Semi-departmentalization limits the number of teachers per student to two (or three at most) for the major subjects, with each teacher concentrating instruction in a couple of subjects (such as one teacher for math and science and the other teacher for English and social studies). Because the number of different students per teacher is also minimized by semi-departmentalization, teacher-student relations should be more positive on the average than in a completely departmentalized middle school. Other versions of semi-departmentalization can be established to minimize the number of different teachers per student and to take advantage of the particular teachers' expertise in the school.

The interdisciplinary team teaching approach may also minimize the potential tradeoffs of quality instruction and teacher-student relations, if the team uses some its planning time to attend

to the individual needs of students. For example, the interdisciplinary team of three or four teachers that shares the same group of students could regularly review the progress of each individual student and give extra attention and assistance to the students who most need it.

Thus the school organization of staffing can affect the quality of instruction, especially in specialized subjects like science and history, but the use of teachers trained in subject specialties with departmentalized assignments may improve instruction at the expense of close positive student-teacher relations. We speculated how semi-departmentalization or planning for individual students within interdisciplinary teacher teams can balance or offset these risks.

School organization and student personal development. Early adolescent students can be very sensitive to teacher and peer reactions as they form their image of themselves and their own capabilities. How students are grouped together and scheduled to classes can influence the information received by early adolescents from teachers and peers. In particular, how ability groups or tracks are used in middle grades can affect students' personal development through peer and teacher influences (Bossert et al, 1984; Everson et al, 1980; Evertson et al, 1981).

Key decisions about school policy and school organization at the middle grades concern how to match instruction to the heterogeneity of student needs, interests, and abilities. It is important that students receive instruction that is appropriate to their current achievement levels if the lessons are to be best for the students' learning progress. Students will not be motivated to put forth their best efforts if their lessons are either too easy or too difficult.

But research strongly suggests that grouping decisions can have negative impacts on some students if a school establishes broad rigid tracks for student groups based on general tests of performance or ability (Evertson, et al, 1981; Lossert and Barnett, 1981). In these situations, students in the lowest tracks are often stigmatized by teachers and peers as poor learners. These negative expectations are often internalized by the lowest track students into a poor self-image

and a low level of confidence in one's abilities as a learner (Slavin, 1980; Slavin and Karweit, 1984; Bossert, et al, 1984).

Non-promotion (being left back to repeat a grade) is another experience that research suggests often has strong negative impact on an individual's self-image and self-confidence in school.

There are alternatives to rigid tracking and non-promotion that can address the heterogeneity of student needs and interests with less negative impact on the personal development of individuals who are well behind or well below the average in their school age group. The alternatives to tracking usually include more flexible grouping decisions -- for example, separate assignments to each subject by current individual achievement levels with some subjects being grouped heterogeneously, so no students are likely to be isolated in low tracks for all their instruction. The alternatives to non-promotion usuallly involve providing remedial help at frequent intervals during the term to low performing students rather than waiting until the end of the year for a single decision for promotion or repeating the grade. The frequency and intensity of remedial help will determine whether regular progress across the grades can be achieved by more students.

The way students are assigned to classes also defines their classmate peer groups. Some middle school educators have advocated that retaining the same limited number of classmates for most activities in the middle grades will help the personal development of early adolescents (Alexander and George, 1981; Lipsitz, 1977). Clear research evidence is not available to assess this prediction. There is strong agreement, however, that rigid tracking to produce consistent classmate groups of poor achievers is not a good idea, because of the negative images that accompany the low tracks.

National Statistics on School Organization in the Middle Grades

The present trend toward creating grade 6-8 middle schools is well documented, but have the grade span changes been accompanied by other school organization changes that are likely to provide more appropriate learning environments for early adolescents? In other words, has the trend away from grade 7-9 "junior high schools" toward grade 6-8 "middle schools" produced new staffing, scheduling and grouping practices that provide theoretically appropriate learning environments for these age groups?

To answer this question, we present tabulations of school organization features of schools throughout the nation that include grade 7. The data are from the principal and teacher surveys in the 1985-86 National Assessment of Educational Progress (NAEP), which covered a representative national sample of reading, math and science teachers of seventh-grade students from schools in all regions and types of communities in America.

The results are presented in five tables and supplemental appendices. The first table shows how school grade spans vary across the nation according to the demography of school district and school building. The remaining tables describe how specific school organization features are distributed across schools with contrasting grade spans, with statistical controls on school size.

Grade span variations

Table 1 presents for the average 7th grade student, zero-order correlations between grade span and demographic characteristics of schools and school districts across the nation. Table 1a reports means and standard deviations for the same measures. These data show that school grade span arrangements are correlated with specific demographic characteristics of schools and school districts including location, school size, and school and community ethnic and socioeconomic composition.

The first panel of Table 1 shows that the typical 7th grade student attending a grade 6-8 middle school is located in a suburban community. In contrast, the typical 7th grade student attending a traditional grade 7-9 junior high school is located within a city area. These data also show that the average 7th grader attending K-8 or 7-12 schools is primarily located in a rural, nonmetropolitan community.

Similar results, showing somewhat finer distinctions in community types, are evident in the second panel of Table 1. These data highlight the concentration of 7th grade students attending K-8 schools in extreme rural locations and those attending 7-12 schools in very small communities.

The third panel of Table 1 shows that many of the typical 7th graders attending K-8 or 7-12 schools are located in the northeast region of the U. S . while 7th graders attending 6-8 middle schools show a concentration in the western region.

The fourth panel of Table 1 shows that the typical 7th grader attending a school with a traditional 7-9 junior high grade-span is exposed to a larger number of students and teachers than 7th grade counterparts in schools with other grade-span configurations. The average seventh grader in a 7-9 junior high attends school with about 905 schoolmates compared to 529 for the average 7th grader in K-8 grammar schools; 661 in 6-8 middle schools, and 607 in 7-12 high schools.

The fifth panel of Table 1 shows that the typical 7th grader in K-8 and 7-9 schools is in a setting with higher concentrations of low-income schoolmates than is a 7th grade counterpart in schools with other grade-span configurations.

The sixth panel of Table 1 shows that the typical 7th grader in 7-9 junior high schools is in a setting with higher concentrations of Black and Hispanic schoolmates, while 7th graders in 7-12 schools have higher concentrations of white schoolmates.

Grade span and variations in school organization and staffing

As the preceding analysis showed, schools of different grade span coverage vary widely in student enrollment size. To the degree that school size may be a factor in determining both the student need for highly differentiated teaching-learning contexts and the schools' capacity to staff such programs, it is important to first control on school size before generalizing about grade span effects on school organization and staffing patterns. The following analyses of the relationship between school grade span and school organization and staffing patterns include controls for school size.

Table 2 presents, for the average 7th grade student, zero-order and partial correlations (controlling for school size) showing the relationship between grade span and school organization and staffing practices. Means and standard deviations for these measures are reported in Table 2a. These data show that many school organization and staffing arrangements of schools serving seventh grade students are significantly influenced by the school's grade span configuration, even after statistically controlling for the effects of school size.

The first three rows of Table 2 (left panel) show that (1) exposure to self-contained classrooms is more typical for the average seventh grader in K-8 schools than for 7th graders in other types of schools; (2) exposure to team-teaching is more typical for the average seventh grader in 6-8 schools than for 7th graders in other types of schools; and (3) exposure to formal departmentalization is more typical for the average seventh grader in 7-9 schools than for 7th graders in other types of schools. These patterns hold when statistical controls are applied for the effects of school size, as shown in the right panel of Table 2.

It is important to point out, however, that departmentalization is the most prominent pattern for the average 7th grader in schools of any grade span (76%, 79%, 96%, and 84% for K-8, 6-8, 7-9, and 7-12 schools, respectively). Only in K-8 schools does the average 7th grader experience self-contained classes more than four percent of the time.

Despite the prevalence of departmentalized staffing arrangements in 6-8 middle schools, a number of other organizational and staffing arrangements distinguish departmentalization in 6-8 middle schools from such practices in other types of schools serving 7th graders. Teachers of typical 7th graders in 6-8 middle schools: (1) more often share common planning time, as shown in row 4; (2) more often are subject matter specialists in some area, especially in science and English, but not mathematics, as shown in rows 5,6,7 and 8; (3) less often teach more than one grade, as shown in rows 9 and 10.

Table 3 presents, for the average 7th grade student, zero-order and partial correlations (controlling for school size) showing the relationship between school grade span and teacher qualifications and staffing arrangements in math and science.

Table 3 (and 3a) shows that with one or two exceptions, 7th graders in traditional junior high schools tend to have math and science teachers with more extensive training (number of science or math courses or earned a BA or MA degree) in the subject than 7th graders in other types of schools. However, Table 3a shows that 7th graders in 6-8 middle schools have more certified science teachers than their 7th grade counterparts in 7-9 junior high schools (29% v 23%) despite, on average, having less training in the subject. These data provide no clear reasons for this apparent anomaly.

In contrast, 7th graders in 6-8 middle schools are more likely than their counterparts in 7-9 junior high schools to have teachers with an elementary teaching certification (46% v 30%). Table 4 shows that 7th graders in 6-8 middle schools and 7-9 junior high schools are much more likely to be exposed to tracking in the major subject areas than their 7th grade counterparts in other types of schools, even when the effects of school size are statistically controlled. These effects appear stronger in grade 6-8 schools despite the strong emphasis by middle school educators on creating structures that optimally foster the development of human relationships.

Nevertheless, the major point here is the widespread use of tracking in the seventh grade and across subject areas. The extent of these practices is clearly shown in Table 4a. Tracking is used less in science than in math or English. Tracking is also less common for 7th graders in K-8 and 7-12 schools, which tend to be small, rural, and serve more homogeneous student populations.

Table 5 presents, for the average 7th grade student, zero-order and partial correlations (controlling for school size) showing the relationship between school grade span and use of selected classroom practices for science and math instruction. Seventh graders in 6-8 middle schools and 7-9 junior high schools tend to have greater access to calculators than their 7th grade counterparts in other types of schools, but the actual frequency of calculator use in math subjects is most common among 7th graders in 7-9 junior high schools.

Science demonstrations and experiments are more typical experiences for 7th graders in 6-8 middle schools. These students, compared to 7th graders in 7-9 junior high schools, have greater access to both general purpose and specialized labs in their science classes despite less well-stocked science equipment. These patterns hold when statistical controls for school size are included. Overall, these data suggest that 7th graders in 6-8 middle schools may be exposed to more innovative teaching approaches in math and science.

Progress Report and Future Issues

The NAEP tabulations help us to judge the extent of the "middle school movement" toward theoretically appropriate school organization and instructional practice that was intended to accompany the shift from 7-9 junior high schools to 6-8 middle schools over the past decade in this country. We can begin to tell which of the ideas about school organization and learning environments for early adolescents actually took root in the new 6-8 schools by examining the variation of practices across grade 6-8 and grade 7-9 schools. (Schools with K-8 and 7-12 schools are exceptions largely found in rural areas and small towns.)

Our general conclusion is that the introduction of the 6-8 grade middle school in some cases was accompanied by fundamental changes in operating programs and learning environments for early adolescents, but these changes are not widespread and are not typical practice. In other words, most schools for students in the middle grades still look much like the junior high school or high school of recent past, even though a sizeable minority of more innovative middle schools can actually now be found.

The mixed picture of the middle school movement can be seen especially in the distributions of specific school organization components, such as team teaching, tracking and teacher specialization. When interdisciplinary team teaching occurs with time set aside for planning and coordination, it is almost always located in a 6-8 middle school -- but this team teaching only occurs in a minority (19 percent) of the 6-8 schools. Departmentalization of staffing without teaming remains by far the most frequent form of teacher assignment in both 6-8 and 7-9 schools.

Tracking of students into separate classes -- a feature not favored by most middle school theorists -- nevertheless continues to dominate as a practice in both 6-8 and 7-9 schools.

The 6-8 middle school is somewhat more likely than 7-9 junior high schools to have a mix of teachers with previous experience in elementary schools and teachers with previous middle or secondary school experience. At the same time, teachers who are certified and specialize in single subjects are found in large numbers in both types of schools.

With so little evidence of team teaching as the favored staffing practice in middle grades and so much evidence of tracking and specialized teaching as the dominant scheduling practices, future research must be concerned with whether other practices are used to compensate for the known weaknesses of departmentalized and tracked schools (such as meaningful homeroom advisors and flexible grouping). In future work, we will use data from a new national survey of middle schools to address these issues.

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Table 1

Relationships between School Grade Span and District or School Demography, for the Average Seventh Grade Student (n=21,677) (Statistic is zero-order correlation of demography measure with grade span dummy variable; values in parentheses are not statistically significant.)

Demography Measure	Grade Span K-8	6-8	7-9	7-12
City location	(-.003)	-.099	.276	-.197
Suburban location	-.100	.129	(.003)	-.098
Rural location	.110	-.054	-.262	.288
Extreme rural location	.255	-.214	-.061	.134
Low metro location	.015	-.016	.072	-.085
High metro location	-.023	.040	(.012)	-.054
Main big city location	-.046	.040	.084	-.122
Urban fringe location	-.039	.038	.086	-.130
Medium city location	-.068	.028	.080	-.072
Small place location	-.012	.017	-.193	.240
Northeast Region	.138	-.122	.049	.118
Southeast Region	.087	-.079	.033	-.015
Central Region	.049	.018	-.097	.040
Western Region	-.140	.161	.020	-.125
School size (students)	-.201	-.086	.342	-.088
School size (teachers)	-.244	-.116	.358	(.003)
Chapter 1 students (%)	.139	.030	.202	.043
Free lunch students (%)	.114	(-.009)	(.003)	-.109
Poverty index	.080	-.067	.042	-.037
% white students in school	(.011)	.013	-.162	.178
% black students in school	.049	-.062	.140	-.138
% Hispanic students in school	-.074	.033	.109	-.111

Table 2

Relationships between School Grade Span and School Organization of Staffing, with Controls on School Size, for the Average Seventh Grade Student (N=21,677)
(b = standardized regression coefficient, r = zero-order correlation; values in parentheses are not statistically significant)

School Organization Measure	Grade Span (b=r) K-8	6-8	7-9	7-12	Grade Span (b) Controlling on School Size K-8	6-8	7-9	7-12
Self-contained classrooms (P)	.215	-.108	-.038	-.026	.190	-.122	.020	-.040
Team teaching (P)	-.053	.168	-.168	(.002)	-.022	.183	-.252	.015
Departmentalized (P)	-.069	-.091	.170	.012	-.083	-.096	.213	.008
Time planning with other teachers	(.005)	.048	(.000)	-.081	.056	.068	-.093	-.062
No. of major subjects per teacher	.409	-.135	-.125	-.097	.382	-.152	-.061	-.115
Teachers do not specialize	.232	-.149	.033	-.068	.228	-.155	.063	-.073
Teacher specializes in math	-.040	-.141	.168	.057	(-.001)	-.126	.115	.073
Teacher specializes in science	-.044	.157	-.090	-.083	-.078	.146	-.045	-.097
Teacher specializes in English	-.083	.116	-.093	.028	-.080	.119	-.118	.030
No. of different grades per teacher	.182	-.293	-.078	.359	-.135	-.316	(-.011)	.340
Teacher in only one grade	-.160	.174	.034	-.136	-.128	.190	-.032	-.122
Number of students per teacher	-.232	.244	-.022	-.096	-.197	.264	-.107	-.079

Table 3

Relationships between School Grade Span and Teacher Qualifications, with Controls on School Size, for the Average Seventh Grade Student (N=21,677)
(b = standard regression coefficient; r = zero-order correlation; values in parentheses are not statistically significant)

Teacher Qualification Measure	Grade Span (b=r) K-8	6-8	7-9	7-12	Grade Span (b) Controlling on School Size K-8	6-8	7-9	7-12
Math BA	-.158	-.025	(.022)	.160	-.137	(-.015)	(-.024)	.171
Math MA	-.141	.042	.098	-.042	-.126	.050	.073	-.034
Science BA	-.158	.096	.035	(.005)	-.115	.116	-.051	.024
Science MA	.149	-.156	(.018)	.049	.140	-.163	.047	.044
Certified in science	-.005	(.007)	-.058	.066	-.023	(.003)	-.032	.060
Certified in elementary	.095	.058	-.078	-.103	.076	.049	-.046	-.113
Certified in math	-.080	-.099	.180	.023	-.056	-.089	.153	.034
Previously taught elementary	.139	.026	-.102	-.070	.134	.022	-.096	-.075
Previously taught secondary	-.036	(.006)	-.040	.084	-.056	(.006)	(-.011)	.077
Math major as undergrad	-.183	(.015)	.132	(.001)	-.160	.027	.094	(.013)
Math major as grad	-.182	.057	.117	-.047	-.166	.067	.088	-.037
Number of math courses in college	-.194	.055	.185	-.108	-.176	.066	.162	-.099
Science major as undergrad	-.101	(-.013)	.196	-.053	-.054	(.007)	.129	-.033
Science major as grad	(.023)	-.028	.043	-.033	(.009)	-.034	.076	-.039
No. of science courses in college	-.086	(-.009)	.175	-.060	-.063	(.001)	.148	-.050
Years of teaching experience	-.110	.165	-.044	-.080	-.138	.157	(-.007)	-.089

Table 4

Relationships between School Grade Span and Use of Tracking in Selected Subjects, with Controls on School Size, for the Average Seventh Grade Student (N=21,677)
(b = standard regression coefficient; r = zero-order correlation; values in parentheses are not statistically significant)

Use of Tracking in:	Grade Span (b=r) K-8	6-8	7-9	7-12	Grade Span (b) Controlling on School Size K-8	6-8	7-9	7-12
English	-.260	.195	.080	-.107	-.200	.224	.042	-.080
Math	-.280	.187	.146	-.152	-.227	.214	.046	-.128
Science	-.128	.122	-.028	-.011	-.089	.140	-.113	(.006)
Most Subjects	-.255	.210	.051	-.099	-.204	.234	.056	-.075

Table 5

Relationships between School Grade Span and Selected Classroom Practices, with Controls on School Size, for the Average Seventh Grade Student (N=21,677)
(b = standard regression coefficient; r = zero-order correlation; values in parentheses are not statistically significant)

Selected Classroom Practice	Grade Span (b=r) K-8	6-8	7-9	7-12	Grade Span (b) Controlling on School Size K-8	6-8	7-9	7-12
School provides calculators to students	.033	.084	.082	-.249	(.027)	.081	.107	-.254
Frequency of calculator use in math	-.088	-.116	.189	(.010)	-.094	-.118	.218	(.009)
Frequency of science demonstrations	(.007)	.201	-.228	-.093	.009	.203	-.262	-.093
Frequency of science experiments	-.005	.173	-.143	-.124	(.001)	.176	-.175	-.122
Have labs at back of classrooms	.043	-.143	.072	.105	-.059	-.139	.056	.111
Have general purpose science labs	-.284	.199	-.131	.218	-.272	.210	-.193	.230
Have specialized science labs	-.038	(.004)	-.145	.229	-.029	(.008)	-.185	.235
Amount of science equipment	-.191	.037	.095	.084	-.176	.046	.065	.093
Science equipment in good condition	-.082	(.019)	.109	-.050	-.040	.037	.039	-.032

Table 1a

Means and Standard Deviations(in parentheses) of District or School Demography Measures by Grade Span (n=21,677)

Demography Measure	Grade Span K-8	6-8	7-9	7-12
City location	.248 (.432)	.212 (.409)	.491 (.500)	.000 (.000)
Suburban location	.316 (.465)	.494 (.500)	.440 (.496)	.294 (.456)
Rural location	.436 (.496)	.294 (.456)	.069 (.254)	.706 (.456)
Extreme rural location	.203 (.402)	.013 (.114)	.030 (.170)	.151 (.358)
Low metro location	.102 (.303)	.087 (.282)	.132 (.339)	.019 (.137)
High metro location	.067 (.250)	.093 (.290)	.089 (.285)	.039 (.194)
Main big city location	.079 (.269)	.125 (.331)	.168 (.373)	.000 (.000)
Urban fringe location	.096 (.295)	.139 (.346)	.185 (.389)	.000 (.000)
Medium city location	.092 (.290)	.160 (.367)	.208 (.406)	.075 (.263)
Small place location	.361 (.480)	.3828(.486)	.188 (.391)	.716 (.451)
Northeast Region	.204 (.403)	.147 (.355)	.229 (.421)	.3267(.469)
Southeast Region	.332 (.471)	.211 (.408)	.271 (.444)	.2238(.417)
Central Region	.316 (.465)	.271 (.444)	.178 (.382)	.315 (.465)
Western Region	.148 (.355)	.371 (.483)	.322 (.467)	.1345(.341)
School size (students)	529 (292)	661 (272)	905 (323)	607 (376)
School size (teachers)	25.7 (13.4)	34.9 (16.4)	50.5 (18.5)	37.0 (24.2)
Chapter 1 students (%)	.778 (.416)	.630 (.483)	.410 (.492)	.677 (.468)
Free lunch students (%)	36.3 (21.7)	29.7 (24.4)	30.0 (20.5)	23.3 (16.6)
Poverty index	15.2 (11.5)	12.7 (9.8)	14.1 (9.4)	12.2 (10.0)
% white students in school	70.1 (36.5)	69.6 (28.3)	59.1 (33.8)	85.5 (23.5)
% black students in school	20.3 (32.0)	16.0 (22.1)	24.4 (28.0)	7.3 (17.6)
% Hispanic students in sch	5.9 (15.5)	9.9 (17.2)	13.5 (26.9)	3.1 (11.7)

Table 2a

Means and Standard Deviations (in parentheses) of School Organization Measures (n=21677)

School Organization measure	Grade Span K-8	6-8	7-9	7-12
Self-contained classrooms	.150 (.357)	.024 (.153)	.028 (.166)	.0305(.172)
Team teaching (P)	.090 (.286)	.186 (.389)	.014 (.119)	.134 (.341)
Departmentalized (P)	.760 (.427)	.790 (.407)	.958 (.202)	.835 (.371)
Time planning w other tch	.990 (.994)	1.021 (.954)	.978 (1.054)	.7596(.862)
No. of major subj per tch	1.848 (1.060)	1.161 (.485)	1.075 (.353)	1.066 (.289)
Teachers do not specializ	.294 (.456)	.072 (.259)	.138 (.345)	.057 (.231)
Teacher specializes in mat	.275 (.447)	.259 (.438)	.480 (.500)	.393 (.489)
Teacher specializes in sci	.244 (.430)	.359 (.480)	.208 (.406)	.188 (.391)
Teacher specializes in Eng	.162 (.368)	.293 (.455)	.164 (.370)	.280 (.449)
No. of different grades p	2.264 (1.665)	1.462 (.619)	1.584 (.717)	2.959(1.803)
Teacher in only one grade	.326 (.469)	.593 (.491)	.549 (.498)	.319 (.466)
Number of students per tea	101 (56)	133 (38)	122 (35)	113 (28)

Table 3a

Means and Standard Deviations (in parentheses) of Teacher Qualification Measures by Grade Span (N=21,677)

Teacher Qualif. Measure	Grade Span K-8	6-8	7-9	7-12
Math BA	.133 (.340)	.299 (.458)	.329 (.470)	.487 (.500)
Math MA	.000 (.000)	.121 (.326)	.156 (.363)	.076 (.265)
Science BA	.403 (.491)	.612 (.487)	.621 (.486)	.583 (.494)
Science MA	.346 (.476)	.162 (.369)	.233 (.423)	.278 (.449)
Certified in science	.276 (.447)	.286 (.452)	.230 (.421)	.369 (.483)
Certified in elementary	.490 (.500)	.404 (.491)	.302 (.459)	.232 (.422)
Certified in math	.208 (.406)	.255 (.436)	.465 (.499)	.325 (.469)
Previously taught elementa	.494 (.500)	.348 (.476)	.240 (.427)	.239 (.427)
Previously taught secondar	.738 (.440)	.777 (.416)	.741 (.438)	.878 (.328)
MATH MAJOR AS UNDERGRAD	6.805(6.583)	10.655(9.406)	12.434(8.686)	10.519(7.270)
Math major as grad	.567 (.686)	3.016(5.996)	3.639(4.252)	2.087(2.857)
No. of math courses in co	7.512(9.032)	13.835(14.395)	16.985(11.583)	9.637(7.145)
Science major as undergr	10.511(8.601)	11.993(7.046)	16.315(6.519)	10.720(3.758)
Science major as grad	3.967(4.847)	3.567(6.182)	4.389(5.344)	3.031(2.661)
No. of sci courses in co	13.741(12.080)	15.537(9.724)	20.903(8.720)	13.302(5.691)
Years of teaching experi	11.864(8.177)	15.313(8.338)	13.321(8.474)	12.242(6.571)

Table 4a

Means and Standard Deviations (in parentheses) of Tracking Variables by Grade Span (N=21677)

	Grade Span			
Use of Tracking in:	K-8	6-8	7-9	7-12
English	.366 (.482)	.744 (.437)	.732 (.443)	.521 (.500)
Math	.481 (.500)	.837 (.369)	.886 (.318)	.589 (.492)
Science	.326 (.469)	.534 (.499)	.447 (.497)	.461 (.499)
Most Subjects	1.368(1.606)	2.638(1.474)	2.480(1.413)	1.901(1.777)

Table 5a

Means and Standard Deviations (in parentheses) of Selected Classroom Practices by Grade Span (N=21677)

	Grade Span			
Classroom Practices:	K-8	6-8	7-9	7-12
School provides calculator to students	.396 (.489)	.403 (.491)	.419 (.494)	.075 (.263)
Frequency of calculator use in math	.019 (.135)	.011 (.103)	.000 (.000)	.038 (.192)
Frequency of science demonstrations	3.457(1.071)	3.587 (.792)	2.857 (.774)	3.159(1.351)
Frequency of science experiments	3.344(1.050)	3.490 (.901)	2.970(1.116)	2.954(1.110)
Have labs at back of classrooms	.4 8 (.499)	.356 (.479)	.508 (.500)	.578 (.494)
Have general purpose science labs	.171 (.377)	.540 (.499)	.288 (.453)	.834 (.372)
Have specialized science lab	.178 (.383)	.213 (.409)	.054 (.226)	.535 (.500)
Amount of science equip.	1.920 (.870)	2.274 (.775)	2.454 (.693)	2.465 (.718)
Science equipment in good condition	2.917(1.186)	3.118 (.985)	3.402 (.938)	2.939 (.857)