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*Editor*

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# *Why Some Schools Have More Underqualified Teachers Than Others*

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RICHARD M. INGERSOLL

**T**he failure to ensure that the nation's classrooms are all staffed with qualified schoolteachers is one of the most important problems in contemporary American education. Over the past two decades, dozens of reports and national commissions have focused attention on this problem, and, in turn, numerous reforms have been initiated to upgrade the quality and quantity of the teaching force.<sup>1</sup>

To address the quality issue, many states have pushed for more rigorous preservice and in-service teacher education, training, and certification standards. In response to the quantity issue, a host of initiatives and programs has been implemented that attempt to increase the supply of teachers by recruiting new candidates into teaching. A wide range of alternative licensing programs has been implemented to ease entry into teaching. Programs such as Troops-to-Teachers attempt to entice professionals into midcareer changes to teaching. Other programs, such as Teach for America, seek to lure the "best and brightest" into the occupation. Some school districts have resorted to recruiting teaching candidates from overseas. Finally, financial incentives such as signing bonuses, student loan forgiveness, housing assistance, and tuition reimbursement have been instituted to aid teacher recruitment.<sup>2</sup>

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Concern with the quality and qualifications of teachers is neither unique nor surprising. Elementary and secondary schooling is mandatory in the United States, and the quality of teachers and teaching is undoubtedly one of the most important factors shaping the learning and growth of students. Moreover, the largest single component of the cost of education in any country is teacher compensation.

The responsibility for ensuring that the nation's classrooms are all staffed with qualified teachers is a perennially important issue in schools, but the thesis of this paper is that it is also among the least understood. Like many similarly worthwhile reforms, recent efforts alone will not solve the problems of underqualified teachers and poor-quality teaching in the United States because they do not address some of their key causes.

One of the least recognized of these causes is the phenomenon known as out-of-field teaching—teachers assigned to teach subjects for which they have little education or training. This is a crucial factor because highly qualified and well-trained teachers may become highly unqualified if, once on the job, they are assigned to teach subjects for which they have little background. Educators have long been aware of the existence of out-of-field teaching. James Conant, former president of Harvard University and father of the SAT, called attention to the widespread “misuse of teachers” through out-of-field assignments in his landmark 1963 study *The Education of American Teachers*. Albert Shanker, the late leader of the American Federation of Teachers, condemned out-of-field teaching as education's “dirty little secret” in a 1985 opinion piece in the *New York Times*. But this practice has been largely unknown to the public, policymakers, and many educational researchers. Until recently, almost no empirical research has been conducted with representative data on out-of-field teaching. Few writers on teacher quality or school organization even acknowledge the existence of this practice.<sup>3</sup> An absence of accurate data on out-of-field teaching contributed to this lack of recognition. This situation was remedied with the release, beginning in the early 1990s, of the Schools and Staffing Survey (SASS), a major new survey of the nation's elementary and secondary teachers conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education.

In previous research I have presented SASS data showing that out-of-field teaching is an ongoing and serious problem across the nation, especially in secondary schools.<sup>4</sup> These findings on out-of-field teaching have been replicated. Other researchers have calculated levels of out-of-

field teaching using the same, or similar, data sources and, although different analysts have focused on a wide range of different measures of out-of-field teaching, all have reached the same conclusion—that there are high levels of out-of-field teaching in American schools.<sup>5</sup>

These findings have been featured in a number of major education reports and been widely reported in the national media.<sup>6</sup> As a result, the problem of out-of-field teaching has become a major concern in the realm of educational policy. The elimination of out-of-field teaching is, for example, an important objective of the No Child Left Behind Act. However, there has been little research on a key question: What are the reasons for the prevalence of out-of-field teaching in American schools? Empirically exploring this question is the objective of this analysis.

### **The Sources of Out-of-Field Teaching**

Both education researchers and the education policy community generally believe that out-of-field teaching, like other types of underqualified teaching, is largely a result of either inadequate training on the part of teachers or shortages of qualified teachers.<sup>7</sup> From this viewpoint—hereafter referred to as the teacher deficit perspective—the source of the problem of out-of-field teaching primarily lies in deficits in either the quality or the quantity of teachers.

In the first case, out-of-field teaching is assumed to be a problem of poorly prepared teachers. In this view, the preparation of teachers in college or university training programs lacks adequate rigor, breadth, and depth, resulting in high levels of out-of-field teaching. Proponents of this view typically propose more rigorous teacher education, training, and certification as the remedy.<sup>8</sup> A common variant of this first view assumes that the problem is a lack of academic and substantive coursework, in particular, on the part of new teachers. Hence the remedy lies in requiring prospective teachers to complete a “real” undergraduate major in an academic discipline.<sup>9</sup>

In the second case, the problem of out-of-field teaching is assumed to be a result of teacher shortages. In this view, shortfalls in the number of available teachers, because of increasing student enrollments and a graying teaching work force, have forced many school systems to lower standards to fill teaching openings. Schools have resorted to hiring underqualified candidates or shifting existing staff trained in one field to teach in another,

**Figure 1. Two Perspectives on the Causes and Consequences of Out-of-Field Teaching***Teacher deficit perspective*

Inadequate teacher supply →  
 Inadequate teacher training → Out-of-field teachers → Decreases in school performance

*Organizational and occupational perspective*

Administrative practices and  
 organizational characteristics → **Out-of-field teachers** → Decreases in school performance

causing out-of-field teaching. Proponents of this view typically propose enhanced teacher recruitment as a remedy.<sup>10</sup>

In contrast to the teacher deficit perspective, this study proposes an alternative perspective—one focused on the character of the organization of schools and occupation of teaching, to explain the sources of out-of-field teaching. My central hypothesis is that out-of-field teaching does not solely, or even primarily, stem from deficits in either the quality or the quantity of teachers. Instead, it is rooted in the manner in which schools are organized and in which teachers are employed and utilized. From this viewpoint, schools are not simply victims of low-quality teacher-training problems or of larger macro-demographic trends of supply and demand. To fully understand the problem of out-of-field teaching, the design and management of the organizations within which teachers work must be examined (see figure 1).

### **An Organizational and Occupational Perspective**

Unlike those employed in the traditional professions, teachers have only limited authority over many key workplace decisions. National data have long documented, for example, that teachers have little influence or input into which courses they are assigned to teach. The data reveal that decisions concerning the selection and the allocation of teachers to course and program assignments are primarily the responsibility and prerogative of principals and other building-level school administrators.<sup>11</sup> These administrators are charged with the often-difficult task of providing a broad array of programs and courses with limited resources, limited time, a limited budget, and a limited teaching staff. Along with these limitations, building administrators' staffing decisions can be constrained by numerous factors, such as teachers union work rules, teacher seniority issues, school district regulations, class-size guidelines, and contractual obligations concerning the

number and type of class assignments that can be allocated to teaching employees. For example, in a typical secondary school, teacher employment contracts stipulate that full-time teaching staff must be assigned to teach five classes in a normal seven class-period day. Maximizing the match between the content of teachers' assignments and the qualifications of the teachers themselves is only one of many demands and constraints administrators must weigh in the making of these decisions.

The resulting tension between multiple demands and limited resources is not new. Since the mid-twentieth century this appears to have increased as the expectations placed on schools by state and federal governments have steadily risen. Increasingly schools have been required to perform tasks once reserved for families, churches, and communities and to address both the academic learning and the social well-being of youngsters.<sup>12</sup> However, field research has shown that within these constraints school principals often have an unusual degree of discretion in staffing decisions.<sup>13</sup> Whereas pre-service teacher training is subject to an elaborate array of state licensing requirements, there is far less regulation of how teachers are utilized once on the job.<sup>14</sup> In this context, principals may find that assigning teachers to teach out of their fields is often not only legal, but also more efficient and less expensive than the alternatives. Simply put, out-of-field teaching is used by administrators because it is a cheap and convenient way of closing the gap between demands and resources; that is, of making ends meet.

For example, instead of trying to find and hire a new science teacher for a new state-mandated, but underfunded, science curriculum, a principal may find it more convenient to assign a couple of English and social studies teachers to cover a section or two in science. If a teacher suddenly leaves in the middle of a semester, a principal may opt to hire a readily available, but not fully qualified, substitute teacher instead of instigating a formal search for a new fully qualified teacher. When faced with the choice between hiring a fully qualified candidate to teach English and hiring a less-qualified candidate who is also willing to coach a major varsity sport, a principal may find it more expedient to do the latter. If a full-time music teacher is under contract, but student enrollment is sufficient to fill only three music classes, the principal may find it both necessary and cost-effective in a given semester to assign the music teacher to teach two classes in English, in addition to the three classes in music, to employ the teacher for a regular full-time complement of five classes per semester. If a school has three full-time social studies teachers but needs to offer seventeen social studies

courses, or the equivalent of three and two-fifths full-time positions, and also has four full-time English teachers but needs to offer only eighteen English courses, or the equivalent of three and three-fifths full-time positions, one solution would be to assign one of the English teachers to teach three English courses and two social studies courses.

Faced with a myriad of such trade-offs and judgments, some degree of teacher misassignment by principals is probably unavoidable. However, while the SASS data have shown that out-of-field teaching is widespread, these data also show large school-to-school differences in this practice.<sup>15</sup> This raises an important question: What accounts for school differences in levels of out-of-field teaching?

### **Administrative Practices, Organizational Characteristics, and Out-of-Field Teaching**

This analysis seeks to build on earlier work by empirically exploring the reasons that particular kinds of schools have more or less out-of-field teaching. It investigates the relationships between the degree of out-of-field teaching in schools and a number of possible factors suggested by the teacher deficit perspective, such as the extent to which schools experience difficulties in recruiting qualified teaching staff for their teaching job openings, and suggested by an organizational and occupational perspective, including a number of administrative practices and organizational characteristics.

#### *Hiring Policies*

While data from SASS show that school principals have a great deal of control over teacher hiring decisions, the data also show that the central administrations of public school districts often impose minimal standards on school-level decisions concerning new hires. For example, the data show that about two-thirds of all school districts formally require new teacher hires to hold a college major or minor in the main field to be taught. Such regulations would be expected to constrain the capacity of school principals to hire out-of-field candidates for openings.

The degree to which a school is faced with teacher recruitment and hiring difficulties and the kinds of regulations imposed by district-level administrators may shape a principal's hiring and staffing decisions. An



organizational perspective, however, suggests an overlooked role exists for the leadership skills of principals in the employment, assignment, and utilization of teachers. This analysis will explore this factor by examining whether there is a positive association between the general leadership skill of principals and the degree of out-of-field teaching in schools.

### *Staffing Practices*

Depending upon the constraints within which principals work, the degree of discretion allowed to them, and their leadership skills, numerous options and strategies could be available to principals in regard to teacher hiring and assignment. When faced with difficulty in finding qualified candidates to fill openings, school principals might opt to hire an available but underqualified teacher at the cost of a regular teacher salary, might choose to reassign an existing teacher to cover part or all of the hard-to-staff classes at no additional salary, or might decide to employ a long-term substitute teacher at a relatively low salary. Each of these choices would be expected to result in significantly more out-of-field teaching.

Alternatively, principals might opt to leave some hard-to-staff positions unfilled and shift student enrollment to existing classes. This would create larger classes, save salary costs, and, presumably, result in less out-of-field teaching. In other cases, administrators might have the budgetary resources and flexibility available to enhance recruitment efforts by providing better starting salaries or pay incentives.

Why are particular schools more likely to have out-of-field teachers? To address this question, this study compares and examines two explanations—the dominant teacher deficit perspective focuses on deficits in the quantity and quality of teacher supply and the organizational and occupational perspective focuses upon the manner in which schools are organized and teachers are employed and utilized. These perspectives are not necessarily mutually exclusive; both may help account for school variation in out-of-field teaching.

### **Data and Methods**

The data for this study come from NCES' Schools and Staffing Survey. This is the largest and most comprehensive data set available on the staffing,

occupational, and organizational characteristics of elementary and secondary schools. The survey was specifically designed to remedy the lack of nationally representative and comprehensive data on these issues.<sup>16</sup>

The U.S. Census Bureau collects the SASS data for NCES from random samples stratified by state, sector, and school level. To date, four independent cycles of SASS have been completed: 1987–88, 1990–91, 1993–94, and 1999–2000.<sup>17</sup> Each cycle of SASS includes several sets of separate, but linked, questionnaires for school administrators and for a random sample of teachers within each school. The response rate has been relatively high: 86 percent for teachers and 94 percent for administrators.

The data used in this study are primarily from the 1993–94 SASS. The sample contains about 46,700 teachers employed in about 9,000 public elementary, secondary, and combined (K–12) schools. Throughout, this analysis uses data weighted to compensate for the over- and undersampling of the complex stratified survey design. Each observation is weighted by the inverse of its probability of selection to obtain unbiased estimates of population parameters.

Representing a wide range of information on the characteristics of teachers, schools, and school districts across the country, SASS is particularly useful for addressing research questions on access to qualified teachers. Teachers reported their certification status and the major and minor fields of study for degrees earned at both the undergraduate and graduate levels. In addition, for each teacher sampled, data were collected on the subject taught, grade level, and number of students enrolled for each class period in the school day. From administrators, SASS obtained a wide range of information on school and district demographic characteristics, staffing procedures, teacher recruiting difficulties, administrative practices, and organizational characteristics.

There are two stages to my data analysis and data presentation. The first stage documents levels of teacher qualifications and out-of-field teaching across different types of schools. The second stage investigates the sources of school-to-school variations in out-of-field teaching.

I begin with a presentation of descriptive statistics on levels of teacher education and teacher certification, and the extent to which these levels vary across different types of schools. This stage of the analysis also presents data on levels and variations of out-of-field teaching. It focuses on establishing the role of out-of-field teaching as a major source of underqualified teachers.

One of the difficulties encountered in researching the problem of under-qualified and out-of-field teachers has been a lack of consensus on the best standard by which to define a qualified teacher. Few would argue that teachers need not be qualified. Moreover, teaching, unlike many other occupations, has an extensive body of empirical research documenting the proposition that the qualifications of teachers are tied to student outcomes.<sup>18</sup> But controversy has long swirled around how much education, what types of training, and which kinds of preparation teachers ought to have to be considered qualified in any given field.<sup>19</sup>

This study assumes that teachers, especially at the secondary level and in the core academic fields, to be considered adequately qualified, ought to have, as a minimal prerequisite, an undergraduate or graduate major or minor in the fields they are assigned to teach. Having a major or minor in a field does not guarantee one is a quality teacher, or even that one is a qualified teacher. I assume, however, that a major or minor is a necessary, if not sufficient, requirement of both.<sup>20</sup>

The first stage of the analysis focuses on the proportion of those teaching in five different fields without an undergraduate or graduate major or minor in that field. The five fields are general elementary education (at the elementary level) and mathematics, English, social studies, and science (at the secondary level). In this measure of out-of-field teaching I count both education and academic majors and minors as qualification to teach; for example, a major either in math or in math education counts as being qualified to teach math.

Some critics do not give equal status to education degrees, such as math education, science education, or social studies education as compared with degrees in math, science, or history. Such critics have argued that subject area education degrees have tended to be overloaded with required courses in pedagogy to the neglect of coursework in the subject itself. Over the past two decades, because of such problems, many states have upgraded teacher education by, among other things, requiring education majors to complete substantial coursework in an academic discipline. For instance, at many teacher-training institutions, a degree in math education currently requires as much coursework in the math department as does a degree in math itself. Hence there are good reasons to count both subject area and academic degrees. But, it is important to recognize that this particular measure, like most indicators of out-of-field teaching, captures a mix of both subject and pedagogical knowledge in its definition of an in-field teacher—something

often missed by observers who often have wrongly assumed that measures of out-of-field teaching refer solely to a lack of subject knowledge in a field.<sup>21</sup>

Having documented cross-school levels of out-of-field teaching, the second stage of the analysis seeks to explain why particular schools are more or less likely to have different levels of out-of-field teaching. In particular, the analysis focuses on the link between the degree of out-of-field teaching in schools and factors representing both the teacher deficit perspective and the organizational and occupational perspective. This second stage begins with a summary of recent trends in overall levels of teacher supply, demand, and shortages; the numbers of schools that experience difficulty recruiting qualified faculty to fill their teaching openings; and the extent to which these difficulties affect levels of out-of-field teaching. The analysis then turns to a more advanced statistical analysis of the relative association of various factors with out-of-field teaching at the secondary level. The secondary subsample includes 23,867 public school teachers in grades seven through twelve. It includes all those teaching in any of eight fields, parallel to conventional departmental divisions at the secondary level: English, mathematics, social studies, science, art and music, physical education, foreign language, and vocational education. It excludes those employed in middle schools.

The dependent variable in this portion of the analysis is a second measure of out-of-field teaching—for each secondary-level teacher, the percentage of his or her daily classes in which he or she does not have an academic or education undergraduate or graduate major or minor in the field taught.<sup>22</sup> The purpose of this second portion of the analysis is to use multiple regression to examine whether this measure of out-of-field teaching is related to a number of aspects of school administration and organization characteristics, while controlling for two groups of independent variables: school contextual characteristics and school recruiting and hiring difficulties. Box 1 provides definitions, and table 1 provides mean teacher and school characteristics associated with the teachers in the sample.

For measures of school contextual characteristics, the analysis includes measures of school poverty enrollment, school urbanicity, both district size and school size, and whether there is a teachers union in the school district. These represent factors that are largely fixed and not amenable to the control of administrators, with the possible exception of school size. The latter has become a major policy issue and could be considered a manipulable aspect of the administration and organization of schools in my analysis.

Here I primarily treat size as an environmental and contextual variable but will also test its direct effects on out-of-field teaching in schools.

For school recruiting and hiring difficulties, the analysis includes a measure to control for whether schools had teaching job openings in the year of the survey and a measure to gauge the extent of difficulty these schools experienced with recruiting qualified faculty to fill their openings for thirteen teaching fields. Finally, after controlling for the teacher and school factors, the analysis includes a number of factors reflecting administrative practices and organizational characteristics. These latter measures include a variable assessing whether the school district has informal or formal rules stipulating that new teacher hires have a major or minor in the main field to be taught; a measure representing the mean school ratings by all of the teachers sampled in each school of the leadership skills of their principals; a measure of the extent to which a school covers hard-to-fill teaching openings by hiring underqualified teachers, reassigning teachers of another subject or grade level, or using short-term or long-term substitutes; a measure of the school's average class size; a measure of whether the school district provides pay incentives for teachers to enhance their education or training through in-service or college coursework; and the normal yearly starting salary provided by the district for new, inexperienced teachers.

The data in the analysis are couched at two levels—teacher level and school level. Hence this analysis uses a regression program, SAS' PROC MIXED (SAS here stands for Statistical Analysis System), that adjusts for the clustering of teachers within schools resulting from the complex, multilevel design of the SASS sample. PROC MIXED has the additional advantage of allowing for the inclusion of the survey's design weights.

SASS is a cross-sectional database. Each cycle represents new and independent teacher and school samples. However, some schools do appear in more than one of the four cycles of SASS and some of the questionnaire items used in this analysis also appear in more than one cycle. Ostensibly, these school characteristics could be traced over time and then examined to determine whether they predict changes in the dependent variable over time. This kind of analysis could be used to speak to the issue of causality and is worth exploring, but I will not attempt to do so here. The repeated schools are not a true panel, are not representative, and do not support inferences of the larger population. Moreover, the teacher sample has little overlap between cycles. The results of the multivariate findings in this chapter represent associations between particular teacher and school measures and the

**Box 1. Definitions of Measures Used in the Multiple Regression Analysis of Out-of-Field Teaching at the Secondary Level***Out-of-field teaching*

**Percent secondary classes out of field**—for each seventh- through twelfth-grade teacher, percentage of classes in which teacher does not have an undergraduate or graduate major or minor in field taught. Both academic and education majors or minors are counted (for example, math and math education). Measure includes all those teaching in any of eight fields, parallel to conventional departmental divisions at the secondary level—English, mathematics, social studies, science, art or music, physical education, foreign language, and vocational education. It excludes those employed in middle schools. For more detail on this measure, see R. Ingersoll, *Teacher Supply, Teacher Qualifications, and Teacher Turnover* (Washington: National Center for Education Statistics, 1995).

*School contextual characteristics*

**Poverty enrollment**—percentage of students receiving the federal free or reduced-price lunch program for students from families below poverty level.

**Rural**—a dichotomous variable where 0 = central city or urban fringe/large town and 1 = rural/small town.

**Suburban**—a dichotomous variable where 0 = rural/small town or central city and 1 = urban fringe/large town.

**District size**—student enrollment of district. Divided by 1,000, to make units refer to increments of 1,000 students.

**School size**—student enrollment of school. Divided by 100, to make units refer to increments of 100 students.

**Presence of teacher union**—a dichotomous variable where 0 = school district has no teacher union and 1 = school district does have one.

*School recruiting and hiring difficulties*

**Teaching job openings**—a dichotomous variable where 0 = school had no teaching job opening(s) that year and 1 = school had teaching job opening(s) that year.

**Hiring difficulties**—on a scale of 0 to 13, sum of 13 teaching fields for which school administrator reported “somewhat difficult,” “very difficult,” or “could not fill” in response to item that asked, “How difficult or easy was it to fill the vacancies for this school year in each of the following fields?” The latter include special education; English

as a Second Language; English for speakers of other languages; bilingual education; English; mathematics; social studies; physical science; life science; music; foreign languages; business or marketing; industrial arts; home economics; trade and industry; and agriculture.

*Administrative practices and organizational characteristics*

**Major/minor required of hires**—on a scale of 1 = not used, 2 = used, 3 = required, school district requirement for new hires having college major or minor in field to be taught, as reported by school administrators.

**Principal leadership**—on a scale of 1 = strongly disagree to 4 = strongly agree the school mean of six items asked of all teachers about whether their principal recognizes staff members for good work; knows what kind of school he or she wants; communicates his or her expectations; is supportive and encouraging; backs up teachers; and communicates with teachers about instructional practices. This measure is based on the school mean of the reports of all teachers sampled in each school, not only those misassigned. Factor analysis (with varimax rotation method) was used to develop this measure. Item loadings of 0.4 were considered necessary for inclusion. Items in the factor had high internal consistency ( $\alpha > 0.7$ ).

**Hiring or assigning underqualified**—on a scale of 0 to 4, sum used of four possible methods to cover vacancies, as reported by school administrators—hire a less than fully qualified teacher; assign teacher of another subject or grade level to teach the class; assign administrator or counselor to teach the class; use short-term or long-term substitutes. To avoid missing observations, this variable is calculated for all schools, even those without vacancies or without hiring difficulties that, by definition, would not have indicated use of these strategies.

**Average class size**—school's mean student enrollment per classroom.

**Pay incentives**—district use of pay incentives for teachers' completion of in-service training or college credits.

**Starting teacher salary**—normal yearly base salary for teacher with a bachelor's degree and no experience, as reported by school administrators. Divided by 1,000, to make units refer to increments of \$1,000.

**Table 1. Means and Standard Deviations for Variables Used in Multiple Regression Analysis of Out-of-Field Teaching at the Secondary Level, 1993–94**

<i>Variable</i>	<i>Mean</i>	<i>Standard deviation</i>
<i>Percent secondary classes out of field</i>	16	35
<i>School contextual characteristics</i>		
Poverty enrollment (percent)	23	22.8
Rural (percent)	43	...
Suburban (percent)	32	.
District size	45,745	105,597
School size	1084	640
With teachers union (percent)	73	...
<i>School recruiting and hiring difficulties</i>		
Schools with teaching job openings (percent)	87	...
Hiring difficulties (scale of 0–13)	1.5	1.9
<i>Administrative practices and organizational characteristics</i>		
Major or minor required of hires (scale of 1–3)	2.6	0.60
Principal leadership (scale of 1–4)	2.1	0.68
Hiring or assigning underqualified (scale of 0–4)	0.31	0.61
Average class size	23	8
With pay incentives (percent)	17	...
Starting teacher salary (dollars)	23,177	3,358

degree to which individual teachers are given out-of-field assignments in schools.

### **Levels of Teacher Qualifications and Out-of-Field Teaching**

The data show that most public elementary and secondary teachers have basic education and training (see table 2). Almost all public school teachers have completed a four-year college education. Ninety-nine percent of public school teachers hold at least a bachelor's degree, and almost half have obtained graduate degrees. Moreover, 94 percent of public school teachers have regular or full state-approved teaching certificates.

The data also reveal some distinct cross-school differences in the qualifications of teachers. Schools with high poverty enrollments and those in urban areas sometimes have less access to qualified teachers. For example, teachers in high-poverty schools are less likely to have graduate degrees than teachers in low-poverty schools. However, little difference is evident



**Table 2. Percentage of Elementary and Secondary Public School Teachers, by Highest Degree Earned and by Highest Type of Certification, by Type of School, 1993–94**

	<i>Less than bachelor's degree</i>	<i>Bachelor's degree</i>	<i>Master's degree or more</i>	<i>No certification</i>	<i>Less-than- regular certification</i>	<i>Regular certification</i>
<i>Total</i>	0.7	52	47	2	4	94
<i>Poverty enrollment</i>						
Low	0.9	45	54	1.5	3	96
High	0.6	56	43	4	6	90
<i>School size</i>						
Small	0.9	61	38	1.7	3	95
Large	0.9	49	50	2	4	94
<i>Community</i>						
Rural	0.8	58	41	2	3	95
Suburban	0.7	46	53	2	3	96
Urban	0.7	49	50	3	5	92

Note: Less-than-regular certification includes all those with emergency, temporary, alternative, or provisional certification. Regular certification includes all those with probationary, regular, standard, full, or advanced certification. (Probationary refers to initial license issued after satisfying all requirements except completion of probationary period.) Low poverty refers to schools where 15 percent or less of the students receive publicly funded free or reduced-price lunches. High poverty refers to schools where over 80 percent do so. Small schools are those with fewer than three hundred students. Large schools are those with six hundred or more students. Middle categories of size and poverty enrollment are not shown.

between suburban and urban schools in the percentage of teachers with graduate degrees. But, it is also important to recognize that these data disclose little of the quality of these qualifications; there may be differences in teacher qualifications not revealed here.

The most glaring and prominent source of inadequate access to qualified teachers is not a lack of basic education or training of teachers, but a lack of fit between teachers' preparation and teachers' class assignments: the phenomenon of out-of-field teaching. Whereas most teachers have a bachelor's degree and a regular teaching certificate, many teachers at both the elementary and the secondary levels are assigned to teach classes in fields that do not match their educational background.

At the elementary school level, the data show that 12 percent of those who teach regular pre-elementary or general elementary classes do not have an undergraduate or graduate major or minor in the fields of pre-elementary education, early childhood education, or elementary education (see column 1 of table 3).<sup>23</sup> There are also cross-school disparities: Elementary teachers in poor schools are less likely to have a major or minor in the field.

However, the standard by which one defines a qualified elementary teacher impacts the amount of out-of-field teaching found in elementary schools. Out-of-field levels drop significantly when looking at those without teaching certificates, in contrast to those without majors or minors. In background analyses (not shown here), I have found that only 5 percent of regular elementary teachers did not have regular certificates in the fields of pre-elementary education or elementary education.

The data also show that levels of out-of-field teaching are higher at the secondary level than at the elementary level.<sup>24</sup> For example, about a third of all public secondary school math teachers have neither a major nor a minor in math, math education, or related disciplines, such as engineering or physics. About one quarter of all secondary school English teachers have neither a major nor a minor in English or related subjects, such as literature, communications, speech, journalism, English education, or reading education. In science, slightly lower levels—about one-fifth of all public secondary school teachers—do not have at least a minor in one of the sciences or in science education. Finally, about a fifth of social studies teachers are without at least a minor in any of the social sciences, in public affairs, in social studies education, or in history (see columns 2–8 of table 3).<sup>25</sup>

As is true in elementary schools, large cross-school differences are found in out-of-field teaching in secondary schools. In most fields, teachers in high-poverty schools are more likely to be out of field than are teachers in more affluent schools, although more affluent schools are not free of out-of-field teaching. For example, almost a third of social studies teachers in high-poverty schools, as opposed to 16 percent in low-poverty schools, do not have at least a minor in social studies or a related discipline. Moreover, small schools (less than three hundred students) have more out-of-field teaching than do large schools (six hundred or more students). These cross-school findings are consistent across all four cycles of SASS and with analyses that use other measures of out-of-field teaching, such as the percentage of classes or the percentage of students taught by out-of-field teachers.<sup>26</sup>

At the secondary level, out-of-field teaching levels are similar for teachers whether one is looking at those without a major or minor, or looking at teachers without certification, in their assigned fields. For example, I have found in other analyses that about a third of public secondary math teachers do not have teaching certificates in math, a figure similar to those lacking a major or minor in math.<sup>27</sup> But focusing on those without certificates can lead one to underestimate the amount of underqualified teaching within

**Table 3. Percentage of Public School Teachers in Each Field without a Major or a Minor in That Field, by School Type, 1993–94**

	<i>Secondary</i>							
	<i>Elementary</i> (1)	<i>English</i> (2)	<i>Math</i> (3)	<i>All sciences</i> (4)	<i>Life science</i> (5)	<i>Physical science</i> (6)	<i>All social sciences</i> (7)	<i>History</i> (8)
<i>Total</i>	12.2	24.1	31.4	19.9	32.9	56.9	19.3	53.1
<i>Poverty enrollment</i>								
<i>Low</i>	11.6	21.8	27.5	17.2	28.9	50.6	16.2	47.1
<i>High</i>	20.8	20.1	37.6	28.0	39.4	68.4	29.6	36.6
<i>School size</i>								
<i>Small</i>	6.6	30.4	41.2	25.5	38.1	64.5	25.5	62.8
<i>Large</i>	15.1	22.4	27.5	17.6	30.1	53.7	17.2	48.1
<i>Community</i>								
<i>Rural</i>	8.3	23.1	30.2	19.5	34.1	60.2	19.5	56.8
<i>Suburban</i>	14.5	21.8	29.6	21.5	32.1	55.1	16.9	50.6
<i>Urban</i>	14.7	25.3	33.1	16.7	31.8	50.5	21.1	48.0

Note: Elementary includes all those teaching in the fields of pre-kindergarten, kindergarten, or general elementary in grades K–8. It includes those teaching in self-contained classes, where the teacher teaches multiple subjects to the same class of students all or most of the day. It includes K–8 teachers employed in middle schools. It excludes departmentalized teachers who teach subject matter courses to several classes of different students all or most of the day. Elementary teachers with a major or minor in the fields of pre-elementary, early childhood, or elementary education are defined as in-field.

The teaching fields of English, math, science, and social studies include only departmentalized teachers in grades seven through twelve. It excludes those employed in middle schools. For details on definitions of these assignment fields and the major and minors defined as in-field in each, see R. Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools," *Educational Researcher*, vol. 28, no. 2 (1999), pp. 26–37.

The estimates for life science, physical science, and history represent the percentage of teachers without at least a minor in those particular subfields. For example, in science, teachers who hold a minor in any one of the sciences are defined as in-field. In physical science—which includes physics, chemistry, space science, and geology—teachers must hold a minor in one of those physical sciences to be defined as in-field, not simply a minor in any science.

Low poverty refers to schools where 15 percent or less of the students receive publicly funded free or reduced-price lunches. High poverty refers to schools where over 80 percent do so. Small schools are those with fewer than three hundred students. Large schools are those with six hundred or more students. Middle categories of poverty and size are not shown.

broad fields, such as science and social studies, that have many disciplines. Teachers in these fields are routinely required to teach any of a wide array of disciplines and subfields within the department. However, simply having a certificate in the larger field may not mean that teachers are qualified to teach all of the subjects within the field. For example, a teacher with a degree in biology and a certificate in science may not be qualified to teach physics. In science and in social studies, as shown in columns 5, 6, and 8 in table 3, there are high levels of within-department, but out-of-subfield, teaching. Over half of those teaching physical science classes (chemistry, physics, earth, or space science) are without a major or minor in any of the physical sciences. Given that most social studies teachers are expected to teach history in middle school and high school, it is worth noting that more

than half of all those teaching history are without either a major or a minor in history.

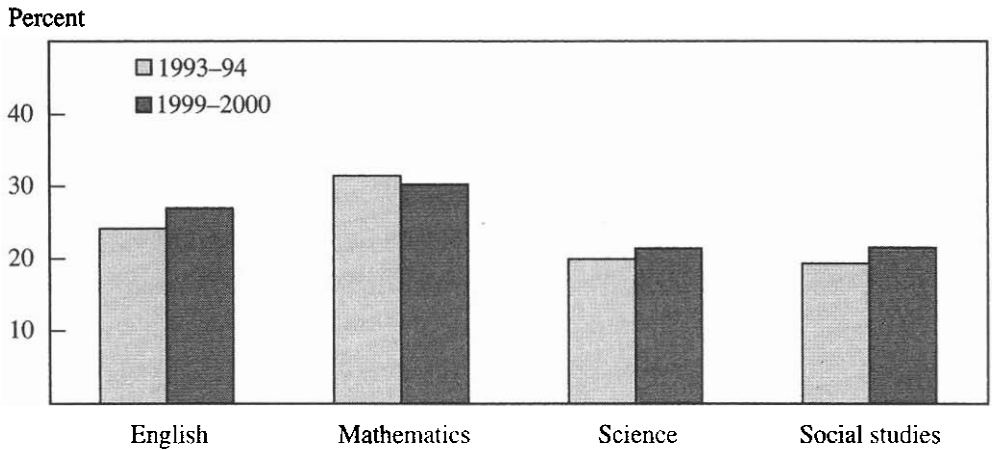
Several points must be stressed concerning the validity of these data on out-of-field teaching. On the one hand, some of these out-of-field teachers undoubtedly may be qualified even though they do not have a minor or major in the field. Some may be qualified by virtue of knowledge gained through previous jobs, through life experiences, or through informal training. Others may have completed substantial college coursework in a field and have a teaching certificate but lack a major or minor in that field.

On the other hand, these measures represent a relatively low standard by which to define a qualified teacher. To many observers, even a moderate number of teachers lacking the minimal prerequisite of a college minor signals the existence of serious problems in schools. When I upgrade the definition of a qualified teacher to include only those who hold both a college major and a teaching certificate in the field, the amount of out-of-field teaching substantially increases.<sup>28</sup> Moreover, the numbers of students affected are not trivial: Every year in each of the fields of English, math, and history well over four million secondary-level students are taught by teachers with neither a major nor a minor in the field.

It is also important to recognize the implications of these data for explaining the sources of out-of-field teaching. One variant of the teacher deficit perspective assumes that out-of-field teaching is largely a problem of poorly prepared teachers. In this view, a lack of adequate rigor, breadth, and depth, especially in academic and substantive coursework, in college or university teacher-training programs results in more out-of-field teaching. The data show, however, that most teachers have at least a bachelor's degree and a full teaching certificate. To be sure, many of these teachers have education, not academic, degrees. But having an education degree does not mean a teacher lacks content training in a particular subject or specialty. SASS data show that few teachers have only a generic major or minor in education, such as in secondary education or curriculum. Most have subject area education majors or minors, such as in math education or English education.<sup>29</sup> And the latter increasingly requires substantial academic subject coursework.<sup>30</sup>

My point is not to dismiss the importance of teacher preparation reforms. There is no doubt the teaching force has and can continue to benefit from more rigorous higher education and training standards. My point is that this view of out-of-field teaching misses the distinction between teachers' training and teachers' assignments and confounds two different types or sources

**Figure 2. Percentage of Public Secondary School Teachers (Grades Seven through Twelve) in Each Field without a Major or Minor in That Field, 1993–94 and 1999–2000**



of underqualified teaching. The data show that those teaching out of field at either the elementary or secondary level are typically veterans with an average of fourteen years of teaching experience. Furthermore, about 45 percent of out-of-field teachers hold graduate degrees in disciplines other than the subjects in which they have been assigned to teach. Hence out-of-field teachers are typically experienced and qualified individuals who have been assigned to teach in fields that do not match their training or education. This is a widespread and chronic practice and has shown little change in levels over the past decade (see figure 2). The data show that each year some out-of-field teaching takes place in well over half of all U.S. secondary schools and each year over one-fifth of the public secondary teaching force does some out-of-field teaching. At the secondary level, these misassignments typically involve one or two classes out of a normal daily schedule of five classes.

### **The Sources of Out-of-Field Teaching**

These data raise questions. If not because of inadequacies in the training of teachers, what is the reason for out-of-field teaching? What accounts for the degree to which school administrators misassign teachers?

### *Teacher Shortages*

Do teacher shortages account for out-of-field teaching? Data from SASS and other NCES data sources show that, consistent with the shortage predictions, demand for teachers has increased since the mid-1980s.<sup>31</sup> Since 1984, student enrollments have increased, most schools have had job openings for teachers, and the size of the teacher work force (K–12) has increased, although the rate of these increases began to decline slightly in the late 1990s.<sup>32</sup> Most important, substantial numbers of schools with teaching openings have experienced difficulties with recruitment. For example, in both 1990–91 and 1993–94 about 47 percent of schools with openings reported some degree of difficulty finding qualified candidates in one or more fields.

The data also show there are several problems with teacher shortages as an explanation for out-of-field teaching. First, shortages cannot explain the high levels of out-of-field teaching that exist in English and social studies, fields that have long been known to have teacher surpluses. Second, even when the rates of student enrollment increases were at their peak in the mid-1990s, only a minority of the total population of schools experienced recruitment problems in any given field. As expected, the data also indicate that levels of out-of-field teaching were higher in schools reporting more difficulties in finding qualified candidates for their job openings. But about half of all misassigned teachers in any given year were employed in schools that reported no difficulties whatsoever finding qualified candidates for their job openings that year. Moreover, in any given year a great deal of out-of-field teaching takes place in schools that did not have vacancies or openings for teachers in that year. In sum, the data show that some schools face difficulties finding qualified teachers to fill positions, and this problem leads to out-of-field teaching assignments. But the data suggest that shortages and their attendant hiring difficulties are not the sole, or even primary, factor behind out-of-field teaching. Instead of simply focusing on macro-demographic sources of this problem, this analysis hypothesizes that out-of-field teaching is also rooted in the manner in which schools are organized and administered.

### *Predictors of Out-of-Field Teaching*

This section presents the results of multiple regression analyses estimating the relative association between the dependent variable—each teacher's

**Table 4. Multiple Regression Analysis of Percent Secondary-Level Classes Out of Field**

Variable	Model 1		Model 2		Model 3	
	(b)	(se)	(b)	(se)	(b)	(se)
<i>Intercept</i>	18.3*	1.36	19.4*	1.58	36.6*	3.28
<i>School contextual characteristics</i>						
Poverty enrollment	0.09*	0.016	0.09*	0.016	0.09*	0.016
Rural	-3.2*	0.93	-3.2*	0.93	-3.0*	0.932
Suburban	-0.6	0.95	-0.62	0.95	-0.55	0.95
District size (by 1,000)	0.01*	0.003	0.011*	0.003	0.01*	0.003
School size (by 100)	-0.30*	0.06	-0.30*	0.06	-0.09	0.06
Presence of teachers union	-0.09	0.899	-0.10	0.747	0.53	0.797
<i>School recruiting and hiring difficulties</i>						
Teaching job openings			-1.4	1.01	-1.4	1.01
Hiring difficulties			0.13	0.182	0.06	0.183
<i>Administrative practices and organizational characteristics</i>						
Major or minor required of hires					-1.5*	0.561
Principal leadership					-1.6*	0.377
Hiring or assigning underqualified					1.1*	0.533
Average class size					-0.67*	0.033
Pay incentives					-0.41	0.672
Starting teacher salary (by 1,000)					0.11	0.108
Proportion of school-level variance explained (Rsq)	0.16		0.16		0.16	
Sample size (N)	18,770		18,770		18,770	

Note: Unstandardized coefficients displayed.

\*  $p < 0.05$

percentage of out-of-field classes—and three groups of independent variables: school contextual characteristics, school recruiting and hiring difficulties, and school administrative practices and organizational characteristics. These three groups of predictors are introduced progressively in three models in table 4. This part of the analysis focuses solely on the secondary level: grades seven through twelve. The data in the previous stage of the analysis (table 3) indicated that levels of out-of-field teaching are more pronounced in secondary schools than in elementary schools. Moreover, to many observers, the problem in secondary schools is a more compelling case because classes at the secondary level usually require a greater level of subject matter mastery and training on the part of teachers than do those at the elementary school level, and, hence, being taught by an out-of-field teacher could be more consequential for students at that level.

Model 1 focuses on the school background variables. It shows that teachers in high-poverty schools are more often out of field, after controlling for other factors. While teachers in urban schools are more often out of field than teachers in rural schools, the difference between out-of-field teaching in urban and suburban schools is not statistically significant (at a 95 percent level of confidence). Both district size and school size are related to out-of-field teaching, but in opposite directions. Larger districts have more out-of-field teaching, while larger schools have less. Small schools, by definition, usually have fewer overall resources, including teaching staff, than do larger schools.<sup>33</sup> That smaller schools have more out-of-field teaching than do larger schools could be because the former find it more difficult to allow staff specialization, and, hence, teachers in these schools are more often required to be generalists.

The presence of a teachers union is associated with less out-of-field teaching, but the coefficient is not statistically significant. This undermines the claims of some opponents of teachers unions who have directly blamed such organizations for the prevalence of out-of-field teaching. In this view, self-serving work rules promulgated by teachers unions, especially seniority rules, are the main reason that classrooms are staffed with underqualified teachers. The use and abuse of such rules are especially prevalent, this argument holds, in times of teacher oversupply, when school officials face the need to cut or shift staff because of fiscal cutbacks or declining enrollments. In such situations, “last-hired, first-fired” union seniority rules require that more experienced teachers be given priority, regardless of competence. As a result, veteran teachers are often given out-of-field assignments, in-field junior staff are transferred or laid off, and students suffer accordingly.<sup>34</sup> The data do not support this viewpoint.

As shown in model 2, surprisingly, school hiring and hiring difficulties themselves do not appear to be the major underlying factors related to the amount of out-of-field teaching in schools, as held by the teacher deficit perspective. A significant bivariate positive correlation exists between the degree to which a school has difficulty finding qualified candidates to fill its openings and the degree of out-of-field teaching in the school. But after controlling for other factors, this relationship becomes weak and statistically insignificant, as shown in table 4.

The question of particular interest here is: After controlling for these characteristics of schools, what administrative practices and organizational characteristics of schools have an independent association with the average



highly complex work requiring specialized knowledge and skill and, like these professions, deserves commensurate prestige, authority, and compensation. These efforts have, however, met with only limited success.<sup>36</sup> The comparison with traditional professions is stark. Few would require cardiologists to deliver babies, real estate lawyers to defend criminal cases, chemical engineers to design bridges, or sociology professors to teach English. This also applies to the high-skill blue-collar occupations. Few, for example, would ask an electrician to solve a plumbing problem. The commonly held assumption is that such traditional male-dominated occupations and professions require a great deal of expertise and, hence, specialization is necessary. In contrast, underlying out-of-field teaching, I hypothesize, is the assumption that female-dominated, precollegiate school teaching requires far less skill, training, and expertise than these traditional professions, and, hence, specialization is less necessary. The continuing status of teaching as a semiprofession has resulted in what the data reveal: Out-of-field teaching is not simply an emergency condition, but a common and accepted administrative practice in many schools in the United States. From this perspective, the long-term solution to upgrading the quality of teaching is to upgrade the quality of the teaching occupation. A well-paid, well-respected profession would be less likely to lower standards as a coping mechanism.

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### Comment by Caroline M. Hoxby

In the United States, serious concern has arisen about out-of-field teaching among elementary and, especially, secondary teachers. While long-standing, it has been on the short list of key education issues since the publication of *A Nation at Risk*, twenty years ago.<sup>37</sup> Concern about out-of-field teaching is currently so great that the No Child Left Behind legislation promulgated in 2002 contains strong incentives for schools to eliminate it. (These incentives fall under the “Highly Qualified Teachers” section of Title I.)

Richard M. Ingersoll does not address the question of whether out-of-field teaching has a negative effect on student achievement. Answering this question convincingly is extremely difficult because schools are not randomly assigned to have out-of-field teachers. It is easy to think that one is looking at the effects of out-of-field teaching when one is merely looking at

amount of out-of-field teaching in schools? The analysis in model 3 shows that several aspects of schools are related to misassignment. It also shows that the addition of this third group of variables brought little change in the coefficients of the earlier groups of predictors in models 1 and 2. One notable exception is the decrease in the school-size effect, suggesting that these aspects of school administration account for the lower amount of out-of-field teaching that large schools have.

School districts vary in the extent to which they impose standards on the teacher hiring process, and these hiring regulations are related to the average degree of out-of-field teaching in schools. The SASS data show that about two-thirds of school districts require that new teacher hires hold a college major or minor in the field to be taught, and, as shown in table 4, teachers in schools governed by these district-level policies do less out-of-field teaching.

The data also show that an additional factor associated with the degree of out of-field teaching in a school is the perceived leadership effectiveness of the principal. Schools vary in how well their faculty as a whole rate the performance of their principals on attributes of good leadership (for example, principals who recognize good teaching, communicate well, are supportive, and back up teachers). The data in table 4 show significantly less out-of-field teaching occurring in schools in which all of the teachers (regardless of whether they are misassigned or not) highly rate the leadership performance of their principals. It is unclear from this finding which aspects of principals' behavior may be related to their staffing assignment practices and whether the attitudes of teachers toward principals are a cause or effect of such practices. That is, principals who rarely misassign teachers may be appreciated for this and thus earn high ratings from the faculty as a whole, or highly rated principals may be more effective at avoiding misassigning their teachers.

While difficulty in filling teaching vacancies does not have an independent effect on the degree of out-of-field teaching, how school administrators choose to cope with their hiring difficulties does. Of those schools with teaching openings, about one-third reported the use of one or more of the following strategies to cover their vacancies: hiring less than fully qualified teachers, reassigning teachers trained in another field to teach the unstaffed classes, or using substitute teachers. Almost by definition these strategies result in out-of-field teaching, and, as expected, the analysis shows more out-of-field teaching in schools that employed more of these methods to fill

their vacancies. This may seem a redundant finding, but it is necessary to control for this factor because the data indicate that misassignment takes place in schools without hiring difficulties and even without vacancies. Moreover, it is also necessary to include this factor because it is not the only strategy administrators might use in the face of difficulties.

In contrast, other school administrators might opt to expand class sizes or cancel classes instead of using misassignment to cope with staffing difficulties. The analysis shows that average class sizes are strongly related to the degree of out-of-field teaching in schools. Schools with larger classes tend to have less out-of-field teaching, after controlling for other factors. A negative association exists between whether districts provide pay incentives to teachers for training and the amount of out-of-field teaching—incentives are associated with less out-of-field teaching—but it is not of statistical significance. Finally, higher starting teacher salaries are also not significantly related to levels of out-of-field teaching.

Several cautions and limitations need to be stressed. This is an exploratory analysis and the regression models account for only a portion of school-to-school differences in out-of-field teaching. Further research is needed to refine and verify these exploratory findings. If borne out by further analysis, these findings do, however, suggest important implications for both theory and policy concerning the problem of out-of-field teachers.

## **Implications**

This study tests the extent to which the problem of out-of-field teaching has to do with the manner in which schools are organized and teachers are employed and utilized once on the job. The analysis shows that out-of-field teaching is a common administrative practice whereby otherwise qualified teachers are assigned by school principals to teach classes in subjects that do not match their fields of training. This practice takes place as often as not in schools that do not suffer from teacher recruitment problems. Hence this analysis suggests that reform strategies that solely focus on teacher preparation or supply, while perhaps highly worthwhile, will not eliminate the problem of underqualified teaching unless they also address the problem of misassignment. In short, recruiting large numbers of new candidates into teaching and mandating more rigorous training requirements for them will not solve the problem of underqualified teaching if large numbers of teach-

ers continue to be assigned to teach subjects other than those for which they were trained.

Focusing blame on teachers, on teacher-training institutions, or on inexorable, macro-demographic trends suggests that schools are simply victims and diverts attention from an important root of the problem—the way schools are organized and teachers are managed. A central objective of this analysis is to explore which aspects of the organization and administration of schools factor into the degree of misassignment in schools. My results suggest that the way school administrators, especially school principals, respond to and cope with staffing decisions and challenges affects the levels of out-of-field teaching more than does the extent to which schools face teacher shortages and attendant hiring difficulties. When facing difficulty finding qualified candidates to fill teaching job openings, some school principals resort to hiring less than fully qualified teachers, assigning teachers of one subject or grade level to teach classes in others, or employing substitute teachers to cover hard-to-staff classes. These decisions result in more out-of-field teaching. Sometimes these choices are unavoidable, and some out-of-field teaching must be expected. But the results also show that school principals vary in their staffing strategies. Sometimes, top-down district regulations shape the choices available. For example, school districts that have formal regulations concerning minimal training requirements for new hires have less out-of-field teaching. One of the stronger predictors of the amount of out-of-field teaching in schools is the leadership performance of principals. The measure used for the latter was a composite indicator based on evaluations by teachers and, hence, could be highly subjective. Like the other factors, however, it is also highly suggestive.

What all of these findings collectively suggest is a role for managerial choice, agency, and responsibility—elements often overlooked in the educational literature on the sources of underqualified teachers. One strategy for raising teaching quality in schools would be to improve the assignment of teachers already employed in schools. This would be a low-cost alternative or complement to strategies aiming to modify the quality or quantity of teacher-training graduates. It would also be an intervention that could be undertaken immediately, as opposed to the lag time it takes for modifications in the output of teacher-training institutions to bring about changes in classroom practice in schools.

While this analysis suggests some alternative staffing strategies for school leaders, it does not suggest any of these options will be easy or cost-free.

Staffing decisions involve some difficult trade-offs and tough choices for school administrators. For example, lowering class sizes, currently a popular reform idea, appears to come at the expense of increasing out-of-field teaching.<sup>35</sup> Likewise, the data suggest that reducing the size of schools, another currently popular reform idea, may also result in more out-of-field teaching. The results also contradict the view that teachers unions are a major source of out-of-field teaching. Schools with unions do not have more out-of-field teaching. Union work rules certainly have an impact on the management and administration of schools, but eliminating teachers unions will not eliminate out-of-field teaching.

### **Future Research Possibilities**

The large-scale survey data analyzed here provide an overall portrait of the levels and sources of out-of-field teaching and can suggest which factors are associated with out-of-field teaching. But they have obvious limits for understanding the processes behind school staffing. Follow-up field investigations are needed to illuminate the decisionmaking processes surrounding the hiring, assignment, and utilization of teachers in particular kinds of schools. What are the hidden incentive systems within which administrators make staffing decisions? How do particular teachers come to be teaching particular classes? What are the reasons behind the misassignment of teachers?

Although this analysis has begun to explore the factors related to school-to-school differences in out-of-field teaching, it does not address adequately a larger question: Why is out-of-field teaching prevalent across the American K–12 education system as a whole? In addition to close-up, micro-level field studies, a second avenue for further research is macro-level, historical, and comparative investigation of the roots of this mode of organizing the work of teachers. One hypothesis is that the prevalence of out-of-field teaching is rooted in the semiprofessional status of teaching—a predominantly female occupation.

Unlike Canada and many European and Asian nations, the U.S. elementary and secondary school teaching force is largely treated as lower-status, semiskilled workers, especially those working in disadvantaged schools. Since the end of the nineteenth century American educators have promoted the view that teaching, like the traditional male-dominated professions, is

the effects of the correlates of out-of-field teaching. Thus far, no credible evidence has been published about the causal effects of out-of-field teaching, and this is problematic. Education researchers must rely on their common sense, which suggests that teachers are unlikely to be effective if they have little or no formal education in the subject they teach. Nevertheless, in reading Ingersoll's paper, one must keep in mind that the effect of out-of-field teaching remains unknown. The supposition that it is negative is based on introspection and correlational data that do not reveal causal effects. Because school administrators should logically react to the effects, not the negative appearance, of out-of-fielding, one should always be mindful that no understanding has been reached about those effects when evaluating administrators' management of their teacher work force.

### *The Deficit Hypothesis and the Organizational Hypothesis*

All this is by way of introduction to Ingersoll's paper, written by a leading scholar who accounts for much of the existing knowledge about the prevalence of out-of-field teaching. Ingersoll attempts to explain why out-of-field teaching takes place by examining the circumstances of schools that do and do not practice it. He describes two hypotheses about why out-of-field teaching occurs: the deficit hypothesis and the organizational hypothesis. He shows that no obvious evidence exists to support the deficit hypothesis. This is a very important finding because the deficit hypothesis is thought to be so obviously correct that it does not need to be debated. The deficit hypothesis dominates education schools and policy circles. By showing that it is probably not correct, Ingersoll opens the door for the organizational hypothesis. He also offers some direct evidence that the organizational hypothesis is correct, but the latter evidence must be described as suggestive instead of causal.

Essentially, supporters of the deficit hypothesis argue that out-of-field teaching is the result of too few prospective teachers being trained in a subject area. Also, they argue, teacher pay is too low generally, and this leads to teacher shortages. The consequence of the shortages is that schools fill vacancies with underqualified teachers—specifically, teachers who may be certified or prepared in an area but who are not certified or prepared in the field to which they are assigned.

In contrast, supporters of the organizational hypothesis argue that plenty of prospective teachers are certified in subject areas, but school districts

mismanage their resources so that they end up assigning teachers to classes in which their subject area knowledge is slight. Such mismanagement may occur because administrators have weak incentives to manage their teaching staffs well or because districts may face high costs (in particular, costs associated with labor unrest) of changing rigid work rules or salary contracts to attract qualified teachers. Consider a district that attempts to rewrite its teachers' contract so that teachers who have math or science skills get paid a substantial premium for filling math and science assignments in secondary schools. (Math and science skills are noteworthy because they earn significant rewards in the private sector.) In a state with laws that are highly supportive of unions (mandatory bargaining, union shops, dues checkoff, and so on), a district that tries to rewrite its contract in this way is likely to face great union resistance and perhaps labor strife. No major U.S. teachers union supports pay premia for teachers with math and science skills. As a consequence, an administrator may decide that dealing with the consequences of out-of-field teaching is less troublesome than facing the consequences of labor unrest. The administrator may therefore assign teachers to subjects in which their preparation is slim, but he or she does so knowingly.

### *Two Other Theories on Why Out-of-Field Teaching Occurs*

At least two other possible hypotheses can be cited for why out-of-field teaching occurs. First, it may be that teachers' subject area skills are mismeasured and that most teachers who appear to be teaching without subject area knowledge do, in fact, have subject area knowledge. Such mismeasurement is most likely to occur with teachers in grades seven through nine, where one could plausibly have ample subject area knowledge without having either minored or majored in the subject in college. For instance, any graduate of a selective liberal arts college should have math and language arts knowledge that is sufficient to teach a typical seventh-grade mathematics or English class. Moving from grade seven to grades ten through twelve, it is less plausible that a person without substantial college-level coursework in a subject could have learned enough about that subject to be an effective teacher of that subject. Similarly, moving from teachers who attended very selective colleges to teachers who attended nonselective colleges, it is less plausible that a person without a major or minor in a subject could know the subject well enough to teach it.

The potential mismeasurement problem does affect Ingersoll's evidence. He measures out-of-field teaching in secondary school by grouping grades seven through twelve together. It would be helpful to have separate statistics by grade. Much of the out-of-field teaching that he identifies likely is middle school teaching. Also, it would be helpful to have some information on whether out-of-field teachers are usually from more selective colleges or less selective colleges.

Second, out-of-field teaching may not be harmful. After all, the evidence on the effects of out-of-field teaching does not come from carefully evaluated policy experiments. Instead, the evidence comes from the normal variation among schools in their use of out-of-fielding, and the schools that use it are not selected randomly. Out-of-field teaching could be correlated with lower student achievement without causing lower student achievement. For instance, out-of-field teaching might appear to lower achievement because it is correlated with parents' dedication to education in the school. Parents' dedication is not observed, however, so education researchers might attribute its effect to out-of-field teaching, in the absence of a true policy experiment. In any case, if the out-of-field teaching that occurs is not harmful, then administrators may be using it wisely to flexibly manage their staff.

### *Descriptive Evidence and Causal Evidence*

One of the persistent difficulties for education researchers is that they rarely get to evaluate true experiments or even the partial experiments that some policy changes provide. That is, they rarely work with clean variation in the policy that interests them—in this case, out-of-field teaching. Instead, they work with variation that is tainted by or can be confounded with other factors, such as the environment in which a school operates. For instance, determining how unions affect out-of-field teaching is difficult, because unions tend to arise in districts that are disproportionately large and urban. But the factors that cause unions to arise may also have independent effects on whether out-of-field teaching occurs. A large school, for example, is unlikely to find itself with the enrollment or staffing fluctuations that produce an environment ripe for out-of-field teaching.

Ingersoll routinely runs into the problem of correlation versus causation. Put another way, the paper is at its best at providing descriptive evidence or evidence of correlations. It is not at its best when attempting to give such



descriptive evidence a causal interpretation. Sometimes descriptive evidence is helpful, such as when Ingersoll is trying to determine whether much support exists for the deficit hypotheses. If the supposition is that the overwhelming reason for out-of-field teaching is a deficit of suitable candidates, then there ought to be fairly obvious evidence of a correlation between out-of-field teaching and measures of teaching deficits. If such a correlation were apparent, it would not be proof that the deficits caused out-of-field teaching, but it would be consistent with the deficit hypothesis. If there were not much of a correlation between out-of-field teaching and indicators of teaching deficits, then deficits would unlikely be the major cause of the phenomenon. For Ingersoll, correlational evidence is more useful for disproving a hypothesis than it is at proving one.

Ingersoll is interested in showing not only that the deficit hypothesis is wrong, but also that the organizational hypothesis is right. Here, the descriptive evidence is more problematic.

**EVIDENCE AGAINST THE DEFICIT HYPOTHESIS.** Suppose the deficit hypothesis were correct. A school that could not find a qualified candidate for a subject area teaching job could do one of two things. First, it could leave the vacancy open and either not cover the classes or cover the classes in a catch-as-catch-can way. That is, out-of-field teaching may or may not be seen in schools that report vacancies. Second, the school could close the vacancy and fill the job with an out-of-field teacher. In this case, schools without vacancies would have more out-of-field teaching. Thus one cannot build a convincing test of the deficit hypotheses by looking at the correlation between vacancies and out-of-field teaching. In short, the statistically insignificant coefficients on the “teaching job openings” variable in Ingersoll’s table 4 do not convince me that the deficit hypothesis is wrong.

In contrast, one can build a convincing test by looking at the correlation between a school reporting hiring trouble and out-of-field teaching. Regardless of whether a school fills or leaves open vacancies, a school that has out-of-field teaching because of a deficit should report that it has trouble hiring. Thus the single most important result Ingersoll finds is the statistically insignificant coefficient on “hiring difficulties” in model 2 of table 4. A positive, statistically significant correlation between reported hiring difficulties and out-of-field teaching is the minimum required evidence for the deficit hypothesis. Seeing that lack of correlation, I find it very hard to believe that difficulty in hiring qualified teachers is the primary reason that schools have out-of-field teaching.

EVIDENCE FOR THE ORGANIZATIONAL VIEW. The first variables in the multiple regression analysis presented in table 4 are the school contextual characteristics. Some of these variables—such as poverty, ruralness, and district size—are clearly outside a school's control and are therefore properly viewed as exogenous forces on whether out-of-field teaching occurs. However, even the coefficients on these variables are difficult to interpret as causal relationships. For instance, does a school's being rural really make it substantially less likely to have out-of-field teaching? This seems unlikely because a school in a sparsely populated area would presumably find it structurally hardest to hire a teacher for every subject class. Also, large districts have more out-of-field teaching. This is peculiar because, structurally, a large district should be most able to reallocate teachers to meet subject area demands. In addition, large districts experience less unpredictable variation in their enrollment (simply because of the law of large numbers). This should enable them to plan better for future staffing needs.

In short, one suspects that the reason that the coefficients are as they are is that big, urban districts are the ones with substantial out-of-field teaching. They do not have out-of-field teaching for structural reasons (because these go against them), but for reasons of governance perhaps. It now becomes difficult to interpret the coefficient on the presence of a teachers union (which is insignificant) as evidence that unions have no effect on out-of-field teaching. Teachers unions arise disproportionately and are disproportionately strong in big, urban districts. So, perhaps teachers unions have no effect or perhaps the coefficients on district size and urbanness are picking up their true effect (because they are certainly not picking up the causal effects of size and population sparsity).

In short, I am not persuaded that I have learned much about the causal effects of schools' contextual characteristics from table 4. This is an example of how hard it is to interpret correlations as evidence of causation.

The variables in table 4 that I have not yet discussed are the administrative practice and organizational variables. These include whether a college major or minor is required of subject area teachers, a subjective rating of the principal's leadership, whether the school hires or assigns underqualified teachers, average class size, whether incentive pay exists, and the starting teacher salary. Of these variables, only one—the starting teacher salary—is arguably exogenous to a school. That is, a district with limited funds may have no choice but to pay lower starting salaries than it would like.

The remaining variables are determined simultaneously with whether to allow out-of-field teaching. For instance, schools that require a college major or minor from subject area hires, not surprisingly, have less out-of-field teaching. After all, the two variables have an almost mechanical relationship: If a school does not hire teachers except when they have subject area degrees, something would have to go terribly wrong with staff management before much out-of-field teaching occurred. But, the fact that a school hires only those with subject area degrees and consequently has little out-of-field teaching is likely caused by a third factor that is not understood.

Similar difficulties arise with “hiring or assigned underqualified teachers.” A school that engages in this practice almost mechanically has out-of-field teaching. Indeed, one might have thought the variable was a measure of out-of-field teaching. Principals’ ratings are also difficult to interpret causally. A good principal may figure out how to avoid out-of-field teaching, or a poorly circumstanced school forced to have out-of-field teaching may end up with disgruntled teachers who give their principal a low rating, even though he or she is not responsible for the overall level of resources.

In summary, on the one hand, the correlations in table 4 do not suggest that the organizational hypothesis is wrong. On the other hand, they do not constitute much evidence that it is right.

### *Where to Go from Here*

To establish whether the organizational hypothesis is correct, an empirical strategy that focuses on policy changes would probably be useful. For instance, Ingersoll might, in the future, use multiple waves of the Schools and Staffing Surveys to form panel data. He might then investigate whether out-of-field teaching changes when a school gets unionized, takes on a new principal, or changes its hiring policies. He might use statewide class-size reduction policies to determine whether class-size reduction causally raises out-of-field teaching. He might examine changes in states’ minimum pay scales to see whether out-of-field teaching among new teachers drops significantly in the year after a state pay scale rises substantially.

The most important policy changes, for determining both the effects and causes of out-of-field teaching, are those occurring because of the No Child Left Behind Act. Given that their previous research stimulated the “Highly Qualified Teachers” clauses, Ingersoll and other scholars should evaluate the

consequences of the legislation. Evaluating new strictures on out-of-field teaching will undoubtedly be the best way to learn about the consequences of such strictures.

Finally, consider the larger implications of the fact that the deficit hypothesis appears to be wrong. If schools that do not have trouble hiring nevertheless practice out-of-field teaching, undue rigidities must exist in the way that teachers are allocated to classes. One suspects that these rigidities may be built into teachers' contracts. Out-of-field teaching makes it easier for a union to protect its members with long tenure, at the expense of less senior teachers with subject area knowledge.

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## Comment by Adam F. Scrupski

Richard M. Ingersoll maintains that out-of-field teaching assignments are not the consequence of an insufficiency of certified teachers or inadequate teacher education. Instead, he says they are the consequence of school organizational factors leading to dysfunctional administrative adaptation to particular personnel problems (the employment of teachers uneducated or uncertified for the positions to which they are assigned). But before granting him the core of his thesis, the problems and issues that the thesis reveals should be examined in some detail.

Ingersoll's enumeration of expedient ways of assigning teachers to vacancies includes the distribution of increments of student clientele among other sections of the same course. This practice has the unfortunate consequence of increasing class size and diminishing morale among the teachers who get the extra students (flouting the teacher group's demand for equal treatment). A second option involves covering classes of additional students through hiring what Ingersoll calls "long-term substitutes." However, the latter seems hardly to be an acceptable option. No pools of such substitutes exist, and hiring a long-term substitute means hiring someone per diem for a long, perhaps a semester-long, term. In New Jersey, regulations forbid the hiring of noncontractual substitutes for long-term service (no substitute teacher in New Jersey may teach for more than twenty consecutive school days). While the former alternative seems not to be seriously considered by Ingersoll, he seems to believe that the latter is a real danger and an often-chosen alternative for expediency-minded school administrators.

In his examination of the parameters of out-of-field teaching, Ingersoll attends first to a definition of out-of-field teaching based on a teacher's major. He begins with elementary school teaching and notes that 12 percent of those who teach pre-elementary or general elementary classes do not have any kind of education major and are therefore out-of-field placements.

But the phenomenon of education major seems to be a disappearing academic identity. At Rutgers, the State University of New Jersey, where I professed for thirty-three years, there has not been an education major since the 1940s. Only students with majors in the arts and sciences may apply to the Rutgers teacher preparation programs. Since 1986, New Jersey's state regulations for teacher certification also require an arts and sciences major. At about the same time, the Holmes Group, an elite collection of professional education units at research universities, called for the abolition of the education major. A steady erosion of the education major has been seen since then. The American Association of Colleges for Teacher Education estimates that thirty-eight states now insist on a major drawn from arts and sciences for teacher certification program enrollees. The appropriate identity, in this case, is not the major but the certification status, as Ingersoll himself notes: "Out-of-field placements drop significantly when looking at those without teaching certificates, in contrast to those without majors or minors." What is the big deal? one might ask. Ed major or teacher certification program? Each signifies a number of courses in pedagogy, curriculum, and foundations of education. The answer is that the inaccuracy identifies cases of out-of-field placement among elementary teachers where they do not exist, in cases in which teachers major in arts and sciences and still enroll in teacher certification programs.

Also, the practice can mask a problem that should be uncovered. For example, at Rutgers two-thirds of elementary certification program enrollees, complying with the requirement for a major drawn from the arts and sciences, major in psychology. (I have been told that is the case at other institutions as well.) And psychology is a thirty-six-credit major. How much psychology does one need to teach school? Surely the two required courses in educational psychology and developmental psychology are sufficient for the general elementary teacher. The remaining psychology credits are taking curricular room that might be occupied by studies in history, literature, music, math, biology, and other content-related areas.

To continue this digression a little further, the solution to the problem of the appropriate major for the elementary teaching aspirant may lie in some

form of general liberal arts major composed of six to nine or so credits each in history, literature, math, science, and music (perhaps including piano, to counter the noisy, joyless hooks of the electric guitar). Some of my colleagues and I at Rutgers tried to subvert the psychology major by including in a revised elementary certification program a requirement for fifteen credits of a subject that is taught in the elementary school, such as those subjects noted above. However, when the new certification program was implemented, the requirement, which had been approved unanimously by the school's faculty, was not included. (I had left the program's directorship by that time, but when I asked why the fifteen-credit item was omitted, I was told that it seemed to be one new requirement too many.) The point here is that the problem of inadequate teacher capability in this case seems not to lie in day-to-day administrative expedience but in the very domain that Ingersoll abjures, teacher education and certification.

To illustrate further the complexity of organizational adaptations as they relate to the supply of teachers, consider Ingersoll's treatment of secondary out-of-field placements in the area of history, a phenomenon recently addressed by Diane Ravitch.<sup>38</sup> Again, terminological phenomena seem to control. It is surely lamentable, as Ingersoll notes, that over half of those reported to be exclusively teaching history are without a major or minor in the subject. However, before attributing complete chicanery, insanity, or plain sloth to those administrators responsible for such a sin of teacher assignment, note that existing social studies certification regulations in most states permit history to be taught by majors in one of the social sciences (or even a kind of interdisciplinary major called social studies) and permit history to be taught through eighth grade in a self-contained fashion by certified elementary teachers or in specialized way, usually at seventh- and eighth-grade levels, by elementary certificants as well.

What Ingersoll has revealed is an apparent weakness in the knowledge of history per se on the part of those assigned to teach the subject as specialists, a weakness whose correction lies not in the hands of day-to-day school administrators, but with state boards and teacher educators. In many cases the problem is being solved at the college certification program level. In New Jersey, despite the state-level regulations that permit any social science major to be certified to teach social studies (which includes history), Rutgers social studies teaching aspirants major in history as a consequence of advisement, and at the College of New Jersey such students are required to major in history.

But Ingersoll has performed a significant service in pointing out that a teacher's nominal identity as even a history major does not necessarily imply a subject matter background fitting him to teach any high school course in the field of history. It appears that the appropriate adaptation to such a situation lies in the hands of local school administrators who must balance the intracurricular strengths of their nominally qualified certificants.

Ingersoll's most puzzling findings are the high levels of out-of-field teaching found in secondary (grades seven through twelve) English and social studies, fields that, as he notes, have long been known to exhibit surpluses of certified teachers. Ingersoll reports that a quarter of secondary-level English teachers have neither a major nor a minor in English or related subjects and "a fifth of social studies teachers are without at least a minor in any of the social sciences, in public affairs, in social studies education, or in history." Most would perceive such findings as indicative of a travesty on secondary education. Are educational decisionmakers in the area of personnel assignment really so delinquent?

The inclusion of grades seven and eight in the category of secondary level, an organizationally related designation traceable to the long-ago days of the grades seven to nine junior high school, could provide an alternative explanation to one that implies serious culpability on the part of expediency-minded school administrators. In most states, elementary certification extends through grade eight. A teacher so certified can legitimately teach all subjects at any grade level through eighth grade. Such a teacher also is certified to teach any single subject, say social studies or English, in a specialized way, but not beyond the eighth-grade level.

Many school administrators and many teachers seem to find that experienced K-8 certified elementary teachers, such as those "veterans with an average of fourteen years of teaching experience" whom Ingersoll found commonly teaching out of field, are better teachers of English or social studies at seventh- or eighth-grade levels than relatively inexperienced certified secondary English or social studies teachers. Because those veteran elementary K-8 teachers are certified to teach English and social studies to seventh or eighth graders, the principal assigns them so to teach. (Schools and Staffing Survey data for 1999-2000 show very high percentages of middle school students learning English and social studies from teachers without a major or credential in the respective subjects, the consequence of elementary teachers assigned to teach the two subjects in either a self-contained or specialized fashion.)

Why might experienced certified elementary teachers be better adapted to teach special subjects, particularly English and social studies, to seventh and eighth graders than specialist-trained high school teachers? Prospective answers to such a question are related to the organizational features of the school as a singular institution, those that Ingersoll said he would rely on to explain out-of-field teaching. Students of the school as an organization and even experienced school personnel can offer at least three reasons.

1. Many educators believe that at seventh- and eighth-grade levels, transitional stages between elementary and high school, students should have teachers who commonly relate to students in more personally diffuse and particularistic ways, as elementary teachers have learned to do, than the more subject-oriented high school teachers are used to doing. It is also believed that experienced elementary school teachers take a greater range of responsibility for student behavior and achievement than do high school teachers, whose reference group instructionally speaking is more likely to be the higher education professoriate, who tend to take a more limited responsibility for student performance.

2. Some secondary administrators like to place seventh and eighth graders in core curriculum arrangements in which a single person teaches both humanities-related subjects, English and history (called social studies). One central New Jersey district (whose high school seniors have on occasion had the highest SAT scores in the state and which has an extremely demanding parent clientele) so organizes seventh and eighth grades, asking that its English-teaching certified specialists gain elementary certification so that they can teach history, too, and that its social studies specialists gain elementary certification so they can also teach English, even though each would be considered out of field in teaching one of the subjects.

3. Classroom discipline problems are considered to be greatest in seventh and eighth grade (before disaffected students reach school-leaving age and can be persuaded, perhaps by a retention or two, to drop out). Also, social studies and English are largely talk courses with a good deal of classroom discussion that places a strain on pupil attention and teacher control. Elementary teachers are believed to be better disciplinarians, more likely to monitor their own behavior for disorder-stimulating propensities and generally taking a greater range of responsibility for classroom happenings. They are more likely to call for parent conferences to alert parents to their children's weaknesses and to enlist parents in dealing with them. They also are less apt to readily refer out-of-order pupils to a principal, a course of



action that Willard Waller called “system building” and which tends to weaken the authority of both teacher and principal.<sup>39</sup> If the purviews and objectives of the middle school curricular and pedagogical adaptations are valid, as they seem to be, the solution is hardly a requirement for dual specialized subject certification supported by a major in both subjects. But it may suggest a preservice preparatory academic program of a humanities-oriented nature, including substantial components of curricular-related work in history and literature, again a case of teacher education, not everyday administrative action.

One implication of the preceding observations is that the Schools and Staffing Survey indicants of teacher qualification in a given subject may be too general, too merely nominal, to be of value in identifying weaknesses in a teacher’s preservice instructional program and, therefore, in relating the resultant credential to measures of pupil performance—the last a demonstration that Ingersoll gives short shrift to in his paper. While he asserts in his paper that “teaching . . . has an extensive body of empirical research documenting the proposition that the qualifications of teachers are tied to student outcomes,” the three studies cited lend only limited support to the proposition. The most recent comprehensive study on the effect of teacher certification on students’ achievement found a relationship only in the area of mathematics. Results for both history and English were indeterminate.<sup>40</sup>

I might offer one suggestion drawn from my years as a middle school principal during a period of genuine teacher shortage (early 1960s). Completion of a certification program may imply more than effective training in pedagogy. Much evidence suggests that teachers are not so instrumentally affected by that pedagogical training. Comparing certification program completers with provisionally certified teachers, many with strong subject matter backgrounds, I found the former considerably more serious about and more committed to teaching. Perhaps their certificates and the academic and clinical experiences they signified were a kind of occupational ante, ensuring embracement of teaching roles. Or perhaps the certification program courses were a testing ground for diligence, independent action, assumption of serious responsibility, attention to detail, and self-monitoring, all necessary for the systematic planning, confident classroom management, and continual assessment of pupil performance that effective public school teaching entails. I found that the provisional-type teachers, for whom the selection of teaching as an occupation (a career change for some) was more a matter of immediacy—not the culmination of long-term aspirations and program-

matic preparation, but a kind of occupational trying on of the teacher persona (or their conception of the teacher persona) to see if it fit the personality—were less likely to embrace the rigors, the hard demands, of the teacher role, however temporarily enacted.

To the extent that school administrators, in making assignments of teachers, are mobilizing functional teacher propensities (say, general intelligence, alertness to what might be considered the gestalt of the classroom as an instructional arena, sensitivity, verbal capability) that are independent of teachers' major or credentialed status, they will contribute to its lack of relationship to student performance.

Ingersoll, after making his case for organizational sources of out-of-field placements, suggests that schools simply need to improve the assignment of teachers already employed. In a presumptive reference to Dan Lortie's insightful study of autonomy and control in elementary school teaching, Ingersoll seems to rely on the title of the book (*The Semi-Professions and Their Organization*) containing Lortie's essay to suggest that the upward mobility of the teaching occupation itself, not an ameliorative upgrading of its laggard incumbents, is required for raising the standards of professional service and ultimately obviating out-of-field teaching. Ingersoll would have been better advised to cite Lortie's genuinely organizationally related observations concerning the strength of the teacher informal group, whose intrinsic reward structure and professional egalitarianism allow it to wield sanctions vis-à-vis the principal that enforce teacher demands for such measures as conformity with official (state-level) regulations that affect teachers' classroom performance. In an incisive application of social exchange theory, Lortie says the teacher group gives the principal the school if the principal gives the teachers the classroom, where teachers' intrinsic rewards are situated. The principal's reciprocal gift giving includes the teachers' specific classroom teaching assignments. Thus an organizationally related explanation of administrative maintenance, not subversion, of certification regulations is found.

Hanging together for Ingersoll as potential explainers of out-of-field placements that vary by school are poverty level: the less the poverty, the fewer the out-of-field placements; presence of hiring standards (essentially an indicant of superordinate administrative base-touching): the more explicit the standards, the fewer the out-of-field placements; and leadership effectiveness of the principal: the greater the teachers' satisfaction with principal performance, the fewer the out-of-field assignments. All of these factors

suggest a school or district of greater administrative accountability (explicit standards), higher teacher morale and work satisfaction (greater satisfaction with principal behavior), and more scrutinizing (higher-income) parents; in short, a better integrated social system, in Parsonian terms.

What do these characteristics imply? I suggest that they imply a discerning, demanding parental clientele—a clientele with a removable stake in the school's success, not easily cowed by the school bureaucracy—and that the parental demand is the essential factor in the appropriate placement of teachers. As one long-experienced middle school teacher once told her principal, "Our supervisors are the demanding parents in this district; if we satisfy them, we don't have to worry about you." Such parents will not tolerate expedient out-of-field teacher placements. Nor should any parents.

How can a school's parents be empowered? How can parents as individuals and as a collectivity be made into effective mediators vis-à-vis the school? Only a greater stake in the effectiveness of the school, it seems, can make a difference. What seems in order is some alteration in institutional structure that transforms the identity of the desirable parent from that of a homework supervisor and Parent-Teacher Association member to that of an everyday social capitalizer, empowered client of the school, and integral member of the school's client community. This is an age of private, independent action on the part of parents as stewards of their children's education, and it is that private option that needs to be supported in all the dimensions it requires.

## Notes

1. For example, National Commission on Excellence in Education, *A Nation at Risk: The Imperative for Educational Reform* (Washington: Government Printing Office, 1983); National Academy of Sciences, *Toward Understanding Teacher Supply and Demand* (Washington: National Academy Press, 1987); National Commission on Teaching and America's Future, *What Matters Most: Teaching for America's Future* (New York: 1996); and National Commission on Teaching and America's Future, *Doing What Matters Most: Investing in Quality Teaching* (New York: 1997).

2. See E. Hirsch, J. Koppich, and M. Knapp, *Revisiting What States Are Doing to Improve the Quality of Teaching: An Update on Patterns and Trends* (University of Washington, Center for the Study of Teaching and Policy, 2001); E. Feistritzer, *Alternative Teacher Certification: A State-by-State Analysis 1997* (Washington: National Center for Education Information, 1997); and W. Kopp, "Reforming Schools of Education Will Not Be Enough," *Yale Law and Policy Review*, vol. 10 (1992), pp. 58–68.

3. Notable exceptions to this include G. W. Haggstrom, L. Darling-Hammond, and D. Grissmer, *Assessing Teacher Supply and Demand* (Santa Monica, Calif.: RAND Corporation,

1988); and T. Sizer, *Horace's Compromise: The Dilemma of the American High School* (Boston: Houghton Mifflin, 1992).

4. See R. Ingersoll, *Teacher Supply, Teacher Qualifications, and Teacher Turnover* (Washington: National Center for Education Statistics, 1995); R. Ingersoll, *Out-of-Field Teaching and Educational Equality* (Washington: National Center for Education Statistics, 1996); R. Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools," *Educational Researcher*, vol. 28, no. 2 (1999), pp. 26–37; and R. Ingersoll, *Out-of-Field Teaching, Educational Inequality, and the Organization of Schools: An Exploratory Analysis* (University of Washington, Center for the Study of Teaching and Policy, 2002).

5. See, for example, S. Bobbitt and M. McMillen, *Qualifications of the Public School Teacher Workforce* (Washington: National Center for Education Statistics, 1995); L. Lewis and others, *Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers* (Washington: National Center for Education Statistics, 1999); and M. McMillen and others, *Qualifications of the Public School Teacher Workforce: 1987–88 to 1999–2000* (Washington: National Center for Education Statistics, 2002).

6. See, for example, Education Trust, *Education Watch* (Washington: American Association for Higher Education, 1996); Education Trust, *Education Watch* (Washington: American Association for Higher Education, 1998); National Commission on Teaching and America's Future, *What Matters Most*; National Commission on Teaching and America's Future, *Doing What Matters Most*; Education Week, *Quality Counts: A Report on Education in the Fifty States*, 1997, 1998, 2000, and 2003.

7. For a review, see Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools."

8. See, for example, L. Darling-Hammond, *Teacher Quality and Student Achievement: A Review of State Policy Evidence* (University of Washington, Center for the Study of Teaching and Policy, 1999); American Council on Education, *To Touch the Future: Transforming the Way Teachers Are Taught* (Washington: 1999); S. Soler, *Teacher Quality Is Job One: Why States Need to Revamp Teacher Certification* (Washington: Progressive Policy Institute, 1999); T. Toch, "Why Teachers Don't Teach: How Teacher Unions Are Wrecking Our Schools," *U.S. News and World Report*, February 26, 1996, pp. 62–71; Bill Clinton, *State of the Union Address* (Washington: Government Printing Office, 1999); and Committee for Economic Development, *American Workers and Economic Change* (New York: 1996).

9. This viewpoint is especially common among news columnists. See, for example, the syndicated columns of David Broder, Thomas Sowell, and Maggie Gallagher the week of September 14–20, 1996.

10. See, for example, National Commission on Teaching and America's Future, *What Matters Most*; and National Commission on Teaching and America's Future, *Doing What Matters Most*.

11. R. Ingersoll, *Who Controls Teachers' Work? Power and Accountability in America's Schools* (Harvard University Press, 2003).

12. M. Kirst, *Who Controls Our Schools? American Values in Conflict* (New York: W. H. Freeman Co., 1984); and J. Coleman and T. Hoffer, *Public and Private Schools: The Impact of Communities* (Basic, 1987).

13. B. Delany, "Allocation, Choice, and Stratification within High Schools: How the Sorting Machine Copes," *American Journal of Education*, vol. 99, no. 2 (1991), pp. 181–207; and Allen Ruby, "An Implementable Curriculum Approach in Improving Science Instruction in Urban Schools," paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada, 1999.

14. Education Week, *Quality Counts*, 2000; and V. Robinson, *Making Do in the Classroom: A Report on the Misassignment of Teachers* (Washington: Council for Basic Education and American Federation of Teachers, 1985).

15. Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools."

16. Haggstrom, Darling-Hammond, and Grissmer, *Assessing Teacher Supply and Demand*.

17. For information on the Schools and Staffing Survey, see S. Choy and others, *Schools and Staffing in the U.S.: A Statistical Profile, 1990–91* (Washington: National Center for Education Statistics, 1993); or R. Henke and others, *America's Teachers: Profile of a Profession, 1993–94* (Washington: National Center for Education Statistics, 1997).

18. See, for example, R. Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal on Legislation*, vol. 28 (1991), pp. 465–98; R. Greenwald, L. Hedges, and R. Laine, "The Effect of School Resources on Student Achievement," *Review of Educational Research*, vol. 66 (1996), pp. 361–96; and S. Raudenbush, R. Fotiu, and Y. Cheong, "Synthesizing Results from the Trial State Assessment," *Journal of Educational and Behavioral Statistics*, vol. 24, no. 4 (1999), pp. 413–38.

19. See, for example, E. Haertel, "New Forms of Teacher Assessment," in G. G. Gage, ed., *Review of Research in Education*, vol. 17 (Washington: American Educational Research Association, 1991), pp. 3–29; W. Haney, G. Madus, and A. Kreitzer, "Charms Talismanic: Testing Teachers for the Improvement of American Education," in Ernst Z. Rothkopf, ed., *Review of Research in Education*, vol. 13 (Washington: American Educational Research Association, 1987), pp. 169–238; and M. Kennedy, "The Problem of Improving Teacher Quality While Balancing Supply and Demand," in E. Boe and D. Gilford, eds., *Teacher Supply, Demand, and Quality* (Washington: National Academy Press, 1992), pp. 63–126.

20. For further discussion of the debate over the necessity of teacher qualifications, see R. Ingersoll, "Misunderstanding the Problem of Out-of-Field Teaching," *Educational Researcher*, vol. 30, no. 1 (2001), pp. 21–22.

21. Previous studies have used a number of different measures of out-of-field teaching, representing a range of standards. Some measures focus on whether teachers have a teaching certificate in the fields they teach, others focus on whether teachers have an undergraduate or graduate degree, and still others focus on whether teachers have both a certificate and a degree in the fields they are assigned to teach. Measures of out-of-field teaching also vary according to whether they focus on the numbers of teachers doing it or the numbers of students exposed to it and according to which fields and subjects are examined and which grade levels are investigated. This study uses several different measures of out-of-field teaching, drawn from this previous work. For a detailed review and evaluation of a variety of different measures of out-of-field teaching, see R. Ingersoll, "Measuring Out-of-Field Teaching," 2002, available from the author.

22. For more detail on this second type of out-of-field teaching measure, see Ingersoll, *Teacher Supply, Teacher Qualifications, and Teacher Turnover*.

23. The data in column 1 of table 3 refer to public elementary and middle school (kindergarten through grade eight) teachers whose assignment is pre-elementary or general elementary and who teach in self-contained classes. The latter refers to those who teach multiple subjects to the same students for all or most of the day. This excludes departmentalized elementary teachers and specialists such as those who teach art, music, physical education, math, or special education to different students throughout the day.

24. The data in columns 2–8 of table 3 refer to public secondary school (grades seven through twelve) teachers who are departmentalized. The latter refers to those who teach subject matter classes to different classes of students for all or most of the day. It excludes departmentalized teachers employed in middle schools.

25. For details on these particular measures, see Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools"; and Ingersoll, "Measuring Out-of-Field Teaching."

26. See, for example, K. Haycock, "Good Teaching Matters . . . A Lot," *Thinking K-16: A Publication of the Education Trust*, vol. 3, no. 2 (1998), pp. 3-14; K. Haycock, "No More Settling for Less," *Thinking K-16: A Publication of the Education Trust*, vol. 4, no. 1 (2000), pp. 3-12; Ingersoll, *Out-of-Field Teaching and Educational Equality*; C. Jerald and R. Ingersoll, *All Talk, No Action: Putting an End to Out-of-Field Teaching* (Washington: Education Trust, 2002); and R. Ingersoll, *Out-of-Field Teaching and the Limits of Teacher Policy* (University of Washington, Center for the Study of Teaching and Policy, 2003).

27. Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools"; and R. Ingersoll, *Can the No Child Left Behind Act Solve the Teacher Quality Problem?* (Washington: National Governors' Association, 2003).

28. Ingersoll, "Measuring Out-of-Field Teaching."

29. Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools."

30. National Association of State Directors of Teacher Education and Certification, *Manual on Certification and Preparation of Educational Personnel in the United States and Canada* (Sacramento, Calif.: 1997).

31. See, for example, Ingersoll, "The Problem of Underqualified Teachers in American Secondary Schools"; and R. Ingersoll, "Teacher Turnover and Teacher Shortages: An Organizational Analysis," *American Educational Research Journal*, vol. 38, no. 3 (2001), pp. 499-534.

32. D. Gerald and W. Hussar, *Projections of Education Statistics to 2008* (Washington: National Center for Education Statistics, 1998); and T. Snyder, C. Hoffman, and C. Geddes, *The Digest of Education* (Washington: National Center for Education Statistics, 1997), pp. 12-13.

33. D. Monk, "Secondary School Size and Curriculum Comprehensiveness," *Economics of Education Review*, vol. 6, no. 2 (1987), pp. 137-50.

34. For example, Toch, "Why Teachers Don't Teach."

35. For insightful discussion of the unanticipated outcomes of elementary school class-size reduction reforms in California, see Haycock, "Good Teaching Matters . . . A Lot"; B. Stecher and others, "Class-Size Reduction in California: A Story of Hope, Promise, and Unintended Consequences," *Phi Delta Kappan*, vol. 82, no. 9 (2001), pp. 670-74; and G. Bohrnstedt, B. Stecher, and E. Wiley, "The California Class-Size Reduction Evaluation: Lessons Learned," in M. C. Wang and J. D. Finn, eds., *How Small Classes Help Teachers Do Their Best* (Temple University, Center for Research in Human Development and Education, 2000), pp. 201-26.

36. D. Lortie, "The Balance of Control and Autonomy in Elementary School Teaching," in A. Etzioni, ed., *The Semiprofessions and Their Organizations: Teachers, Nurses, and Social Workers* (Free Press, 1969), pp. 1-53; Burton Clark, "The High School and the University: What Went Wrong in America, Parts 1 and 2," *Phi Delta Kappan*, vol. 66 (1985), pp. 392-97, 472-75; and R. Ingersoll, "The Status of Teaching as a Profession," in Jeanne Ballantine and Joan Spade, eds., *Schools in Society: A Sociological Approach to Education* (Belmont, Calif.: Wadsworth Press, 2000), pp. 115-29.

37. National Commission on Excellence in Education. *A Nation at Risk*.

38. Diane Ravitch, "The Educational Backgrounds of History Teachers," in P. N. Stearns, P. Seixas, and S. Wineburg, eds., *Knowing, Teaching, and Learning History* (New York University Press, 2000), pp. 143-55.

39. Willard Waller, *The Sociology of Teaching* (John Wiley, 1957).

40. Andrew Wayne and Peter Young, "Teacher Characteristics and Student Achievement Gains: A Review," *Review of Educational Research*, vol. 73, no. 1 (Spring 2003), pp. 89-122.