The Supply of and Demand for Teachers in California Public Schools

Patrick M. Shields
Camille E. Esch
Daniel C. Humphrey
Viki M. Young

The research reported here was sponsored by the Center for the Future of Teaching and Learning with funds from the William and Flora Hewlett Foundation, the Walter S. Johnson Foundation, and the Stuart Foundation.

Section I: Introduction to the Problem

Over the past few years, California policymakers have initiated a number of new programs to strengthen the state's teacher work force. These efforts reflect concern over California students' lack of achievement relative to their peers nationally—as reflected, for example, in the results of California students on the 1994 and 1998 National Assessment of Educational Progress (NAEP).[1] To raise student achievement dramatically, policymakers argue, will require fundamental improvements in teacher quality and significant shifts in the ways teachers and students interact in the classroom.

Patrick M. Shields is Manager and Senior Policy Analyst at SRI International in Menlo Park, California, where **Daniel C. Humphrey** is a Senior Research Analyst and **Camille E. Esch** and **Viki M. Young** are Research Associates.

Policies targeting improved teaching and better classrooms reflect both smart politics and sound research. National and state public opinion polls show that teacher quality is one of the most important policy-relevant problems in America's schools.[2] Research has pointed to teacher quality as one of the few variables demonstrably related to student achievement that can be affected by policy change.[3]

Accordingly, California has a rash of new policies in place—or in progress—to address teacher and classroom quality, including:

- class size reduction, which has successfully cut class sizes to 20 or fewer students in over 80 percent of the K–3 classrooms in the state;
- expansion of the Beginning Teacher Support and Assessment (BTSA) program;
- expansion of the capacity of the California State University (CSU) system to prepare more teachers;
- expansion of alternative certification routes;
- credentialing reciprocity with a number of other states; and
- creation of a statewide teacher recruitment initiative: CalTeach.*

As these new policies have been designed and implemented, a group of stakeholders have come together to track the status of the teacher work force in the state and to help support efforts to improve its quality. This initiative, *Teaching and California's Future,* involves a task force of key policymakers, practitioners, institutions of higher education, and professional development organizations convened to

* Proposed legislation in the Davis administration to establish a peer review system for teachers and to establish summer reading academies are consistent with this focus on improving teacher quality.

develop and implement a plan to improve teacher development policies and practices in California. The task force is supported by a team of researchers who are undertaking a comprehensive inventory of the status of teacher development in the state.

One of the core tasks of the research team is to track the demand for teachers in California's classrooms and the extent to which this demand can be met by fully qualified teachers. This document presents a current assessment of teacher supply and demand in the state, updating an earlier report to the task force.[4] The key findings of this analysis are:

- California has long suffered from a shortage of fully qualified teachers;
- the implementation of class size reduction has dramatically increased the shortage;
- the shortage of qualified teachers is markedly uneven across different geographical areas and across subject areas; and
- current policy initiatives to address this problem by increasing the supply of credentialed teachers and reducing teacher attrition are not likely to be sufficient to meet future demand for teachers.

The bottom line is stark: ***Given the current capacity of the teacher preparation and support system in the state, tens of thousands of California school children—concentrated in our urban areas—will remain in classrooms led by unqualified teachers.***

In support of this conclusion, the document first describes the historical demand for teachers and projects that demand out to 2007. We also describe the differential demands for teachers across content areas and grade levels. Second, we analyze historical teacher supply trends and project those trends out over the same period. Next we make projections

about how the supply of teachers will be affected by two recent key policy initiatives: expansion of the BTSA program and expansion of CSU's capacity to produce new teachers. We then describe the degree to which we can expect the supply of fully credentialed teachers to meet the projected demand. Finally, we examine the existing teacher shortage and describe the distribution of underqualified teachers throughout the state.

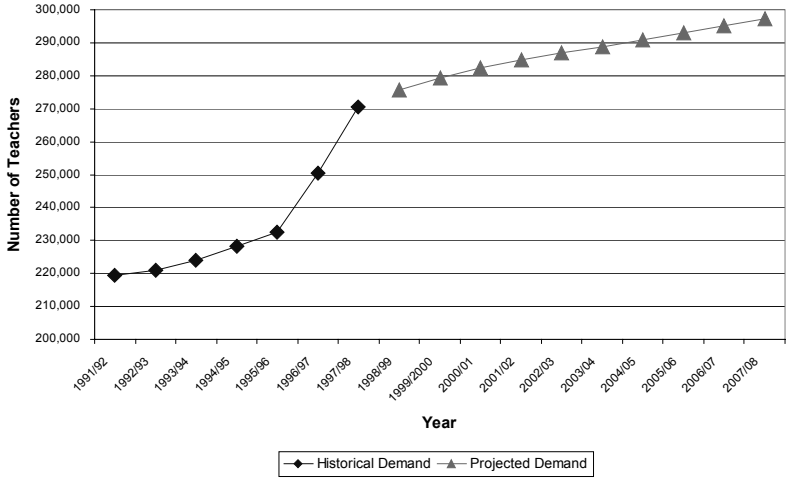
Section II: The Demand for Teachers in California Classrooms

In 1997–1998, there were 244,157 certificated teachers in K–12 classrooms throughout California.[5] The size of the teacher work force has increased 28 percent in the past 12 years—starting with 190,055 teachers in 1986–1987 (Figure 1). The marked increase in the teacher work force in 1996 and 1997 reflects the implementation of class size reduction.

Even after the hiring in response to class size reduction, California can expect to hire a large number of teachers—averaging about 25,000 each year through 2007 (Figure 2). From 1999 through 2007, we estimate that more than 227,000 new teachers will be needed to accommodate California's growing student population and regular teacher attrition and retirement.* These figures do not include the credentialed teachers necessary to replace the 29,000 emergency permit holders currently in California classrooms.

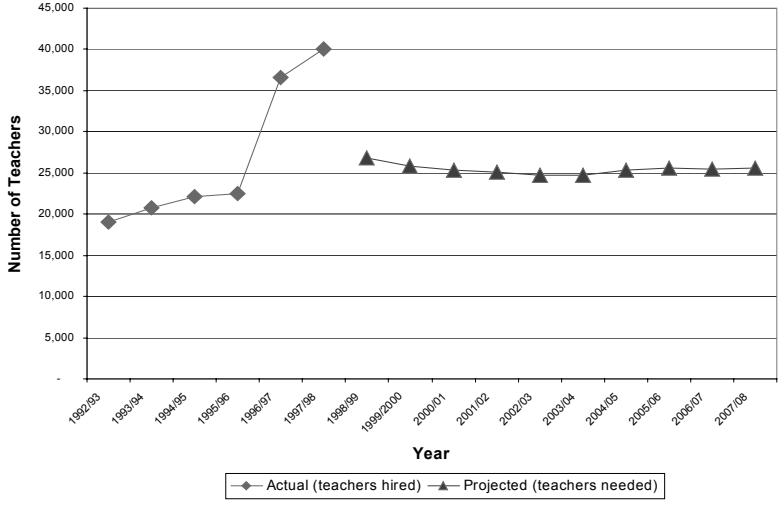
* These numbers may underestimate future demand for teachers as they do not account for a potential increase in the number of teachers retiring as baby boomers reach retirement age (we discuss this issue later in the report).

Figure 1
Historical and Projected Demand for Teachers in California
1991/92–2007/08



Source: California Department of Education (CDE)

Figure 2
Actual and Projected Teacher Hires
1992/93–2007/08



Sources: Fetler (January 1997) and CDE (August 1997)[6]

Projecting the demand for new teachers requires assumptions about enrollment trends, the stability of teacher-student ratios, and attrition and retirement rates. Thus, these projections represent estimates and should be interpreted as such. It is also important to keep in mind that other contextual factors could change and subsequently affect these projections. For example, if class size reduction were expanded to cover more grade levels, we would expect a sharp increase in the demand for teachers. Similarly, if teachers were provided with more time for planning or peer evaluation—as some reformers argue they should be[7]—this change could also increase the demand for teachers.

Variation of Demand by Content Area and Grade Level

Overall estimates mask wide variations in demand for teachers in certain content areas, grade levels, and geographic areas. According to district-predicted hirings for 1998–1999, the largest area of reported need is in self-contained classrooms.[8] Given the demands of the class size reduction program, it is understandable that elementary classrooms are in the greatest need. Figure 3 indicates that bilingual and special education are also areas of high need.* Recent efforts to reduce class size in ninth grade may have created additional demand for core subject high school teachers.

* Despite the passage of Proposition 227, demand for bilingual teachers remains high. Whether or not schools have discontinued bilingual classes, they still report wanting teachers who can communicate with parents and who understand their students' native languages.

Figure 3
Estimated Number of Teacher Hires:
Areas with Highest Need (1998–1999)

Teaching Area	Number of Predicted Hires	Percentage of All Expected Hires
Self-contained	7,843	38
Bilingual education	3,175	15
Special education	2,858	14
Mathematics	1,133	6
English/drama	1,149	6
Life science	810	4
Social science	722	4
Physical science	618	3
Foreign language	522	3

Source: CDE (April 1998)[9]

Factors Fueling Demand

The statewide demand for teachers reflects three core factors: student enrollment growth, class size reduction, and attrition/retirement.

Student Enrollment Growth

The student population in California is projected to grow from 5.7 million K–12 students in 1997–1998 to approximately 6.2 million students by 2007–2008.[10] Assuming a pupil-teacher ratio of 20.8:1 (the average ratio after class size reduction), California would need to add 21,507 new teachers from 1998 to 2007 to keep pace with student enrollment growth alone.

Class Size Reduction

The class size reduction (CSR) initiative created a need for approximately 19,000 new elementary teachers in 1996–1997[11]—in addition to the approximately 16,000 elementary

teachers hired for normal replacement and growth needs.[12] According to the Legislative Analyst's Office (LAO), this represented a 115 percent increase in the demand for new elementary teachers over the previous year. LAO also estimated that 7,800 more teachers needed to be hired to fully implement CSR in three grades statewide in 1997–1998.[13]

The 1998 augmentation of the 1990 Morgan-Hart Class Size Reduction Act aims to reduce class sizes in ninth-grade core subject areas and may result in increased demand for single-subject teachers. The projected demand for teachers presented here relies on a stable pupil-teacher ratio that assumes full implementation of CSR in K–3 and in grade 9 in the core subjects.

Attrition and Retirement

Much of the predicted increase in demand is due to the expected departure of many teachers from California's work force, through retirement, relocation, or decisions to switch careers. Overall, most estimates of ***annual attrition*** cluster around 6 percent.*[14] Although we do not have hard data on when in their career trajectories teachers actually leave the profession for reasons other than retirement, others have estimated that as many as 50 percent of all new teachers leave the profession within the first five years.[15]

Most estimates of ***annual retirement*** cluster around 2 percent—ranging between 1.3 percent and 2.3 percent.[16] These estimates are generally based on data from the California State Teachers Retirement System (CSTRS). According to one report, 1.8 percent of teachers retired in 1990 and 2.3 percent retired in 1993.[17] Assuming a combined 8 percent attrition and retirement rate, one would estimate a

* Attrition rates vary from region to region. Those areas that have the most difficulty attracting new teachers also suffer from the highest attrition rates.

demand for approximately 21,600 teachers in 1998–1999 to replace those who left the profession at the end of 1997–1998. These figures are reflected in the demand estimates in Figures 1 and 2.

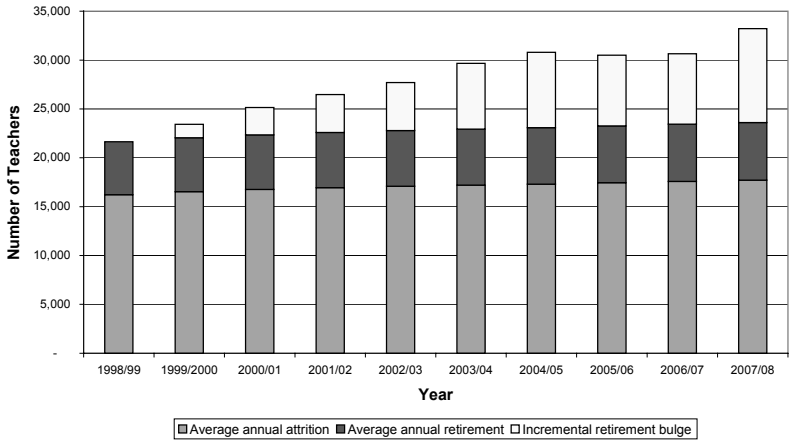
However, many expect the retirement rate to increase among teachers (as it likely will in all professions) in the coming years because of the age of the current work force. According to the California Department of Education (CDE) and CSTRS membership data, half of all teachers are more than 45 years old, and one out of seven is 55 or older.[18] Although current data sources do not allow a comprehensive and accurate analysis of the probable impact of the baby boomers' retirement, a rudimentary analysis with available data shows that the potential impact is enormous. We present here a summary of that analysis to emphasize the need for better data collection, analysis, and planning before the increasing retirement rates result in further shortages of thousands of teachers.

A major obstacle to predicting the advent of the retirement bulge is that the only applicable data—CSTRS's age and retirement data—do not separate out K–12 teachers from junior college instructors. To infer the K–12 retirement rate, we estimated retirement rates for the total CSTRS membership using the age data and average retirement age for the membership. Then, indexing the estimated rate of retirement to the actual CSTRS membership retirement rate for 1998 (the last year available), we calculated a retirement rate *index* (similar to the consumer price index) and applied the index to the average retirement rate for K–12 teachers.

Using conservative assumptions based on average ten-year historical membership growth and the average membership retirement age of 60, we estimate that the annual retirement *rate* could increase by a factor of 2.65 between 1999 and 2007. Thus, the assumed annual retirement rate of 2 percent of K–12 teachers could increase steadily to 5.3 percent (2.65

times 2 percent) by 2007. This above-average rate of retirement would stimulate, from 1999 to 2007, a cumulative demand for 50,000 teachers, doubling the demand due to retirement imbedded in the projections presented in Figures 1 and 2. In 2007 alone, the difference between 5.3 percent retirement and 2 percent retirement totals approximately 10,000 teachers. Figure 4 details projected demand due to average attrition, average retirement, and the retirement "bulge." The retirement "bulge" will continue through 2014 when today's 45 year olds will reach the average retirement age.

Figure 4
Projected Cumulative Demand Due to Average Attrition, Average Retirement, and Retirement "Bulge" 1998/99–2007/08



Again, this is a rudimentary analysis using published CSTRS membership data and contains some reasonable, but fundamental, assumptions that require refinement. First, applicable CSTRS data need to be disaggregated by K–12 and junior college, including:

- number of current active members by age
- historical membership growth (over the past ten years)

- historical retirement (over the past ten years)
- average retirement age
- historical inactive members by year, i.e., attrition (over the past ten years)

With the above data, our analysis, at minimum, could be replicated with more accurate results. Further analysis would require ongoing monitoring of annual K–12 retirement. In any case, the increased retirement "bulge" is imminent and merits policymakers' attention.

Section III: The Supply of Teachers for California Classrooms

We define the supply of teachers as the number of properly credentialed teachers willing and able to take positions in California schools. As such it includes (1) the base of veteran credentialed teachers remaining in the work force at the beginning of each school year and (2) "new" teachers entering the work force for the first time. Below, we describe what is known about the participation of these two groups in the work force. We then project the supply of teachers through the next decade.

The Base of Veteran Teachers

The base of veteran credentialed teachers in California schools at the beginning of a given school year is equal to the number of teachers in the work force from the previous year minus normal attrition and retirement and minus emergency credentialed teachers. As described above, we expect approximately 8 percent of currently practicing teachers to leave the profession each year. In addition, we reduce the

supply estimates by the number of emergency credentialed teachers—because these do not meet our criteria of "fully qualified teachers."

Thus, for example, at the end of the 1996–1997 school year, there were 250,527 teachers in California classrooms. We estimate that approximately 20,042 retired or left the profession and another 18,595 were on emergency permits. Thus, at the beginning of the 1997–1998 school year, the supply of fully credentialed veteran teachers who carried over from 1996–1997 was approximately 211,890.

New Teachers Entering the Profession

Each year, the base of veteran teachers is augmented by "new" credentialed teachers. In 1996–1997, the California Commission on Teacher Credentialing (CCTC) issued over 20,000 teaching credentials. However, of these 20,000 credentials, only about 17,100 actually went to new teachers—of whom 13,800 had typically just completed their training programs in California and 3,300 were from out of state. The remaining credential recipients were teachers who renewed their permits or "upgraded" from a preliminary credential to a professional clear credential.

The actual number of "new" teachers applying for and willing to take vacant positions each year, however, is not equivalent to the total number of new credentials because (1) not all newly credentialed teachers will actually apply for and take teaching positions and (2) a certain number of previously credentialed teachers will choose to reenter the work force. We discuss each of these issues below.

Low Employment Rates of Newly Credentialed Teachers

Many newly credentialed teachers from California either do not apply for teaching positions or are unable to find a position in a preferred location or teaching assignment.* Estimates of the exact number of first-time, in-state credential holders who actually enter the teaching force each year vary from study to study, but hover around 50 percent.[19]

One possible explanation for these low employment rates is the *selectivity* and *immobility* of new teachers. A CCTC survey of all individuals receiving credentials from January 1990 to December 1992 (response rate of 58 percent)[20] showed that:

- 52 percent said they limited their job search to schools within a 25-mile radius of their home, while an additional 22 percent put a 50-mile radius limit on their job search.
- 42 percent said they preferred to work in a suburban setting, 26 percent preferred a rural/small town, 13 percent preferred an urban setting, and 10 percent reported no preference.
- When asked to rank their most important reasons for applying to districts, their number one reason was "how close the district was to my current home," followed by "the teaching assignment (subject or grade level) available."

Thus, for some teachers, distance from home is a factor that inhibits them from applying or taking jobs in certain districts. For others, lack of particular subject or grade-level positions prevents them from finding employment. And for still other teachers, perceived disparities in district funding or working

* Out-of-state teachers who apply for temporary credentials typically have good prospects for employment—it is for that reason that they make their application. Thus, we assume that the vast majority of out-of-state teachers who receive credentials actually go on to teach.

conditions might dissuade them from seeking teaching positions in certain areas—particularly poorer urban and rural districts.[21]

We estimate that, without the CSU expansion policy discussed later, approximately 14,500 individuals would have completed a teacher preparation program in 1998–1999. Assuming a 50 percent participation rate, we would expect only 7,250 of those individuals to enter the teaching force. We use a constant 50 percent rate of participation of newly credentialed teachers in the projections presented here.

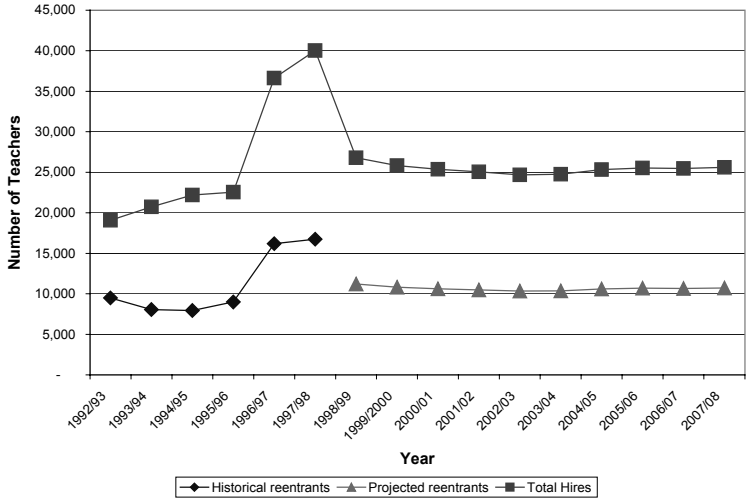
The Influx of Reentrants to the Teacher Work Force

Many teachers leave the profession early in their careers—whether for personal reasons (e.g., to raise a family) or professional ones (to pursue other careers). These teachers make up a large reserve pool of qualified teachers, some portion of which reenters the work force each year—supplementing the number of newly credentialed teachers just graduating from training programs. Following the methodology of other work force projections,[22] we estimate that reentrants comprise just over 40 percent of new hires, with the six-year average at 42 percent of all new hires. As Figure 5 indicates, reentrants remain a critical source of qualified teachers in projecting the size of the teacher work force through 2007.

We have little data on the employment decisions of these individuals, but given the reasons teachers state for not entering the profession, we can hypothesize that the proximity of available positions and desirability of specific teaching assignments would be major determinants of whether teachers choose to reenter the profession. Consistent with this hypothesis, the number of reentrants into teaching surged with class size reduction as teaching positions opened up in every community in the state. As class size reduction

reaches full implementation, this "reserve pool" may have been largely tapped.

Figure 5
Estimated Historical and Projected Reentrants vs. Total Hires
1992/93–2007/08



Source: Fetler, 1997; CBEDS, 1997; SRI Analysis

Projecting the Supply of Teachers into the Future

Projecting the size of California's teaching force depends on a series of assumptions that can be based only in part on historical data. Not only do we need to estimate the teaching force participation of veteran and new teachers, but we must project potential impacts of new policies. We begin with projections of the supply of qualified teachers using historical trends. We then estimate the impact of two particularly promising policies: the expansion of the Beginning Teacher Support and Assessment (BTSA) program, designed to reduce attrition, and the expansion of the capacity of the CSU system, intended to produce a greater number of newly credentialed teachers. Finally, we discuss the promise of other recently enacted policies.

Teacher Work Force Projections Before Implementation of 1998 Legislative Mandates

In Figure 6 we show that under the "status quo," after the effects of class size reduction but prior to the legislation passed in 1998, the number of credentialed teachers participating in the work force is projected to rise by 14,000 to 260,279 from 1998 to 2007—an increase of 5.8 percent. These projections use reasonable assumptions based on historical averages, including 6 percent annual attrition, 2 percent annual retirement, 50 percent participation of newly credentialed teachers, the five-year annual average of 2,888 new teachers from out of state, and 42 percent of total new hires who are reentrants.

Incremental Impact of BTSA Expansion

The Beginning Teacher Support and Assessment (BTSA) program provides fully prepared first- and second-year teachers with opportunities to deepen their pedagogical content knowledge and skill with the assistance of support providers—more experienced and expert teachers. New legislation requires that all teachers who receive preliminary credentials participate in a formal induction program to receive their clear credential.* The 1998–1999 budget provided $67 million for BTSA programs, up from $17.5 million in 1997–1998, to support all teachers in their first two years of teaching.[23]

Pilot studies of BTSA's precursors, such as the California New Teacher Project (CNTP), showed higher retention rates among those teachers who volunteered to participate in an induction program than among nonparticipants. Eighty-

* The legislation provided funds for the BTSA program to reach all new teachers. Teachers beginning service in September 1999 must complete BTSA to obtain their professional clear credentials. BTSA was not required for teachers beginning prior to September 1999.

seven percent of CNTP teachers returned to teach in the same district for a second year, and 81 percent for a third year, both much higher than national averages. Even higher percentages remained in the teaching profession, even if they changed districts.[24] The expansion of BTSA to all new teachers is meant to reduce the attrition rate among teachers in their first five years of teaching. However, the demands to provide service to *all* beginning teachers pose serious challenges to districts. The quality of programs that began small and/or served highly motivated, self-selected teachers is likely to be affected as districts try to (1) attract sufficient numbers of expert teachers willing to mentor new recruits and (2) convince already taxed beginning teachers to take on additional work, no matter how beneficial.

We present high and low projections for the impact of the BTSA legislation. High projections assume that expanded BTSA programs will be almost as successful as they have been in the past, at an 80 percent five-year retention rate. This assumption produces a cumulative increase of almost 67,000 teachers from 1999 to 2007, so that by the year 2007, 16,500 teachers will be in the work force who otherwise would not be. At a 60 percent five-year retention rate, low projections take into account decreasing marginal effectiveness of expanded BTSA programs but recognize improvements over the status quo. The low assumption results in an additional 22,500 teachers over the same period of time and in an incremental increase of almost 6,000 in the last year.

Increasing CSU's Capacity to Prepare Additional Teachers

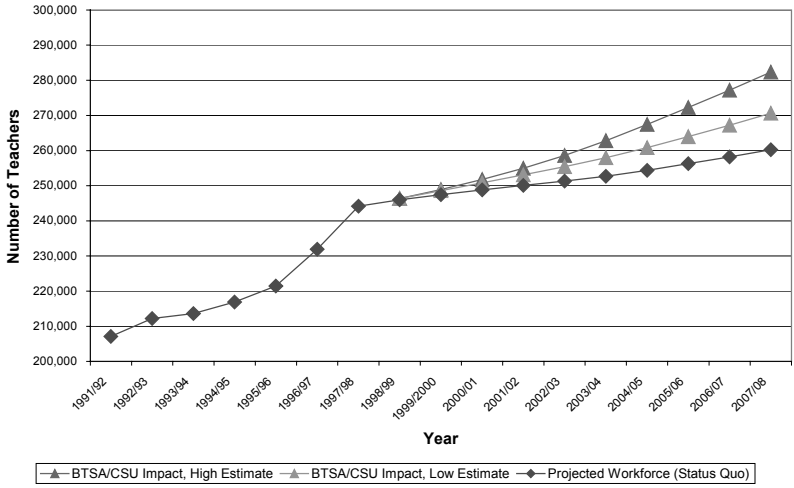
CSU- and UC-recommended new credentials have remained relatively flat from 1989 to 1997, despite the total increase of 2,500 new credentials during that period of time. Independent institutes of higher education (IHEs) have been more responsive to the market, accounting for most of the growth

in new credentials and increasing their total market share from 32 percent of all new credentials in 1989 to 42 percent in 1997.[25]

In response, the state has increased funding to CSU to increase its production of credentialed candidates. CSU plans to produce a total of 15,000 credentialed graduates per year by 1999–2000, up from 11,736 in 1996–1997 and an estimated 13,500 in 1997–1998. Because the majority of new credential growth has been among the independent IHEs at much higher tuition fees than those CSU charges, we can expect that prospective teachers who otherwise would have enrolled in independent IHEs will fill some percentage of the new CSU positions. Thus the announced expansion does not realistically represent the net number of new credentials. We use sensitivity analysis to estimate the impact of the new CSU positions under three scenarios—100 percent (i.e., a zero percent shift from independents), 75 percent, and 50 percent new positions—and assume that all new teachers participate in the expanded BTSA programs discussed above. The cumulative number of new teachers entering and staying in the work force through 2007 are 36,000; 26,800; and 17,900 respectively. Under these scenarios, the incremental number of new teachers in 2007 due to the CSU expansion are 6,300; 4,600; and 3,100, respectively.

Figure 6 compares the combined impact of BTSA and CSU expansion using both high and low estimates to the projected teacher work force absent those policies. We project that in the absence of these new policies, the fully credentialed work force would include 250,000 teachers by 2007. BTSA and CSU expansion promise to increase this number to somewhere between 270,000 and 280,000.

Figure 6
Projected Impact of BTSA and CSU Expansion on Teacher Work Force 1991/92–2007/08



Source: Fetler, 1997; CDE, 1998; SRI Analysis

The Promise of Other State Policies to Affect the Supply of Fully Credentialed Teachers

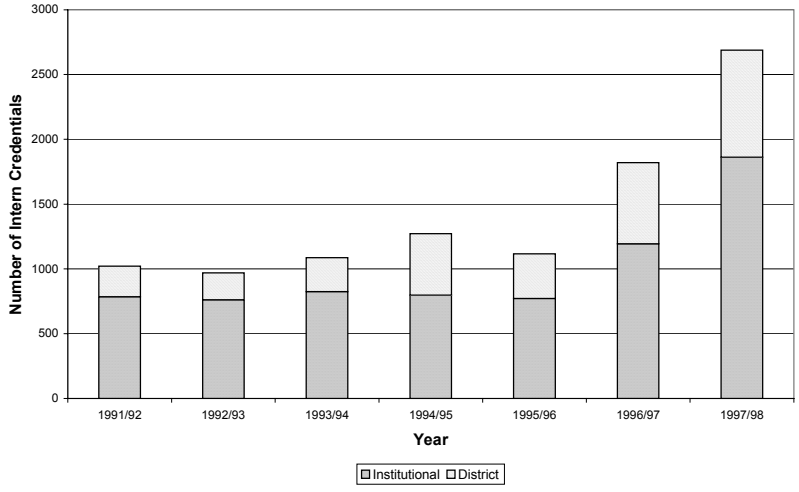
Other policies the state enacted in 1998 aim at lowering barriers to entry in the teaching profession, but without any historical data, they are extremely difficult to quantify. Their impacts will need to be tracked in the ensuing years to accurately gauge whether the measures are sufficient to close the remaining gap and to end the need for emergency permits within a reasonable time frame. Three efforts appear especially promising in that they may affect the supply of teachers in the next few years: the expansion of the intern and preintern programs and the establishment of reciprocal credentialing agreements with other states.

Intern programs. Individuals qualify for intern status if they have a baccalaureate degree and have passed the California Basic Educational Skills Test (CBEST®) and subject matter

requirements. While teaching full time, interns also engage in a planned course of study with expert teachers or IHE faculty. Intern programs offer an alternative certification route that better meets the needs of those who want to enter the teaching profession but need to maintain a steady income and/or cannot leave their place of residence to attend a traditional preparation program.

Figure 7 shows the growth in institutional and district intern programs from 1991 to 1998. The CCTC issued a total of 2,689 first-time and new-type intern credentials in 1997, up from 1,820 in 1996 and 1,116 in 1995. Because intern credentials are valid for a two-year period, we estimate that there were 4,509 first- and second-year interns in 1997. Funding sufficient to cover 7,300 interns in their first and second years of training is available annually, beginning in 1998–1999.[26]

Figure 7
Institutional and District Intern Credentials
1991/92–1997/98



Source: CCTC, 1999

The rapid increase in the number of interns is important for two reasons. First, it shows that among the many emergency credentialed teachers, a subset is receiving clear support and is in line to receive a full credential. Given current funding levels, we expect that about 7,300 will be receiving formal training as interns. Second, it is hoped that the support interns receive and the availability of this alternative route into the profession will in fact increase the supply of teachers. In particular, it is hoped that intern programs will attract candidates who already live in the communities in which teachers are in demand.

Unfortunately, data on the number and percentage of interns who complete their programs and garner a preliminary or professional clear credential are not sufficient to project future labor force participation rates. An analysis of first-time and new-type intern certificates awarded in 1996–1997 shows that 80 percent received a preliminary or professional clear credential during the same fiscal year and 56 percent did so for 1997–1998.*[27] The large difference in conversion rates within the same fiscal year between 1996–1997 and 1997–1998 suggests that it is too early to have an accurate picture of the percentage of interns who complete their program and gain a credential and the significance of the average length of the program. However, it is clear that intern programs hold promise.

* Most intern programs are two years in length, although the largest district program, Los Angeles Unified School District, has a one-year intern program. Because the report analyzed activity within a single fiscal year, it did not capture those interns who converted to preliminary or professional clear after a two- or three-year course of study.

Preintern program. Introduced in 1998, this program targets individuals on emergency permits who have not met subject matter requirements and have had no previous teaching experience. The program is intended to support preinterns in meeting subject matter requirements and give them skills in basic classroom management strategies, lesson planning, and instructional methods. The legislature has earmarked funding to serve 5,000 preinterns; however, there is no data on how many preinterns actually complete their subject matter requirements, move into intern programs, and ultimately receive a preliminary or professional clear credential.

Lowering barriers for out-of-state teachers. Passed in 1998, AB 1620 will reduce the barriers that teaching candidates credentialed outside of California face in accepting teaching positions in California, augmenting a fourth source of credentialed teachers. The CCTC is in the process of evaluating other states' teacher preparation standards—and so far has identified nine states where standards are equivalent to California's. Graduates with credentials from institutions in these states will be eligible for clear credentials in California. The bill will also simplify the process for candidates from states whose standards are not equivalent to California's. It is impossible to estimate the impact of this new policy, but by lowering the entry barriers, teaching in California will be a more attractive alternative for out-of-state graduates than it was previously.

Other policies expected to have some marginal impact include accreditation of out-of-state preparation programs with satellite campuses in California; Cal Math Initiative; blended four-year programs; CalTeach; CalGrant Teacher Program; and APLE Loan forgiveness program. In addition, CSU will launch a new credential program—CalState TEACH—in the fall of 1999. This 18-month program will utilize the Internet, school-site mentors, and site-visiting

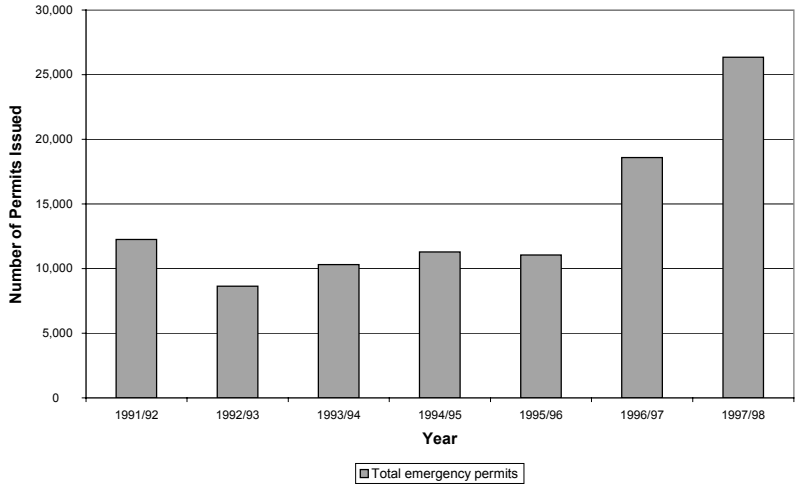
faculty supervisors and aims to certify up to 1,000 teachers currently working on emergency permits. It is impossible to estimate with any confidence the additional numbers of credentialed teachers that these programs might produce. However, they warrant monitoring to assess their effectiveness.

Section IV: Putting Supply and Demand Together

California has long suffered from a shortage of fully credentialed teachers. At the beginning of the 1990s, 12,200 classroom teachers held emergency credentials, representing about 5.5 percent of the teacher work force.* This figure remained steady through the first half of the decade until the implementation of class size reduction, when the number of teachers with emergency permits increased to over 18,000 in 1996–1997 and then to over 26,000 in 1997–1998 (Figure 8). Currently, we estimate that one in every ten California classrooms is staffed by an emergency credentialed teacher.

* The minimum requirements for an emergency single- or multiple-subject teaching permit are completion of a bachelor's degree, passage of the California Basic Educational Skills Test (CBEST®), and verification of subject-matter competence at a level established by regulations for the emergency permit. Individuals serving on an emergency permit must enroll in a CCTC-approved professional preparation program for the credential and complete a minimum of six semester units of course work each year in order to renew the permit. Emergency permits can only be renewed for five consecutive years, after which individuals on emergency permits wishing to remain in teaching must achieve a preliminary or professional clear credential.

Figure 8
Total Emergency Permits
1991/92–1997/98



Source: CCTC (1998)[28]

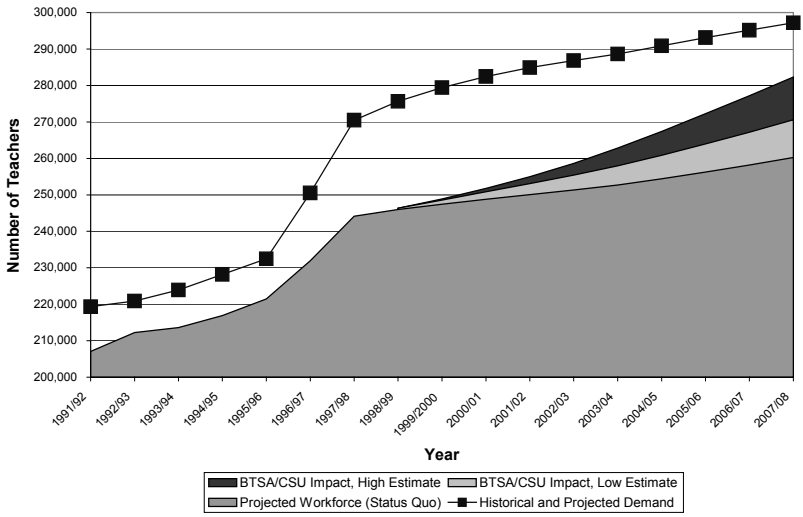
Class size reduction also resulted in tremendous growth in the number of waivers issued.[29] From 1995 to 1996, there was a 240 percent increase in the number of multiple-subject (elementary) waivers—from 251 in 1995 to 861 in 1996. Furthermore, the pressure of class size reduction created opportunities for many substitute teachers to move into full-time classroom assignments, creating a significant shortage of substitutes. As a result, the number of 30-day substitute teaching waivers increased by more than 300 percent, from 583 in 1995 to 2,366 in 1996. They comprised 33 percent of all waivers issued in 1996.[30]

The Projected Impact of New State Policies

This severe shortage of teachers is well known to state policymakers, and in the 1998 legislative session a number of bills were passed to address the problem. As discussed

above, two of these—the BTSA expansion and the increase in the capacity of the CSU system—can be expected to affect the number of credentialed teachers in the work force in the near term. In Figure 9, we project the supply of fully qualified teachers participating in the work force relative to overall demand through the year 2007. We use three different projections. First, we estimate the supply of fully credentialed teachers under the "status quo" scenario (absent the impact of recent policies). Second, we project a low estimate of the impact of BTSA and CSU expansion. Finally, we project an optimistic scenario of the policies' impacts.

Figure 9
Projected Teacher Work Force Through 2007/08



As Figure 9 shows, absent the implementation of BTSA and CSU expansion policies, the gap between credentialed teachers in the work force and total demand grows from 29,000 in 1998 to almost 37,000 in 2007. Under the optimistic scenarios of BTSA and CSU expansion, the gap closes to 14,800 by 2007, roughly where the state was prior to class size reduction; using the low-impact estimates, the gap remains at 26,500 in 2007. In any case, we predict continued

shortfalls even after the implementation of these two key policies. In addition, these estimates incorporate historical annual retirement rates of 2 percent of the work force. As noted above, the potential increase in retirement rates could pull another 50,000 teachers out of the work force between 1999 and 2007.

Again, these projections are based on certain assumptions, the validity of which can only be tested by time. However, it is important to recognize the persistence of teacher shortages and that, importantly, this shortage is not evenly distributed across geographic or content areas. We discuss these shortages in the next section.

Uneven Distribution of Shortages

More in-depth examination of teacher shortages reveals that they are not evenly distributed across the state. As a result, California faces an oversupply of teachers in certain geographic and curricular areas and severe shortages in others. Further, these severe shortages tend to be concentrated in districts with high percentages of poor and minority students. In this section we discuss the distribution of underqualified teachers statewide, by geographic areas, by percentage of poor and minority students in the school, and by subject area.

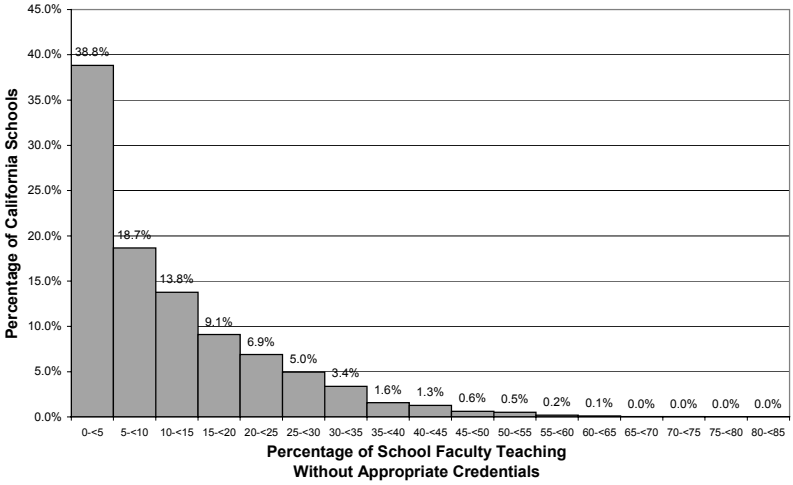
Statewide Distribution

Over 10 percent of California teachers hold an emergency permit, waiver, or intern certificate. In other words, they do not hold a full credential for their particular teaching assignment.* Because these teachers have not completed a teacher

* A small percentage of teachers holding emergency permits may hold a full credential to teach in another subject area or grade level. In 1996–1997 this included roughly 11 percent of single-subject emergency permit holders and less than 1 percent of multiple-subject emergency permit holders (averaging out to 4 percent of both).

preparation program or other requirements for their teaching assignment, we refer to them as underqualified teachers. Statewide, the average percent of underqualified teachers is high. Furthermore, Figure 10 shows that these teachers are not evenly distributed in schools throughout the state.

Figure 10
Distribution of Underqualified Teachers in California Schools



Source: CBEDS, 1999, upon special request; SRI Analysis

District Distributions

Nearly 39 percent of California's schools have staffs with fewer than 5 percent underqualified teachers and do not face a critical shortage. The remaining 61 percent of the schools in the state have underqualified teachers in proportions increasingly greater than 5 percent. Over 40 percent of the schools have staffs with at least 10 percent underqualified

teachers, and nearly one-fifth of the schools have staffs with over 20 percent underqualified teachers.*

The distribution of underqualified teachers varies by a number of school-level characteristics, including the urbanism of the school site and the demographics of the student population. Urban areas tend to be the hardest areas to staff. Fast-growing enrollment and the class size reduction program have exacerbated the shortages in many large urban districts. Compared to the statewide average of 11 percent, urban schools had staffs with, on average, 17 percent underqualified teachers in 1997–1998. Suburban and rural schools each had staffs with about 8.1 percent underqualified teachers. Though rural schools as a group had a lower percentage of underqualified teachers, there is wide variation among rural districts. Some remote districts in particular face dire shortages of credentialed teachers and should not be overlooked.

- The CCTC reports that the greatest need for credentialed teachers is concentrated in three areas: southern California, central California, and the San Francisco Bay Area. For example, Los Angeles County accounted for more than 40 percent of all multiple-subject waivers issued statewide in 1996.[31]
- In contrast, 348 districts (35 percent) did not employ any emergency permit teachers in 1996–1997. According to the CCTC report, these districts are located mostly in affluent suburban areas—such as Mill Valley in Marin County and Palos Verdes in Los Angeles County—and

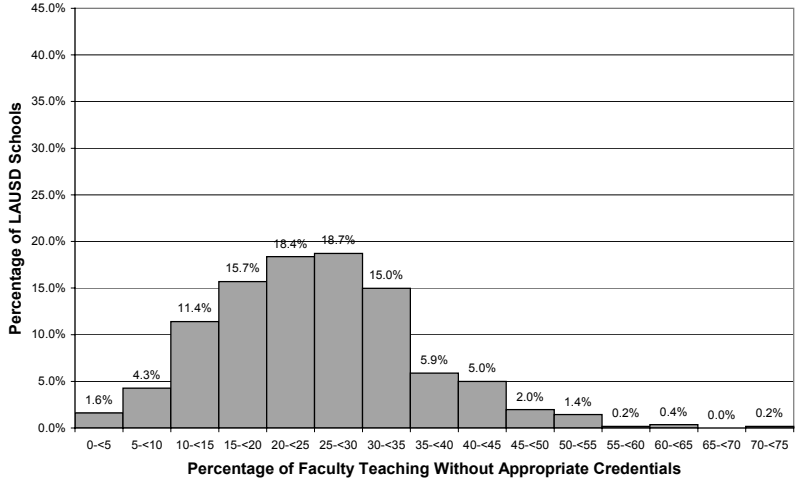
* The analysis in Figure 10 (and subsequent analyses on the distribution of underqualified teachers) does not include adult, vocational, or other alternative schools. There are one or two schools in each of the percentage categories above 65 percent. However, these schools constitute less than one-half of one percent and are represented as 0.0 percent in Figure 10.

nonagricultural rural areas—such as all 11 districts in Trinity County and 11 of 12 districts in Tuolumne County. [32]

- The CCTC analysis of county-level emergency permit and waiver data indicate that urban areas and rural farming areas experience the greatest difficulty attracting credentialed teachers in the areas of English, social studies, and physical education and that nonagricultural rural counties rarely request emergency permits in these areas.[33]

Not surprisingly, the statewide distribution curve shown in Figure 10 looks very different when calculated for individual districts in high-need areas. Whereas a plurality (39 percent) of California schools has fewer than 5 percent underqualified teachers, this is not the case in several individual districts. Figure 11 shows the distribution of underqualified teachers in schools in the Los Angeles Unified School District (LAUSD). Less than 2 percent of the schools in this district have fewer than 5 percent underqualified teachers on their faculties, and a full two-thirds of LAUSD schools have more than
20 percent underqualified teachers. LAUSD is a significant case because of its massive size. However, other smaller districts have even more distressing distributions of underqualified teachers. Over three-quarters of the 32 regular schools in the Compton Unified School District, for example, have more than 40 percent underqualified teachers on staff. Incredibly, over one-third of Compton schools have more than 50 percent of classrooms filled by underqualified teachers.

Figure 11
Distribution of Underqualified Teachers in LAUSD Schools

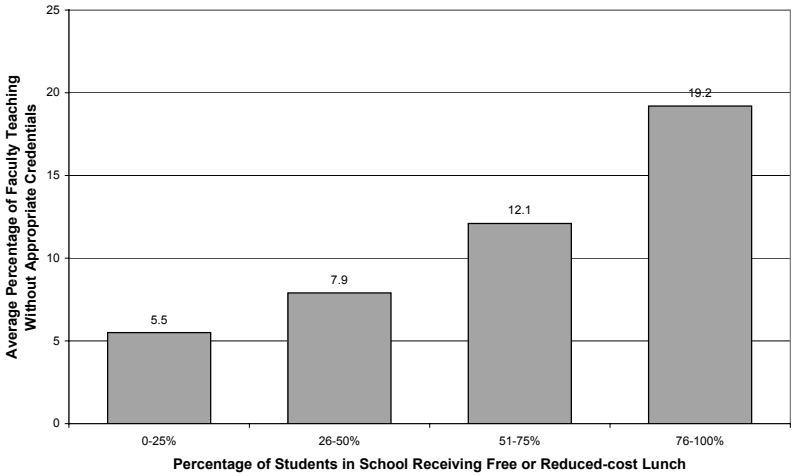


Source: CBEDS, 1999; SRI analysis

Distribution by Student Poverty and Minority Levels

Underqualified teachers are also unevenly distributed among schools with demographically different student populations. Schools with the highest percentage of students receiving free or reduced-cost lunch (a proxy for the poverty level of the student population) also have the highest percentage of underqualified teachers. Figure 12 shows that in schools with the highest student poverty level, there is an average of 19.2 percent underqualfied teachers on staff. This compares with just 5.5 percent underqualified teachers in those schools with the lowest student poverty level. It is important to note that fully one-third of California schools fall into the highest poverty category.

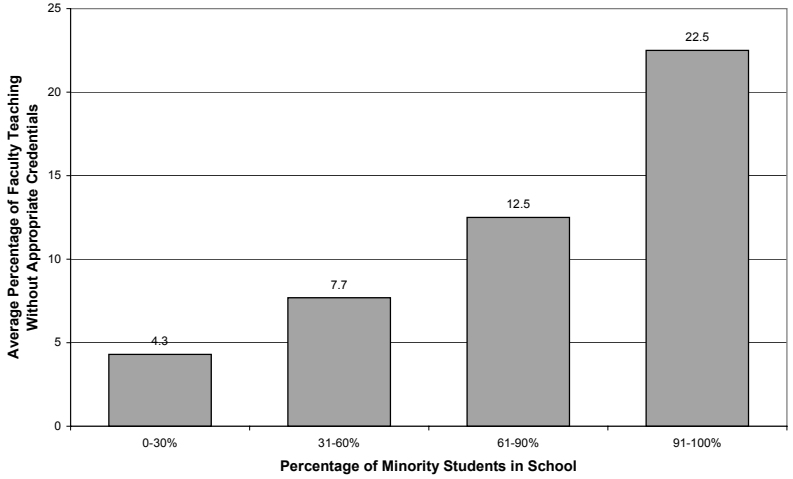
Figure 12
Distribution of Underqualified Teachers
by Student Poverty Level



Source: CBEDS, 1999; SRI Analysis

The distribution of underqualified teachers looks similar when schools are broken out by the percentage of ethnic minorities in their student population. (This reflects a .74 correlation between the percentage of minority students and the percentage of students receiving free or reduced-cost lunch.) Here, however, the distribution is even slightly more skewed. Figure 13 shows that in schools with over 90 percent minority students, there are on average, 22.5 percent underqualified teachers on staff. This compares to only 4.3 percent underqualified teachers in schools with the fewest minority students. Again, fully one-third of California schools fall into the highest minority category.

Figure 13
Distribution of Underqualified Teachers by Percentage of Minority Students

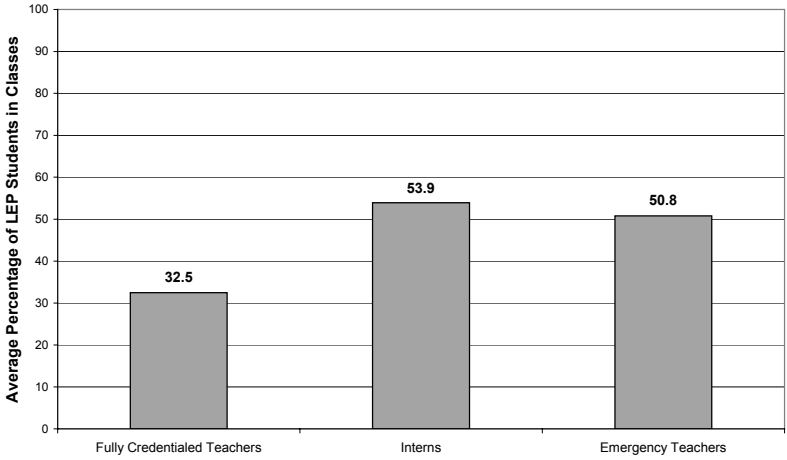


Source: CBEDS, 1999; SRI Analysis

Figures 12 and 13 rely on school-level data. Classroom-level data shows a similar pattern of juxtaposing those students most in need academically with those teachers who are least qualified. Figure 14 shows the percentage of Limited English Proficient (LEP) students in the classrooms of underqualified teachers. Emergency permit holders report an average of 50.8 percent LEP students in the classes they teach, compared to 32.5 percent LEP students in the classes of fully credentialed teachers.*

* Overall, teachers reported having 35 percent LEP students in the classes they teach. This is consistent with the statewide percentage of LEP and Fully English Proficient (FEP) students, combined. It is likely that teachers did not distinguish between students classified as LEP or FEP but instead reported on the percentage of students in their classes whom they knew to be speakers of English as a second language.

Figure 14
Percentage of LEP Students by Teacher Credential Status



Source: SRI Statewide Survey of California Public School Teachers, 1998–1999

Special Education Shortages

The area of special education has experienced significant teacher shortages in recent years. In 1996 more than 3,600 special education emergency permits were issued to new teachers—leaving 30 percent of special education staff without proper credentials.[34] The CCTC reports a 42 percent increase in special education waivers, from 1,551 in 1995 to 2,207 in 1996.

In 1997 the CCTC adopted regulations that changed the requirements for special education credentials, in part as a response to the shortage of special education teachers. The new requirements, which teacher preparation programs are currently phasing in, provide more flexibility for special education teachers coming from out of state. They also eliminate the requirement that special education teachers first earn a multiple- or single-subject credential before earning a special education credential. Instead, general education and

special education course work are now integrated into a single credential program. The changes also allow for more flexibility in assigning teachers to teach students with different types of disabilities in a range of instructional settings (e.g., special day classes, special schools, resource rooms).

Subject Area Shortages

Traditionally, mathematics and science have been recognized as subject areas lacking sufficient numbers of teachers. Math and science are the subjects with the largest numbers of holders of single-subject emergency permits. In 1996–1997, 1,716 (24 percent) of all single-subject emergency permits issued were in the area of science and 1,381 (19 percent) were in mathematics. Disaggregated data indicate that almost all counties in the state request science and math emergency permits.[35] The CCTC reports that in 1994–1995 there was a demand for 4,559 secondary math teachers and a supply of only 765 qualified teachers for those positions—leaving a shortage of 3,794 qualified secondary math teachers in the state.[36]

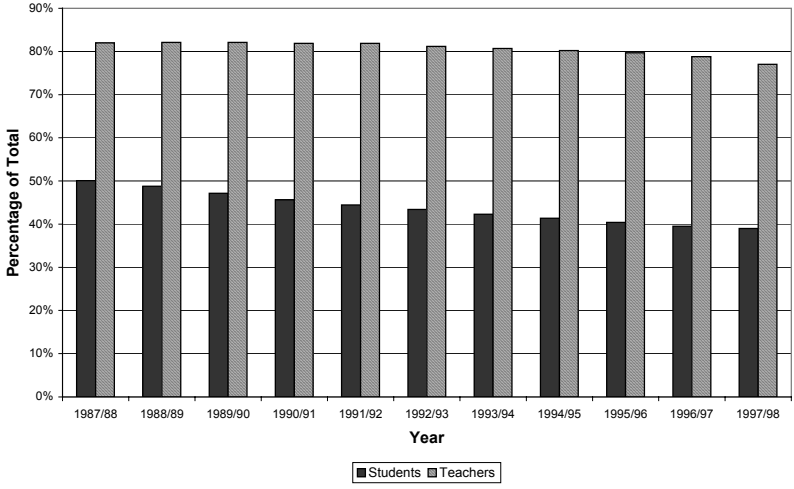
Many districts also experience difficulty in recruiting secondary teachers of English, social studies, and physical education—subjects that are not typically recognized as shortage areas. In 1996–1997, 1,249 (17 percent) of all single-subject emergency permits issued were in the area of English, 1,033 (14 percent) were in social science, and 582 (8 percent) were in physical education.[37]

Mismatch Between the Demographics of Teachers and Students

As Figure 15 illustrates, the diversity of the state's teacher work force has not kept pace with that of the student population. In the past decade, the majority of students in the

state shifted from being white (50 percent in 1987–1988) to nonwhite (only 39 percent of students were white in 1997–1998). Whereas the demographics of students changed dramatically, the profile of teachers remained fairly constant during this same period—the percentage of white teachers decreased only 5 percentage points, from 82 percent in 1987–1988 to 77 percent in 1996–1997.

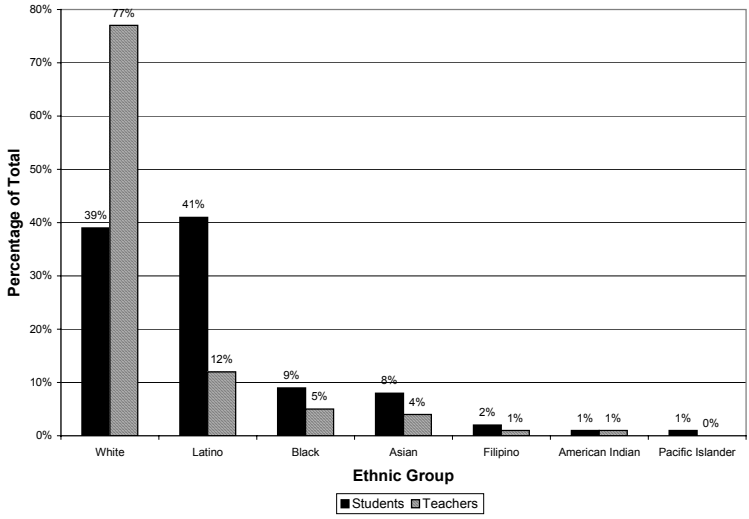
Figure 15
Percentage of White Students and Teachers
1987/88–1997/98



Source: CDE (1998)[38]

Thus, the current teacher work force clearly does not reflect the diversity of students throughout California. Although 61 percent of students statewide were ethnic minorities in 1997–1998, only 22 percent of teachers were from those same groups. As Figure 16 illustrates, the greatest discrepancy is between the percentage of Latino students and teachers—41 percent of students compared to only 12 percent of all teachers in the state were Latino.

Figure 16
California Student and Teacher Ethnicity
1997–1998



Source: CDE (1998)[39]

The first priority of teacher recruitment and preparation efforts is to prepare competent and caring teachers for all California students. All teachers must develop the skills to understand each student's cultural background and use instructional and language development strategies that build on that background. This argument is the basis for the Cross-cultural, Language and Academic Development Examinations (CLAD®) and Bilingual Crosscultural, Language and Academic Development Examinations (BCLAD®) credentials. Teachers of any ethnicity can be effective under certain conditions: with pedagogical and subject matter competency, a caring attitude, and a capacity and willingness to become familiar with students' previous knowledge, background, and experiences that have been conditioned by culture. All teachers must use this knowledge to recognize and identify the school-relevant capacities that students come with; teaching well means building in these capacities.

Indeed, by ensuring that currently available teachers are teaching effectively and California's diverse students are learning and performing at full capacity, we can enable the current student body to have the opportunity to become effective future teachers and eventually diversify the teaching force.

Still, other factors being equal, a cultural and linguistic match between students and their teachers can facilitate teaching and learning because of the shared understandings and interpretations of the world that might be garnered from participation in common experiences based on culture. In addition, such teachers serve as important role models for students.

Section V: Summary and Key Issues

These findings of our analysis of the supply and demand for teachers in California is hardly surprising. We began the decade of the 1990s with a shortage of fully credentialed teachers. Class size reduction, for all its apparent benefits and its popularity, exacerbated the problem severely. We currently have approximately 29,000 teachers on emergency credentials in the state—meaning that more than one in every ten classrooms in the state is staffed by a teacher without proper credentials.

It is important to note that not every emergency credentialed teacher is a "bad" teacher. In fact, many of these teachers possess strong qualifications; they may be professionals from other occupations with strong content knowledge who have chosen to enter teaching or former instructional assistants who have a deep understanding of classroom instruction and their students' cultural and linguistic backgrounds. Many of these individuals are enrolled in formal internship programs to complete the necessary requirements for their proper

credentials. State policy explicitly encourages such alternative routes into the profession. However, such individuals only comprise a fraction of the emergency credentialed teachers. In many districts, especially those with high numbers of poor and minority students, far too many classrooms are staffed by teachers without sufficient training to provide students a quality educational experience. It is most troubling that these problems are most severe in the very schools where student needs are the greatest.

Recent state legislation has been passed to address this problem. An aggressive teacher recruitment campaign is underway, efforts are being made to reduce the barriers for out-of-state credentialed teachers to get California credentials, alternative routes are being expanded, and teacher preparation programs are being streamlined. Most promising in the near term are efforts to expand the capacity of the California State University system to prepare more teachers and the expansion of the Beginning Teacher Support and Assessment program. We have projected the impact of the latter two programs—the other efforts lack sufficient historical data to estimate their impacts—and have found that even under the most optimistic projections, California will continue to experience a shortage of qualified teachers into the foreseeable future. Our best-case scenario finds the state in 2007 with about as many emergency credentialed teachers as it had at the beginning of the 1990s. Looking ahead, it will be important to monitor the effects of the untested legislation passed in 1998, as well as to understand and address the projected retirement "bulge."

These findings underscore the challenges policymakers and practitioners face in tackling the difficult issues of preparing and recruiting a larger and more diverse teacher work force and encouraging it to work where teachers are most needed. It is not simply a matter of producing or recruiting the requisite number of new teachers but also of maintaining the

quality of the work force and ensuring that qualified candidates find their way to districts and schools with openings.

Our work has uncovered the need for a more refined and coherent data system for use by policymakers. The preceding section, and gaps of information therein, underscores the need for a stronger data system in the state to track the health of the teacher development system. To inform policymaking on teacher development—particularly the preparation and recruitment of teachers—policymakers require access to timely, reliable data. Currently, there is not a system in place that provides consistent, easy-to-access data on many key drivers of the size of the teacher work force in California. For example, given the multitude of credentials offered and the many ways of breaking down data based on the various categories, it is difficult to obtain consistent data on the number of newly credentialed teachers coming out of the various preparation and internship programs *across time*.[40] Also, there has been no analysis of the impact of the potential retirement rate increase as teachers currently between the ages of 45 to 59 years approach the average retirement age of 60.

In addition to the subtle problems with existing data, there is also a lack of information on many important facets of teaching. For example, it is widely accepted that statewide data and averages fail to capture the variation and diversity of conditions within and between California regions and districts. Unfortunately, few available data sources accurately portray the local-level differences in urban, rural, and suburban districts—for example, with regard to work conditions or the background and preparation of teachers. Similarly, there is a dearth of information on the match or mismatch between the number of teachers prepared or produced in a district or geographic area and the number of teachers demanded in that same area.

Notes

1 U.S. Department of Education. (1999). The national results of the NAEP 1998 reading. See National Center on Educational Statistics. Washington, D.C.: Author.

2 Recruiting New Teachers, Inc. (1999). The essential profession. Belmont, MA: Author.

3 Ferguson, R. (1998). Can schools narrow the Black-White test score gap? In C. Jencks & M. Philips (Eds.), The Black-White test score gap. Washington, D.C.: The Brookings Institute.

4 Shields, P. M., Marsh, J. A., & Powell, J. (1998). An inventory of the status of teacher development in California. Menlo Park, CA: SRI International.

5 California Department of Education (CDE); Educational Demographics Unit; Research, Evaluation and Technology Division. (1997, August). Number, percent, and average salary of new teachers in California public schools: 1981–82 through 1996–97 (One year of total educational service). Sacramento, CA: Author.

6 Fetler, M. (1997, January). Where have all the teachers gone? Education policy analysis archives, 5(2). And CDE (1997, August).

7 National Commission on Teaching & America's Future. (1996, September). What matters most: Teaching for America's future. New York, NY: Author.

8 CDE. (1997, October). Teacher demand: Estimated number of teacher hirees in California public school districts, 1998–99. CBEDS data computer printout. Sacramento, CA: Author.

9 CDE; Educational Demographics Unit. (1998, April). Teacher shortage and demand: School year 1997–98. Sacramento, CA: Author.

10 CDE. (1997). Public school summary statistics, 1996–97. Sacramento, CA. State of California, Department of Finance. (1998, December). California public K–12 projections by county, 1998 series. Sacramento, CA: Author.

11 Legislative Analyst's Office (LAO). (1997, February 12). Policy brief: Class size reduction. Sacramento, CA: Author.

12 SB 1422 Advisory Panel on Teacher Education, Induction and Certification for Twenty-First Century Schools. (1997, November). California's future: Highly qualified teachers for all students. Sacramento, CA: Author.

13 LAO (1997, February 12).

14 Cohen, D. K., & Das, H. (1996, July). The need for teachers in California (Working paper series, Policy Analysis for California Education). Berkeley, CA: University of California at Berkeley, and Fetler. (1997, January).

15 CSU Institute for Education Reform. (1996, September). A state of emergency . . . in a state of emergency teachers. Sacramento, CA: Author. The SB 1422 Advisory Panel reported that 30 percent to 50 percent of teachers leave within the first three years.

16 Cohen & Das (1996, July); Fetler (1997, January).

17 Fetler (1997, January).

18 CDE (1997); CSTRS (1998).

19 Cohen & Das (1996, July); Fetler (1997, January).

20 Tierney, D. (1994). A study of the employment patterns of graduates of California teacher education programs and the employment decisions of a selected sample of California school districts. Sacramento, CA: California Commission on Teacher Credentialing, Professional Services Division.

21 Darling-Hammond, L. (1997, November). Doing what matters most: Investing in quality teaching. New York, NY: National Commission on Teaching & America's Future.

22 Fetler (1997).

23 CCTC memo (1999, January 20).

24 CCTC, CDE. (1992). Success for beginning teachers: The California new teacher project.

25 CCTC (1998, November). Numbers of multiple- and single-subject teaching credentials issued by CCTC on recommendation of California IHEs with CCTC-approved programs.

26 CCTC memo (1999, January 20).

27 CCTC (1999).

28 CCTC (1998). Six-year report on emergency permits.

29 The requirements for waivers are at a level below those required for the emergency permit. Districts are entitled to request credential waivers when they are unable to fill a position with an appropriately credentialed teacher, an intern, an emergency credentialed teacher, or a teacher who may be assigned to an area not authorized by his/her credential. The goal of the waiver process, according to the CCTC, is to transition individuals from waivers to emergency permits and ultimately to full credentials. One of the most common Education Code regulations waived is the CBEST requirement.

30 CCTC (1997, August 5).

31 CCTC (1997, August 5).

32 CCTC (1998, May). 1996–97 Annual report: Emergency permits and credential waivers. Sacramento, CA: Author.

33 CCTC (1998, May).

34 California Statewide Task Force on Teacher Recruitment (1997, March).

35 CCTC (1998, May).

36 CCTC (1997, October). Recruitment and preparation of teachers for mathematics instruction: Issues of quality and quantity in California. Sacramento, CA: Author. The CCTC defines "fully qualified" as teachers with valid secondary math credentials. "Underprepared" or "not fully qualified" teachers include individuals with out-of-credential assignments, emergency permits, waivers, and misassignments.

37 CCTC (1998, May).

38 CDE (1998).

39 Student data come from the CDE Web page, CBEDS databases (data collected October of each year). Teacher data come from CDE; Educational Demographics Unit; Research, Evaluation and Technology Division. (1998, March). Number of teachers in California schools by ethnic group, October 1981 through October 1996. Sacramento, CA. Public School Summary Statistics, 1997–1998. Because of budget cuts, CDE did not collect data on certificated staff in 1991–1992. We have used the data from 1990–1991 to estimate the ethnicity of teachers for this year.

40 Some reports of annual credentials issued include new and first-time credentials along with renewals, making it impossible to identify the number of new teachers available to teach (as opposed to new pieces of paper issued). Similarly, some reports include interns in the count of credentials issued by IHEs, while others disaggregate the candidates coming out of traditional preparation programs from the alternative programs. Also, some reports may include special education credentials with counts of single- and multiple-subject credentials, while others disaggregate the various credential types. The issue of data consistency is further complicated by the fact that separate state agencies and individuals within them are collecting the various data.