TECHNICAL REPORT

CSR Research Consortium

a partnership researching California's class size reduction reform

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Class Size Reduction in California:

Findings from 1999–00 and 2000–01

Co-Editors
Brian M. Stecher
George W. Bohrnstedt

FEBRUARY 2002

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While the co-principal investigators and the authors take full responsibility for the content of this report, invaluable advice on the design of the study as well as comments on an earlier draft of this report were provided by members of the Consortium's Advisory Group. The Advisory Group members are listed on the inside back cover.

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EXECUTIVE SUMMARY

Brian M. Stecher and George W. Bohrnstedt

This third report on our ongoing evaluation of California's Class Size Reduction (CSR) program brings us up through the 2000–01 school year. We update our previous findings on the implementation of the CSR program in grades K–3 and on how the program has affected the qualifications of teachers, curriculum and instruction, student achievement, and special populations. In most cases, this report adds two years of data to the findings contained in our second CSR evaluation report (Stecher and Bohrnstedt, 2000). It also provides updated information on how districts and schools have allocated resources in support of CSR, a topic last discussed in our first CSR evaluation report (Bohrnstedt and Stecher, 1999). Our next report, which will be the fourth and final in the series, will be issued in June 2002. It will synthesize all the results of our evaluation, paying particular attention to policy questions related to CSR.

What we found in the third year of our evaluation is that CSR had been essentially fully implemented in grades K–3 by 2000–01, and that there were no longer differences in school/district participation in the program related to student demographic characteristics. For the most part, resources (including facilities and funds) continue to be reallocated away from other programs to support the implementation of CSR, and in most districts, the cost of CSR still exceeded the reimbursement received from the state.

The decline in teacher qualifications that occurred in the program's early years has slowed or stopped. In 2000–01, approximately 85 percent of K–3 teachers were fully credentialed. Similarly, the difference in teacher qualifications between schools serving the most and those serving the fewest low-income students[1] leveled off after having grown dramatically during the program's first three years. But the gap in teacher credentialing in low- versus high-income schools persisted. In 2000–01, about 96 percent of K–3 teachers in schools serving the fewest low-income students were fully credentialed, whereas the corresponding figure in schools serving the most low-income students was 79 percent.

Statewide, the average achievement scores of students in all elementary grades have increased annually since the Standardized Testing and Reporting (STAR) testing program began in 1997–98. However, the statewide pattern of score increase in the elementary grades does not match the statewide pattern of exposure to CSR, so no strong relationship can be inferred between achievement and CSR. In addition, California was implementing a number of

[1] Students are referred to as low-income or as being from low-income families in this report if state records classify them as receiving public assistance in the form of Aid to Families with Dependent children (AFDC) or its successor in California, CalWORKS.

significant new programs at the same time CSR was being implemented, and it is impossible to attribute changes in achievement scores to any single cause. It also is difficult to say how much of the gain in achievement test scores is real and how much reflects inflation in scores brought about by teachers learning to "teach to" a new test. This kind of inflation is often observed with the introduction of new high stakes test such as the STAR test adopted in California in 1996–97. Finally, CSR does not appear to have affected the rates at which students are identified as needing special education, or the percentage of special education students who are taught in special day classes.

Background

In 1996, the California legislature passed SB 1777, a reform measure aimed at cutting class size in the early school grades from what had been an average of 29 students to a maximum of 20.[2] The program is voluntary; school districts that chose to participate in 2000–01 received about $850 for each K–3 student enrolled in a class of 20 or fewer students. (The per capita amount has risen annually since the program's inception.) The CSR program was inspired by an experiment conducted in Tennessee from 1985 to 1990 known as the Tennessee STAR (Student/Teacher Achievement Ratio) project. This experimental program produced relatively large achievement gains for all students, and the gains for low-income and minority students were almost twice as large as the gains for other students.

However, there are substantial differences between Tennessee's and California's situations. The Tennessee program was a carefully controlled experiment (with random assignment of both teachers and students to small or regular size classes) involving about 10,000 students; the California program has been implemented statewide and serves 1.8 million students. California reduced its maximum class size of 33 students to 20; Tennessee took its class size of 22–26 students down to 13–17. California serves a student population that is decidedly more ethnically and linguistically diverse than Tennessee's. And, California schools lack two important ingredients that Tennessee schools had—adequate space and enough qualified teachers for program implementation. Because of these differences, California's CSR program must be judged on its own terms rather than as a replication of the Tennessee experiment.

In 1997–98, the state of California selected a consortium of organizations—American Institutes for Research (AIR), RAND, Policy Analysis for California Education (PACE), WestEd, and EdSource—to conduct a four-year evaluation of the CSR program. The Consortium released its first report in June 1999; it covered the initial two years of the CSR program. A second report, covering the 1998–99 school year, was issued in June 2000. This third report presents findings for the 1999–00 and 2000–01 school years.

[2] SB 1777 required that a school first reduce the size of its grade 1 classes, then its grade 2 classes. Once its grade 2 classes were reduced, the school could choose to reduce its kindergarten or grade 3 classes.

Procedures

Our evaluation drew upon three major sources of data. In the spring 2000, the Consortium sent surveys to a representative sample of district superintendents, school principals, and classroom teachers in grades 1 through 4. The surveys contained questions about the themes of this evaluation: implementation, resource usage, district and school administration, classroom practices (including curriculum, instruction, and student behavior), and attitudes toward CSR. In addition to this survey data, we used results from California's Standardized Testing and Reporting (STAR) program, the California Basic Educational Data System (CBEDS), and Personnel Assignment Information Form (PAIF).[3] The STAR data consisted of Stanford Achievement Test, 9th Edition (SAT-9) test scores along with student background information. The PAIF data included teachers' assignments and information about their educational background and teaching experience. Finally, we obtained state archival data on CSR implementation, expenditures, special education students, and other relevant information.

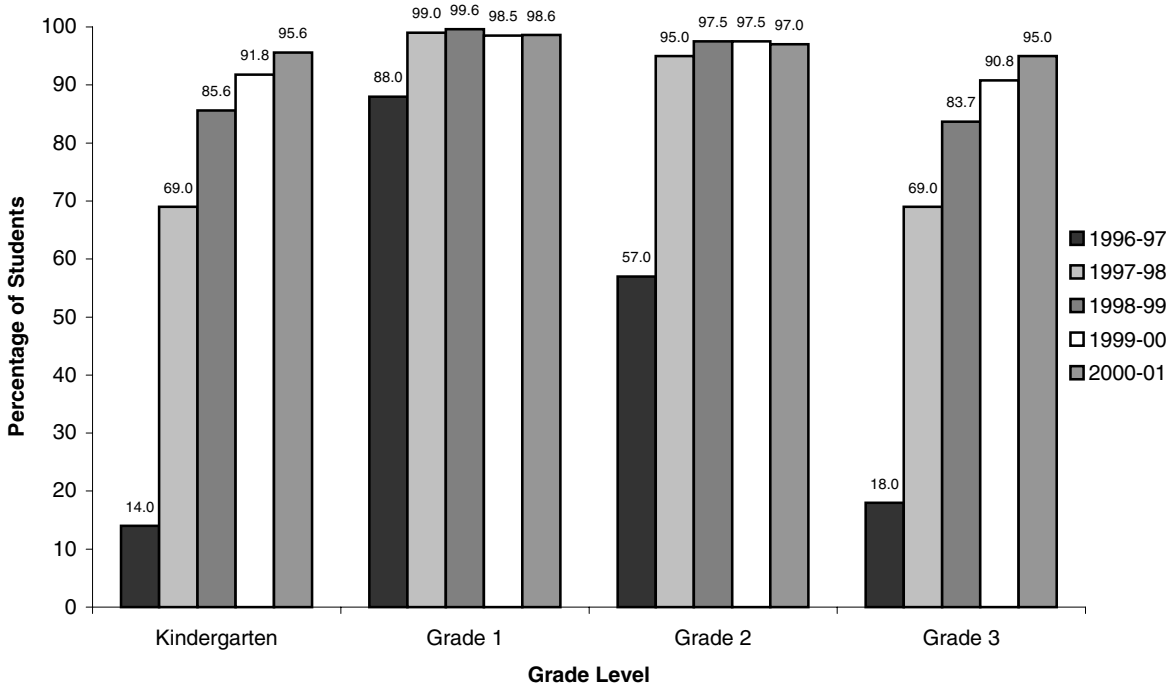
Results

CSR Implementation Is Essentially Complete

California's CSR reform effort had attained almost full implementation by the 2000–01 school year, the program's fifth year. As Figure 1 shows, at that time 97 percent of the state's K–3 students were enrolled in classes of 20 or fewer, and 99 percent of all eligible districts were participating in the program.

[3] Neither the student nor the teacher files contained individual names or direct identifiers.

Figure 1–
Percentage of Students in Reduced Size Classes, by Grade Level and Year



Also, for the first time since the program's inception in 1996, implementation rates varied little by grade level or student demographic characteristics. The gap in CSR implementation between districts and schools with low versus high percentages of low-income, minority,[4] or English learner (EL)[5] students that had persisted for the first years of CSR had been all but eliminated.

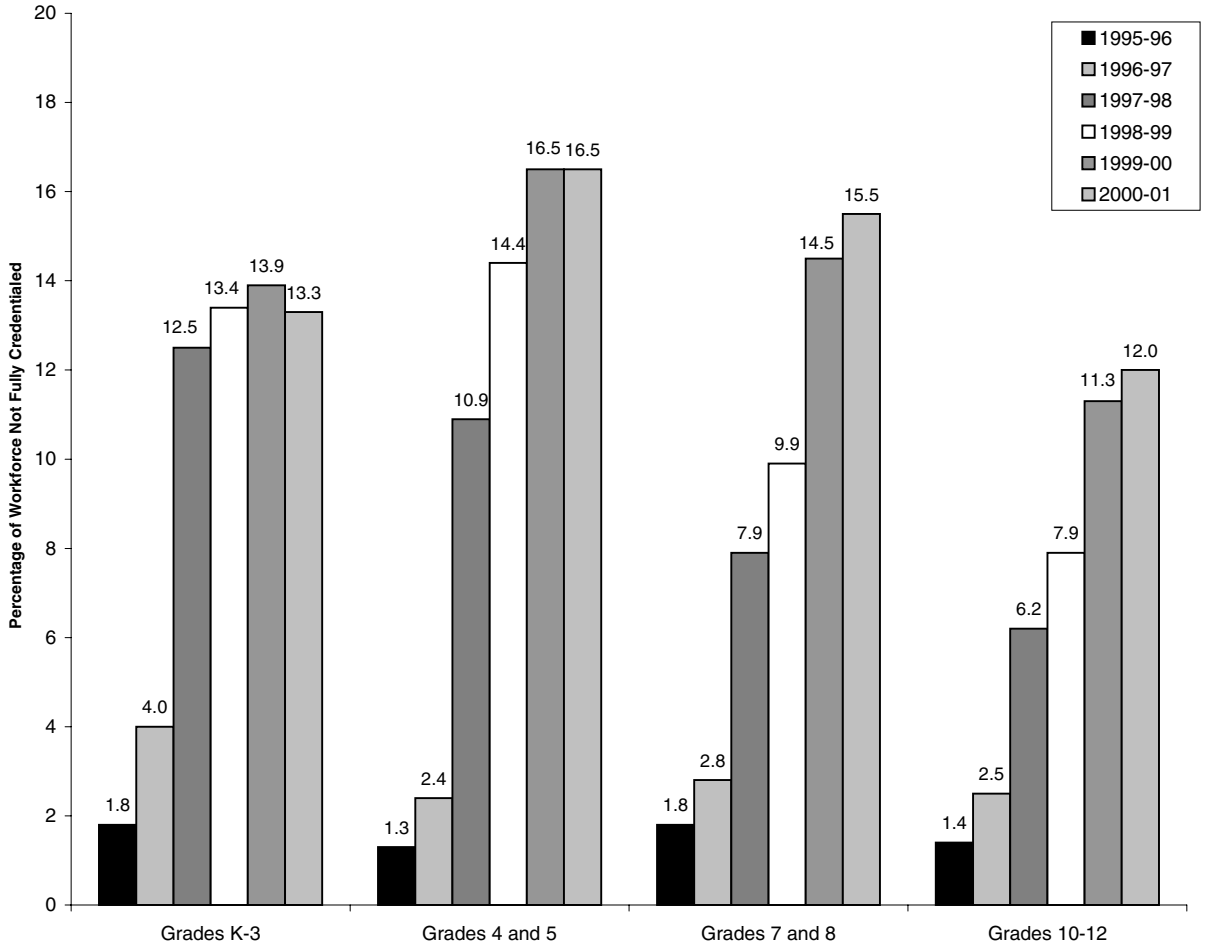
The Decline in Elementary Teacher Qualifications Has Leveled Off But Remains Substantial

The rapid growth in the K–3 teacher workforce documented in our earlier CSR evaluation reports leveled off by 2000–01, and, for the most part, so did the decline in teacher qualifications (see Figure 2). The percentage of elementary school teachers without full credentials increased rapidly from 1995–96 through 1998–99, but stayed the same or declined slightly in 2000–01. In comparison, the increase in the percentage of secondary school teachers without full credentials during this period was slower and continued through 2000–01. As a result, the problem of under-qualified teachers is almost as great in middle schools as it is in elementary schools, and CSR does not affect the middle school grades.

[4] Minority students are any students not classified as Caucasian. The largest groups of minority students are, in order of group size, Hispanics, Asian/Pacific Islanders, and African Americans.

[5] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

Figure 2–
Percentage of Teachers Without Full Credentials, 1995–96 to 2000–01



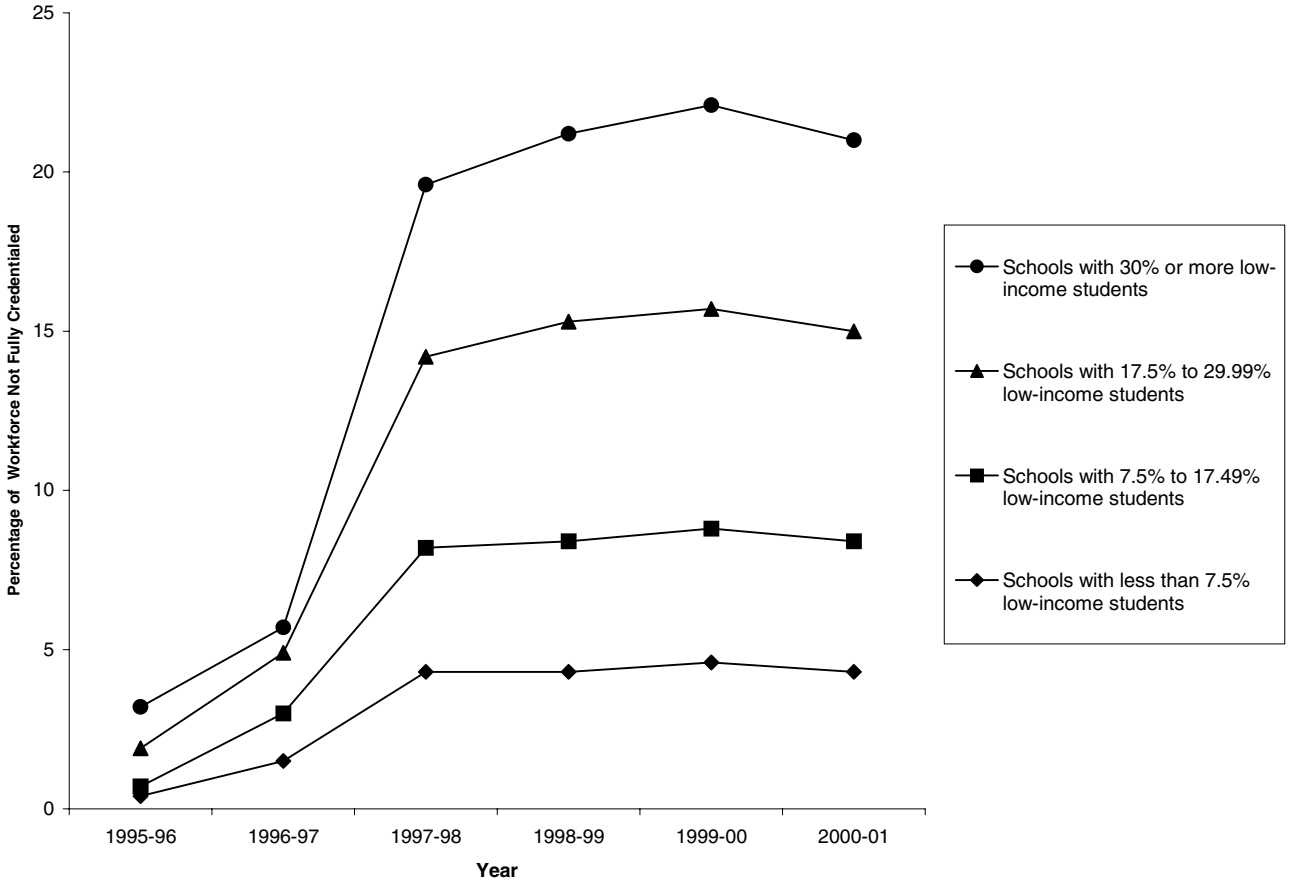
Source: CBEDS-PAIF.

The Gap in K–3 Teacher Qualifications Persists, But Did Not Worsen

In 2000–01, the difference in teacher qualifications between elementary schools that served larger proportions of low-income, minority, or EL students and those that served smaller proportions of low-income, minority, or EL students declined for the first time since 1996–97 when CSR began implementing (see Figure 3). Between 1995–96 and 1997–98, elementary schools that served larger proportions of low-income, minority, or EL students had relatively larger increases in the proportion of K–3 teachers who were not fully credentialed than schools serving smaller proportions of low-income students. The gaps in

K–3 teacher qualifications between schools that served different population groups then grew much more slowly between 1997–98 and 1999–00. In 1999–00 and 2000–01, the overall qualifications of California's elementary teachers began to improve slightly, and the gaps in teacher qualifications between schools began to decline slightly but remained strikingly large.

Figure 3–
Percentage of K–3 Teachers Not Fully Credentialed in Schools with Different Proportions of Low-Income Students

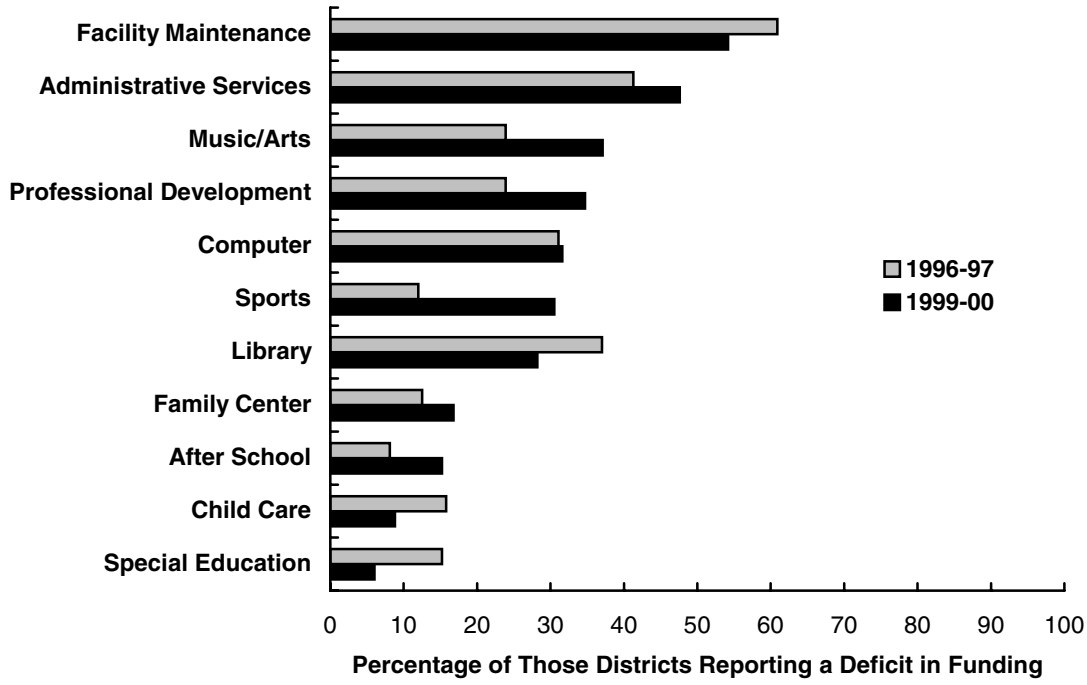


Note: The numbers for this table can be found in Appendix B (See Table B.16).
See Tables B.40, B.54, and B.60 for grades 4–5, 7 and 8, and 10–12.
Source: CBEDS-PAIF.

Districts and Schools Continued to Reallocate Resources to Support CSR

Resource limitations continue to be a concern for districts as they implement CSR. In fact, one district in southern California recently decided to eliminate CSR in third grade as part of a larger effort to balance its budget for the 2002–03 school year. Almost two-thirds of districts reported that the state reimbursement for CSR is insufficient to cover actual district costs. Overall, the CSR program has required that districts and schools reallocate funds and space away from a variety of support and educational programs, and this reallocation has not lessened over time (see Figure 4). Some of the programs affected are arguably relatively low priority for principals, superintendents, and parents- programs such as administration, music/arts, gym, and sports. However, higher-priority programs, such as professional development, computer labs, libraries, and after school programs, have also been impacted. It remains to be seen how this reallocation of resources may affect students' overall education and performance over the long term. Additional information about district budget constraints and intentions regarding CSR will be available in our fourth year evaluation report.

Figure 4–
Programs Reduced by Districts to Compensate for Insufficient CSR Reimbursement



Source: 1998 and 2000 CSR surveys of superintendents.

Students in Reduced Size Classes Received More Individual Instruction But Not Different Curriculum or Learning Activities

In all three CSR surveys (1998, 1999, 2000), teachers in reduced size classes reported that they devoted more instructional time to small groups and working with individuals during mathematics and language arts lessons than did teachers in non-reduced size classes. In addition, teachers in smaller classes also provided comparatively more extended attention to poor readers (see Table 1), and they were more positive about their ability to assess and meet student needs and to provide students with quick feedback and individual attention. Reduced class size was related to better-disciplined students on some but not all measures, and in some but not all years.

Table 1–
Frequency of Individual Instruction for Readers Needing Extra Help (average number of times per week), Grades 3 and 4

	1998		1999			2000		
	Third Grade		Third Grade			Third Grade		
Provider	Reduced	Non-reduced	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Teacher	3.0**	2.5	2.9** ++	2.2♥	1.8	2.9** ++	2.1	1.9
Aide or volunteer	2.3	2.2	2.2**	1.8	1.8	2.3+	2.5♥♥	1.5
Specialist	2.2	2.0	2.0*	1.5*	1.7	2.0	1.9	2.0

Note: Scale converted from fixed categories to times per week.
* denotes significant differences between third-grade reduced and third-grade non-reduced classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced classes at the .01 level.
+ denotes significant differences between third-grade reduced and fourth-grade classes at the .05 level.
+ + denotes significant differences between third-grade reduced and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced and fourth-grade classes at the .05 level.
♥♥ denotes significant differences between third-grade non-reduced and fourth-grade classes at the .01 level.
Source: 1998, 1999, and 2000 CSR teacher surveys.

However, teachers reported few differences in curriculum regardless of class size. Whether they were teachers in a reduced or a non-reduced class, they covered about the same number of mathematics and language arts topics and devoted about the same amount of time to each major curriculum element in 1998, 1999, and 2000. We also found that there were few differences between reduced and non-reduced classes in terms of language arts or mathematics learning activities.

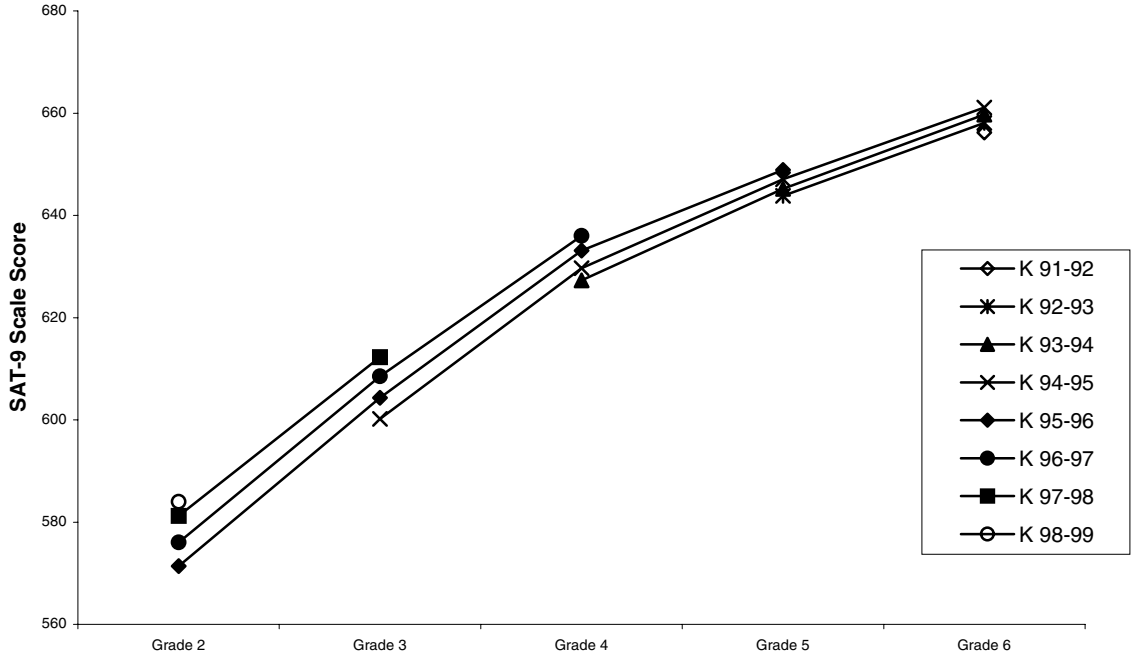
Achievement Scores Improved But Effect of CSR Remains Uncertain

Because CSR was almost fully implemented by 2000–01, we could not analyze achievement differences between students in reduced and non-reduced size classes as we had in the past. Furthermore, at the time this report was written the only achievement data available for 2000–01 were statewide average scores by grade level. As a result, our analysis was limited to comparisons of achievement among statewide cohorts of students with different average amounts of exposure to CSR. We compared cohorts that entered kindergarten from 1991 to 1998 to see whether patterns of achievement were related to patterns of exposure.

For each cohort we examined, the average SA

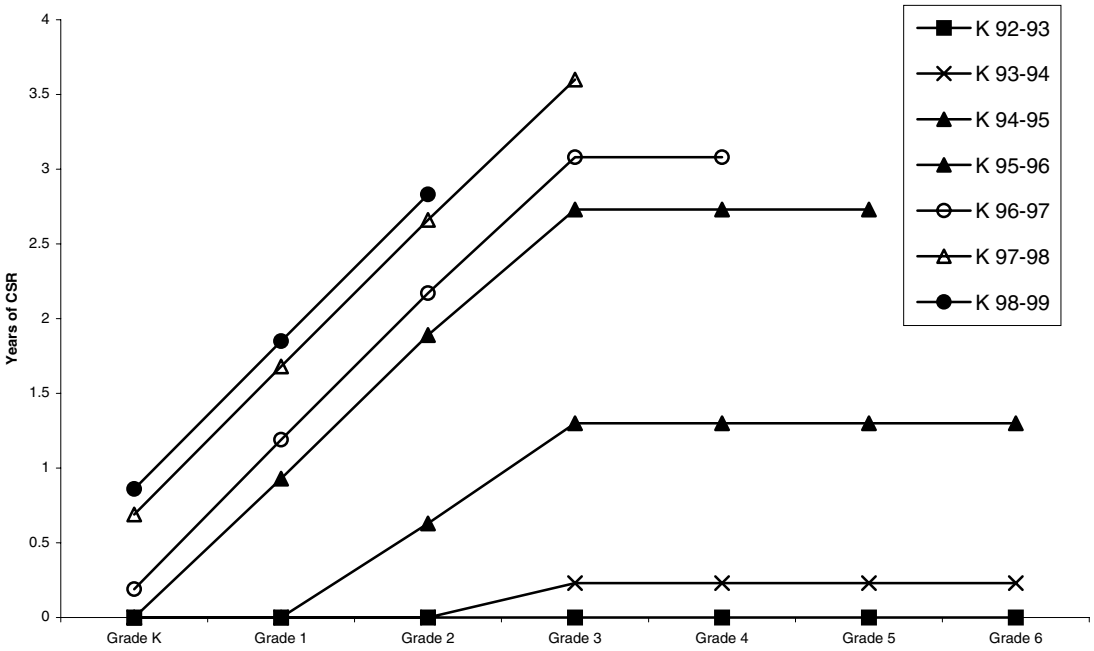
T-9 scale score increased annually (see Figure 5). More importantly, the average score of each succeeding cohort was higher than that of the previous cohort at a given level. Thus, achievement has been increasing during CSR's implementation.

Figure 5—
Average SAT-9 Reading Scores for California Students, by Cohort and Grade



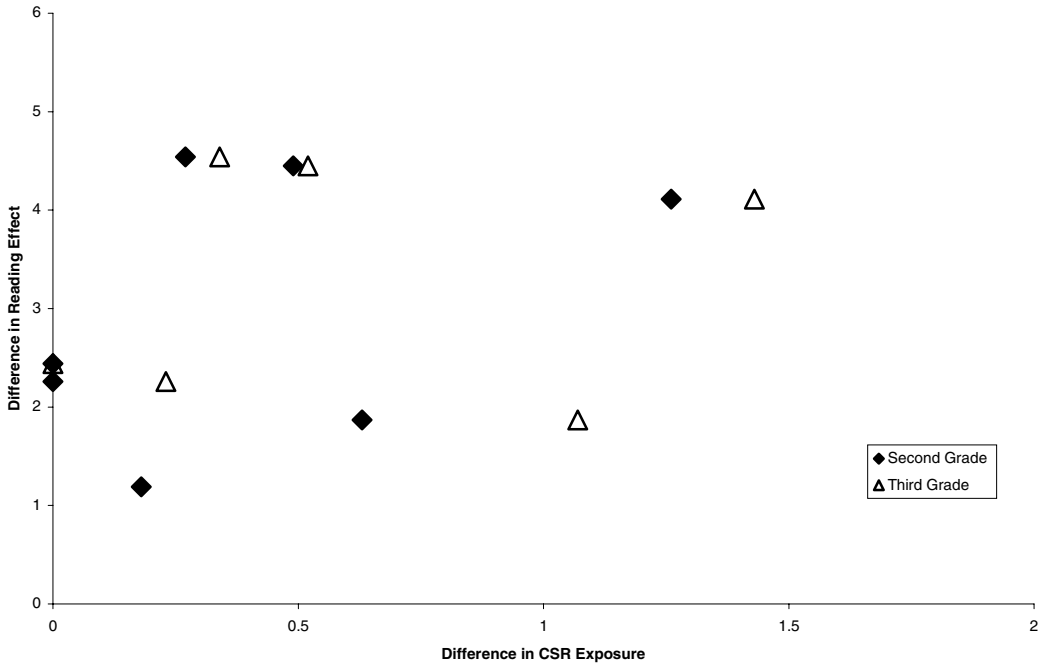
CSR began in 1996–97 with first grade (and other grades in a few cases). In subsequent years, additional grades were added. Successive cohorts of students received more exposure to CSR at each grade level, on average, than did previous cohorts (see Figure 6).

Figure 6–
Average Cumulative Years of Exposure to CSR, by Grade by Cohort



To determine whether there was a relationship between CSR exposure and achievement, we compared differences in achievement and differences in CSR exposure between each successive cohort of students in second grade and third grade (see Figure 7). If there were a positive relationship between CSR and achievement, the points on the graph would be clustered in what would look like a line sloping upward from left to right. We would see some points with a small difference in achievement and a small difference in exposure to CSR, and others with a large difference in achievement and a large difference in CSR exposure. However, we did not find such a pattern. There was no strong association between differences in exposure and differences in achievement effects during this period.

Figure 7–
Differences in Reading Effects Versus Differences in CSR Exposure



CSR Has Had Little Effect on Students from Special Populations

The statewide data continued to show that CSR has had little impact on participation in special education. There has been no CSR-related change in the percentage of K–3 students identified as needing special education services since CSR was introduced. Furthermore, there has been no CSR-related change in the percentage of K–3 students in special education who are placed in special day classes. The CSR program put additional pressure on services for special education students, as we noted in our previous evaluation reports. Many schools reallocated special education facilities, and many teachers switched from teaching special education students to teaching in regular K–3 classes.

Similarly, there was little evidence that CSR had a specific effect on EL students. Schools with the largest proportion of EL students had the largest number of teachers specifically credentialed to work with EL students. However, we found that the distribution of such teachers per 100 EL students actually favored schools with fewer EL students.

Conclusion

This interim report should be read as an update on the CSR program for the 1999–00 and 2000–01 school years. Some of the negative effects previously observed had moderated by 2000–01, but others remained. And important differences between schools serving different student population groups persisted. When we looked at student achievement statewide, we did not find a strong association between achievement and CSR participation.

In general, we did not attempt to draw summative conclusions about the overall effectiveness of the CSR program in this report, nor did we develop recommendations for policymakers. The fourth and final CSR evaluation report, which will be issued in June 2002, will synthesize the evidence we have collected over the past four years and will focus on the policy lessons that can be learned. It will also contain additional analyses exploring the relationship between teacher characteristics and student achievement gains in reduced size classes. See Appendix D for a list of topics to be covered in the final report.

CHAPTER I

Introduction

George W. Bohrnstedt, Jamie Shkolnik, and Brian Stecher

California's Class Size Reduction (CSR) program began in 1996 with the passage of SB 1777. This measure, designed to reduce class size in the early school grades from an average of 28 students to a maximum of 20, sparked one of the largest and costliest statewide education reforms in history. The voluntary program, which now offers participating districts approximately $850 for each kindergarten through third-grade student enrolled in a class of 20 or fewer, currently costs over $1.5 billion per year and affects almost 1.9 million students.

Educators and policymakers hold high expectations for the program, based in large part on the results of a class size reduction experiment conducted in Tennessee from 1985 to 1990 (Mosteller, 1995; Finn, 1998; Finn and Achilles, 1999). Known as the Tennessee STAR (Student/Teacher Achievement Ratio) project, this educational improvement effort produced relatively large achievement gains for all students, as measured by their scores on the Stanford Achievement Test (SAT-9). Gains in student performance were shown to persist in the long term, even after students had returned to non-reduced size classes (Nye, Hedges, and Konstantopoulos, 1999). Moreover, the gains for low-income[1] and minority students were almost twice as large as those for other students. (For a comprehensive review of the literature, see the first CSR evaluation report, Bohrnstedt and Stecher, 1999.)

Though the success of the Tennessee STAR project bolstered support for the California CSR program, the Tennessee experiment could not serve as a model for class size reduction in the completely unique context of California. Never before had a program to reduce class size been implemented on such a large scale. California also is a culturally diverse state, with a relatively high percentage of students for whom English is a second language. Teachers qualified to teach English learners (EL)[2] were already in short supply prior to the program's rapid implementation. The existing shortages of teachers and space in California school districts increased the challenge of implementing CSR quickly.

[1] Students are referred to as low-income or as being from low-income families if state records indicate that they receive public assistance in the form of Aid to Families with Dependent Children (AFDC) or its successor in California, CalWORKS.

[2] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

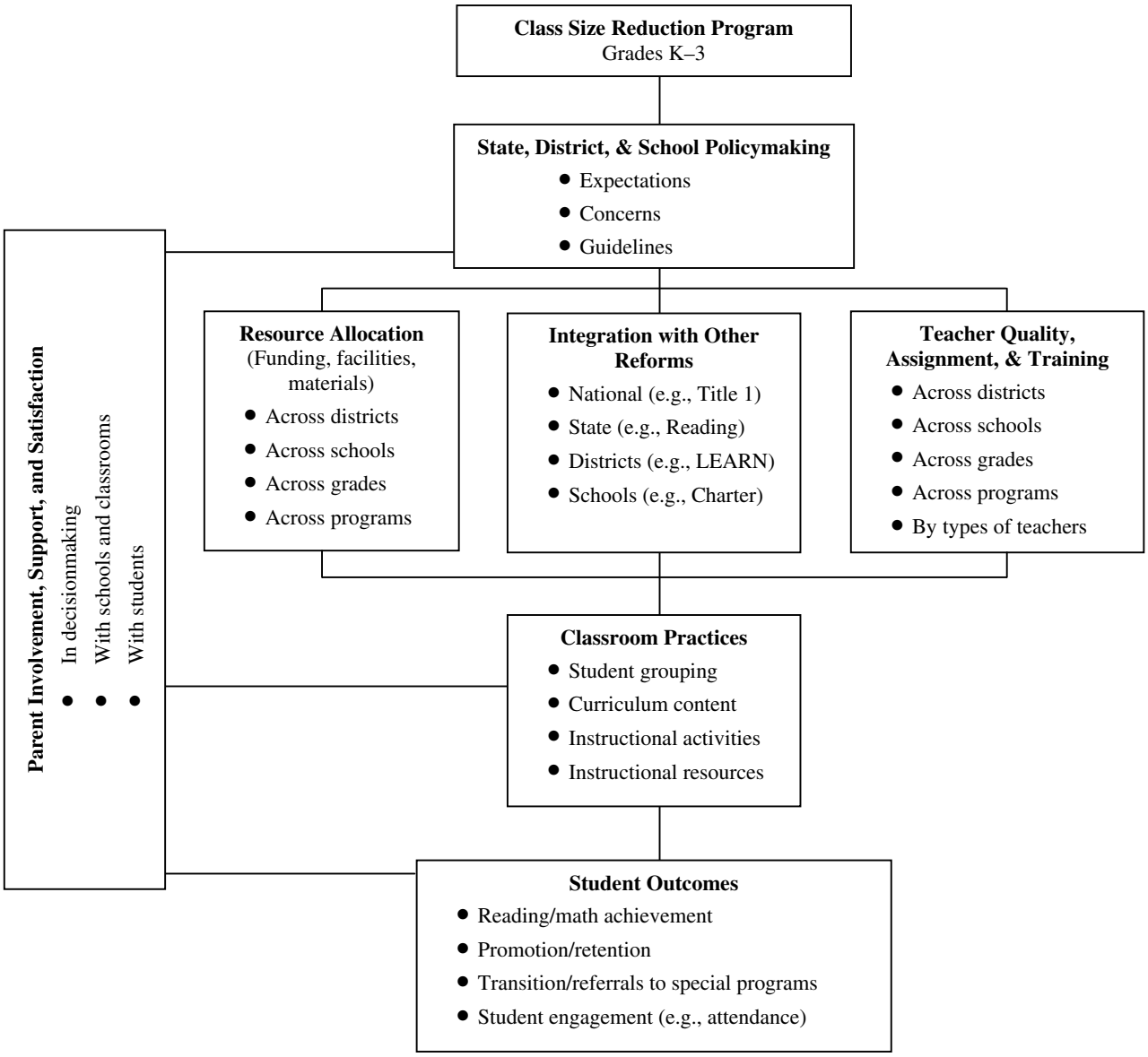
The CSR Research Consortium, a group of California research and policy organizations,[3] came together shortly after the passage of SB 1777, determined to gain expertise in all aspects of class size reduction, particularly in the application of California's CSR program. To that end, funds were obtained from several prominent California foundations to plan for an evaluation. From its earliest meetings, the Consortium agreed that its evaluation of California's CSR program needed to be *comprehensive*. The evaluation should not only consider the effect of reduced class size on student achievement, but should also examine the impact of the reform on all aspects of the educational system. The Consortium believed that some of the most important effects of CSR might not directly relate to student achievement. The state of California, in recognition of the Consortium's leadership in studying class size reduction in the state, commissioned it to develop a formal plan for evaluating California's CSR initiative. The plan developed by this group was approved and adopted by the State Board of Education in October 1997. In spring 1998, the American Institutes for Research (AIR) was awarded the contract to conduct the evaluation on the Consortium's behalf.

The Consortium felt that it was important to maintain the integrity of the plan it had developed to the greatest degree possible, so representatives of the Consortium approached foundations in search of funding for those parts of the plan not included in the state's contract. In addition, foundation funds were obtained for surveys of districts, schools, teachers, and parents.

Figure 1.1 shows the Consortium's conceptual model for investigating the impact of the CSR program. This model begins with questions about the role of policymaking in a school district's decisions about whether and when to implement CSR. It also includes the larger, state and district policies within which the CSR program is implemented. At both the district and the school level, CSR implementation is assumed to be influenced by other education reform efforts, as well as by the physical and human resources available. The CSR reform occurred when other educational reforms either were being put in place or already existed, so it was important to consider the extent to which CSR either complemented or competed with these other reform efforts. The complexity of the context in which CSR implementation has been taking place makes it difficult if not impossible to isolate CSR's effects on academic achievement. California's Proposition 227 (which California voters passed in 1998 and which for all intents and purposes bans bilingual education), the Public School Accountability Act, peer teacher evaluation, and the elimination of social promotion are just some of the more prominent reforms that must be considered.

[3] The CSR Research Consortium includes the American Institutes for Research (AIR), RAND Corporation, Policy Analysis for California Education (PACE), WestEd, and EdSource.

Figure 1.1–
The Impact of California's CSR Initiative



The model also captures the resources that were available in the districts as they planned CSR implementation. At this level, it is especially important to examine the effect on the overall quality of California's teaching corps, as well as which districts hired the least-educated, least-experienced, and least well-credentialed teachers.

Finally, the model focuses on whether being in a larger versus a smaller size class is related to student achievement. In the Tennessee STAR project, achievement effects were roughly twice as large for minority and low-income students as for other students. Given the many differences between the California and the Tennessee programs, would California realize the same benefits Tennessee did, especially for its minority and low-income students?

Format of the Year 3 CSR Evaluation Report

The findings of this third evaluation report, which are the results of analyzing the fourth and fifth years of the CSR program (1999–00 and 2000–01), are being released as an interim report. Our upcoming fourth and final CSR evaluation report will include several additional analyses that will be considered, along with findings from previous years, when making policy recommendations. The final report is currently scheduled for release in June 2002. See Appendix D for a summary of topics to be covered in the final report.

The evaluation described herein focused on research questions that were, for the most part, extensions of those studied in our first and second evaluations (see Bohrnstedt and Stecher, 1999; and Stecher and Bohrnstedt, 2000). Guided by our model (Figure 1.1) once again, we continued to examine the rate of CSR implementation, with special attention paid to the following issues: whether some K–3 students were still less likely than others to be in reduced size classes, the relationship between CSR and resource allocation, the relationship between CSR and the numbers and types of teachers being placed in K–3 classes, whether classroom instructional practices changed with the fourth and fifth years of CSR, whether students in reduced size classes scored higher on achievement tests, and how CSR relates to identification rates for special education students.

CSR and Implementation

As noted earlier, implementation of the CSR program proceeded very rapidly in the program's first three years, especially in grades 1 and 2.[4] During this year's evaluation, we were particularly interested in the degree to which implementation had been carried out in kindergarten and grade 3 by the fifth year of CSR. We were also interested in whether we would continue to find that schools with the highest percentages of disadvantaged (minority, low-income, or EL) students were least likely to implement CSR. Chapter 2 examines these and other implementation issues.

CSR and Resource Allocation

Across the state, implementation of CSR has required that districts and schools reallocate funds and space away from a variety of support and educational programs. In our first evaluation report, we found that to implement CSR rapidly, many schools took space from other programs to use as classrooms, especially in schools serving low-income, minority, and EL students. Chapter 3 of this report further explores how the CSR program affected the allocation of resources in California districts and primary schools over its first four years of implementation. We look at adequacy of CSR funding and how districts whose CSR costs

[4] The law called for class size reduction to begin in grades 1 and 2 and then proceed to kindergarten and grade 3.

were not fully covered managed to fund the CSR program. We also examine the reported effects of resource constraints on the implementation of CSR in grades K–3, as well as how implementations affected the upper elementary grades (grades 4–6), which were not part of the CSR program. The views of principals and superintendents on alternative education initiatives and on how CSR implementation affected other educational reforms, as presented in survey and interview data, are also considered. Principals and superintendents were surveyed in both 1998 and 2000.

CSR and Teacher Characteristics

California's total student enrollment was surging in the years prior to CSR implementation, exceeding the national average growth rate from 1988 on and creating an increased demand for qualified teachers. Implementation of CSR required many new teachers to fill new K–3 classrooms, raising important issues about the ability of schools and districts to find additional qualified teachers. Our second CSR evaluation report showed that teacher education and credentialing levels decreased significantly in the first three years of CSR implementation. Furthermore, these drops were not spread evenly across schools: Comparatively greater drops were seen in schools serving high percentages of low-income, Hispanic in particular, minority in general, or EL students, as well as in schools that were large and urban. Chapter 4 examines whether the K–3 teacher workforce continued to change during the fourth and fifth years of CSR implementation.

CSR and Classroom Practices

One of the hypotheses associated with the decision to implement reduced size classes—in California as well as other states—is that once the constraints of larger class sizes have been lifted, teachers will change their instructional practices in ways that benefit students. Little evidence for this hypothesis was found in our first two evaluation reports, and other studies of teacher practices associated with teaching in smaller classes have also found few changes (ERIC, 2000). However, we did find that smaller classes did allow teaching to smaller groups of students and to the individual needs of some students. We examined new survey data to determine whether a fourth year of experience teaching in smaller classes had resulted in any changes in instructional practices beyond those observed in the first two evaluations. Our findings are reported in Chapter 5.

CSR and Student Achievement

The most critical question related to the CSR initiative continues to be the degree to which smaller class size is associated with student performance. Our previous two evaluation reports found small achievement gains associated with reduced class size. This evaluation report focused on the cumulative impact of CSR during the 1996–97 and 2000–01 school years. Specifically, in Chapter 6 we looked at trends in student achievement and compare them to patterns of exposure to CSR. Our analysis focused on differences in achievement between cohorts of students who entered the system at different times and received different patterns of instruction in reduced size classes. We examine each wave of students who entered kindergarten in California between 1993–94 and 1999–2000, comparing their pattern of achievement with their pattern of exposure to reduced classes during kindergarten through third grade.

CSR and Special Populations

We have not overlooked how CSR implementation might affect special needs students, such as EL and special education students. In Chapter 7, we examine the percentage of students identified as needing an individual education plan (IEP) to see if this percentage increased or decreased since CSR implementation began. We also looked to see whether more students with IEPs were being placed in special day classes. We then turned to just EL students looking for changes in the number of certified teachers specifically certified to work with minority and bilingual students between 1996–97 and 2000–01.

CHAPTER 2

Implementation of CSR

George W. Bohrnstedt, Jamie Shkolnik, Freya Makris, and Michalis Michaelides

Introduction

The second Class Size Reduction (CSR) evaluation report found that the program was implemented very quickly over its first two years (1996–97 and 1997–98) and then somewhat more slowly in its third year (1998–99). By the end of the third year, over 1.7 million students were in classes of 20 or fewer, representing nearly 92 percent of the state's K–3 students. However, we also found that districts varied in their ability to implement the program. In particular, districts with high percentages of low-income,[1] minority,[2] or English learner (EL)[3] students were slower to implement CSR.

In this chapter, we examine implementation of the CSR program through its fifth year—the 2000–01 school year. After discussing the data and methods we used, we examine three main issues:

- Has the CSR program reached full implementation in its fifth year in California?
- What percentages of students, by grade level, were in reduced size classes in each of the first five years of the CSR program?
- Did implementation rates continue to vary as a function of such characteristics as a school's percentage of low-income, EL, or minority students, as was the case during the first three years of the CSR program?

[1] Students are referred to as low-income or as being from low-income families in this report if state records classify them as receiving public assistance in the form of Aid to Families with Dependent children (AFDC) or its successor in California, CalWORKS.

[2] Minority students are any students not classified as Caucasian. The largest groups of minority students are, in order of group size, Hispanics, Asian/Pacific Islanders, and African Americans.

[3] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

Data and Methods

We addressed our research questions using data provided by the state of California. State data included CSR implementation rates determined from both the California Department of Education (CDE) CSR Web site[4] and the California Basic Educational Data System (CBEDS), which includes the Professional Assignment Information Form (PAIF) data set.

The analysis procedures involved an examination of CSR participation cross-classified by type of school or district (i.e., by school and district characteristics such as percentage of low-income students).

Comprehensive Basic Educational Data System

CBEDS contains information that CDE collects each October from school districts, schools, and certificated staff [5] on three data collection forms: the County and District Information Form (CDIF), the School Information Form (SIF), and the Professional Assignment Information Form (PAIF), respectively. Included in the CDIF data are district-level statistics on teacher shortage and demand, which are not reported separately by grade level or school. Data collected for each of the state's public schools on the SIF include counts of students and classified (non-certificated) staff, enrollments in several special programs (e.g., magnet programs), and Internet-linked classrooms. Within each school, student counts are broken down by gender and race/ethnicity for each grade (K–12), as well as by two ungraded categories (elementary and secondary). Classified staff counts are broken down by gender, race/ethnicity, and full-time/part-time status for three categories of employees: paraprofessionals, office/clerical staff, and other classified staff. Using SIF and other sources, CBEDS also generates variables indicating each school's grade, type,[6] and year-round and charter school status.

Information collected on the PAIF concerns the background (e.g., gender, race/ethnicity, birth year, education and credentials, years of service) and work assignments of individual certificated staff.[7] The PAIF provides space for teachers to report up to eight separate assignments, but teachers in self-contained elementary classrooms typically have only one or two. Information collected about each elementary school assignment includes the percentage of a teacher's total time spent in the assignment, a code describing the nature of the assignment, and the number of students served. Aside from the numbers of male and female students in each assignment, the PAIF files contain no information about the enrollment composition of particular classrooms (i.e., students' race/ethnicity, English proficiency, socio-economic status, or the proportion of special education students). The PAIF data provide information about class sizes during early October of each school year. During the first year of CSR implementation (1996–97), many classes were reduced in size *after* the

[4] This Web site address is http://www.cde.ca.gov/classsize/.

[5] The term *certificated staff* refers to teachers, administrators, and pupil services staff (e.g., counselors, librarians, school nurses, and resource specialists).

[6] The type indicator classifies schools in a variety of "regular" (e.g., regular elementary schools, middle schools, high schools) and "special" (e.g., special education facilities, community day schools, and alternative schools) categories.

[7] CBEDS does not collect individual data on non-certificated staff. As stated earlier, it does collect aggregate counts of these staff on the SIF.

October CBEDS data were collected. Consequently, analyses based on PAIF data underestimate the degree to which CSR was implemented during 1996–97.

CBEDS staff have compiled school-, district-, county-, and state-level summaries of the student (SIF) and staff (PAIF) data and have posted them on the CDE Internet site. Dbase IV files on many topics are available for 1990–91 through 2000–01. We have made extensive use of both these summary files and the more detailed information on individual teachers' assignments and characteristics found in the original PAIF files. For this chapter, we used data from 1995–96, 1996–97, 1997–98, 1998–99, 1999–00, and 2000–01.

Throughout this chapter, classifications of schools according to their percentages of EL, minority (in general), Hispanic, and African American students are based on data from CBEDS school summary files.

Student Income Data

California conducts an October count of 5- to 17-year old children residing in each public school's attendance area who are eligible to receive free or reduced-price lunches and of students whose parents are in CalWORKS (formerly AFDC). These counts are conducted separately from the CBEDS data collection and do not distinguish among public school students, private school students, and students not attending school at the time of the count. Therefore, the "percent free lunch" and "percent AFDC" statistics reported for each public school are approximate, based on data for the combined public and private student population of the school's attendance area. Throughout this report, the classifications of schools and districts according to the percentage of their low-income students are based on the percentages of students receiving AFDC that are reported in these files.

Implementation Results

Incentives for participation in the CSR program were substantial in terms of public support, potential for student learning and achievement, and additional funding to school districts. As was shown in our two previous evaluation reports, the result was that a large percentage of schools chose to implement CSR, even in the face of existing shortages of both teachers and classrooms.

Overall, by the fifth year of implementation (2000–01), 99 percent of eligible districts were participating in the program—only 9 districts were not. Participating districts included 97 percent of the state's 1.92 million K–3 students. This represents an increase over the fourth year of implementation, when 95 percent of K–3 students received instruction in classes of 20 or fewer, and over the third year, when 92 percent of K–3 did. Between the 1999–00 and 2000–01 school years, over 37,000 additional students began receiving instruction in reduced size classes.[8]

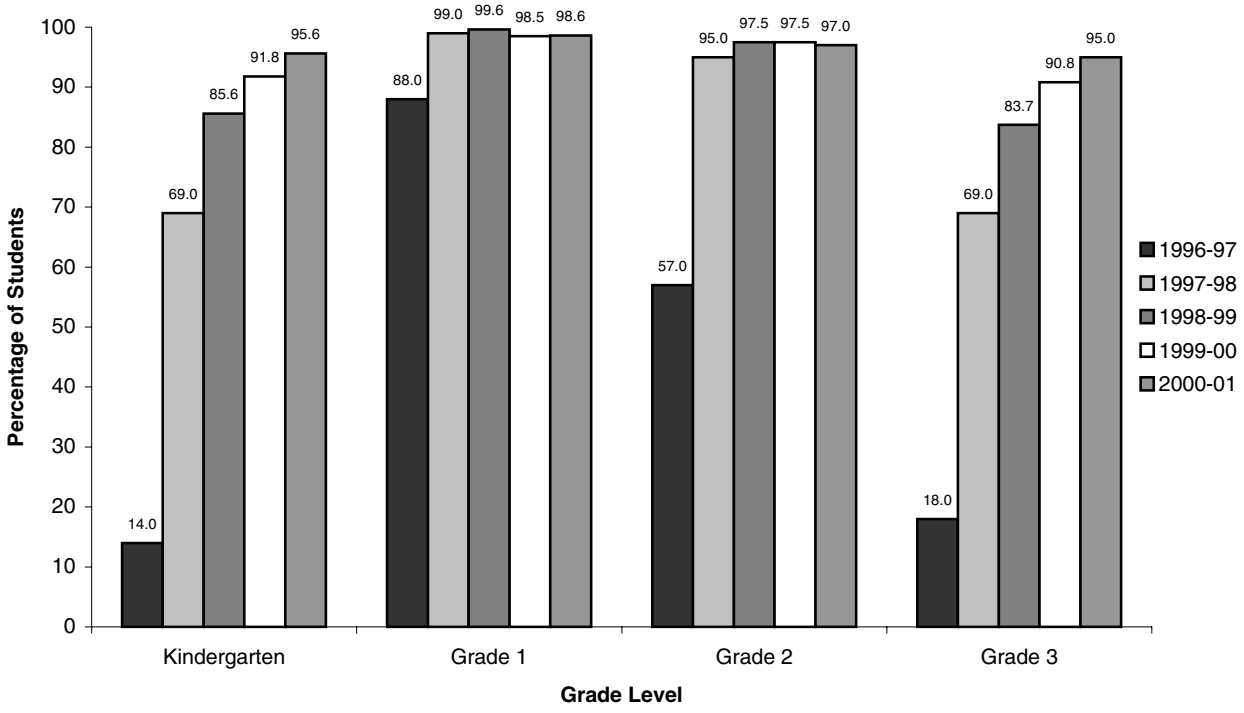
[8] These data were taken from CDE Web site http://www.cde.ca.gov/classsize/particip/sum00.htm.

Implementation Rates by Grade Level and Year

SB 1777, whose passage began the CSR program, required that schools initially implement CSR in first grade, with priority for further implementation given to second grade. As a result of this directive, implementation of CSR in these two grades was almost complete by the second year of the program.

Although little progress was made in implementing CSR in kindergarten and third grade during the first year, attention to these two grades grew during the second and third years. By the end of the second year, 1997–98, roughly two-thirds of California's kindergarteners and third graders were in reduced size classes. As Figure 2.1 shows, this trend continued into the third and fourth years: Roughly 86 percent of kindergarten students and 84 percent of third graders were in reduced size classes by the end of 1998–99, and nearly 96 percent of kindergarteners and 95 percent of third graders were in reduced size classes by 2000–01.

Figure 2.1–
Percentage of Students in Reduced Size Classes, by Grade Level and Year



Implementation Rates by School Characteristics

For the second and third year of the program, we found that districts with high percentages of minority, low-income, or EL students were slower in their initial implementation of CSR in grades 1 and 2 than were schools serving lower percentages of these students. This implementation gap between schools with and without large percentages of minority, low-income, or EL students then began to close in the third year of the program. We were

interested to see whether the gap would persist or completely close in the fourth and fifth years of CSR.

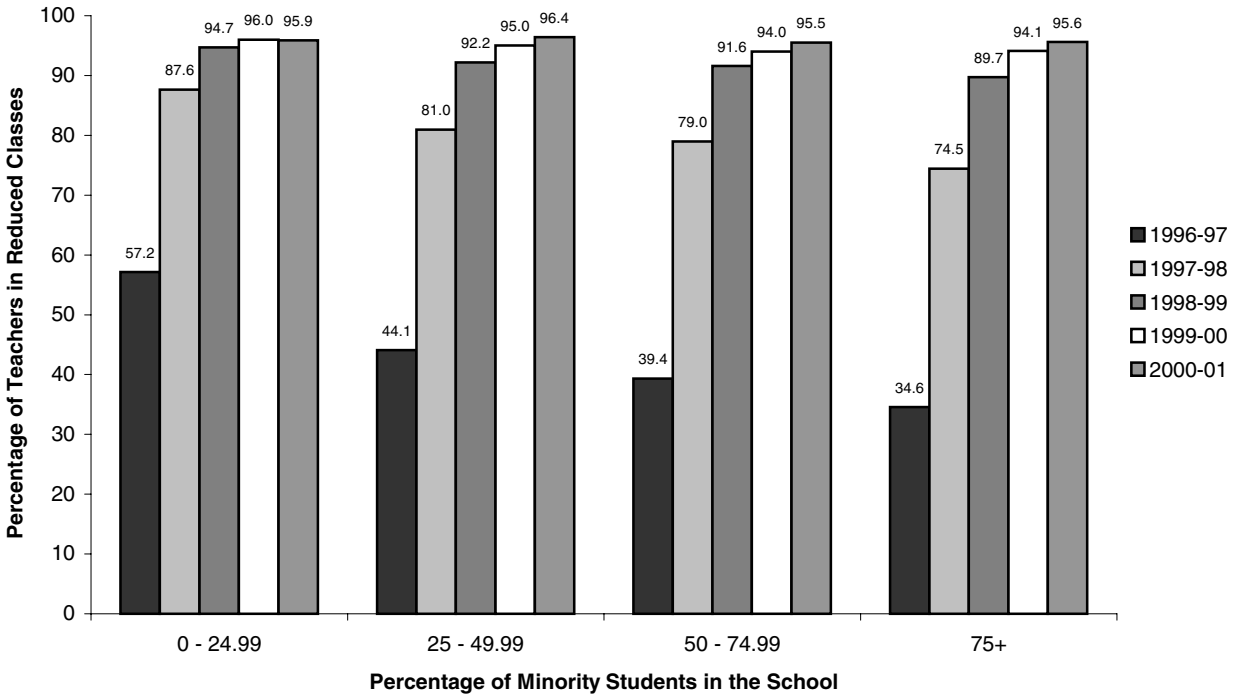
To address this issue, the percentage of K–3 teachers—teacher being defined as one full-time equivalent (FTE)[9]—working in reduced size classes across the first four years of CSR was cross-classified by categories of schools serving different concentrations of urban, low-income, or EL students. Categorization was carried out using teacher assignments because no data are available on the actual number of students in reduced size classes by demographic characteristics.

To explore the relationship between school characteristics and implementation rates, we categorized the population of California's elementary schools into rough quartiles based on a set of demographic variables, except for the percent Hispanic variable, which was used to classify schools into rough thirds.

Implementation by Percentage of Minority Students. By the end of the first year of CSR's implementation (1996–97), about 42 percent of California's K–3 teachers were in reduced size classes. As seen in Figure 2.2, teachers in schools with relatively low percentages of minority students were far more likely to be in reduced size classes than were their counterparts in schools with relatively high proportions of such students. In 1996–97, 57 percent of K–3 teachers in schools with less than 25 percent minority students were in reduced size classes, compared with 35 percent of teachers in schools with 75 percent or more minority students—a gap of roughly 22 percent. The gap was closed by nearly half in the second year of implementation, but even then, 13 percent more K–3 teachers were in smaller classes in schools with less than 25 percent minority students than were in smaller classes in schools with 75 percent or more minority students. In the third year of implementation, this gap closed even further. Schools with less than 25 percent minority students had 95 percent of their K–3 teachers in reduced sized classes, compared to 90 percent of the K–3 teachers in schools with 75 percent or more minority students. That is, the gap had been reduced to just 5 percent between the schools with the largest and smallest percentages of minority students. In the fourth year, the gap narrowed even further, and by the fifth year, it had closed completely: 96 percent of K–3 teachers in schools with both high and low percentages of minority students taught in reduced size classes.

[9] For Figures 2.2 and 2.3 and Tables 2.1–2.6, the percentages of teachers in reduced size classes were calculated from data in the CBEDS-PAIF files on individual teachers' teaching assignments. These assignments are expressed in terms of full-time equivalent units (FTEs). Most K–3 teachers had a full-time appointment and taught all day in one class; in our analysis, they were counted as one FTE. Teachers who had part-time jobs or divided their time between two assignments were counted as fractional FTEs. A teacher's class assignment was counted as "reduced size" if it involved between 14 and 21 students and as "not reduced" if it involved between 22 and 50 students. Because they did not fit the profile of a regular, self-contained K–3 classroom, we excluded from the analysis all assignments with fewer than 14 or more than 50 students and all assignments of teachers who reported splitting their time among more than two assignments. We used 21 (rather than 20) as the maximum number of students in a "reduced" class to compensate for differences between our and CDE's methods for calculating class size. Our estimate was based on data from a single (October) count of students; the funding formula for CSR required that the *average* number of students in the class not exceed 20.4 over the course of the school year.

Figure 2.2–
Percentage of Teachers in Reduced Size Classes, by Percentage of Minority Students in the School



Because nearly all first- and second-grade teachers were teaching in reduced size classes by the end of the third year of CSR implementation, the gap shown in Figure 2.2 for schools with high versus low percentages of minorities is due to the implementation rates in kindergarten and third grade. This can be seen more clearly in Table 2.1. As shown there, schools with a high percentage of minority students were slower to implement the program in kindergarten and third grade classes initially. By 2000–01, however, the implementation gap between schools with low and high percentages of minority students had closed significantly for third-grade teachers and had even reversed itself for kindergarten teachers.

In summary, regardless of their school's percentage of minorities, nearly all first- and second-grade students were in reduced size classes by the CSR program's third year of implementation. However, until the fifth year, kindergarten and third-grade students were somewhat less likely to be in a reduced size class if they were in schools with high versus low percentages of minority students.

Table 2.1–
Percentage of Kindergarten and Third-Grade Teachers in Reduced Size Classes, by Percentage of Minority Students in the School

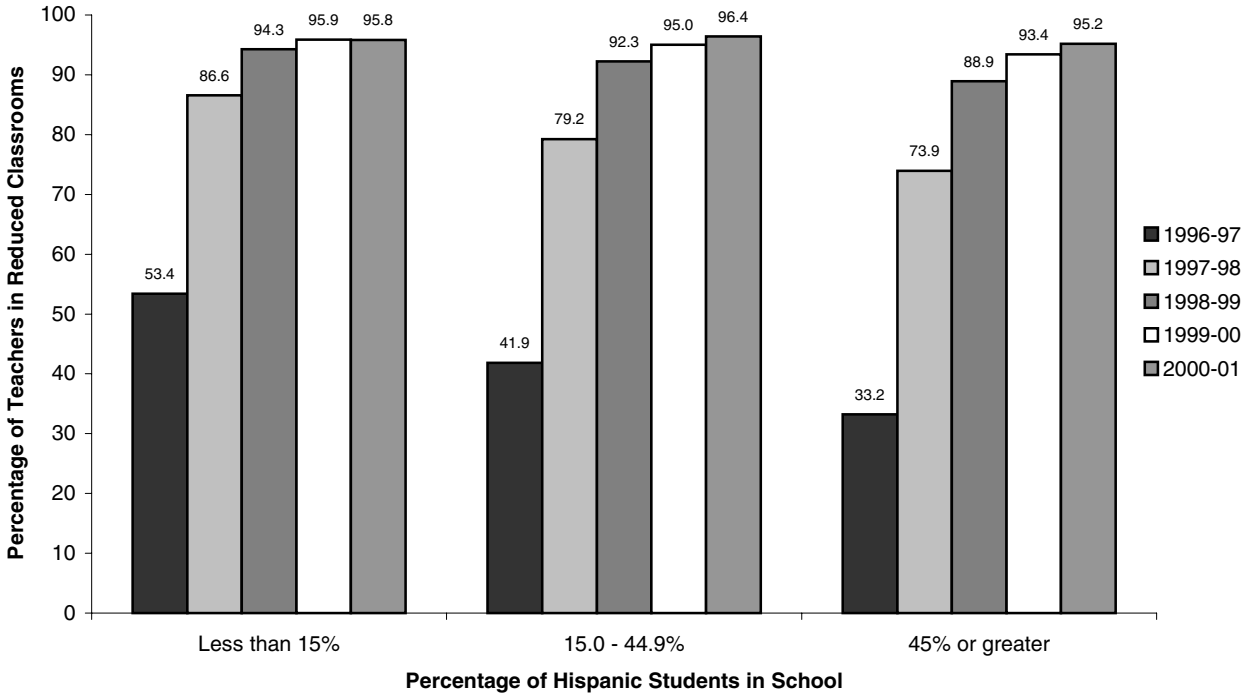
	1996–97	1997–98	1998–99	1999–00	2000–01
Percentage of Minority Students			**Kindergarten Teachers (%)**		
Less than 24.99%	21.4	60.2	83.7	87.1	87.9
25–49.99%	11.8	46.8	78.0	85.6	88.4
50–74.99%	12.5	43.7	75.2	83.7	86.7
75% or greater	11.8	34.3	70.5	84.0	89.2
Low-High Difference	**9.6**	**25.9**	**13.2**	**3.1**	**-1.3**
			Third-Grade Teachers (%)		
Less than 24.99%	30.9	79.4	96.2	97.3	97.9
25–49.99%	16.3	60.3	87.2	93.5	95.8
50–74.99%	10.6	56.9	84.4	90.5	94.3
75% or greater	6.8	52.3	83.6	90.4	95.1
Low-High Difference	**24.1**	**27.1**	**12.6**	**6.9**	**2.8**

We now turn to whether the pattern of results in Figure 2.2 and Table 2.1 holds for specific minority and other disadvantaged groups.

Implementation by Percentage of Minority Students by Minority Type. We examined the relationship between implementation and the percentage of Hispanic students in the school. As shown in Figure 2.3, the pattern of results we found for the percentage of teachers in reduced size classes by the percentage of Hispanic students in the school reflects the pattern we found in the percentage of teachers in reduced size classes by the percentage of all minority students in the school (Figure 2.2). The gap between teachers in reduced size classes in schools with the highest versus the lowest percentage of Hispanic students was 20 percentage points after one year of CSR, 13 percentage points after two years, 5 percentage points after three years, less than 3 percentage points after 4 years, and, at 0.6 percentage points, the gap was virtually closed by the fifth year.

We next examined this relationship using the percentages of African American students and Asian/Pacific Islander students in the school. The data can be found in Appendix A (see Tables A.1 and A.2). There was little evidence of a gap in implementation of CSR for kindergarteners and third graders as a function of the percentage of African American or Asian/Pacific Islander students in the school. Nearly 93 percent of teachers in schools with less than 6 percent Asian/Pacific Islander students and 94 percent of teachers in schools with more than 6 percent Asian/Pacific Islander students taught in reduced size classes. For both schools with high percentages of African Americans and schools with low percentages, the percentage of teachers teaching in reduced size classes was 93 percent.

Figure 2.3–
Percentage of Teachers in Reduced Size Classes, by Percentage of Hispanic Students in School



As Table 2.2 shows, the trends by percentage of Hispanic students in a school are very similar to the trends by percentages of minority students in a school shown in Table 2.1.

Table 2.2–
Percentage of Kindergarten and Third-Grade Teachers in Reduced Size Classes, by Percentage of Hispanic Students in the School

	1996–97	1997–98	1998–99	1999–00	2000–01
Percentage of Hispanic Students			**Kindergarten Teachers (%)**		
Less than 15%	20.5	58.1	80.0	85.7	86.2
15.0–44.9%	13.1	43.6	78.5	86.3	89.2
45% or greater	8.9	33.3	69.5	82.7	88.8
Low-High Difference	**11.6**	**24.8**	**10.5**	**3.0**	**-2.6**
			Third-Grade Teachers (%)		
Less than 15%	24.6	75.7	94.6	96.3	97.2
15.0–44.9%	11.9	57.1	87.3	93.4	96.4
45% or greater	8.3	50.9	80.5	88.3	93.5
Low-High Difference	**16.3**	**24.8**	**14.1**	**8.0**	**3.7**

Implementation by Percentage of English Learners. While the majority (85%) of California's EL students were Hispanic in 2000–01, not all were. Furthermore, only 62 percent of Hispanic K–3 students were classified as EL students, which means that large numbers of them were not. Therefore, it is important to examine implementation rates not only for the percentage of Hispanic students in a school, but also for the percentage of EL students in a school.

After three years of CSR implementation, K–3 teachers in schools with larger percentages of EL students were still slightly less likely than teachers in schools with smaller percentages of EL students to be teaching in reduced size classes—the gap had closed to around 4 percent (see Table 2.3). By the fifth year, the gap had almost entirely closed. The last CSR evaluation report found that the gap occurred almost entirely at the kindergarten level. We found that by the fifth year, kindergarten teachers in schools with high proportions of EL students were slightly more likely to be teaching in reduced size classes than were kindergarten teachers in schools with smaller proportions of EL students (see Table 2.4).

Table 2.3–
Percentage of K–3 Teachers in Reduced Size Classes, by Percentage of EL Students in the School

	K–3 Teachers (%)				
Percentage of EL Students	**1996–97**	**1997–98**	**1998–99**	**1999–00**	**2000–01**
Less than 7.50%	50.8	85.2	93.6	95.3	96.0
7.50–19.99%	42.7	79.9	92.2	95.1	96.1
20.00–39.99%	39.5	78.7	91.5	94.8	96.0
40% or greater	35.0	73.8	89.3	93.7	95.3
Low-High Difference	**15.8**	**11.4**	**4.3**	**1.6**	**0.7**

Table 2.4–
Percentage of Kindergarten Teachers in Reduced Size Classes, by Percentage of EL Students in the School

	Kindergarten Teachers (%)				
Percentage of EL Students	**1996–97**	**1997–98**	**1998–99**	**1999–00**	**2000–01**
Less than 7.50%	18.3	56.0	81.7	86.3	87.5
7.50–19.99%	12.2	45.4	76.5	86.2	88.6
20.00–39.99%	11.8	41.2	75.1	84.8	88.5
40% or greater	12.0	33.3	69.5	82.4	88.4
Low-High Difference	**6.3**	**22.7**	**12.2**	**3.9**	**-0.9**

Implementation Rates by Percentage of Low-income Students

As Table 2.5 shows, schools with higher percentages of low-income students were slower to implement CSR in the first two years than were schools with lower percentages of these students, but by the third year this was no longer the case. As a result, since the 1998–99

school year, K–3 teachers have been just as likely to teach in reduced size classes whether their schools have high or low percentages of low-income students.

Table 2.5–
Percentage of K–3 Teachers in Reduced Size Classes, by Percentage of Low-income Students in the School

	K–3 Teachers (%)				
Percentage of Low-Income Students	**1996–97**	**1997–98**	**1998–99**	**1999–00**	**2000–01**
Less than 7.50%	49.6	82.9	91.9	94.3	95.4
7.50–17.49%	43.0	80.3	91.8	95.2	96.5
17.50–29.99%	38.3	78.3	91.3	94.6	95.6
30% or greater	38.9	77.2	91.8	94.9	95.8
Low-High Difference	**10.7**	**5.7**	**0.1**	**-0.6**	**-0.4**

Characteristics of Schools Not Implementing CSR

Given the huge financial incentives and the public pressure for districts and schools to reduce class size, a question of interest is: How do schools that were not implementing CSR by the 2000–01 school year differ from those that were? This question can be examined by inspecting the data in Table 2.6, which show the results of cross-classifying implementation status with school size and school percentage of low-income, EL, and minority students for the 1998–99 and 2000–01 school years.

As can be inferred from the grade 1 and 2 implementation statistics reported at the beginning of this chapter, very few schools had not implemented CSR in grades 1 and 2 by 2000–01. Of more than 4,400 elementary schools in the state, only 25 had not implemented CSR in grade 1, and only 16 in grade 2. Schools that did not implement CSR in grades 1 and 2 in 2000–01 were significantly smaller in size than those that did, but care should be taken in interpreting this difference given the small number of non-implementing schools.

Schools with higher percentages of EL and minority students were slightly less likely to have implemented the CSR program in grade 3. This was not true in the case of kindergarten. No single characteristic consistently differed between schools that had and had not implemented CSR as of 1998–99 and 2000–01.

Table 2.6–
Average Differences Between Schools Implementing and Not Implementing CSR on Selected Characteristics: 1998–99 and 2000–01

	N		School Size[a]		% Low-Income		% EL		% Minority	
Kindergarten	**98–99**	**00–01**	**98–99**	**00–01**	**98–99**	**00–01**	**98–99**	**00–01**	**98–99**	**00–01**
Implemented	3395	3941	616.5	629.1	18.4	14.1	26.4	27.9	58.9	62.9
Not Implemented	977	474	682.8	655.3	14.3	10.4	30.8	27.3	65.3	61.4
Difference			**-66.3**	**-26.2**	**4.1**	**3.7**	**-4.4**	**0.6**	**-6.4**	**1.5**
Grade 1										
Implemented	4407	4410	638.4	636.2	17.6	13.7	27.6	28.0	60.7	63.1
Not Implemented	24	25	447.3	586.3	19.7	16.9	16.7	29.9	47.0	67.9
Difference			**191.1**	**49.9**	**-2.1**	**-3.2**	**10.9**	**-1.9**	**13.7**	**-4.8**
Grade 2										
Implemented	4402	4433	637.4	637.2	17.5	13.7	27.5	28.0	60.6	63.0
Not Implemented	39	16	692.1	557.8	17.9	12.8	34.1	33.2	69.9	64.2
Difference			**-54.7**	**79.4**	**-0.4**	**0.9**	**-6.6**	**-5.2**	**-9.3**	**-1.2**
Grade 3										
Implemented	3901	4297	625.2	632.7	17.6	13.7	26.4	27.6	59.0	62.6
Not Implemented	551	152	713.9	717.1	16.8	13.4	34.1	32.6	70.0	70.8
Difference			**-88.7**	**-84.4**	**0.8**	**0.3**	**-7.7**	**-5.0**	**-11.0**	**-8.2**

[a] Number of students in school.

Conclusions

Summary of Findings

The CSR program, which began implementing in 1996, is virtually fully implemented. By its fifth year (2000–01) 97 percent of California's kindergarten through third-grade students were in classes of 20 or fewer, and 99 percent of all eligible districts were participating in the program—only 9 districts were not.

In previous years of the program, implementation rates varied by grade level. By 2000–01, however, implementation in kindergarten and third grade was only slightly behind implementation in grades 1 and 2: 96 percent of kindergarteners and 95 percent of third graders were in reduced size classes, compared with 99 percent of first graders and 97 percent of second graders.

Previous years analyses also revealed that implementation rates varied substantially with respect to the percentages of minority students in schools. However, the data for 2000–01 shows that the gap in implementation between schools with the highest versus the lowest percentages of these students had completely closed by the end of the fifth year. When we analyzed the data separately by the percentage of students who were Hispanic, African American, or Asian/Pacific Islander, we found for the first time since the program began

that there was no longer a disproportionately large number of non-reduced classes as a function of the percentage of students in schools with these minority characteristics.

Finally, when we examined implementation rates as a function of the percentage of low-income students in the school, we found that the gap between schools with high versus low percentages of these students was also completely closed for all K–3 classes by the end of the third year of CSR implementation and that it remained closed in 2000–01.

CHAPTER 3

Resource Allocation

Georges Vernez and Catherine Augustine

Introduction

CSR implementation— with its requirements for space, staff, and other resources—has been taking place in a period of rapid growth in student enrollment and amidst state demands that districts and schools implement multiple other educational reforms. During the first four years of the CSR program (1996–97 through 1999–00), over 58,000 students were added yearly to California's elementary school enrollment, and districts and schools were required to implement numerous reforms including curriculum changes in reading and mathematics, restrictions on bilingual education, and a high stakes accountability system.

This chapter examines how the CSR program affected the allocation of resources in the state's districts and elementary schools in its first four years of implementation. Readers should take into account the multiplicity of the demands that were placed all at once on districts and schools when interpreting the findings presented here. In particular, it is essential to keep in mind that when superintendents and principals identified specific resource constraints and strategies to overcome them, they were likely to do so within this broader context. As a result, the constraints and strategies cannot be uniquely attributed to implementation of the CSR program.

Our examination addressed the following questions:

- To what extent has the state funding covered the districts' operating costs of implementing CSR? Where there have been local costs what has been their magnitude and how have they been financed? And where there have been surpluses who has benefited?

- To what extent have resource constraints (e.g., space, teachers, and supplies) affected implementation of CSR? How have affected districts and schools reallocated resources to compensate for these constraints?

- Has CSR implementation affected implementation of other state and local school reforms?

- To what extent has implementation of CSR in grades K–3 affected resource allocation to upper elementary grades (i.e., grades 4–6)?
- Would superintendents and principals prefer to use CSR funds for alternative education initiatives?

Data and Methods

To address the questions above, we used data from two surveys of superintendents and principals, one funded in spring 1998, the other in spring 2000. The first survey covered the 1996–97 and 1997–98 school years; the second covered the year 1998–99 and 1999–2000.[1] The analysis procedures involved an examination of CSR revenues and survey responses cross-classified by type of schools or districts (e.g., by such characteristics as percentage of low-income students, percentage of minority students, and whether students were located in an urban, suburban, or rural area). Where appropriate, results across characteristics and over time were evaluated for statistical significance at the .05 level or less with F-, t-, and chi-square tests.

The superintendents and principals who responded to the survey in 2000 were not all the same ones who had responded in 1998. Forty-seven percent of districts and 43 percent of schools in our samples responded to both surveys. Hence, longitudinal analyses were conducted on the sample of respondents that responded to both surveys and on the entire sample. As the results were generally similar using either sample, only the results from our analyses of the entire sample are reported here.

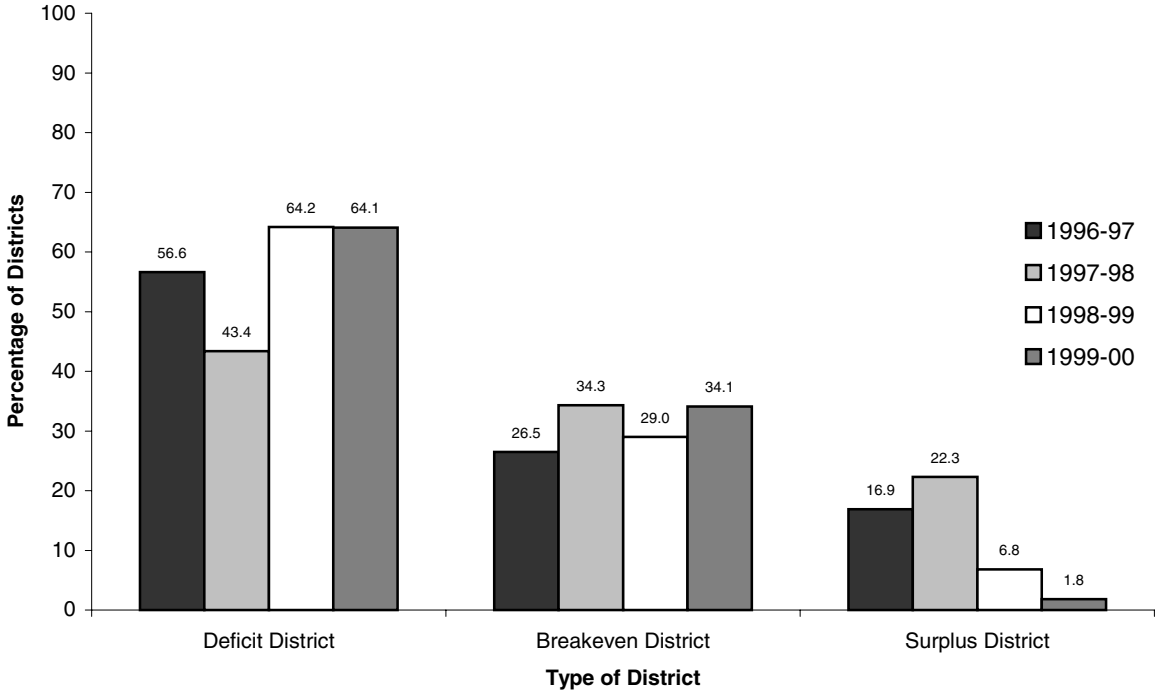
Adequacy of CSR Funding

Over the first four years of the CSR program, a majority of districts consistently reported that their operating costs of implementing the CSR program exceeded state reimbursement.

In the first year (1996–97), more than one out of two districts reported that the $650-per-pupil state payment was insufficient to cover its additional costs. This share dropped to two out of five districts in the second year thanks to a 25 percent increase in state reimbursement to $800. However, in the two subsequent years, the state provided no further increases other than a cost-of-living adjustment, and the share of districts with a deficit climbed to two out of three.

[1] For a description of the survey design, sampling, and topics, see Chapter 2 of the first CSR evaluation report, Bohrnstedt and Stecher, 1999.

Figure 3.1–
Adequacy of CSR Funding



Source: 1998 and 2000 CSR surveys of superintendents.

Figure 3.1 shows CSR funding over the four years. As can be seen, while the share of districts reporting a deficit increased slightly over time, the share of districts that enjoyed a state reimbursement exceeding their operating costs dwindled rapidly, from one out of every five districts in the first year to nearly none in the fourth year.

For districts whose costs of implementing the CSR program exceeded the state reimbursement, the average size of the deficit per pupil increased from an average of $112 (or 17% of the state reimbursement) in the first year to $163 (or 20% of the state reimbursement) in the fourth year.

We found that the share of districts reporting a deficit increased over time regardless of a district's size, urbanicity, or share of EL or minority students (Table 3.1). Suburban districts were the main exception: The share of suburban districts with a deficit decreased by nearly 18 percentage points between 1996–97 and 1999–00.

Table 3.1–
Percentage of Districts Reporting a CSR Funding Deficit or Surplus, by District Characteristics and Year

	Districts Reporting (%)			
	Deficit		Surplus	
District Characteristic	**1996–97**	**1999–00**	**1996–97**	**1999–00**
Size (number of students)				
1–500	38.8	59.0	37.8	0.0
501–2,500	54.2	71.5	9.9	3.5
2,501–10,000	70.0	52.8	13.0	3.9
10,000–50,000	61.7	67.4	15.9	0.0
Urbanicity				
Rural	47.1	76.3	23.5	0.0
Suburban	75.6	58.0	4.6	6.4
Urban	24.8	85.2	33.6	0.0
Percentage of students receiving AFDC				
< 10.0	75.3	62.3	14.1	1.2
10.0–20.0	45.0	61.1	12.7	3.6
> 20.0	46.3	76.9	23.3	0.0
Percentage of EL students				
< 5.0	45.8	60.3	6.8	0.0
5.0–14.9	66.1	83.3	23.1	0.0
15.0–29.9	64.6	58.6	12.7	7.0
> 30.0	64.6	63.3	22.7	0.0
Percentage of minority student				
< 16.66	41.2	77.0	17.4	0.0
16.67–33.33	47.2	56.8	20.7	0.0
33.34–66.66	73.0	68.3	10.4	6.6
> 66.67	57.9	55.1	21.7	0.0
Total	**56.6**	**64.1**	**16.9**	**1.8**

Source: 1998 and 2000 CSR surveys of superintendents.

In surplus districts, the average surplus was reported to have varied over the years, averaging $37 per pupil in the first year, $111 in second year (reflecting the large one-year increase in reimbursement), and about $50 in both the third and the fourth. Surpluses were used primarily for professional development and facility maintenance.

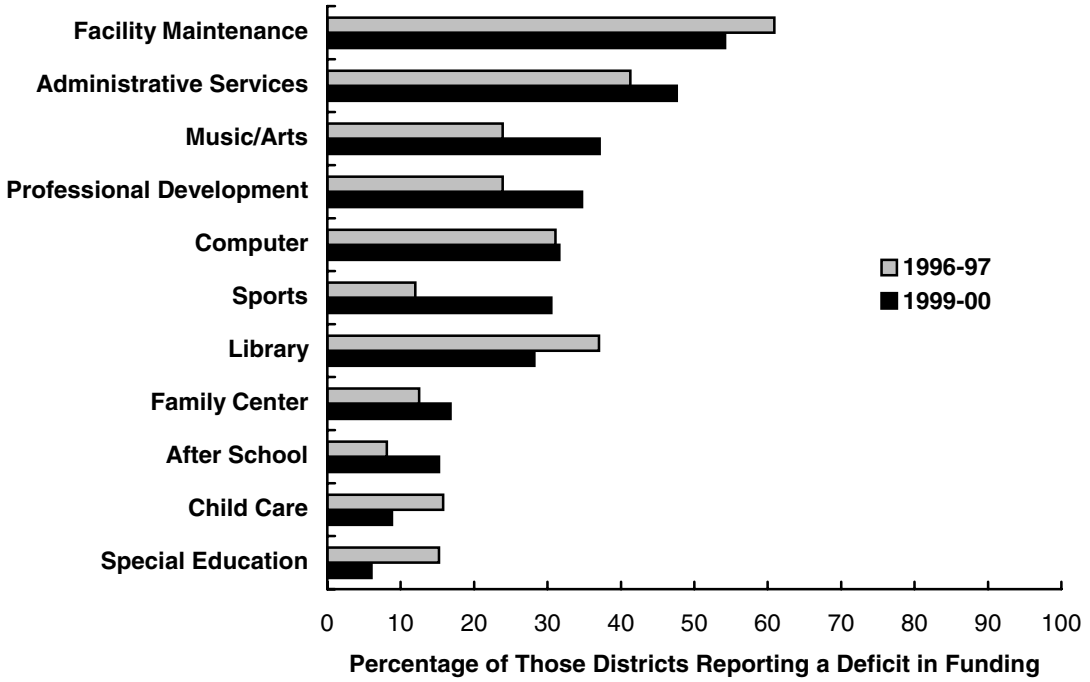
District Funding of CSR Program

Districts reporting deficits in funding used various strategies to generate the resources needed to implement CSR (see Figure 3.2). A majority of these districts reduced funds allocated to facility maintenance and administrative services, thereby seeking to minimize adverse effects on direct educational programs. A smaller share of districts, about one- third, reallocated resources away from professional development, computer programs, and/or

libraries—activities that do not directly impact classrooms but do provide support important for instruction. The share of districts reducing funds allocated to professional development increased from 24 percent of deficit districts in first year to 35 percent in the fourth year. Similarly, an increasing share of deficit districts reported having had to reallocate resources from music/arts and sports programs.

Districts reporting deficits in funding generally avoided reallocating funds away from programs such as after school, childcare, and special education programs, all of which are typically directed toward disadvantaged students.

Figure 3.2–
Programs Reduced by Districts to Compensate for Insufficient CSR Reimbursement



Source: 1998 and 2000 CSR surveys of superintendents.

Effects of Resource Constraints

As implementation of the CSR program was beginning in the 1996–97 school year, California's districts and schools were already straining to cope with rapidly growing enrollments due to combined natural growth and immigration. In addition, California at that time had fallen to 40th among states in the nation's states in per-pupil expenditures (EdSource, 2001).

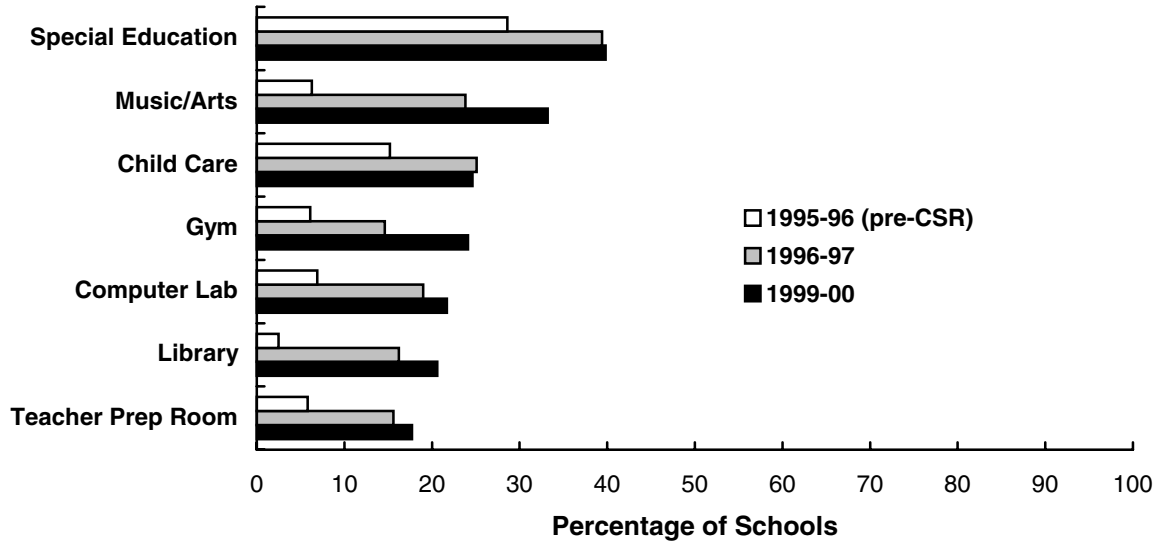
In such an environment of combined growth and limited resources, it was to be expected that the resources (mainly space and staff) needed to implement the CSR program might be

stretched to the limit and that other educational programs or other activities would be displaced. We turn now to examining how schools made space to accommodate the almost 50 percent increase in the number of K–3 classrooms (see Chapter 4 for a discussion of staffing issues). We then look at why some districts and schools delayed implementation of CSR and had not fully implemented CSR in all K–3 grades.

Making Space for CSR Classrooms

As Figure 3.3 indicates, schools throughout the state already had taken space for classrooms from various educational programs in the year preceding the start of the CSR program. This practice increased significantly in the first year of CSR implementation and then further increased every year after, although at a lower rate.

Figure 3.3–
Percentage of Schools Reporting That They Preempted Space for Classrooms, by Type of Space



Source: 1998 and 2000 CSR surveys of principals.

Special education has been the program most impacted by the need for space to meet increased enrollments and increased numbers of classrooms. Nearly 30 percent of the state's schools reported having taken space away from special education prior to implementation of CSR. This share increased to two out of every five schools in the first year of CSR implementation and remained at this high level in subsequent years.

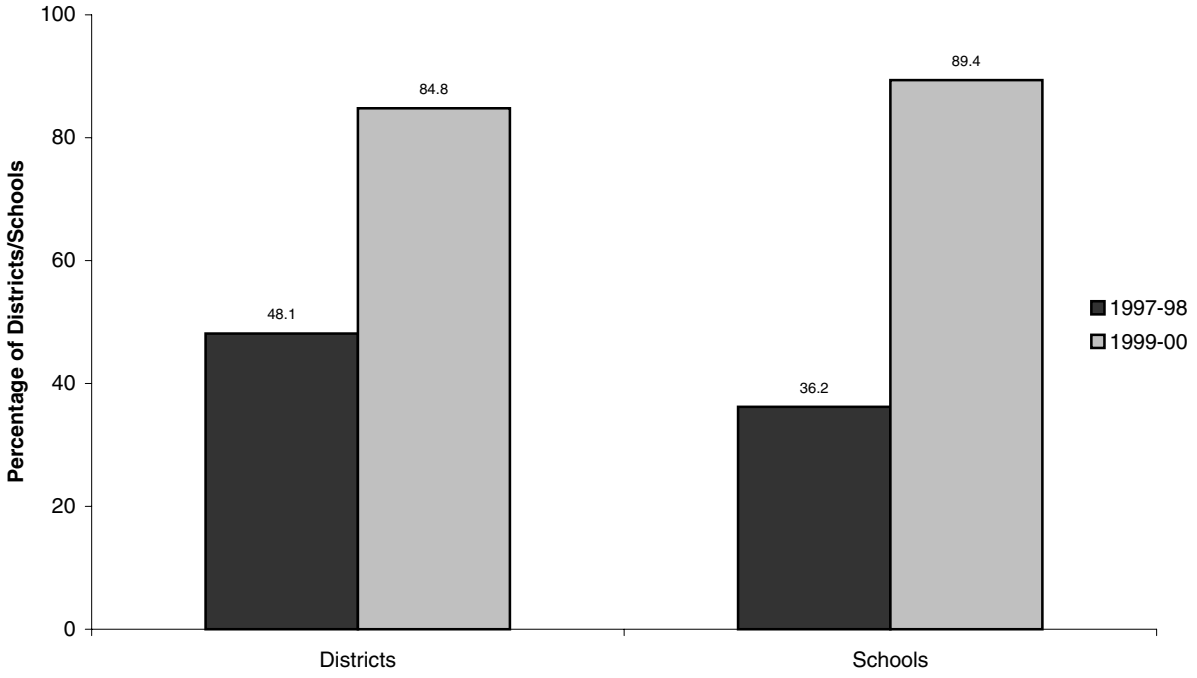
Other programs, however, were also increasingly affected by the growing demand for space as CSR implementation proceeded. The use of music/arts classrooms for other purposes was infrequent prior to CSR implementation, but the preemption of such space increased significantly in the first year of CSR implementation, and by the fourth year one out of three schools was using space previously dedicated to music/arts.

Similarly, about one of every four schools had taken space away from child care and gymnasiums by the fourth year. And roughly one in five had taken space from computer rooms, libraries, and/or teacher preparation rooms to meet CSR space requirements. The use of such spaces increased sharply in the first year of CSR implementation, increased further in the second and third years, and tapered off slightly in the fourth year.

Reasons for Lagging Implementation

Figure 3.4 shows that the share of districts that had completed their CSR implementation in grades K–3 (i.e., all eligible grades) increased from 45 percent in second year to 85 percent in the fourth year, and that the share of schools that had completed implementation more than doubled, going from 40 percent to 90 percent in the same period. By 1999–2000, most of the remaining 10 percent of schools had implemented CSR in grades 1 and 2, but two-thirds had yet to reduce class size in kindergarten, and one-third had yet to do so in third grade.

Figure 3.4–
Districts and Schools That Have Implemented CSR in All Eligible Grades, 1997–98 and 1999–00



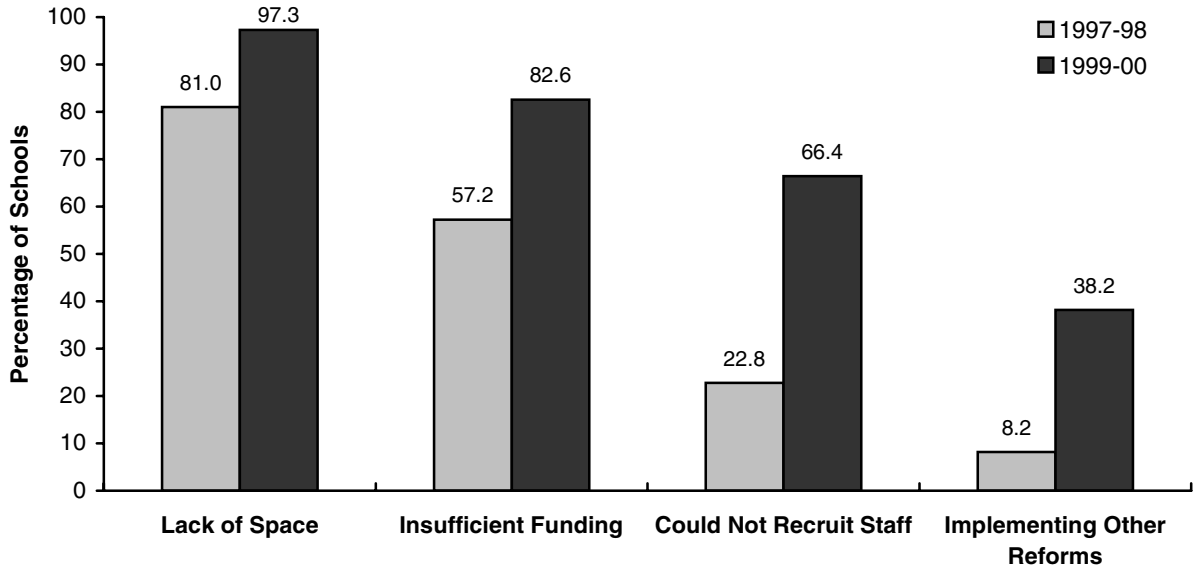
Source: 1998 and 2000 CSR surveys of superintendents and principals.

Figure 3.5 shows the reasons reported for not fully implementing CSR. Lack of space was the reason most frequently given in both the second and fourth years of the program. Whereas 80 percent of principals gave this reason in 1998, nearly all principals gave it in 2000, suggesting that the remaining schools may need capital investments or to have their

students transferred to other schools if CSR is to be fully implemented. Lack of sufficient funds was the second most frequently cited reason given in both years.

By the end of the second year of implementation, both "inability to recruit staff" and "implementing other reforms" were rarely identified as reasons for not fully implementing CSR. Then, "insufficient time to plan" was more frequently cited, by about one-third of principals not yet having completed implementation (Bohrnstedt and Stecher, 1999). By the fourth year, however, the proportion of principals citing "inability to recruit staff" and "implementing other reforms" had tripled, suggesting that multiple barriers affected the few schools that had not completed implementation.

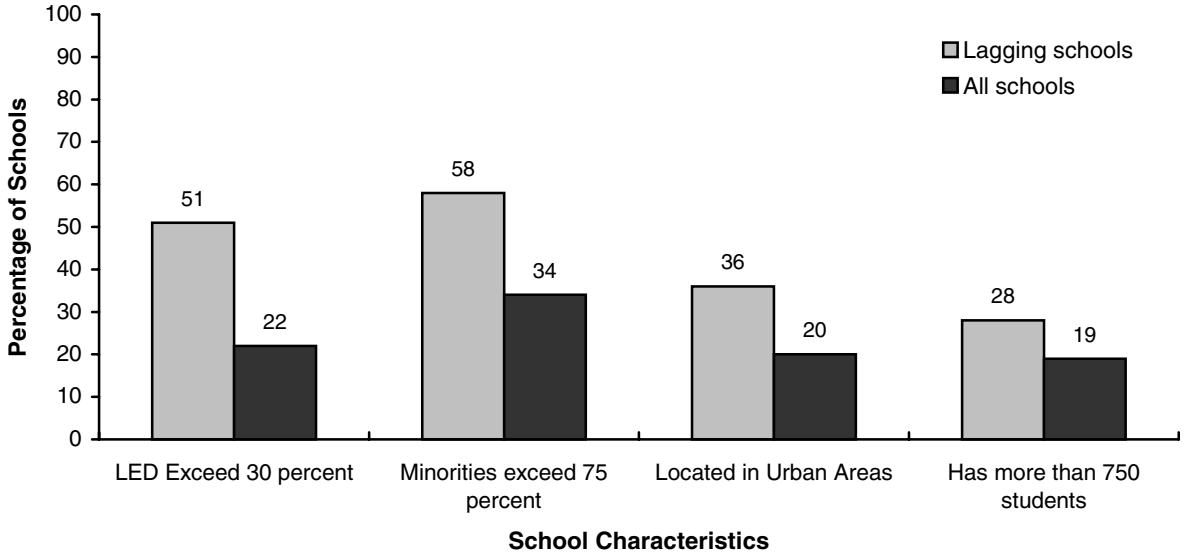
Figure 3.5–
Principals' Reasons for Not Completing CSR Implementation in All Eligible Grades by End of 1997–98 and 1999–00



Source: 1998 and 2000 CSR surveys of principals.

As Figure 3.6 shows, schools that had not fully implemented CSR in the fourth year were more likely to be located in urban areas, to have more than 750 students, and to be more than 75 percent minority. Often located in disadvantaged areas, these schools tend to have more difficulties than other schools in attracting and keeping teachers and are experiencing disproportionate growth in enrollments. Thus, they may have exhausted any existing space flexibility. These schools may also be under the most pressure to increase student achievement, which means they may be placing more emphasis on implementing reading and other programs aimed at boosting achievement rapidly.

Figure 3.6–
Characteristics of Schools Lagging in CSR Implementation, 2000



Source: 1998 and 2000 CSR surveys of principals.

Effects of CSR on Implementation of Other Educational Reforms

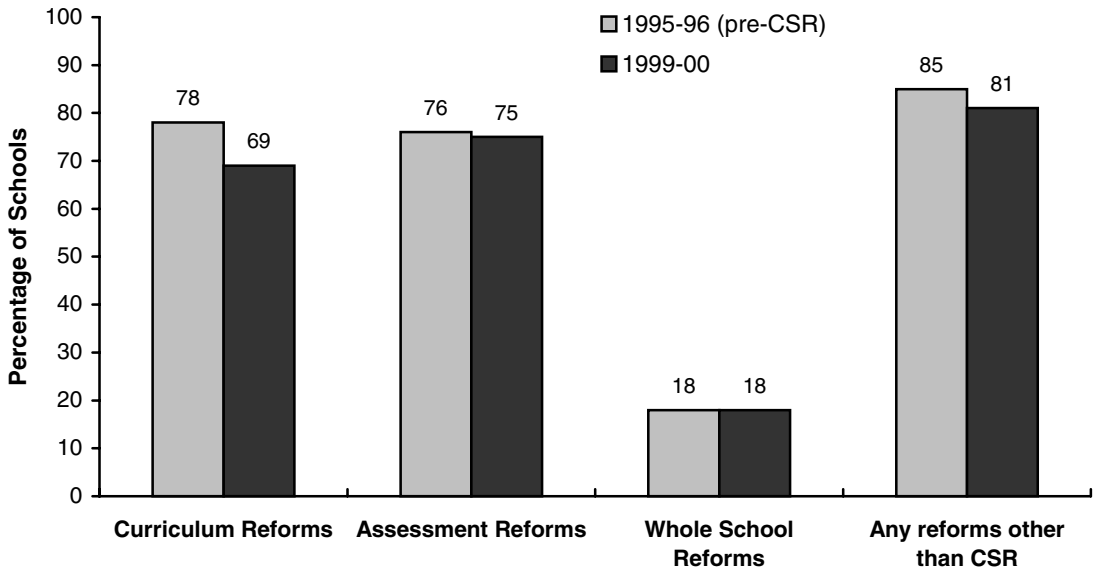
Both superintendents and principals reported that their implementation of CSR did not significantly affect their other educational reform efforts.

When the CSR program was announced, districts and schools throughout the state were already implementing other educational reforms (see Figure 3.7), some mandated by the state and some in accordance with district and/or school initiatives. At that time, 85 percent of the state's primary schools reported implementing at least one other type of reform, including curriculum, assessment, and/or whole school reform. By fourth year of CSR implementation, about 80 percent of California's elementary schools were still pursuing such efforts.

Given that some of the reforms were state mandated—a new state curriculum framework in mathematics and reading and new accountability requirements—it is not surprising that most schools were concurrently implementing these reforms and the CSR program. In some schools, however, CSR implementation caused some initial delays in the implementation of other reforms. About one out of four principals indicated that he or she had to use facilities for CSR that were also needed for other reforms. About one out of five principals indicated that CSR implementation initially diverted his or her attention from other reforms, and one out of ten reported having to postpone other reforms. With the exception of continuing to use facilities for CSR that had previously been allocated to other reforms, these effects were seemingly short lived, and by the fourth year of CSR implementation, less than 2 percent of principals still reported such effects.

Whole school reform efforts, which were not stated mandated, were not as widely undertaken by the state's elementary schools. They were under way in about one out of five schools. These efforts ranged from implementation of LEARN in the Los Angeles Unified School District, to implementation of the Coalition of Essential Schools, Accelerated Schools, Annenberg Schools, or other Comprehensive School Reform programs. In the 1999–00 school year, schools with a higher proportion of minority students were more likely than other schools to be engaged in whole school reform efforts.

Figure 3.7–
Schools Implementing Other Education Reforms, by Type of Reform, 1995–96 and 1999–00



Source: 1998 and 2000 CSR surveys of principals.

Effects of CSR on Non-Reduced Class Size in Upper Grades

The resource constraints documented above raised concerns that implementation of CSR in the eligible grades (K–3) might adversely affect resources for students in the upper grades (4–6) within the same schools. When asked to indicate whether CSR implementation had decreased or increased teacher retention, parent complaints, class size, and availability of enrichment programs in the upper grades, a majority of principals reported that CSR had not affected on these variables (see Table 3.2).

Nevertheless, as can also be seen in the table, a significant proportion of principals, from 23 to 33 percent, indicated that CSR implementation decreased the proportion of teachers who were tenured, decreased teacher retention, and increased class size in the upper grades. And a majority of principals thought that CSR decreased the morale of teachers in the upper grades. According to principals, the resentment of teachers in grades 4 to 6 for the emphasis given to lower grades by the CSR program increased over time. In spring1998, 35 percent of principals agreed with the statement that "teachers in grades 4 to 6 are resentful of the emphasis given to lower grades." In spring 2000, that percentage rose to 57 percent.

Table 3.2–
Principals' Perceived Effects of CSR Implementation on Other Grades with Non-Reduced Class Sizes, 1999–00

Effect of CSR on Non-reduced Class Size Grades	Percentage of Principals Reporting that CSR Resulted in a(n)	
	Decrease	Increase
Proportion of teachers who are tenured	26	6
Number of students per class	8	23
Ability to retain teachers	33	4
Teacher's morale	52	5
Complaints from parents	11	19
Availability of curriculum programs	18	13
Students' performance	7	45

Source: 2000 CSR survey of principals.

In contrast, 45 percent of principals thought that CSR would cause student performance to increase in the upper grades, whereas only 7 percent thought that it would negatively affect student performance.

Principals' and Superintendents' Views of Alternative Educational Initiatives

We asked superintendents and principals whether they would prefer that "none," "some," or "a lot" of the more than $1.5 billion annually dedicated to the CSR program be spent instead on a number of educational alternatives ranging from "upgrade teacher training" to "tutor individual children" to "expand music and arts programs" to "hire more reading/math specialists." We asked the same question in the spring 1998 and 2000 surveys.

Table 3.3 summarizes the principals' and superintendents' views about reallocating "some" or "a lot" of CSR funds to alternative educational programs. With few exceptions, less than 50 percent of either group of supported some reallocation of CSR funds. And, again with few exceptions, the views of principals generally mirrored those of superintendents. However, principals generally were more supportive of reallocating resources to the various alternatives presented than were superintendents.

Table 3.3–
Percentage of Principals and Superintendents Who Would Prefer to Spend "Some" or "A Lot" of CSR Funds for Alternative Educational Reforms

	Principals (%)		Superintendents (%)	
Alternative Educational Reform	Spring 1998	Spring 2000	Spring 1998	Spring 2000
Upgrade teacher training	59	52	55	38
Tutor individual children having learning difficulties	54	49	39	37
Hire more reading/math specialists	47	54	35	40
Improve school facilities	53	39	45	33
Hire more counselors	40	39	11	31
Provide after school programs	40	40	23	26
Equip all schools with computers and train teachers to use them	37	30	26	22
Expand music and arts programs	35	37	20	27
Provide summer school for all children	31	36	21	25
Increase teacher salaries	25	38	23	25
Hire more classified staff	29	27	21	18
Expand sports programs	12	12	1	6
Provide scholarships to all who qualify to go to college	11	11	6	8

Source: 1998 and 2000 CSR surveys of principals and superintendents.

The responses displayed in Table 3.3 may also be interpreted as indicating the relative preferences of principals and superintendents for the various hypothetical educational initiatives presented to them. With this interpretation in mind, the following conclusions can be drawn.

Principals and superintendents gave top priority to initiatives expected to increase student achievement. These initiatives included using funds to "upgrade teacher training," "tutor individual children," and "hire more qualified reading/math specialists." The relative priority of the latter increased between the 1998 and 2000 surveys and may reflect the state's emphasis on increasing student performance in reading and mathematics. All three initiatives would be expected to increase student performance, and the high priority given to them may also reflect education staff's response to the state's growing emphasis on school and district accountability for student performance.

Reallocation of resources to "expand sports programs," and "provide scholarships to all who qualify to go to college" received the least support from both principals and superintendents in both the 1998 and 2000 surveys.

Support for using resources to "improve school facilities" rated near the top in spring1998 for both principals and superintendents, but it declined sharply in spring 2000. In spring 1998, more than half of principals supported using funds for this purpose; in 2000, the figure was 39 percent. For superintendents, support declined from 45 percent in spring 1998 to 33 percent in spring 2000. This shift in priority came at the same time as support for "hire more reading/math specialists" increased.

Principals and superintendents moved apart over the two years regarding the relative importance attached to "increase teacher salaries." In spring 1998, 25 percent of principals and 23 percent of superintendents supported this initiative. By spring 2000, the percentage

of supporting principals had grown to 38 percent while the percentage of supporting superintendents remained unchanged.

Conclusions

Implementation of the popular CSR program has required that districts and schools increasingly reallocate funds and space away from a variety of support and educational programs. Many of the programs affected are arguably relatively low-priority for principals and superintendents—programs such as facility maintenance, administration, music/arts, gym, and sports. But higher-priority programs—such as professional development, computers, libraries, and after school programs—have also been impacted. How this reallocation of resources may affect students' overall education and performance over the long term remains to be seen. Furthermore, we do not know whether districts will be able to continue this reallocation in the future. Recently, one district in southern California decided to eliminate CSR in third grade as part of a larger effort to balance its budget for the 2002–03 school year (Garrison, 2002). At the time of our final evaluation report this June, we will have additional data that will bear on whether this is an isolated or a more widespread phenomenon.

CHAPTER 4

Teacher Characteristics

Jamie Shkolnik, Michalis Michaelides, and Freya Makris

Introduction

The first CSR evaluation report (see Bohrnstedt and Stecher, 1999) described how the increased demand for K–3 teachers to implement the Class Size Reduction (CSR) program in California's schools was associated with a decrease in the overall qualification levels of the K–3 teacher workforce. For example, the proportion of not fully credentialed teachers who were working in K–3 classes grew from 2 percent in 1995–96 (the year prior to the CSR program) to 12 percent in 1997–98 (the second year of the program). The second CSR evaluation report (see Stecher and Bohrnstedt, 2000) updated these earlier findings on the K–3 teacher workforce and expanded the analysis to other grades: upper elementary (grades 4 and 5), middle school (grades 7 and 8), and high school (grades 10 and 12). We found that the decrease in overall qualification levels of K–3 teachers persisted into the third year of the program and that teacher qualification levels for upper elementary, middle school, and high school declined as well.

This chapter updates these earlier findings, taking into account teacher workforce changes that occurred in the fourth and fifth years of CSR implementation, the 1999-2000 and 2000–01 school years. This focus here is primarily on two questions:

- How did the K–12 teacher workforce change between 1995–96 and 2000–01 as CSR was implemented?

- Were changes in teacher qualifications uniform across schools or were there differences associated with student or school characteristics (e.g., a school's percentage of minority students,[1] low-income students,[2] or students who were English learners)?[3]

[1] Minority students are any students not classified as Caucasian. The largest groups of minority students are, in order of group size, Hispanics, Asian/Pacific Islanders, and African Americans.

[2] Students are referred to as low-income or as being from low-income families in this report if state records classify them as receiving public assistance in the form of Aid to Families with Dependent children (AFDC) or its successor in california, CalWORKS.

[3] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage

The first CSR evaluation report documented a 38 percent increase in the number of K–3 teachers—equivalent to 23,500 additional teachers—during the first two years of CSR implementation (1996–97 and 1997–98).

The second CSR evaluation report, which covered implementation in the 1998–99 school year, described continued but slower growth in the K–3 teacher workforce as more kindergarten and third-grade classes were reduced in size. In that year, about 5,000 teachers were added to the K–3 workforce. In the fourth and fifth years of CSR implementation (1999–2000 and 2000–2001), growth in the K–3 teacher workforce leveled off. The total number of California K–3 teachers actually declined slightly.

Between 1995–96 and 1997–98, elementary schools that served larger proportions of low-income, minority, or EL students saw their proportion of K–3 teachers who were not fully credentialed, had minimum education levels, or had fewer than three years of experience increase more than did elementary schools that served smaller proportions of these students. These gaps in K–3 teacher qualifications between schools that served different population groups remained constant or grew slightly between 1997–98 and 1998–99. In grades 4 and 5, gaps in teacher qualifications also grew between 1995–96 and 1997–98, and they continued to grow in 1998–99. Similar results were found at the middle and high school levels.

In examining school characteristics and teacher qualifications in this chapter, we limit our presentation to schools having different proportions of low-income students. Appendix B contains information on the changes in the K–3 and grade 4 and 5 workforces related to proportions of EL, minority, and Hispanic students, as well as to school enrollment (size) and location (urban, rural, and suburban). Appendix B also contains basic information on changes in the grade 7 and 8 and 10–12 workforces in relation to proportions of low-income and minority students.

Methods

Data Sources

Our primary data source for analysis of the teacher workforce is the Professional Assignment Information Form (PAIF). All professional school staff complete this form at the beginning of each academic year, in early October. Through the PAIF, teachers provide information about themselves, including demographics, education level, years of experience, and credential status, as well as information on the classes they teach. The data are stored in the California Basic Educational Data System (CBEDS) by the California Department of Education.

We defined a K–5 teacher as one who is assigned to a "self-contained" classroom with between 14 and 50 students in grades K–5.[4] Teachers with students in both third and fourth

in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

[4] Sixth-grade teachers were not included in the analysis because some of them teach in junior high schools and some teach in high schools. (About half of them reported teaching in departmentalized, as opposed to self-contained, classes.) Thus, to ensure we had elementary school teachers separated from middle and high school teachers, we left them out.

grade were counted as K–3 teachers. We adopted this broad definition to make sure we captured all the relevant teachers. Teachers in classes that included some combination of grades 4–8 were not included.[5]

For grades 7 and 8 and 10–12, a teacher was defined as one who teaches in departmentalized classrooms and spends most of his or her time teaching classes in which the majority of students are in the stated grade range.[6] This category does not include administrators, those with other instructionally-related assignments (such as resource specialists, independent study teachers, or homeroom teachers), and special education teachers. Teachers who teach in classes with students of multiple grades are not included in the analysis, so the number of teachers considered is lower than the actual number of high school teachers. The upper-level grade categories are useful for comparing trends with the elementary-school grade categories, because they are not directly affected by the K–3 reduction in class size.

Teacher Characteristics

Teacher "quality" is a concept that is both poorly defined and difficult to measure. We focus here on three indicators of teacher qualifications generally believed to be associated with quality: teaching experience, education level, and credentialing. It is important to remember that the teacher characteristics we use (fully credentialed, not fully credentialed, etc.) may be related to quality but are not direct measures of a teacher's classroom effectiveness.[7]

To examine teaching experience, we defined a teacher who was in the first three years of teaching as a novice.[8] All teachers with four or more years were thus classified as experienced.

For education level, we separated teachers into two groups: those with a bachelor's degree only and those with education beyond a bachelor's degree.[9] Just under 0.6 percent of the total K–5 teacher workforce reported having less than a bachelor's degree, so we included these teachers in the bachelor's-degree-only category. As is also true for experience, education increases a teacher's salary—a signal that school districts value better-educated teachers.

Teachers were also assigned to one of two categories according to their credentialing status. We classified teachers simply as fully credentialed or not fully credentialed. Table 4.1 shows the various responses teachers could have provided on the PAIF and how those answers mapped into our two credential categories. Many teachers marked more than one response. If any one of a teacher's responses fell into the fully credentialed classification, we classified that teacher as fully credentialed.

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5 The number of teachers in combination classes including grades 4–8 declined between 1995–96 and 1998–99 from 4,700 to 4,400.

6 Some ninth-grade teachers are in junior high schools, and others are in high schools. As we did with the sixth-grade teachers, we chose to leave them out of our analysis to ensure that the patterns we uncovered could be cleanly interpreted.

7 Similar measures of teacher qualifications are found in Henke et al., 1997, and Kirby, Naftel, and Berends, 1999.

8 The three-year period for a novice teacher was selected to approximate the probationary, pre-tenure period.

9 Teachers responded to a question on the PAIF form that asked about their highest educational level. Choices included: doctorate, master's plus 30 or more semester hours, master's degree, bachelor's degree plus 30 or more semester hours, bachelor's degree, and less than bachelor's degree. Our cutoff was at the bachelor's degree category.

Table 4.1–
Teacher Credential Classifications

	Teacher Responses on PAIF		
Classification	**1995–96 and 1996–97**	**1997–98 and 1998–99**	**1999–00 and 2000–01**
Fully Credentialed	Adult Vocational Educ. Elementary Secondary Specialist	Full Credential	Full Credential
Not Fully Credentialed	Trainee Emergency	University Internship District Internship Emergency Waiver	University Internship District Internship Pre-Intern Emergency Waiver

School Characteristics

As was the case in the second CSR evaluation report, we categorized the state's elementary schools along six dimensions to examine whether changes in the K–3 workforce disproportionately affected some schools. Four of the categories were based on student characteristics: percentage of students receiving AFDC (i.e., low-income students), percentage of EL students, percentage of minority (non-white) students, and percentage of Hispanic students. The two other categories were based on school characteristics: location (rural, suburban, and urban) and school size (enrollment). The school location data were taken directly from CBEDS. Schools were ranked within these categories along each dimension and assigned to groups of similar schools. Groups contained similar numbers of schools, when possible, and were not weighted by number of students or teachers. Categorizations were based on conditions during the first year of CSR, 1996–97. The minority, low-income, EL, and enrollment categories have four ranked groups (i.e., quartiles); the school location and Hispanic categories have three ranked groups. Complete definitions and information on the number of schools and K–3 teachers in each grouping can be found in Appendix D, Part 1, of the first CSR evaluation report (Bohrnstedt and Stecher, 1999).[10] The middle school and high school analyses were only conducted for percent minority and percent low-income students.

It is important to note that not all changes occurring in the K–5 workforce while the CSR program was being implemented can be solely attributed to the program. CSR undoubtedly was a major influence on the elementary-teacher labor market and thus a likely cause of at least some of the changes, but other factors have had an impact as well—e.g., changes in opportunities available to teachers and would-be teachers because of an improved economy, and increased enrollments in all grades. We thus have included information on changes in teacher qualifications in middle and high school to provide contextual information on the changes affecting the entire teacher workforce. Given that teaching in grades 7 and 8 and 10–12 requires different certification than does teaching in K–5, CSR is less likely to have directly influenced the teacher workforces in these higher grades. However, any changes in

[10] Between 1996–97 and 1998–99, reported proportions of low-income students showed great variation for some schools. Repeating the elementary grade analysis without schools that had a one-year change of 15 percentage points or more in the proportion of low-income students did not change the trends reported.

teacher qualifications in middle and high school should serve as an indication of the type and size of changes caused by factors other than CSR.

Results

We begin this section by looking at general changes in California's teacher workforce. We update last year's findings with those for the 1999–00 and 2000–01 school years and look at the results in the context of changes that were occurring across the entire teacher workforce. We then turn to K–3 teacher qualifications and school characteristics to examine the distributional changes, after which we place these distributional changes in the context of those occurring for teachers in other grades. As our last step, we update the information on mechanisms of change that we reported in the second CSR evaluation report.

General Changes in the K–12 Teacher Workforce

In 1996–97 and 1997–98 (the first two years of CSR), California's K–3 teacher workforce grew at a rate of 19 and 16 percent, respectively. In 1998–99, the growth rate slowed to 6 percent. By 2000–01, it had slowed to less than 1 percent. Table 4.2 shows the basic demographics of the K–3 workforce between 1995–96 and 2000–01.

Table 4.2–
Demographic Changes in K–3 Teacher Workforce from 1995–96 to 2000–01

Demographics	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01
Total number of K–3 teachers	62,226	73,959	85,814	91,112	93,743	93,489
Percentage of first-year teachers	6	N/A[a]	12	10	7	8
Mean number of students per teacher	28.9	24.9	21.1	19.9	19.3	19.2
Percent white	74	73	72	71	70	69
Percent Hispanic	14	15	16	17	17	18
Percent Asian	6	6	6	6	7	7
Percent African American	5	5	5	4	5	4
Percent American Indian	0.6	0.6	0.6	0.6	0.6	0.5
Percent Male	8	8	9	9	9	9

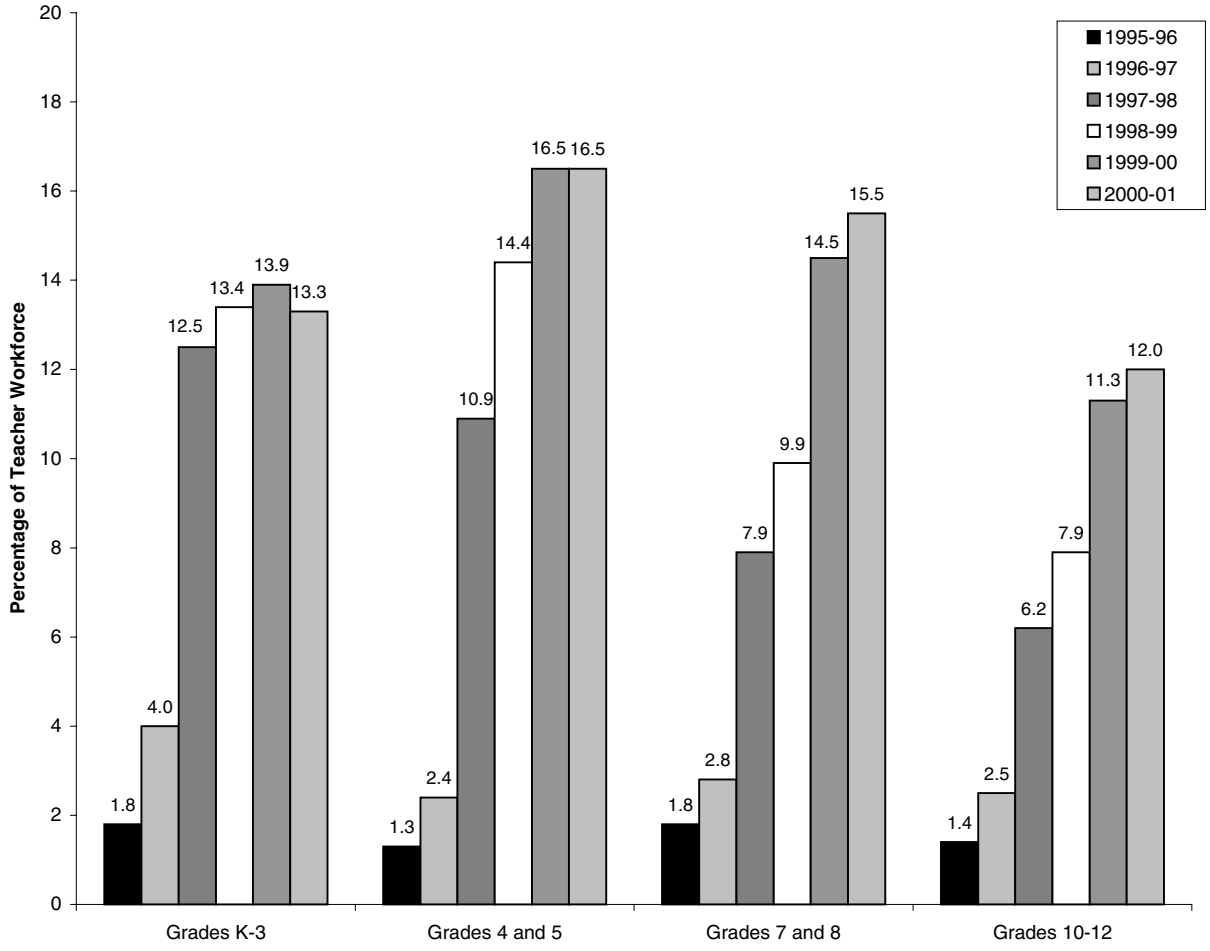
Source: CBEDS-PAIF.
Note: Similar information for grades 4 and 5, 7 and 8, and 10–12 is presented in Appendix B (see Tables B.1, B.2, and B.3).
[a] Measures of teacher experience were not available for 1996–97 because numerous data were missing in that year.

By 2000–01, the total number of K–3 teachers was 93,489. The percentage of these who were white dropped by five percentage points, while the percentage of Hispanic teachers seemed to make up for this drop, increasing by four percentage points. Class sizes for teachers in grades K–3 decreased steadily from an average size of 29 before CSR to just over 19 in 2000–01. Fourth- and fifth-grade teachers during these years did not fare as well. (See Appendix B, Table B.1.) Their class sizes lingered at 29. For teachers in middle school and high school, class sizes held steady from 1995–96 until 1998–99. Between 1998–99 and

2000–01, class sizes in these schools decreased by an average of 4 students per class, to 29 students and 28 students, respectively. (See Appendix B, Tables B.2 and B.3.)

Figure 4.1 shows the overall changes in credentialing levels for teachers in grades K–3 and compares them with changes in credentialing levels for teachers in grades 4 and 5, 7 and 8, and 10–12. Each bar shows the percentage of not fully credentialed teachers for a given year. As is evident, that percentage has increased sharply since 1995–96 for all grade levels, and was the highest in grades 4 and 5 for both 1999–00 and 2000–01, holding steady at 16.5 percent in both years. Also evident is that the proportion of not fully credentialed teachers decreased only once, in K–3 in 2000–01, while it continued to increase in grades 7 and 8 and 10–12. This was occurring while class sizes at these grade levels were decreasing, which could explain the increase in the percentage of teachers not fully credentialed.

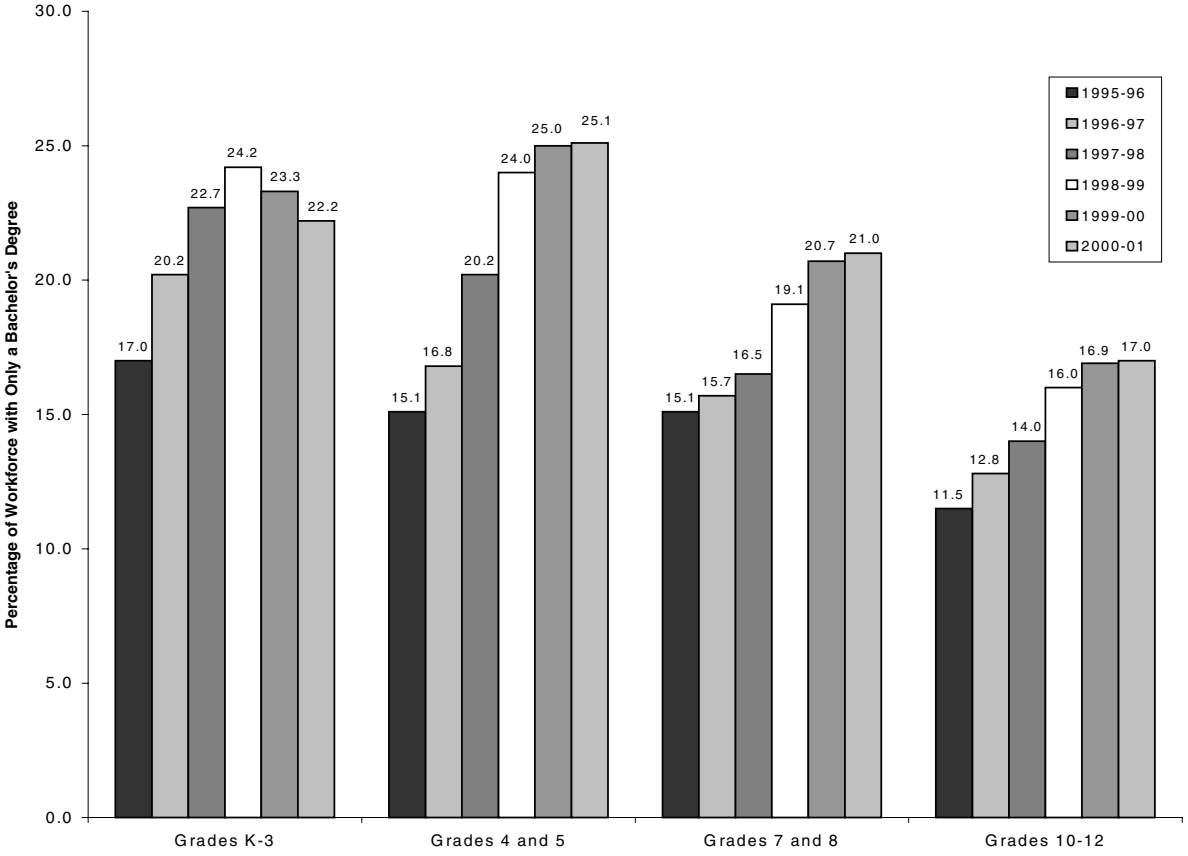
Figure 4.1–
Changes in Proportion of Teachers Not Fully Credentialed



Source: CBEDS-PAIF.

The patterns for the proportion of teachers with full credentials across grade level and year are remarkably similar to the patterns for the other two measures of teacher qualifications: education and experience. Figure 4.2 shows changes in the proportion of teachers with only a bachelor's degree. The proportion of teachers with only a bachelor's degree decreased in grades K–3 in 1999–00 and 2000–01 and, for grades 4 and 5 and higher, increased slightly in 1999–00 and then essentially held steady in 2000–01.

Figure 4.2–
Changes in Proportion of Teachers with Only a Bachelor's Degree

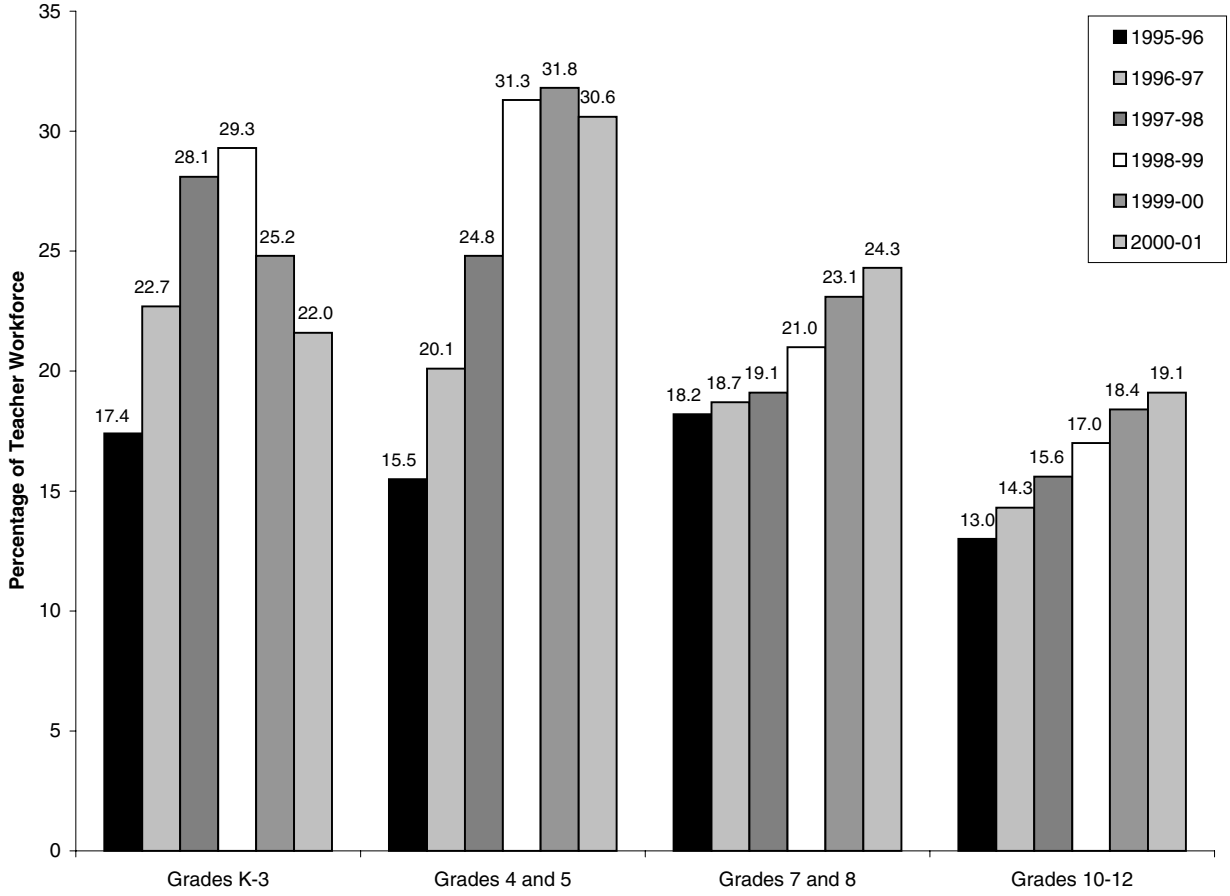


Source: CBEDS-PAIF.

Figure 4.3 shows changes in the proportion of novice teachers (i.e., those in their first three years of teaching). Here, the proportion decreased sharply for K–3 in 1999–00 and 2000–01, dropping from 29.3 percent in 1998–99 to 22.0 percent in 2000–01. Teachers who started teaching K–3 in the first and second years of CSR, when the increase in demand for teachers was the greatest, were in their fourth and fifth years by the 2000–01 school year. Before CSR began and during the first two years, the percentages of new teachers in K–3 and grades 4 and 5 were similar: 6 percent of K–3 teachers and 5 percent of grade 4 and 5 teachers were in their first year in 1995–96; and 12 percent of both K–3 teachers and grade 4 and 5 teachers were in their first year two years later. (See Tables 4.2 and B.1.) By 1998–99, however, the percentage of first-year teachers had decreased to 10 percent in K–3 but had

increased to 13 percent in grades 4 and 5. One possible explanation for the high percentage of new teachers in grades 4 and 5 is that experienced teachers switched to grades K–3, leaving more openings for new teachers in grades 4 and 5.[11] The percentage of novice teachers in grades 4 and 5 leveled off at approximately 31 percent after 1998–99, perhaps because of the large inflow of new teachers into those grades in that year. In 2000–01, these teachers were in their third year of teaching.

Figure 4.3–
Changes in Proportion of Novice Teachers



Note: Percentages shown for 1996–97 are averages of percentages for adjacent years due to an unusually high percentage of missing data.
Source: CBEDS-PAIF.

Finally, although Figures 4.1, 4.2, and 4.3 tell much the same story, it is not the same teachers driving these results. As Figure 4.4 shows, for the 2000–01 school year, only 7.0 percent of K–3 teachers fit all three categories of lower qualifications: not fully credentialed, bachelor's degree only, and novice. Almost two-thirds of the K–3 teachers (65.2%) fit none of these categories, meaning that they were the most qualified. Some K–3 teachers fit only

[11] Flows of teachers into some grades and out of other grades (teacher mobility) will be analyzed in our fourth CSR evaluation report using longitudinal data on teachers.

one category—1.8 percent not fully credentialed, 8.6 percent bachelor's only, and 8.7 percent novice—and 8.7 percent fell into exactly two categories. Figure 4.5 shows the breakdown for the grade 4 and 5 teachers. In 2000–01, they were more likely than K–3 teachers to fit all three of the categories of lower qualifications: 9.2 percent, compared with 7.0 percent of K–3 teachers. And they were less likely to be the most qualified (i.e., to fall into none of the three categories): 57.7 percent compared with 65.2 percent of K–3 teachers.

Figure 4.4–
Overlap of Teacher Characteristics for Grades K–3, 2000–01

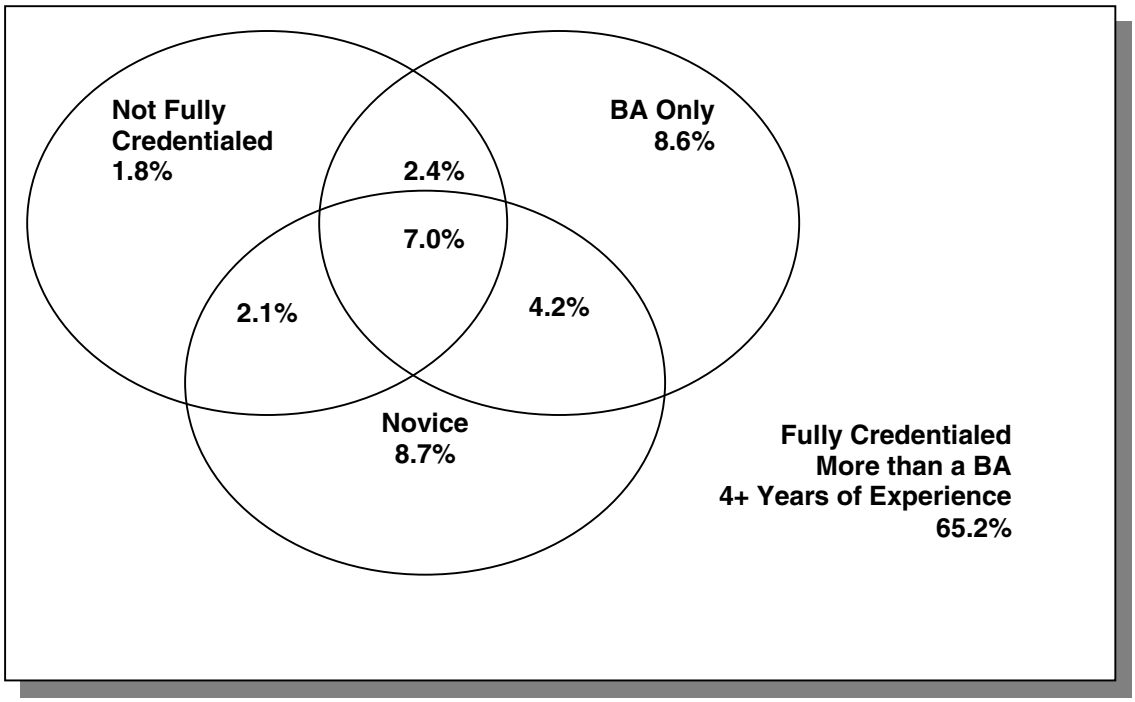
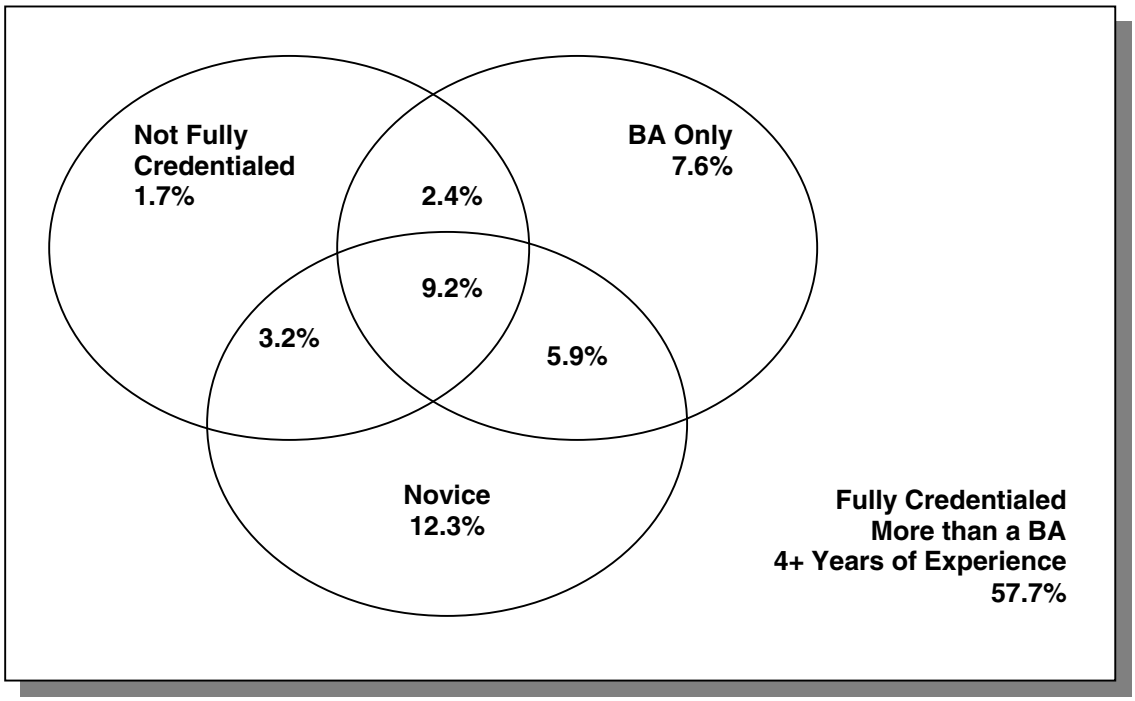


Figure 4.5–
Overlap of Teacher Characteristics for Grades 4–5, 2000–01



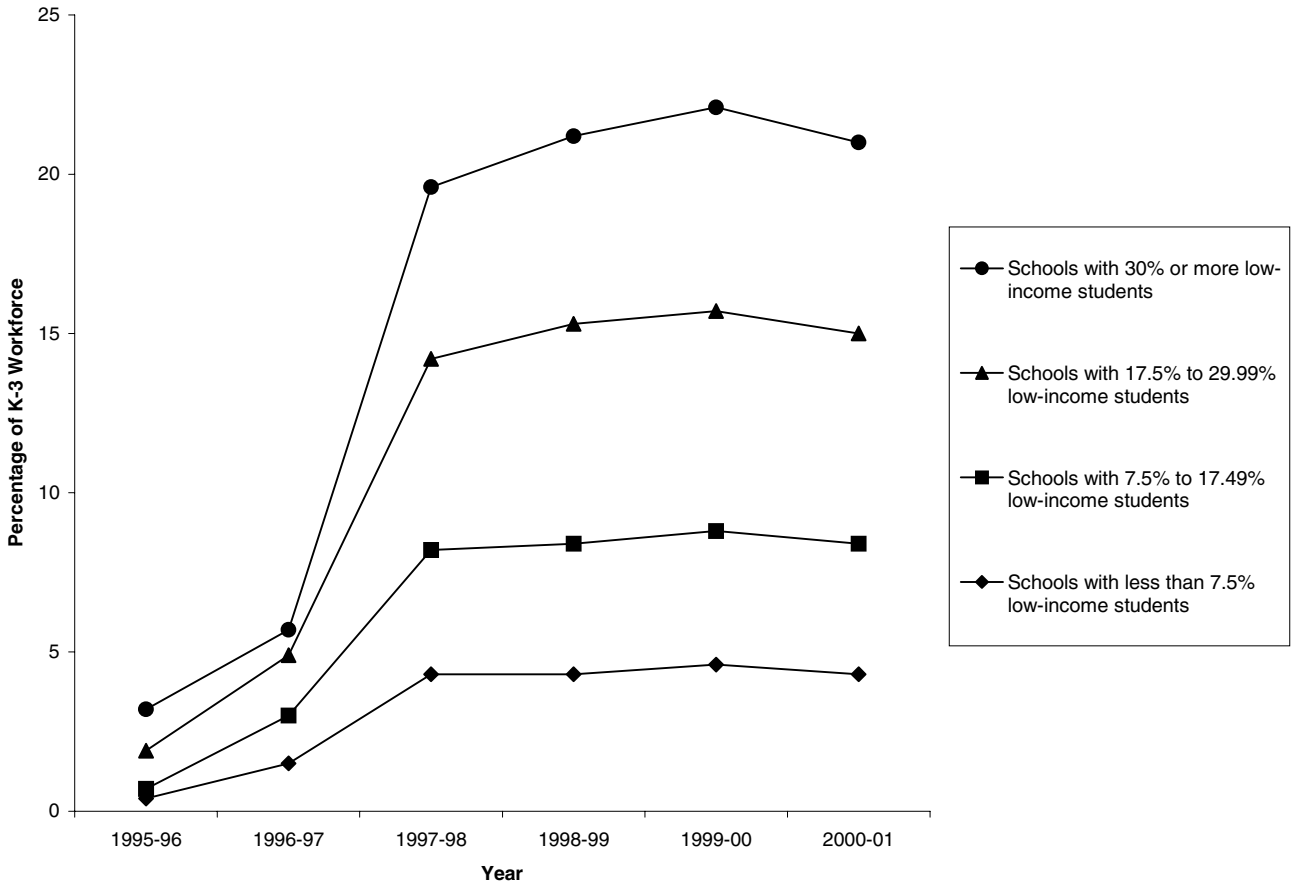
Changes in K–3 Teacher Qualifications Across Schools

We now turn to our findings on K–3 teacher qualification levels across schools with different proportions of students classified as low-income. Unless stated otherwise, the patterns described are similar to those seen when schools are classified by proportion of EL students, minority students in general, and Hispanic students in particular. Results for these latter classifications, as well as comparisons based on school urbanicity and school size, are presented in Appendix B.

Figure 4.6 shows the distribution of not fully credentialed K–3 teachers in schools with different proportions of low-income students. In our first evaluation report (see Bohrnstedt and Stecher, 1999), we found that the gap in teacher qualification levels between schools that served larger and smaller proportions of low-income students grew as CSR was being implemented. For example, in 1995–96, before the implementation of CSR, the gap in the proportion of not fully credentialed teachers between schools that served the largest and smallest proportions of low-income students was about 3 percentage points (3.2 percent compared with 0.4 percent). This gap grew to 15 percentage points in 1997–98 and continued to grow, but at a much slower pace, from 1997–98 to 1998–99. By 1998–99, it was 17 percentage points. Though the overall percentage of not fully credentialed teachers at the K–3 level has now begun to drop slightly, the gap in the percentage of these teachers teaching in schools with high versus low percentages of low-income students persists. From 1998–99 through 2000–01, a difference of approximately 17 percentage points remained between schools serving the highest and lowest proportion of low-income students. In

other words, a student a school in the lowest income quartile had a one in five chance of being taught by a teacher without a full credential, compared with a student in the highest income quartile school whose chance was one in twenty-three.

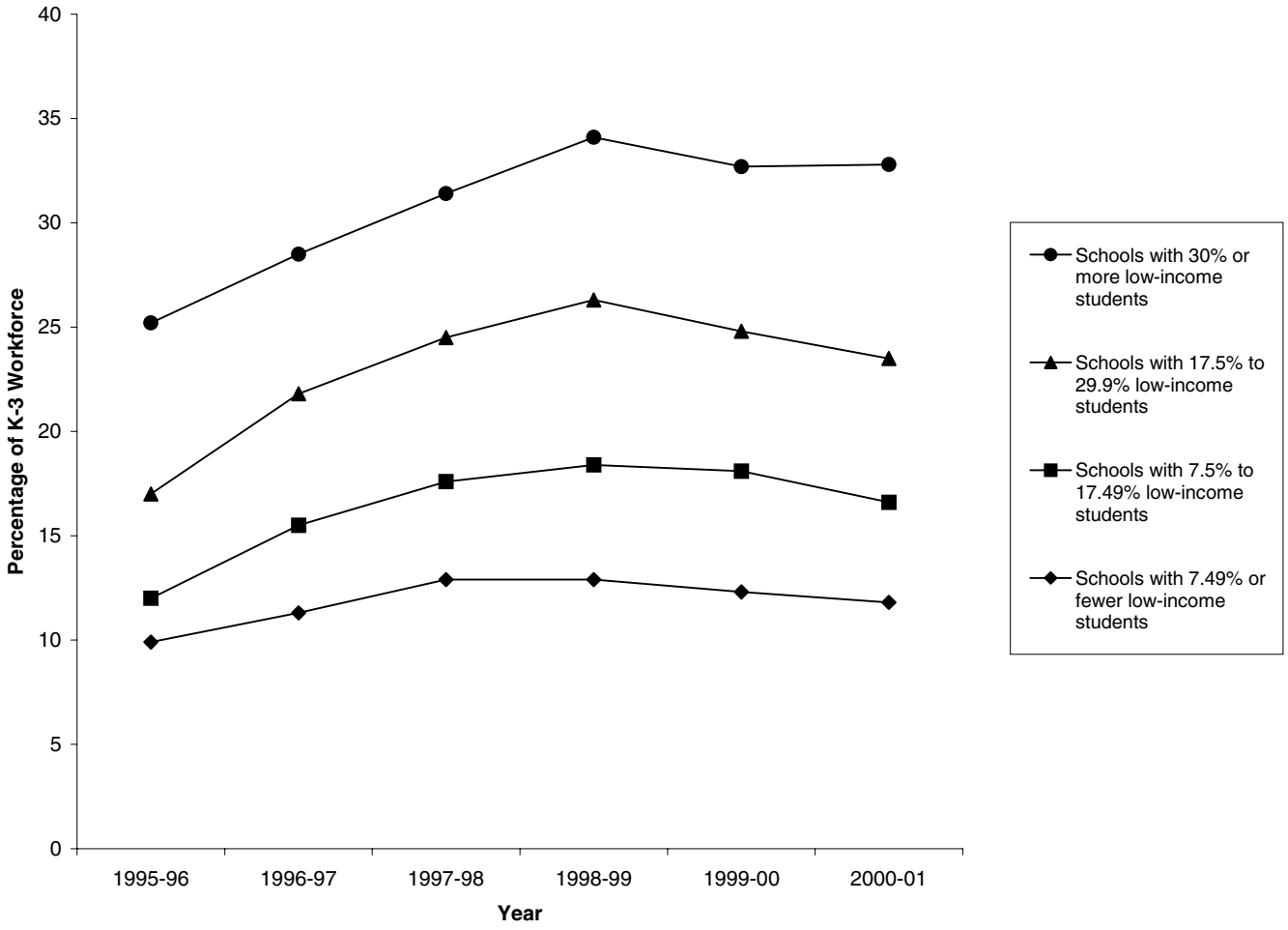
Figure 4.6–
Percentage of K–3 Teachers Not Fully Credentialed in Schools with Different Proportions of Low-Income Students



Note: The numbers for this table can be found in Appendix B, see Table B.16. (See Tables B.40, B.54, and B.60 for grades 4 and 5, 7 and 8, and 10–12.)
Source: CBEDS-PAIF.

Figure 4.7 shows the proportion of K–3 teachers with only a bachelor's degree across schools with different proportions of low-income students. In 1995–96, before CSR began implementing, there was a 15 percent gap in the proportion of teachers with only a bachelor's degree in schools with the most low-income students versus schools with the fewest low-income students. By 1998–99, after three years of CSR, the gap had widened to 22 percent. It then remained at roughly that level through 2000–01, even though there was an overall drop in the percentage of teachers with only a bachelor's degree at the K–3 level.

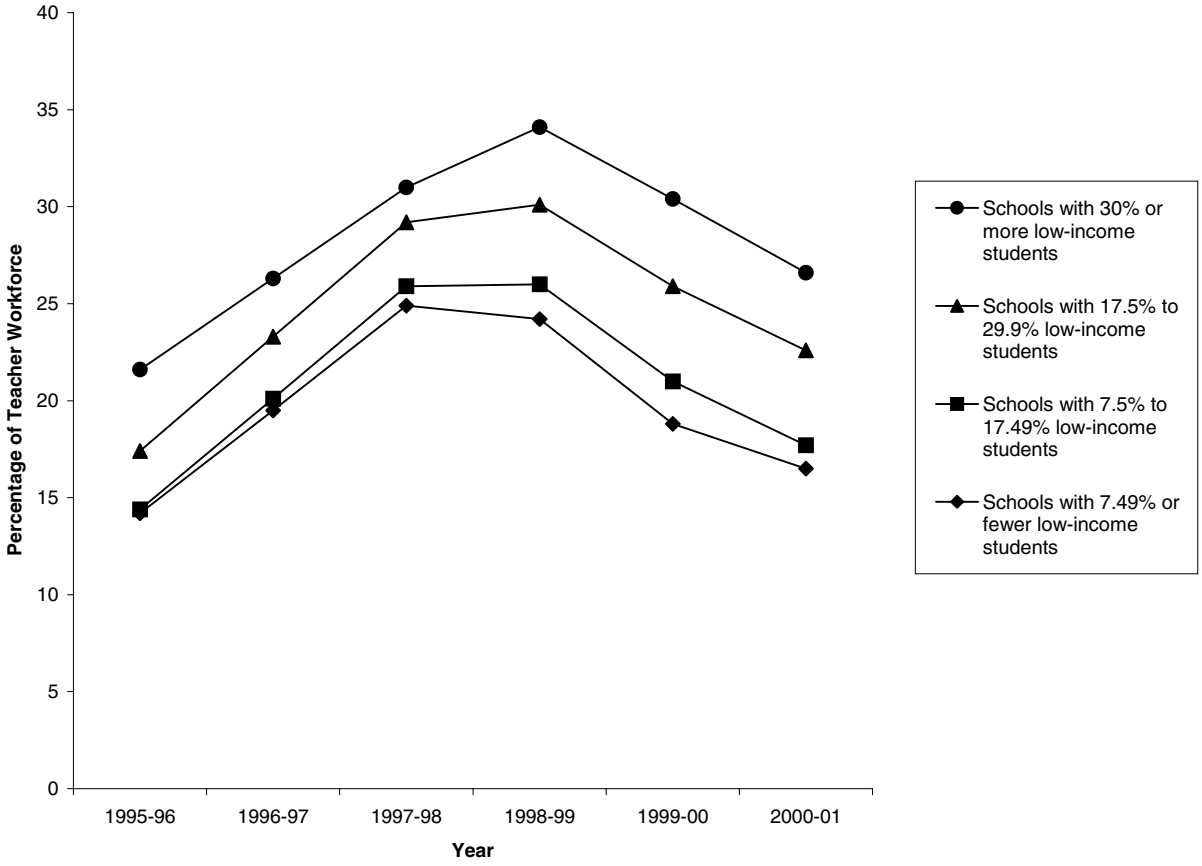
Figure 4.7–
Percentage of K–3 Teachers with Only a Bachelor's Degree in Schools with Different Proportions of Low-Income Students



Note: The numbers for this table can be found in Appendix B, see Table B.10. (See Tables B.34, B.53, and B.59 for grades 4 and 5, 7 and 8, and 10–12.)
Source: CBEDS-PAIF.

Figure 4.8 shows the percentage of novice teachers in schools with different proportions of low-income students. During the first two years of CSR, this indicator of teacher qualifications behaved slightly differently than the other indicators did: The gap in teacher experience between schools with the largest and the smallest proportions of low-income students shrank slightly, dropping from 7 to 6 percentage points. This trend was reversed in 1998–99, however, when the gap increased to 10 percentage points. As the figure shows, the percentage of novice teachers decreased in all four categories of schools at that time, the reason being that the large number of teachers who entered in 1996–97 and 1997–98 were then in their fourth and fifth years of teaching. A gap of about 10 percentage points did remain, however, between the proportion of novice teachers teaching in schools with the largest proportion versus the smallest proportion of low-income students.

Figure 4.8–
Percentage of K–3 Novice Teachers in Schools with Different Proportions of Low-Income Students



Note: The 1996–97 percentage of novices is an average of the values of adjacent years due to missing experience data.
Note: The numbers for this table can be found in Appendix B, see Table B.4. (See Tables B.28, B.52, and B.58 for grades 4 and 5, 7 and 8, and 10–12.)
Source: CBEDS-PAIF.

Conclusions

Summary of Findings

Between 1995–96 and 1997–98, K–3 students at schools in all four income quartiles experienced a steep rise (which leveled off somewhat in 1998–99) in the percentage of teachers without full credentials and a slower rise in the percentage of teachers without advanced degrees. All four quartiles experienced a fairly steep rise in the percentage of novice teachers that peaked in 1998–99 and then decreased almost as quickly as it had risen.

In 1995–96, before CSR began, schools in each of the four income quartiles had low percentages of not fully credentialed K–3 teachers. Even in schools with the most low-income students, only 3.2 percent of the K–3 teacher workforce was not fully credentialed. CSR was associated with an increase in the percentage of not fully credentialed teachers, but the increase was not equitably distributed across schools. In 1996–97 and even more so in

1997–98, the gap in the percentage of fully credentialed teachers in the schools with the highest percentage of low-income students increased dramatically compared to that in the schools with the lowest percentage of low-income students, and the gap remained at 17 percentage points through 2000–01.

Schools with a high percentage of low-income students were also more likely to have a higher percentage of teachers who do not have advanced degrees. This discrepancy existed before the implementation of CSR and had grown by 2000–01. The schools with higher percentages of low-income students saw more of an increase in teachers with only a bachelor's degree than did schools with lower percentages of low-income students. The gap between the highest and the lowest quartiles was 15 percentage points before CSR and 20 percentage points by 2000–01.

Schools in all four of the income quartiles experienced an increase and then a decrease in the percentage of novice teachers. Schools with high percentages of low-income students had higher percentages of novice teachers both before and after CSR implementation, and the gap remained steady over the six years evaluated.

Discussion

Schools that had fewer rather than more students classified as low-income, EL, minority in general, or Hispanic in particular seemed better able to recruit teachers who were fully credentialed, better educated, and experienced.

In *Status of the Teaching Profession* (Shields et al., 2000), researchers at the Center for the Future of Teaching and Learning (CFTL) reported that there are enough credentialed teachers in California to fill every teaching position in the state. The existence of open teaching positions in low performing schools led them to conclude that some potential teachers are either unwilling or unable to take jobs in low performing schools. Their findings with regard to schools with larger percentages of students from higher income families are the opposite. Such schools do not have a problem finding credentialed teachers. This finding presented in the CFTL report is consistent with our CSR evaluation results. We find that almost all of the teachers in school with higher-income students are fully credentialed, while teachers in schools with lower-income students are much more likely to lack full credentials.[12] The CTFL report suggests that the disparities between more advantaged and less advantaged schools may continue to grow in the coming years, due to increasing enrollments and an expected increase in the retirement rate of teachers. Our report looks at these gaps over six years and finds that the discrepancy in the percentage of fully credentialed teachers, although quite large, has remained steady from 1997–98 through 2000–01. In other words, inequities exist but are not worsening.

Understanding the movements, or flows, of teachers that caused the growing disparity in K–3 teacher qualifications between schools with different populations of students is key to an analysis of CSR. It is highly likely that several different patterns of movement contributed to the disparities we found in teacher qualifications. One pattern that surfaced in our previous evaluation stemmed from the fact that schools with lower proportions of low-income

[12] See the CFTL report for information on California's policies aimed at recruiting, training, and retaining credentialed teachers.

students were able to attract the better-prepared teachers as CSR was implemented. The questions to be answered are: Have teachers moved from teaching other grades to teaching K–3? Have fully credentialed, better educated, and experienced teachers moved to higher-performing and higher-income schools? How much movement has there been before and during implementation of CSR? How much of the movement was due to CSR?

We have been able to secure data that will allow us to better determine the flow of teachers as a function of attrition at various grade levels and the degree to which upper-grade teachers and teachers with specialized credentials (e.g., in special education) are drawn to teach at the K–3 levels. These analyses will be completed, reported, and discussed in our next CSR evaluation report.

CHAPTER 5

Teaching Mathematics and Language Arts

Cathleen Stasz, Vi-Nhuan Le, and Brian Stecher

Introduction

Changes in classroom practices are thought to be a primary mechanism by which class size reduction influences student achievement and other student outcomes. The idea is that smaller classes allow teachers to teach in ways not possible with larger classes. Therefore, they may change their teaching practices, incorporate different instructional activities, introduce more comprehensive or in-depth curriculum, and/or adopt different classroom management strategies—any or all of which may lead to better student outcomes.

This chapter presents our findings on differences in the curriculum and teaching practices of teachers in reduced and non-reduced size classes. As with the two previous Class Size Reduction (CSR) evaluation reports, we address three main questions:

1. Do reduced and non-reduced size classes differ with respect to content covered in language arts and mathematics instruction? Do teachers in reduced size classes cover more topics or spend more time on individual topics?

2. Do reduced and non-reduced size classes differ with respect to teaching practices? Are students grouped differently? Are there differences in students' learning activities? Are there differences in the amount of individualized instruction and feedback?

3. Are there other factors, in addition to class size, that relate to teaching practices, such as student race/ethnicity, language proficiency, availability of instructional aides, or availability of teacher staff development?

We approached these questions in two ways. First, we compared teacher responses on surveys administered in spring 1999 and spring 2000. In a few cases, we included survey data from the spring 1998 survey as well. Second, for each of the two years, we compared responses of teachers in non-reduced and reduced size third-grade classes with those of teachers in fourth-grade (non-reduced size) classes.

The comparison with fourth grade, which is an addition to the analyses we conducted in previous years, provides another way to isolate the effects of class size. Because the CSR program only applies to grades K–3, reduced size third-grade classes differ from fourth-grade classes along two dimensions: grade level and class size. One would thus expect that, to the extent that class size is a factor underlying any observed differences, fourth-grade teachers' responses would more closely resemble those of third-grade teachers in non-reduced size classes than they would those of third-grade teachers in reduced size classes. This assumption may not hold in areas where third and fourth grade might be expected to differ—for example, in curriculum topics.

In general we found that:

- Smaller class size did not prompt teachers to radically alter their teaching practices, nor did it change the breadth or depth of curriculum coverage.
- Smaller classes did provide greater opportunities for individualized instruction.
- Students in reduced size classes showed more positive-learning behavior over the two years we measured such behaviors. They were less disruptive, less likely to compete for their teacher's attention, and less likely to engage in exclusionary behavior than were students in non-reduced size classes.

The next section reviews the findings on teacher practices from the two previous CSR evaluation reports (Bohrnstedt and Stecher, 1999; Stecher and Bohrnstedt, 2000). The ensuing sections then present our methods for this third evaluation report, our results, and our conclusions.

Review of Earlier Findings

Year One Evaluation Results. In the first year of the evaluation, teacher surveys were administered in spring 1998. We found few differences in the teaching practices of third-grade teachers in reduced versus non-reduced size classes (Stasz and Stecher, 1999). With regard to their mathematics and language arts lessons, teachers reported that they covered about the same number and type of topics and spent about the same amount of time on them. Classes were about the same length, and teachers assigned similar amounts of homework.

Generally, teachers also reported similar instructional practices, although a few differences were noted. Teachers in non-reduced size classes were more likely to teach the whole class or large groups of students (five or more), whereas teachers in reduced size classes were more likely to teach smaller groups of two to four students. Students in smaller classes also spent significantly more time writing narrative pieces (in language arts), playing mathematics games, and using patterns to find relationships in mathematics.

The most notable difference in practices between the reduced and non-reduced size classes concerned time spent in individualized instruction: Teachers in reduced size classes were

significantly more likely to provide sustained attention to students whom they identified as needing help with reading.[1] In addition, teachers spent more time discussing individual students' personal concerns. Teachers in reduced size classes also spent less time disciplining students than did teachers in non-reduced size classes. In other respects, however, teachers in both size classes spent their time in similar ways (e.g., completing paperwork, assessing and monitoring students, and reviewing homework).

Background differences among teachers did not appear to affect these findings. When we compared teachers in reduced and non-reduced size classes in terms of teacher experience, professional development opportunities, degree or credential held, and percentage of minority or English learners (EL)[2] students in class, only two differences proved to be significant: Teachers in reduced size classes were more likely to have a master's degree and, not surprisingly, to have participated in staff development activities that focused on teaching in smaller classes.

Year Two Evaluation Results. The survey administered in spring 1999 was revised from the previous year based on an analysis of the responses, pilot testing, and input from CSR Consortium members. It included a number of items from the previous year, plus some new questions about student behavior.

The year two comparisons, which occurred after three years of CSR, examined teaching practices in reduced and non-reduced size third-grade classes and found them more alike than different for most of the variables measured (Stecher et al., 2000). However, a pattern of differences began to emerge. In spring 1999, there was evidence of greater individualization and less disruption in reduced size classes, as well as some differences in content coverage than had been observed in spring 1998. Teachers in reduced size classes continued to provide more extensive attention to poor readers, and they continued to devote more instructional time to small groups. They also spent more time working with individual students during language arts lessons. This last difference had not been significant in spring 1998, and although it is small in magnitude—about seven minutes per day—it translates to about 20 hours per school year.

Teachers in smaller classes were more positive than teachers in larger classes about their ability to assess and meet student needs and to provide students with quick feedback and individual attention. Nevertheless, in spring 1999, two-thirds of teachers in reduced size classes still found it hard to meet the instructional needs of all their students.

In both years, class size was also associated with student discipline. In spring 1998, teachers in reduced size classes spent less time disciplining students than their counterparts in non-reduced size classes. In spring 1999, teachers in reduced size classes reported that a smaller proportion of students were disruptive during lessons.

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[1] Sustained attention was defined as five or more continuous minutes. The survey did not ask about sustained attention in mathematics.

[2] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

All teachers in both years covered about the same number of topics in mathematics and language arts and devoted about the same amount of time to those topics. In 1999, however, teachers in non-reduced size classes also reported feeling rushed to cover basic topics and unable to explore curriculum topics in depth. There were no differences in instructional activities in language arts associated with class size. In mathematics, students in reduced size classes were more likely to work with measuring instruments than were students in non-reduced size classes. Over the two years of the study, teaching practices for teachers in reduced and non-reduced size classes were more similar than different.

Methods

For our newest evaluation, we once again used data from a statewide survey to contrast the teaching practices of teachers in reduced and non-reduced size classes. The teacher survey administered in spring 2000 was virtually identical to that administered in spring 1999. It consisted of 49 items, most of which were multiple-choice, and it asked teachers about their experience and background, classroom and student characteristics, instructional activities and curricular focus in language arts and mathematics, and attitudes toward various topics.

We re-sampled among teachers from the same schools that had participated in the spring1999 survey. We administered the survey to 1,393 teachers in first through fourth grades, 130 of whom were newly eligible for the evaluation because they had not been teaching in the sampled schools in the previous year.

In 1999, we over-sampled third-grade teachers because it was the grade level with the greatest variation in class size.[3] In 2000, we did not intentionally over-sample third-grade teachers, because most schools had reduced the size of their third-grade classes by this time. However, because we had over-sampled third-grade teachers in the previous year and had re-sampled from the same set of teachers for this year's analysis, third-grade teachers remained over-represented in the 2000 sample. They constituted nearly two-fifths of the sample, whereas the remaining grades made up between one-eighth (fourth grade) and one-fifth (second grade).[4]

Response rates were lower in 2000 than in previous years.[5] We received a total of 786 responses, representing an overall response rate of 56 percent. The response rates for first-, second-, third-, and fourth-grade teachers were 53, 59, 55, and 63 percent, respectively.

In the following sections, we compare the responses of third-grade teachers in reduced and non-reduced size classes with those of fourth-grade teachers in each of two years, 1999 and 2000. In 1999, the third-grade sample included 636 teachers, 531 of who taught in reduced size classes, and 105 of whom taught in non-reduced size classes. The fourth-grade sample included 173 teachers. In 2000, the third-grade sample included 362 teachers, 335 who

[3] That is, there were too few non-reduced classes in first and second grades for analysis, and there were no reduced classes in fourth grade.

[4] The small sample size in fourth grade prevents us from reporting the responses of fourth-grade teachers in schools with reduced third-grade classes and fourth-grade teachers in schools with non-reduced third-grade classes.

[5] Response rates in 1998–99 ranged from 76 to 84 percent, with an overall response rate of 80 percent. Response rates in 1997–98 ranged from 65 percent for teachers to 88 percent for superintendents.

taught in reduced size classes, and only 27 who taught in non-reduced size classes. The fourth grade sample included 113 teachers. It is important to keep in mind that the number of teachers in non-reduced size classes in 2000 was very small, so the results may not be widely generalizable beyond this particular sample.

Data Analyses

The tables in this chapter present weighted mean values for teachers in reduced and non-reduced size classes within survey years. The weights adjust for non-response patterns as well as the two-stage sampling design. We conducted statistical tests (with adjustments to the standard errors) to determine whether differences observed between the groups were statistically significant.[6] This analysis compares survey findings from spring 1999 and spring 2000.

Our analyses in the two previous CSR evaluation reports found that CSR was implemented at different rates in different types of schools (Bohrnstedt and Stecher, 1999, Stecher and Bohrnstedt, 2000). Schools in urban areas that served a greater proportion of low-income or minority students reduced size classes much less rapidly than did schools that served a smaller proportion of these students. Furthermore, we found that teachers in non-reduced size classes tended to be less educated, less experienced, and more likely to hold an emergency teaching credential than were teachers in reduced size classes (Stecher et al., 2000). Because CSR was not implemented randomly across schools, it is possible that differences in teaching practices between teachers in reduced and non-reduced size classes are due to pre-existing differences in teacher and student characteristics rather than to class size. We used regression analysis to disentangle the effects of CSR from those of extant teacher and student characteristics.[7] The independent variables in our regression equation included a dichotomous variable for class size, and continuous or ordered categorical variables for teacher experience, teacher education level, teacher credential status, and percentage of EL students in a class. Tables in this chapter report the weighted mean values for each group, but the tests of statistical significance between groups are based on the coefficient of the class size variable in the regression analysis.

Table 5.1 shows the average values for selected teacher, student, and class characteristics in reduced and non-reduced size third-grade classes and in fourth-grade classes in our 1999 and 2000 samples.

[6] Because teachers are clustered within schools, standard errors under the two-stage sampling design are larger than would be the case for a simple random sampling design.

[7] In analyzing teacher support we did not control for these differences, because it was considered a school variable, not a class or teacher variable.

Table 5.1–
Average Teacher, Student, and Class Characteristics

Characteristics	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
	Reduced (N = 531)	Non-reduced (N = 105)	Fourth Grade (N = 173)	Reduced (N = 335)	Non-reduced (N = 27)	Fourth Grade (N = 113)
Teacher						
Gender (% female)	82.4**	84.6	85.1	84.0*	94.6♥	79.3
Race/ethnicity (% minority)	22.0*	40.1♥	23.1	23.0	25.3	24.6
Experience (years)	13.4	11.1	12.4	14.2	16.7	13.2
Education (% master's or higher)	29.9	21.8	26.3	35.6	29.3	29.6
Credentialing (% emergency teaching permit)	5.9**	18.9	10.8	6.7	1.8	4.5
Student						
Race/ethnicity (% minority)	61.3**	76.5♥	60.3	59.6**	77.0	66.3
Language status (% EL)	26.0**	40.4♥♥	24.1	26.9	34.0	27.5
Family income level (% free/reduced-price lunches)	53.0*	66.2	57.0	53.2	61.0	53.8
Class						
Number of students	19**++	30	30	19**++	30	30

Note: Significance tests were conducted within the year.
* denotes significant differences between third-grade reduced and non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and non-reduced size classes at the .01 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.
♥♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .01 level.

In spring 1999, third-grade teachers in non-reduced size classes were more likely than third-grade teachers in reduced size classes to be female and a member of a minority group and to hold an emergency teaching permit. In spring 2000, two groups differed only with respect to gender: Again, there were significantly more female teachers in non-reduced size third-grade classes than in the other two types of classes. The percentage of teachers in non-reduced size third-grade classes who had an emergency credential decreased substantially over the two years (from 18.9 percent to 1.8 percent). This sharp decrease may be a function of the small sample size in 2000 (only 27 teachers) or a response bias among this group, or it may indicate that teachers were successfully completing their credential requirements.

The characteristics of students in some of the sampled classes also were quite different. In spring 1999, students in non-reduced size classes were more likely to be minority, EL students and free/reduced-price lunch recipients. In spring 2000, students in non-reduced size third-grade classes were still more likely to be from a minority group than were students in reduced size third-grade classes. Otherwise, the composition of the classes in 2000 was similar. Finally, the reduced size third-grade classes had an average of 19 students, whereas the non-reduced size third-grade classes and the fourth-grade classes both had an average of 30 students.

Results

We now present the results from a number of analyses we undertook to determine whether class size is related to the support teachers receive, the type and coverage of topics in mathematics and language arts (for third grade only), instructional practices, student behavior, and attitudes about teaching.

Teacher Support

Professional development activities can enhance the effects of reduced class size by training teachers how to take advantage of having fewer students to teach. Likewise, the presence of classroom aides or volunteers can influence teaching and learning by reducing the number of students that teachers have to teach or monitor. Table 5.2 shows the average number of professional development days and average classroom support in reduced and non-reduced size third-grade classes and fourth-grade classes.

The amount of professional development was comparable across all groups in spring 1999, but it then decreased by about two days for third-grade teachers and increased slightly for fourth-grade teachers in spring 2000. The reason for this difference between third- and fourth-grade teachers is unclear. As expected, teachers in reduced size classes were more likely to participate in professional development activities that focused on teaching in smaller classes.

With respect to classroom support, the pattern is clear. For both years, teachers in reduced size classes reported significantly more support from parent or adult volunteers (number of volunteers) and student aides (hour per week) than did teachers in non-reduced size classes. There were no differences among the classes in hours of assistance per week provided by regular classroom aides, although the average number of hours declined from spring 1999 to spring 2000.

Table 5.2–
Average Level of Teacher Support

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Professional Development						
Number of days	5.3	5.3	4.5	3.2	2.6♥	5.2
Reduced size is focus (number of topics out of 10 [1999] or 11 [2000])	2.8* ++	1.6	1.5	2.9** ++	1.3	0.9
Classroom Support						
Parent and/or adult volunteers (number)	1.2* ++	0.6	0.6	1.3** +	0.7	0.7
Regular classroom aides (hours/week)	3.2	2.6	2.7	2.6	1.8	2.5
Student aides (hours/week)	1.3* ++	0.4	0.4	0.7* +	0.2*	0.3+

* denotes significant differences between third grade reduced and third grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
+ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size clsses and fourth-grade classes at the .05 level.

Curriculum Content and Coverage

Table 5.3 shows the average number of minutes per day devoted to language arts and mathematics lessons and homework in third grade for 1998, 1999, and 2000.[8] In spring 2000, teachers from both the reduced and the non-reduced size third-grade groups reported spending a comparable amount of class time on mathematics (approximately one hour per day). In language arts, teachers in reduced size third-grade classes reported spending 19 minutes more per day on language arts than did teachers in non-reduced size third-grade classes. Although this gap was not statistically significant, it is nevertheless an important because it means that over the academic year, students in reduced size classes received approximately 57 more hours of language arts instruction than did students in non-reduced size classes.

There were no significant reported differences between teachers in reduced and non-reduced size third-grade classes with respect to homework. Irrespective of class size, teachers assigned almost 20 minutes of language arts homework and approximately 13 minutes of mathematics homework per day. The amount of mathematics and language arts homework assigned in 2000 was roughly comparable to that assigned in 1998 and 1999.

[8] We did not include fourth-grade in this analysis, because we expect that third- and fourth-grade curriculum are very different.

Table 5.3–
Average Minutes Devoted to Lessons and Homework Each Day in Third Grade

	Spring 1998		Spring 1999		Spring 2000	
	Reduced	Non-reduced	Reduced	Non-reduced	Reduced	Non-reduced
Lessons						
Language arts	--	--	114.3	104.9	118.6	99.5
Mathematics	57.5	60.5	61.9	60.1	62.6	56.5
Homework						
Language arts	23.0	21.7	19.0	20.3	19.3	16.3
Mathematics	13.9	13.8	12.6	14.0	12.6	13.3

In spring 2000, teachers in non-reduced size classes were more likely to feel that they had to hurry through their curriculum (see Table 5.4). However, third-grade teachers in reduced and in non-reduced size classes were equally likely to feel that they had time to explore curriculum topics in depth in 2000, which had not been the case in 1999. It is important to note that across both years, however, more than three-quarters of teachers, regardless of class size, believed there was not enough time to cover the curriculum without rushing.

Table 5.4–
Third Grade Teachers' Opinions About Curriculum (average percentage who agree or strongly agree)

	Spring 1999		Spring 2000	
Statement	**Reduced**	**Non-Reduced**	**Reduced**	**Non-Reduced**
"We have to hurry all year long just to cover the basic things my students need to know."	83.9	90.4	87.1*	95.8
"I have time to explore my curriculum topics in depth."	27.4**	14.6	19.6	20.9

* denotes significant differences between reduced and non-reduced size classes in the same year at the .05 level.
** denotes significant differences between reduced and non-reduced size classes in the same year at the .01 level.

Although third-grade teachers in non-reduced size classes believed that they had less time to cover basic curriculum topics than did third-grade teachers in reduced size classes, both groups reported spending a similar amount of time on major mathematics topics during the week prior to the survey in 2000 (see Table 5.5). There were no significant differences in the absolute amount of time spent on each element, but there were differences in terms of relative emphasis. Both groups reported spending the most time teaching "whole number operations" and "problem solving" and the least time teaching "time." This result is consistent with that observed in spring 1999.

For the most part, teachers in both groups covered approximately the same number and types of topics in language arts in 2000 (see Table 5.6). However, students in reduced size classes received more instruction devoted to appreciating literature than did students in non-reduced size classes. As with the results from 1999, teachers in both reduced and non-

reduced size classes devoted most of their efforts to "reading," followed by "writing," "speaking, listening, viewing," "appreciating literature," and "study skills."

Table 5.5–
Time Devoted to Mathematics Curriculum Topics in Third Grade (average hours in previous week)

	Spring 1999		Spring 2000	
Curriculum Topic	**Reduced**	**Non-reduced**	**Reduced**	**Non-reduced**
Whole number operations	2.3	2.5	2.2	1.8
Problem solving	2.2	2.1	2.2	1.9
Understanding numbers	1.7	1.9	1.7	1.3
Fractions and decimals	1.2	1.5	1.1	1.2
Geometry	1.0	1.1	1.1	0.7
Estimation	0.9	1.0	0.8	0.9
Time	0.6	0.6	0.6	0.5

Table 5.6–
Time Devoted to Language Arts Curriculum Topics in Third Grade (average hours in previous week)

	Spring 1999		Spring 2000	
Curriculum Topic	**Reduced**	**Non-reduced**	**Reduced**	**Non-reduced**
Reading	3.9	3.8	4.0	3.9
Writing	2.7	2.7	2.8	2.1
Speaking, listening, viewing	2.2	2.2	2.2	1.8
Appreciating literature	2.0	1.9	2.0*	1.4*
Study skills	1.5	1.5	1.5	1.3

* denotes significant differences between reduced and non-reduced size classes in the same year at the .05 level.

Instructional Practices

The number of students in the class can influence the teacher's decisions about how to teach particular lessons. With fewer students to manage, teachers may engage students in richer, more complex activities, provide more variety in learning activities, group students in different ways, or find time to individualize instruction. The following sections highlight instructional differences we found between teachers in reduced and non-reduced size classes along several dimensions: student grouping, individualization of instruction, and instructional activities in mathematics and language arts.

Student Grouping

For many proponents of the CSR program, one of the apparent benefits is that it allows students greater opportunities to work in small groups. The prevalence of grouping for instruction may be important because grouping reduces the effective class size—i.e., irrespective of actual class size; when a teacher works with a small group, his or her attention

is focused on fewer students during the instructional activity. Thus, grouping in any size class creates a "smaller class" for purposes of instruction (Stasz and Stecher, 2000).

We present our results for grouping strategies in two ways: first, as average number of minutes per day; second, as percentage of average class time. Small groups were defined as 2–4 students; large groups were defined as 5–6 students.

Table 5.7 shows the average amount of instructional time spent with the whole class, groups, or individuals in third grade mathematics. Whole class instruction was by far the predominant grouping practice in spring 2000, as it was in previous years. Regardless of class size, third-grade teachers spent more of their mathematics instruction time teaching the entire class. As was the case in previous years, teachers in 2000 reported that students in reduced size classes spent much more of their mathematics instruction time working in small groups than did students in non-reduced size classes. For the most part, grouping practices in mathematics remained relatively stable across the three years.

Table 5.7–
Grouping Practices in Third-Grade Mathematics (average minutes per day)

	Spring 1998		Spring 1999		Spring 2000	
Group	**Reduced**	**Non-reduced**	**Reduced**	**Non-reduced**	**Reduced**	**Non-reduced**
Whole class	28.8**	33.7	31.8	34.7	34.3	34.1
Large group	8.4	9.5	9.0	10.1	8.9	6.4
Small group	10.8**	8.7	12.5**	8.9	9.1*	5.6
Individuals	13.2	11.9	11.8	9.5	12.1	9.9

* denotes significant differences between reduced and non-reduced size classes in the same year at the .05 level.
** denotes significant differences between reduced and non-reduced size classes in the same year at the .01 level.

Similar patterns were observed with language arts, but the differences were more pronounced (see Table 5.8). Third-grade teachers in both reduced and non-reduced size classes spent most of their language arts instruction time teaching the entire class, but teachers in reduced size classes were much more likely to form groups, both large and small, than were teachers in non-reduced size classes. Comparing trends across years, group work and class size were roughly correlated over the first two survey years: Teachers in reduced size classes tended to form small groups, whereas teachers in non-reduced size classes formed large groups. In addition, teachers in spring 2000 reported spending about the same amount of time working with individual students whether they were in a reduced size class or not. In spring 1999, teachers in reduced size classes more frequently reported working with students one-on-one.

Table 5.8–
Grouping Practices in Third-Grade Language Arts (average minutes per day)

	Spring 1998		Spring 1999		Spring 2000	
Group	Reduced	Non-reduced	Reduced	Non-reduced	Reduced	Non-reduced
Whole class	38.2*	43.0	51.1	50.4	53.7	57.5
Large group	26.5*	32.2	28.6	35.0	31.7**	17.7
Small group	20.6**	15.7	23.3**	14.6	23.2**	11.0
Individuals	15.6	13.9	17.3**	11.4	16.2	16.9

* denotes significant differences between reduced and non-reduced size classes in the same year at the .05 level.
** denotes significant differences between reduced and non-reduced size classes in the same year at the .01 level.

Tables 5.9 and 5.10 present grouping practices as a percentage of overall average lesson time for third- and fourth-grade mathematics and language arts classes in spring 1999 and spring 2000.[9] For mathematics in spring 1999, fourth-grade students spent about the same proportion of time in whole class and small group instruction as did third-grade students in non-reduced size classes, but had a different allocation of time than third-grade students in reduced size classes. Some of these differences were also evident the following year.

Table 5.9–
Grouping Practices in Mathematics (average percentage of lesson time per group)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Group	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Whole class	48.8++	54.9	56.4	53.3++	60.9	60.1
Large group	13.8	16.0	12.8	13.8++	11.4	8.6
Small group	19.2++	14.0	14.4	14.1	10.0	14.6
Individuals	18.1	15.0	16.3	18.8	17.7	16.6

++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.

In spring 1999, fourth-grade teachers reported that students spent significantly more of their language arts class time in whole class instruction, compared to third-grade students in reduced or non-reduced size classes (see Table 5.10). They spent significantly less time in small groups than did third-grade students in reduced size classes in both spring 1999 and spring 2000, and less time in large groups than did students in non-reduced size third-grade classes in spring 1999 and reduced size third-grade classes in spring 2000. Generally, fourth-grade teachers' grouping practices more closely resembled those of third-grade teachers in non-reduced size classes than those of teachers in reduced size classes in spring 2000.

[9] Estimates for 1998 are not included, because the responses that year were capped at 99 minutes, invalidating estimates of the total length of language arts lessons. Survey revisions in later years changed the response frame to allow longer times to be recorded.

Table 5.10–
Grouping Practices in Language Arts (average percentage of lesson time per group)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Group	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Whole class	42.4^{++}	45.2$^{\blacktriangledown}$	53.7	43.0^{++}	55.8	62.0
Large group	23.8	31.4$^{\blacktriangledown\blacktriangledown}$	20.3	25.4^{++}	17.2	16.2
Small group	19.4^{++}	13.1	13.0	18.6^{++}	10.7	11.3
Individuals	14.4^{**+}	10.2$^{\blacktriangledown}$	13.0	13.0	16.4	10.5

** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
$^{+}$ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
$^{++}$ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
$^{\blacktriangledown}$ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.
$^{\blacktriangledown\blacktriangledown}$ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .01 level.

Individualization

Arguably, one of the greatest advantages associated with a small class is that it may enable teachers to better tailor instruction to the needs of individual students. Table 5.11 shows the frequency with which students identified as needing extra help with reading received at least five continuous minutes of assistance. Survey results indicate that students in reduced size classes received individual assistance from their teachers (over all three survey years) and from an aide or volunteer (spring 1999 and 2000) more frequently than did students in non-reduced size classes. Fourth-grade students needing help with reading also received help less often from teachers (spring 1999) or aides (spring 2000), than did students in non-reduced size third-grade classes. Help from specialists was more frequent for reduced size classes, compared to other class types, in spring 1999 only.

Teachers were also asked about their ability to individualize instruction (see Table 5.12). Across both years, teachers in reduced size classes were much more likely to report that they could gauge students' abilities and provide feedback quickly on written assignments. Conversely, teachers in non-reduced size classes were more likely to report that they lacked the time to provide students with individual attention and to meet students' instructional needs. It is important to point out that a majority of teachers in both years felt unable to provide students with adequate individual attention or to address the instructional needs of all students.

Table 5.11–
Frequency of Individual Instruction for Readers Needing Extra Help (average number of times per week)

	Spring 1998		Spring 1999			Spring 2000		
	Third Grade		Third Grade			Third Grade		
Provider	Reduced	Non-Reduced	Reduced	Non-Reduced	Fourth Grade	Reduced	Non-Reduced	Fourth Grade
Teacher	3.0**	2.5	2.9** ++	2.2♥	1.8	2.9** ++	2.1	1.9
Aide or volunteer	2.3	2.2	2.2**	1.8	1.8	2.3+	2.5♥♥	1.5
Specialist	2.2	2.0	2.0*	1.5*	1.7	2.0	1.9	2.0

Note: scale converted from fixed categories to times per week.
* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
+ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.
♥♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .01 level.

Table 5.12–
Opinions About Individualization (average percentage of teachers who agree or strongly agree)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Statement	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
"I know what each of my students knows and can do in the subjects I teach."	93.1* +	80.7	85.7	93.9* ++	64.7	74.4
"I almost always provide feedback to my students on their writing assignments within one day."	61.4** ++	43.3♥	30.3	62.4** ++	36.3	35.8
"I would like to give more individual attention to my students, but I just don't have time to do it."	75.3** ++	96.6	98.2	83.5** ++	100.0♥	95.4
"I find it hard to meet the instructional needs of all of my students."	65.9** ++	89.1	91.4	69.8** ++	91.8	90.9

* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
+ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.

Table 5.13 shows the amount of time teachers reported spending on a number of non-instructional activities. In spring 1998, third-grade teachers in reduced size classes reported spending more time addressing individual students' personal concerns than did third-grade

teachers in non-reduced size classes. However, these differences did not persist based on teachers' responses in the spring 1999 and spring 2000 surveys.

Table 5.13–
Time Spent on Selected Teacher Activities (average hours during previous week)

	Spring 1998		Spring 1999			Spring 2000		
	Third Grade		Third Grade			Third Grade		
Activity	Reduced	Non-reduced	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Diagnosing learning needs of individual students	2.1	2.0	1.6	1.7	1.4	1.4	1.2	1.3
Providing individual feedback on student work	2.4	2.3	2.2	2.4	2.3	2.2	2.1	2.3
Addressing individual students' personal concerns	1.9*	1.8	1.5	1.6	1.6	1.4	1.4	1.4
Reviewing homework	2.2	2.1	1.8	2.0	2.3	1.8	2.1	2.2

Note: Scale converted from fixed categories to times per week.
* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.

Instructional Activities

On the whole, teachers in both reduced and non-reduced size classes tended to use the same kinds of instructional activities in mathematics (see Table 5.14). Regardless of class size or grade level, the most frequent activity was practicing computational skills, and the least common activity was using a calculator in both spring 1999 and spring 2000. Students in reduced size third-grade classes and fourth-grade classes spent more time working with measuring instruments than did students in non-reduced size third-grade classes, in both years as well. Students in reduced size third-grade classes in both survey years also were reported as spending more time working with manipulatives than did fourth graders and students in non-reduced size third-grade classes in spring 2000. Third graders in reduced size classes in spring 2000 were also reported as using mathematics in the context of other subjects more than did third graders in non-reduced size classes; they also spent more time than fourth graders did playing mathematics games and, in spring 2000, working in mixed-ability groups and practicing computational skills. Overall, then, practices in fourth and non-reduced size third-grade classes were quite similar.

In language arts, students in reduced size third-grade classes were significantly more likely to dictate stories, read aloud to a partner, or write with invented spellings (only in spring 2000) than were students in non-reduced size third-grade classes and fourth-grade classes (see Table 5.15). In spring 1999, there were no statistically significant differences between reduced and non-reduced size third-grade classes in the frequency with which students were reported as engaged in these activities. Activities involving writing or phonics were more common in third grade than fourth. In spring 2000, the frequencies of all student activities, except phonics work, were quite similar in non-reduced size third-grade classes and fourth-grade classes.

Table 5.14–
Frequency of Selected Mathematics Activities (average number of times per week)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Activity	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Use a calculator for math	0.6	0.5	0.5	0.5	0.4	0.5
Work with measuring instruments	1.2**	0.9♥	1.1	1.4** +	0.9	1.1
Play with math-related games	1.6++	1.3	1.1	1.5++	1.1	0.9
Work with manipulatives	1.9++	1.5	1.3	1.6** ++	1.0	1.0
Use patterns to discover mathematical relationships	2.1	1.8	1.9	2.3++	1.8	1.7
Use math in context of other subjects	2.0	2.0	1.8	2.0*	1.7	1.9
Explain how a math problem is solved	3.0	2.6	2.8	3.0	3.1	2.9
Do math worksheets or problems in a textbook	3.2	3.3	3.3	3.5	3.6	3.5
Work in a mixed-ability group	3.6	3.6	3.2	3.5+	3.3	2.9
Practice computational skills	3.7	3.8	3.5	3.9+	3.9	3.6

* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
+ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.

A potential advantage of CSR is that it may allow teachers to try more innovative teaching methods than would be possible with larger classes. The spring 1999 survey findings did not support this premise, but spring 2000 survey results provide some evidence that teachers in reduced size classes are more likely to try innovative practices than were teachers in non-reduced size classes. In mathematics, such innovative practices as having students work with manipulatives or use mathematics in the context of other subjects were more common in reduced size classes than in non-reduced size classes. Similarly, "less traditional" teaching approaches, such as reading aloud to a partner and dictating stories to a teacher, occurred more frequently in reduced size classes than in non-reduced size classes. However, while these innovative activities were more likely to occur in reduced size classes, they were still less common than more traditional activities, such as having students practice computational skills in mathematics or engage in guided reading discussions in language arts.

Table 5.15–
Frequency of Selected Language Arts Activities (average number of times per week)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Activity	Reduced	Non-Reduced	Fourth Grade	Reduced	Non-Reduced	Fourth Grade
Dictate stories to a teacher or aide	0.6	0.5	0.5	0.7** ++	0.2	0.4
Read aloud to a partner	2.2+	1.9	1.8	2.3** +	1.4	1.8
Write narrative or descriptive pieces	2.3++	2.3♥	1.9	2.4++	2.0	1.9
Work in a reading workbook or worksheet	2.5	2.6	2.4	2.7	2.7	2.4
Work on phonics	2.5++	2.3♥	1.4	2.6* ++	2.1	1.3
Discuss new or difficult vocabulary	2.8	2.9	2.7	2.8+	2.1	2.5
Listen to teacher read stories where student can see the print	2.9	3.2	2.7	3.0++	2.4	2.4
Have guided discussions about their reading	3.2+	3.3	2.9	3.3	2.9	2.9
Write with encouragement to use invented spellings, if needed	3.3++	3.2♥	2.5	3.2** ++	2.1	2.2
Work in a mixed-ability group	3.5	3.6	3.2	3.5+	2.9	2.9

* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
+ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.
♥ denotes significant differences between third-grade non-reduced size classes and fourth-grade classes at the .05 level.

Student Behavior and Classroom Discipline

For a number of reasons, some educators believe that fewer student disciplinary problems can be expected in smaller classes. With reduced size classes, teachers may be better able to address student concerns, thereby eliminating the need for students to "act out" in order to receive attention. Teachers in smaller classes also may be able to quickly address any discipline problems that arise and decrease the chances of disruptions to others. With fewer students, smaller classes afford fewer opportunities for conflict among students. Alternatively, reduced size classes may foster a greater sense of student collegiality.

Table 5.16 shows the percentage of students who were reported as competing with one another for their teacher's attention, sought assistance from another student regarding schoolwork, or engaged in exclusionary behavior. In spring 1999, students in fourth-grade and third-grade non-reduced size classes were significantly more likely to compete for their teacher's attention and to engage in exclusionary behavior than were students in reduced size classes. Teachers reported as well that fourth graders were more likely than third graders in reduced size classes to seek assistance from another student regarding schoolwork. In spring 2000, the differences between fourth grade and third-grade reduced size classes generally persisted.

Table 5.16–
Student Behavior (average percentage of students engaging in behavior on most recent day)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Behavior	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Competed with another student for teacher's attention	29.2**++	41.7	40.7	29.6++	33.6	40.5
Sought assistance from another student regarding school work	38.9++	41.6	44.4	37.0	34.1	39.9
Engaged in exclusionary behavior	19.3**++	26.3	28.2	19.2++	18.1	27.2

Note: Scale converted from fixed categories to proportion of students.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
++ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.

As Table 5.17 shows, few significant differences in terms of disciplinary problems during the previous week of school were reported by teachers in reduced and non-reduced size third-grade classes when compared with each other and when compared with those in fourth-grade classes. Although third-grade teachers in reduced size classes reported having to stop students from fighting and needing to contact a parent about poor behavior somewhat more often than did third-grade teachers in non-reduced size classes, the differences were generally not significant.

Table 5.17–
Discipline Problems (average percentage of students engaging in behavior during past week)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Behavior	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Stop from fighting (verbal or physical) in the classroom	9.6*	6.5	10.7	8.5	7.4	8.5
Contact a parent because of poor behavior	10.3	9.0	11.5	10.3	8.5	11.7

Note: Scale converted from fixed categories to proportion of students.
* denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .05 level.

Teacher reports indicate that students in reduced size classes were less disruptive than were students in all non-reduced size classes (spring 1999) and less often "off task" than were fourth-grade students (see Table 5.18). In spring 1999 and spring 2000, students in reduced size classes were reported as more likely than fourth graders to complete the whole daily lesson. Classes did not appear to differ significantly in the proportion of students who asked for help or helped other students as a function of class size.

Table 5.18–
Student Behavior During Language Arts Lesson (average percentage of students engaging in behavior during most recent lesson)

	Spring 1999			Spring 2000		
	Third Grade			Third Grade		
Behavior	Reduced	Non-reduced	Fourth Grade	Reduced	Non-reduced	Fourth Grade
Completed the whole lesson for the day	72.9^{++}	69.4	66.8	75.0^{++}	74.9	69.2
Were "off task" but not disruptive for more than five minutes	24.9^{++}	28.2	29.9	26.2^{+}	27.4	30.0
Helped another student complete his/her work	30.0	34.3	31.1	30.7	25.9	28.8
Disrupted the work of other students	18.6** $^{++}$	23.1	22.8	19.7	20.7	20.6
Asked for help from teacher or another adult	32.4	33.2	32.7	31.3	29.5	30.8

Note: Scale converted from fixed categories to proportion of students.
** denotes significant differences between third-grade reduced and third-grade non-reduced size classes at the .01 level.
$^{+}$ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .05 level.
$^{++}$ denotes significant differences between third-grade reduced size classes and fourth-grade classes at the .01 level.

Conclusions

In the absence of a strong theoretical framework that explains why smaller classes would be expected to produce better student achievement or improve other student outcomes, we examined several aspects of teaching that research suggests might be related to class size: teacher experience and background, supports for teaching, student characteristics, instructional activities and curricular focus in language arts and mathematics, and student behaviors. For this evaluation, we once again compared survey responses from third-grade teachers in both reduced and non-reduced size classes, but we also included data from fourth-grade teachers. Since fourth-grade classes are not part of the CSR program and thus are non-reduced, inclusion of fourth-grade teachers allowed us to further explore class size effects. If class size underlies the response differences between third-grade teachers in reduced and non-reduced size classes, one would expect response similarities among fourth-grade teachers and third-grade teachers in non-reduced size classes, as well as a differences between fourth-grade teachers and third-grade teachers in reduced size classes. Generally, we found this to be the case.

Class size appears to be one of the factors that accounts for differences in classroom support to teachers. In both the spring of 1999 and 2000, third-grade teachers in reduced size classes reported receiving more assistance from parent or adult volunteers and student aides than both fourth-grade teachers and third-grade teachers in non-reduced size classes. These differences were not found in the spring 1998 survey (Stasz and Stecher, 2000), and it is unclear why they arose. The number of regular classroom aides available to any teachers did not differ across the three years of the survey.

The amount of professional development for third-grade teachers, regardless of class size, was comparable across the three years, and was comparable for fourth-grade teachers in spring 1999. In spring 2000, third-grade teachers' average staff development days decreased while staff development for fourth-grade teachers increased. One possible explanation for the decline in staff development time is that the state increased the number of required school days in the year during the period of the study, and some districts met the new requirement by adding elementary staff development days. However, one would expect that this change would affect fourth-grade teachers as well. We also found that, as expected, teachers in reduced size classes were significantly more likely than teachers in non-reduced size classes to report receiving professional development related to teaching in smaller classes.

Third-grade teachers in reduced and non-reduced size classes did not differ much in their language arts and mathematics teaching practices. Over three years of study, they covered the same number and types of topics in both language arts and mathematics, and placed the same relative emphasis on major topics. Teachers in reduced size classes tended to spend more time in language arts activities: The reported average difference of 19 minutes, in spring 2000, would amount to about 57 more hours of language arts instruction per school year. The amount of homework assigned in these classes was similar over the three years (about 20 minutes in language arts and 13 minutes in mathematics). Most teachers felt that they needed to rush to get through the curriculum.

We found that third-grade teachers' instructional practices in language arts and mathematics generally remained similar regardless of class size, and this finding was consistent across the three years. However, there were some notable differences. With respect to grouping practices, whole class instruction predominated in mathematics and language arts classes, but teachers in reduced size classes were more likely to teach small groups of two to four students than were teachers in non-reduced size classes (both third and fourth grade). By and large, the grouping practices of fourth-grade teachers more closely resembled those of third-grade teachers in non-reduced size classes than those of third-grade teachers in reduced size classes. Teachers spent less time working with individuals than with groups during mathematics and language arts instruction, and differences between teachers were not significant except in 1999. That year, teachers in reduced size third-grade classes reported spending a little more time with individuals in language arts compared to teachers in non-reduced size classes.

In each of the three years, the teacher reports showed that smaller classes provided greater opportunity for individualized instruction. This is one of the more consistent findings in our study of teaching practices. Students identified as poor readers received individual assistance from their teacher more frequently in reduced classes than in non-reduced size classes in all three years, and they received more individualized assistance from an aide or volunteer in the last two years. Fourth-grade students identified as poor readers had even fewer opportunities for individual help than did students in third-grade non-reduced size classes. Teachers in reduced size classes also reported being better able to assess students' ability, provide individual attention, give feedback in a timely manner, and meet their students' instructional needs than teachers in non-reduced size classes. These differences were significant and consistent over the two years these questions were asked.

In terms of classroom management, students in reduced size classes showed more positive-learning behavior than did students in non-reduced size classes over the two years we measured such behavior. They were less disruptive, less likely to compete for their teacher's attention, and less likely to engage in exclusionary behavior. Teachers reported that third graders in reduced size classes also were more likely to complete the daily lesson and less likely to be "off task" for more than five minutes compared to fourth graders. There were few differences between students in reduced and non-reduced size classes with respect to more serious discipline problems, which were quite infrequent in both grades.

Finally, with respect to instructional activities, we observed some similar patterns. In mathematics, students in reduced size classes were more likely than students in non-reduced size classes to work with "hands-on" materials (i.e., manipulatives and measuring instruments), play mathematics games, and use patterns to discover mathematical relationships (spring 2000). In spring 2000, they also were reported as using mathematics in the context of other subjects more often than did students in non-reduced size third grade classes. Similarly, in language arts, activities such as reading aloud to a partner and dictating stories to the teacher were reported as occurring more frequently in reduced than in non-reduced size classes. Third-grade classes differed from fourth-grade classes in some respects: Third-grade students were reported as more likely to write narrative pieces, to use invented spellings (1999), and as would be expected, to work on activities involving phonics.

In both reduced and non-reduced size classes, however, traditional practices (e.g., completing mathematics worksheets, guided reading discussion in language arts) remained by far the most common instructional activities. In the majority of activities we asked about over the three years (17 math and 15 language arts activities in the first year; 10 activities in each subject in the second and third years), relatively few differences were significant.

Overall, our findings suggest that having a smaller class neither prompted teachers to radically alter their teaching practices nor changed the breadth or depth of curriculum coverage. These findings may be due to limitations in the surveys, which do not incorporate all the practices that teachers might engage and/or may be insufficient for detecting more subtle changes in instructional practices (Burstein et al., 1995). It would be good to confirm these self-reported differences in practice with independent observations of classroom behaviors. However, our study is similar to many other studies of teaching practices in classes that vary in size in that we found few, somewhat modest differences (e.g., Cahen et al., 1983; Molnar et al., 1999; Betts and Shkolnik, 1999; Evertson and Randolph, 1989). The one positive note from our study of teaching practices is that teachers in reduced size classes seem able to provide more individual instruction to students, especially those identified as poor readers. The extent to which this individual attention—or any of the other differences observed in teachers' practices—affects student learning remains unknown.

CHAPTER 6

Achievement

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Introduction

In the two previous Class Size Reduction (CSR) evaluation reports (see Bohrnstedt and Stecher 1999; Stecher and Bohrnstedt, 2000), we estimated the impact of CSR on student achievement by comparing the Stanford Achievement Test, 9th Edition (SAT-9) test scores of third-grade students taught in reduced classes with those of third-grade students taught in non-reduced classes. The analysis was conducted at the student and school levels using data from all students in California who participated in the state's Standardized Testing and Reporting (STAR) program and whose CSR status could be determined with reasonable confidence. Pre-existing differences between the CSR and non-CSR students were adjusted for by using background information about students and teachers as well as scores from fourth- and fifth-grade students who had little or no exposure to CSR.

For a number of reasons, we could not use a similar, comparative approach for this current evaluation report. By 2000–01, CSR had been implemented in over 95 percent of the third-grade classes in California, leaving too few untreated students to serve as a comparison group. Furthermore, some or all of the upper-grade (i.e., fourth- and fifth-grade) students in most schools had participated in reduced size classes in earlier years, so we could not use their test results to control for pre-existing differences. Thus, the two major analytic strategies we had used in the past were no longer applicable.

However, from 1996–97 to 2000–01, CSR went from partially implemented in two grade levels to almost fully implemented in four grade levels (kindergarten through third grade). This large but uneven growth in participation in CSR over time provides an opportunity to look at the impact of CSR on achievement in a different manner. We can examine trends in achievement among cohorts of students who have different patterns of exposure to CSR. Trends in achievement that correspond to patterns of exposure provide evidence in support of the hypothesis that CSR improves achievement; trends that have no relationship to CSR participation offer no such support. Of course, in interpreting these trends, we also have to consider other policies implemented during this five-year period and other external factors that might affect trends in test scores (e.g., increasing familiarity with the STAR test items). These external changes complicate the analysis and preclude us from making any strong

causal statements about the impact of CSR, per se. Nevertheless, the trend analyses are extremely revealing about the potential size of the CSR effects.

It is worth noting that membership in the cohorts changes somewhat over time as students move in and out of the California public school system. Because we do not have student identification numbers, we cannot adjust the data to ensure that the groups are identical over time. Consequently, it is more accurate to refer to our groups as "synthetic" cohorts to indicate that there is some variation in participation from one year to the next. To simplify the presentation, we usually drop the *synthetic*, but the reader should understand that the results were not adjusted to accommodate student mobility at the state level. Because we are using complete statewide data, the vast majority of students remain in our sample from year to year.

We currently have only summary data on achievement at the state level, rather than results for each school or each student. As a result, we look only at state-level trends in achievement and CSR participation. The final CSR evaluation report, to be issued in summer 2002, will supplement these findings with analyses of trends at the school level and trends for different groups of students.

Summary of Previous Findings

Our two previous evaluation reports have found that CSR had small, positive associations with achievement. We reported five major findings in 2000:

"One-year" effects. Students who were exposed to CSR in third grade performed better than those who were not. This was true in 1997–98, when both groups of third grade students had little or no prior exposure to CSR, and it was true again in 1998–99, when both groups had one to two years of prior exposure. The differences in scores were equivalent to effect sizes of about 0.04 to 0.1 standard deviation units. In 1998–99, the differences were larger for mathematics and language than for reading and spelling.

No interaction with student background factors. The effects of such "one-year" differences in CSR exposure were similar regardless of a school's population demographics, i.e., regardless of a school's percentage of minority,[1] low-income,[2] or English learner (EL) students.[3] This was true in 1997–98 and again in 1998–99. We did find in 1998–99 that the effects were somewhat larger in schools with the highest percentages of minority, low-income, or EL students, but the differences in scores were not statistically significant.

[1] Minority students are any students not classified as Caucasian. The largest groups of minority students are, in order of group size, Hispanics, Asian/Pacific Islanders, and African Americans.

[2] Students are referred to as low-income or as being from low-income families in this report if state records classify them as receiving public assistance in the form of Aid to Families with Dependent Children (AFDC) or its successor in California, CalWORKS.

[3] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

Persistence of effects from second- and third-grade exposure after return to a non-CSR fourth grade. There was evidence that CSR effects persisted after students had returned to non-reduced classes for one year. Restricting our attention to students enrolled in the same school for three or more years, we found that third graders who in 1997–98 were in reduced classes scored higher than their counterparts in non-reduced classes. Then, in 1999, after both of these groups had been in non-reduced fourth-grade classes, the first group again outperformed the second, and the difference was 0.04 standard deviation units. These fourth-grade effects were observed for students exposed to CSR solely in third grade and for students exposed to CSR in both second and third grade. There were no such effects, however, for students whose exposure was in second grade only.

The effect of two years of CSR versus three years. We found few differences between students with two years of exposure and those with three. Among second graders, scores were the same in reading, mathematics, and spelling; among third graders, they were the same in reading and mathematics. Differences of 0.04 to 0.06 in language scores were associated with greater exposure in both groups. Again, our results were restricted to students enrolled in the same school for three or more years.

Cumulative effects among fourth-grade students in California. We did not find any noteworthy effects for fourth graders in the first two years. However, we noted that the effects of smaller classes on fourth graders could be clearer in future years, when these students will have had more exposure to CSR.

In an attempt to put these findings in context, we compared them to the results of the Tennessee STAR (Student/Teacher Achievement Ratio) project. Of course, there are important differences between the two efforts that reduce their comparability. Nevertheless, in those selected cases where the California and Tennessee results can be directly compared, the findings are similar. The important exception is that we found no interaction between class size effects and demographic factors in California, while in Tennessee it was found that class size reduction had roughly twice as great an effect for minority students as for non-minority students. Finally, because we do not have baseline data from before CSR was implemented and do not have student achievement data from kindergarten and first grade (these grades are not tested in California), we were unable to estimate the cumulative effects of four years of exposure to CSR in California's schools. The size of this effect was one of the chief findings from the Tennessee STAR study.

This year we approached the problem differently and found somewhat different results. Our analysis focused on statewide average achievement scores during the period 1997–98 to 2000–01. We compared the achievement of successive cohorts of students as they moved through the system with their exposure to CSR. Successive cohorts of students had higher achievement during this period, which suggests that one or more of the state educational reforms (which include CSR, demanding curriculum standards, a standardized testing program, the end of bilingual education, and high stakes accountability) were having a positive effect. However, the pattern of increases did not match the pattern of CSR exposure, so we cannot make a strong case that CSR was chiefly responsible for achievement gains.

Methods

Analytic Strategy

The analysis described here focused on the cumulative impact of CSR during the 1996–97 through 2000–01 school years. Specifically, we looked at trends in student achievement and compared them with patterns of exposure to CSR during this period. Our focus was on differences in achievement between cohorts of students who entered the system at different times and received different patterns of instruction in reduced size classes. We examined each wave of students who entered kindergarten in California between 1991–92 and 1998–99, comparing their patterns of achievement and their patterns of exposure to reduced classes during kindergarten through third grade.

Before the CSR program began in 1996–97, the average class size in California in kindergarten through third grade was 28.9 (Stecher and Bohrnstedt, 1999). Even then, few schools probably were able to maintain much smaller classes, perhaps as small as 20 students. We were unable to account for these "pre-CSR" small classes in our analysis. By 1997–98, the second year of the program, the average class size in K–3 had dropped to 21.1. This is the major CSR effect that the study examines.

In previous reports we referred to our approach as a "dose-response" approach, but that label oversimplifies the actual situation. A traditional dose-response analysis looks for a relationship between the level, or dose, of a treatment variable and the size of an outcome variable. Thus, in our case, we might look for evidence that students who spend more time in reduced size classes (i.e., get a greater "dose") reap greater benefits in terms of achievement (i.e., get a greater "response"), with other things being equal. However, that approach now requires some modification, because a cohort's exposure to CSR is manifested in two different ways: amount of exposure and year of exposure. For example, in the early cohorts, only a small fraction of the students participated in CSR at all, and most of those began participating in grade 2 or 3. In the later cohorts, nearly all students participated in CSR in grades 1, 2, and 3, but varying proportions of students participated in CSR in kindergarten. Thus, our analysis needs to be sensitive both to how much exposure students received and to when that exposure occurred.

Under ideal circumstances, we would be able to compare student achievement for all combinations of exposure and starting grade. If all combinations existed, then we could examine the effects of exposure, starting grade, and interactions between them. For example, by comparing students who started their CSR exposure in kindergarten and continued it for 1, 2, or 3 years, we would estimate the effects of different levels of exposure. Alternatively, we could study the importance of starting grade by comparing students who had just two years of CSR exposure beginning in kindergarten, first grade, or second grade. However, the actual pattern of implementation produced a very limited range of combinations of exposure and starting grade, thereby greatly limiting the comparisons we can make and the effects we can estimate.

Data Sources

We assembled statewide test score data and statewide CSR participation data from the California Department of Education. Since 1997–98, all California students in grades 2–11

have been required to take the SAT-9 annually in the spring. Students complete the SAT-9 in four subjects: reading, mathematics, language, and spelling. We used the average SAT-9 scale scores (rather than raw scores, percentile ranks, or normal curve equivalents) for our achievement analyses because the scales are equated across grade levels, facilitating cross-grade comparisons. There are no achievement data prior to 1997–98, nor are there any scores for students below grade 2. This absence of baseline data and kindergarten and first-grade achievement data means that we can make far fewer comparisons between patterns of exposure and achievement than we would like.

Results

Student Achievement

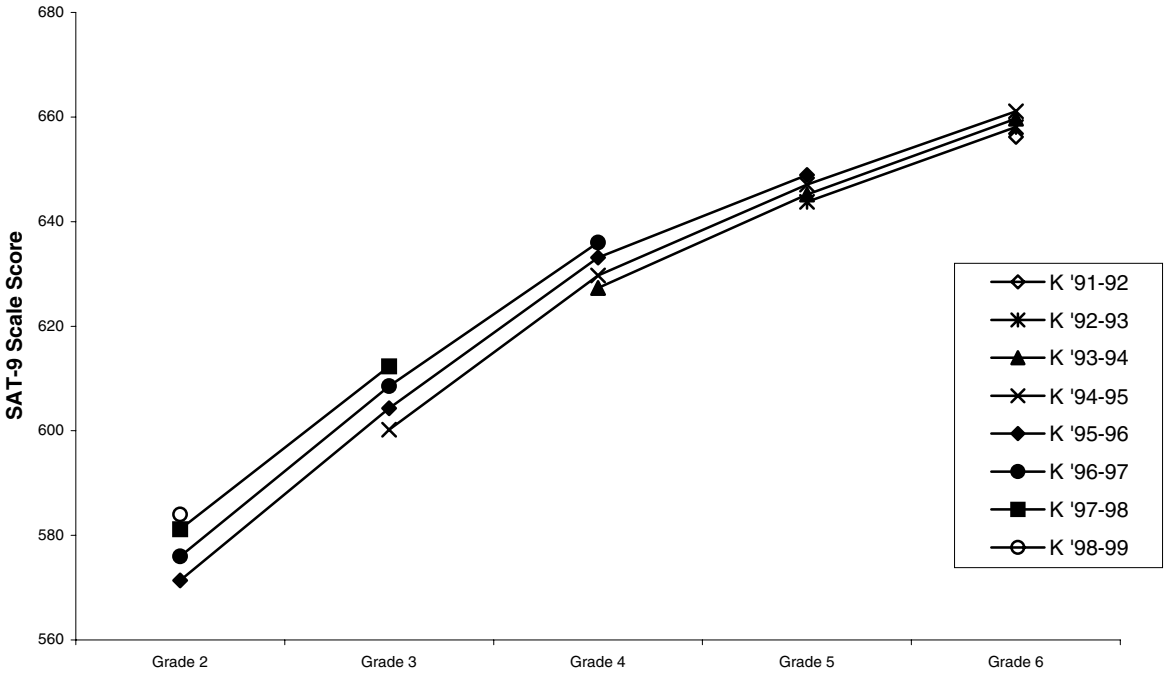
California elementary school students are tested in reading, mathematics, language, and spelling once they reach the second grade. The SAT-9 test assigns all students a score on a common scale that spans all the grade levels. As a result, scores can be compared across grades. Table 6.1 shows the average scale score on the SAT-9 test of reading for each statewide cohort from second grade through sixth grade, the cohorts being identified by the year they entered kindergarten. Each cohort is represented as a row in the table, and the entries show the average score as the cohort moved from one grade to the next. The entries in each row end at the sixth grade or the current school year, 2000–01. For each cohort, the average score increases with each additional year of schooling, as it should. The same information for mathematics and language is contained in Tables C.1 and C.2 in Appendix C.

Table 6.1–
Average SAT-9 Reading Scores for California Students, by Cohort and Grade

Cohort (Kindergarten year)	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
K 1991–92					656.2
K 1992–93				643.8	658.1
K 1993–94			627.3	645.2	659.7
K 1994–95		600.2	629.7	647.1	661.1
K 1995–96	571.4	604.3	633.1	648.9	
K 1996–97	576.0	608.5	636.0		
K 1997–98	581.2	612.3			
K 1998–99	584.0				

It may be easier to see achievement trends when the results are displayed graphically. Figure 6.1 shows the test score data from Table 6.1 as a series of line graphs, each line representing a cohort of students. For example, the line marked with a circle shows the average SAT-9 scores for students who entered kindergarten in 1996–97, were first tested in second grade in 1998–99, and were most recently tested in fourth grade in 2000–01.

Figure 6.1–
Average SAT-9 Reading Scores for California Students, by Cohort and Grade



A number of important patterns are revealed by Figure 6.1:

1. Each cohort line rises from left to right, indicating that students were reading better in terms of SAT-9 scale scores as they moved through the grades. We would expect to see this effect under normal circumstances, regardless of CSR.[4]

2. Each cohort line is slightly higher than the previous one, indicating that successive cohorts were reading with somewhat greater facility than their predecessors as measured by the SAT-9 test. This pattern of moderate annual improvement is exactly what educational policymakers want to see. It suggests there is overall improvement in achievement with each successive group of students. This growth may have resulted from state policy initiatives, such as new curriculum standards, teacher professional development, the elimination of bilingual education, the Public School Accountability Act (the Academic Performance Index), teacher familiarity with the test, or CSR. The causal agents might also have included changes in external factors (such as parental support for reading).

[4] The fact that the lines are relatively straight is a function of the way the test is scaled; and it also indicates that achievement levels in California were similar to achievement levels in the SAT-9 national norming sample in this grade range.

3. The differences between the cohorts are evident when students are first tested in second grade. Thus, differences among the cohorts reflect some factors that were operating prior to second grade.

4. In reading, differences among the cohorts in grades 2 through 4 tend to be larger than differences among them in grades 4 through 6. In the earlier grades, differences are about three or four points; in the later grades, they tend to be less than two points. This might mean that factors leading to primary grade differences dissipate over time or that the later cohorts were more similar throughout their schooling (something we are unable to examine in these data).

5. The distances between pairs of lines are similar at each grade level. This indicates that the improvement from one cohort to the next was relatively constant during this time period. Whatever caused the improvement seems to have had a similar added effect each year. This observation will be important when we try to assess how much CSR contributed to the improvement in scores.

Figures 6.2 and 6.3 provide the same information for mathematics and language. The pattern of achievement test results for these subjects is similar to that identified for reading, and the same five observations are true for the mathematics and language results.

Figure 6.2–
Average SAT-9 Mathematics Scores for California Students, by Cohort and Grade

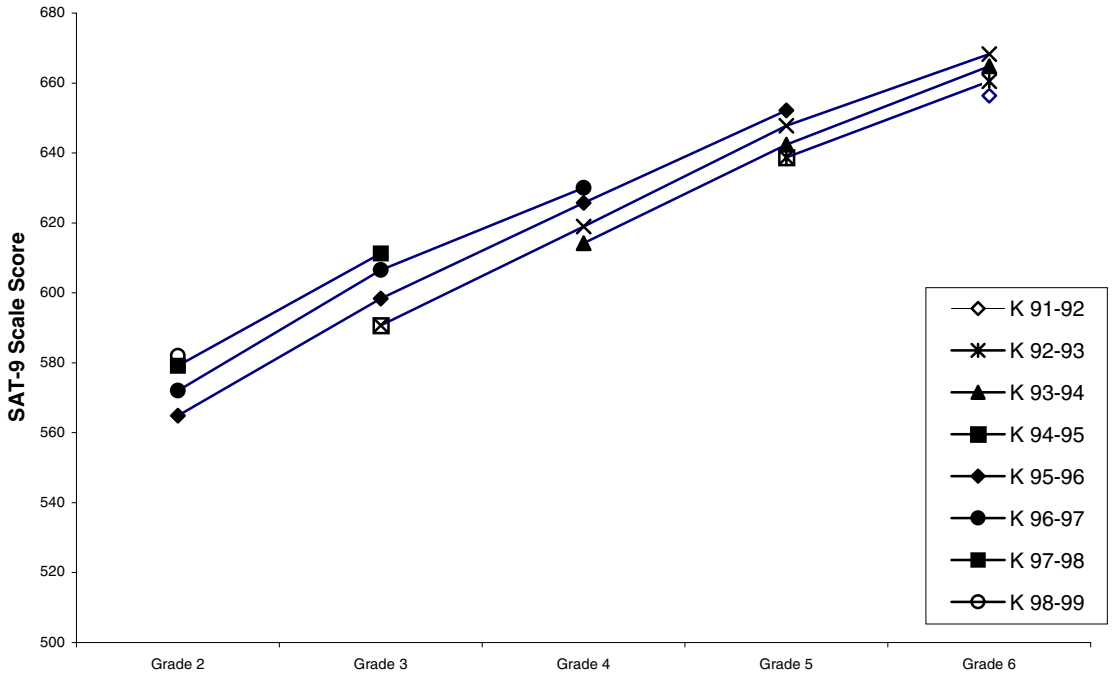
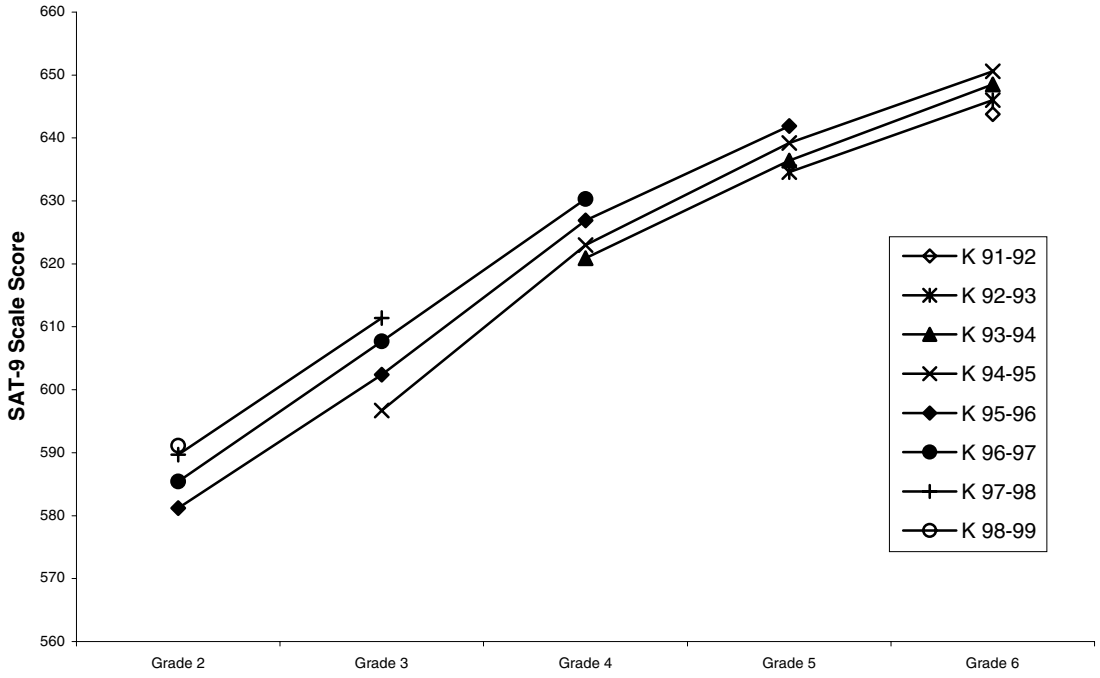


Figure 6.3–
Average SAT-9 Language Scores for California Students, by Cohort and Grade



The similarity of the slopes of the achievement lines in Figures 6.1 through 6.3 suggests that cohort-to-cohort differences in achievement might be represented by a single value reflecting the vertical difference between lines. We generated such estimates using regression analyses. For each subject, we modeled SAT-9 scale scores as a function of cohort and grade level according to the following equation:

$$\text{achievement(cohort, grade)} = \text{mean}_{\text{cohort}} + b * \text{grade} + \text{error}$$

where achievement(cohort, grade) is the mean SAT-9 scale score for each cohort at each grade level. Separate models were constructed for reading, mathematics, and language. All three models fit the data quite well. For example, there was no improvement in fit when means were allowed to vary by grade level. In addition, tests for cohort by grade interactions were not significant, which is consistent with the observation that the cohort lines are nearly parallel for each subject. Table 6.2 contains the estimated cohort effects for each subject.

Table 6.2–
Estimated Cohort Effects (SAT-9 scale score metric)

Cohort (Kindergarten year)	Reading	Mathematics	Language
K 1991–92	656.2	656.4	643.8
K 1992–93	658.2	660.5	646.2
K 1993–94	659.5	664.5	648.5
K 1994–95	661.2	668.6	650.4
K 1995–96	664.2	674.9	654.5
K 1996–97	668.3	681.6	659.0
K 1997–98	673.1	688.4	663.5
K 1998–99	676.3	691.6	664.7

We can also compute the differences between adjacent achievement effect estimates, which provide a simple indicator of cohort-to-cohort achievement changes. These differences (which are all positive) are reported in Table 6.3.

Table 6.3–
Cohort-to-Cohort Differences in Estimated Effects (SAT-9 scale score metric)

Cohort-to-Cohort	Reading	Mathematics	Language
K 91–92 to 92–93	2.01	4.12	2.44
K 92–93 to 93–94	1.29	3.95	2.26
K 93–94 to 94–95	1.69	4.14	1.87
K 94–95 to 95–96	2.98	6.25	4.11
K 95–96 to 96–97	4.15	6.77	4.54
K 96–97 to 97–98	4.78	6.73	4.45
K 97–98 to 98–99	3.23	3.22	1.19

All of these analyses demonstrate the simple fact that achievement test scores increased consistently during CSR implementation. Obviously, these results do not prove that CSR caused the gains in achievement. However, a comparison of patterns of achievement with patterns of exposure to CSR may provide evidence that there is a positive relationship between the two.

CSR Exposure

Our ability to make comparisons between cohorts with different levels of exposure to CSR is determined by the natural variation in implementation of CSR between 1995–96 and 2000–01. Local decisions about implementation led to differences in student participation by grade level and by year. Table 6.4 shows the statewide percentage of California students participating in CSR by grade level and school year from 1996 on. There was no CSR program prior to 1996–97, so the exposure in those years was zero.

Table 6.4–
Percentage of Students in CSR, by Grade and Year

Grade	1996–97[a]	1997–98	1998–99	1999–00	2000–01
Kindergarten	19	69	86	92	96
First	93	99	99	99	99
Second	63	96	98	98	98
Third	23	67	84	91	94

Note: All entries include both full-day and partial-day CSR participation. Partial-day participation was quite rare.
[a] These figures have been adjusted to include students in combination classes, who were not tabulated by grade level in 1996–97. The roughly 120,000 K–3 students who were in combination classes have been reallocated evenly across the four grade levels.
Source: California Department of Education.

This variation in implementation led to differences in the amount and pattern of student exposure to CSR. The data in Table 6.4 can be easily transformed to show the statewide average exposure to CSR experienced by each successive cohort of students during their elementary years. Table 6.5 shows the average cumulative exposure of California elementary school students to CSR during this period. Each cohort is represented as a row in the table and the cohorts are identified by the year they entered kindergarten. The entries in each row end at the 2000–01 school year or in fifth grade. In general, the amount of instruction in reduced classes increases for each cohort as it moves from kindergarten through third grade, and then is constant thereafter because CSR did not extend into the upper elementary grades. The amount of exposure also increases for each successive cohort that entered the system during this period.

For example, none of the students entering kindergarten in 1995–96 was in a reduced class. However, most students participated in CSR during the following years. Specifically, 93 percent of this cohort was in a reduced class in first grade, 96 percent was in a reduced class in second grade, and 84 percent was in a reduced class in third grade. On average, this cohort's cumulative CSR experience by the end of the third grade was a total of 0.93 + 0.96 + 0.84 = 2.73 "years" from first through third grade. This cohort was first tested as second graders in 1997–98. By comparison, 86 percent of the kindergarten cohort that entered in 1998–99 was in a reduced class, 99 percent was in a reduced first-grade class, and 98 percent was in a reduced second-grade class. Thus, the average exposure of the 1998–99 cohort was 0.86 + 0.99 + 0.98 = 2.83 "years" from kindergarten through second grade. Students in this cohort were tested for the first time as second graders in 2000–01. Note that these two averages are similar numbers (2.73 and 2.83) but reflect very different starting grades.

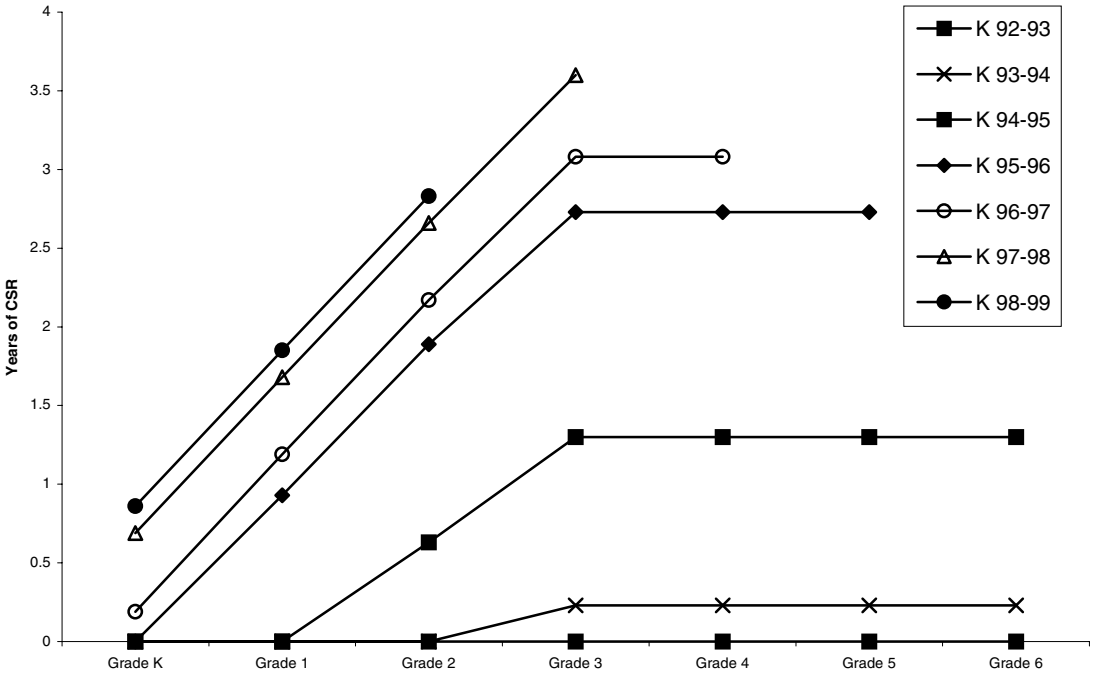
Table 6.5–
Average Annual and Cumulative Years of Exposure to CSR, by Grade by Cohort

Cohort (Kindergarten year)	[Annual] and Cumulative Exposure to CSR in Subsequent Years					
	Kindergarten	First	Second	Third	Fourth	Fifth
K 1992–93	[0] 0	[0] 0	[0]0	[0] 0	[0] 0	[0] 0
K 1993–94	[0] 0	[0] 0	[0] 0	[0.23] 0.23	[0] 0.23	[0] 0.23
K 1994–95	[0] 0	[0] 0	[0.63] 0.63	[0.67] 1.30	[0] 1.30	[0] 1.30
K 1995–96	[0] 0	[0.93] 0.93	[0.96] 1.89	[0.84] 2.73	[0] 2.73	[0] 2.73
K 1996–97	[0.19] 0.19	[0.99] 1.18	[0.98] 2.16	[0.91] 3.07	[0] 3.07	
K 1997–98	[0.69] 0.69	[0.99] 1.68	[0.98] 2.65	[0.94] 3.59		
K 1998–99	[0.86] 0.86	[0.99] 1.85	[0.98] 2.83			
K 1999–00	[0.92] 0.92	[0.99] 1.91				
K 2000–01	[0.96] 0.96					

Note: All entries include both full day and partial day CSR participation. Partial day participation was quite rare.
Source: Consortium analysis of CSR participation data from the California Department of Education.

A careful reading of Table 6.5 shows that the annual increases in exposure to CSR as a cohort moved through the system were fairly similar across cohorts. The cohorts differ primarily in the amount of exposure they had in kindergarten. These patterns are clearer when the data are represented graphically— see Figure 6.4. Each line in the figure traces the exposure of a statewide cohort as the students progressed through the elementary grades. Because CSR did not begin until 1996–97, students in the kindergarten class of 1993–94 received no instruction in reduced classes until they reached third grade. At that point, only about one in four students was enrolled in a reduced class. Thus, the average exposure for the statewide cohort was only about 0.25 years. In contrast, students in the kindergarten class of 1997–98 received almost all of their first four years of instruction in reduced classes.

Figure 6.4–
Average Cumulative Years of Exposure to CSR by Grade by Cohort



For the most part, the lines in Figure 6.4 are straight and parallel, as a result of three important facts. First, within each cohort, the annual increase in exposure to CSR is roughly the same from kindergarten through third grade (i.e., one additional year), which is why the lines are straight. Second, with the exception of the first two cohorts (92–93 and 93–94), the annual increases in exposure are the same for all cohorts, which is why the lines are parallel. In addition, the slope of the line associated with the second cohort (94–95) is nearly equal to the slope of the other lines. Third, with the exception of the first two cohorts, the main difference in exposure among cohorts occurred in kindergarten; after that, additional exposure to CSR was the same for all cohorts. The cohort-to-cohort differences are visible in the figure as the constant vertical distance between the lines.

The cohort-to-cohort differences in exposure at each grade level are also shown in Table 6.6. For the later cohorts, differences that occurred in kindergarten are retained in later grades.

Table 6.6—
Cohort-to-Cohort Differences in CSR Exposure (years)

Cohort-to-Cohort	Kindergarten	First Grade	Second Grade	Third Grade	Fourth Grade
K 92–93 to 93–94	0	0	0	.23	.23
K 93–94 to 94–95	0	0	.63	1.07	1.07
K 94–95 to 95–96	0	.93	1.26	1.43	1.43
K 95–96 to 96–97	.19	.25	.27	.34	.34
K 96–97 to 97–98	.50	.50	.49	.52	--
K 97–98 to 98–99	.17	.17	.18	--	--
K 98–99 to 99–00	.06	.06	--	--	--

The Relationship Between Achievement and CSR Exposure

There are a number of models of the relationship between achievement and CSR that researchers might want to test, but the data from California permit us to explore only two of them. First, we can test whether there is a relationship between achievement and total exposure to CSR in grades K–3. Second, we can test whether there is a relationship between achievement and kindergarten exposure to CSR (assuming students are exposed to CSR in first, second, and third grades as well). We cannot test relationships based on the year participation begins or the extent of sustained, continuous participation, because, for the most part, the year in which students first participated in reduced size classes and their total exposure to reduced size classes are completely confounded in our data. Nor can we test models that hypothesize non-linear CSR effects, such as a declining annual impact. The pattern of CSR participation that has occurred in California does not provide useful information on these alternative formulations.

We examined the relationship between achievement and CSR exposure by comparing the cohort-to-cohort differences in achievement with cohort-to-cohort differences in total exposure. A positive correlation between differences in achievement and differences in exposure is consistent with the hypothesis that CSR improves achievement, although it does not by itself confirm the hypothesis. Examining year-to-year differences may seem like an unnecessarily complicated way to analyze this simple relationship, but it is the best approach for dealing with the effects of external factors that were undergoing changes at the same time CSR was being implemented. For example, one could compare the achievement of the kindergarten cohort of 1993–94, which received only 0.23 years of exposure to CSR on average by the time it reached fourth grade, with the kindergarten cohort of 1996–97, which received 3.07 years of exposure to CSR on average by the time it reached fourth grade. The fourth grade SAT-9 reading scores of the high-CSR group were 10 points higher than those of the low-CSR group. However, there were a myriad of other factors occurring during these four years that might also account for the improved scores. (More will be said about these factors later.) The longer the timeframe included in the analysis, the greater the potential size and number of these external, uncontrolled factors. The approach we use—comparing differences between adjacent cohorts—eliminates the potential confounding effects from external factors unrelated to changes in CSR that result in growth of scores between

successive cohorts. Our method cannot completely remove the effects of confounding factors, because such factors may change during the comparison period. But, it does lessen the number and scope of those influencing each comparison, and it increases the number of comparisons that can be made.

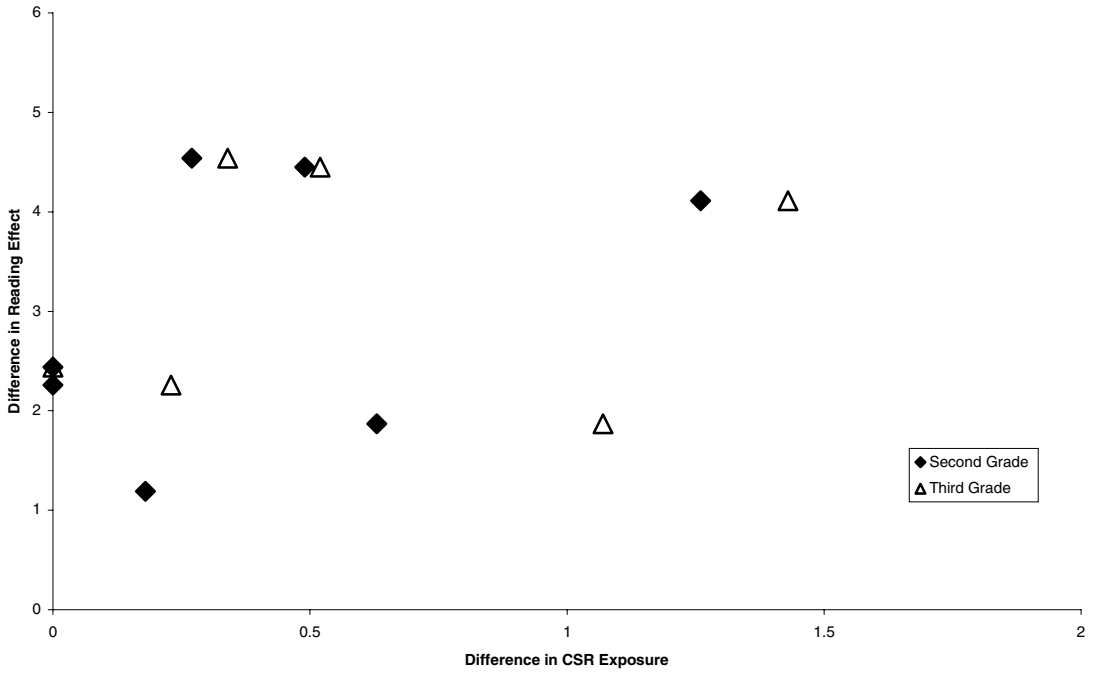
Table 6.7 combines data on cohort-to-cohort differences in estimated reading effects (from Table 6.3) and cohort-to-cohort differences in CSR exposure (from Table 6.3 and 6.6). The data do not provide much support for the hypothesis that total CSR exposure is positively related to achievement. Pairs of cohorts with the greatest differences in total CSR exposure show only modest differences in reading effects, and those with the greatest differences in reading effects show relatively small differences in total CSR exposure.

Table 6.7–
Cohort-to-Cohort Differences in Reading Effects and CSR Exposure

Cohort-to-Cohort	Reading Effect Difference	Second-grade CSR Exposure Difference	Third-grade CSR Exposure Difference
K 91–92 to 92–93	2.01	0	0
K 92–93 to 93–94	1.29	0	.23
K 93–94 to 94–95	1.69	.63	1.07
K 94–95 to 95–96	2.98	1.26	1.43
K 95–96 to 96–97	4.15	.27	.34
K 96–97 to 97–98	4.78	.49	.52
K 97–98 to 98–99	3.23	.18	--

This pattern may be clearer in Figure 6.5, which shows the data from Table 6.7 in graphical form. Again, there is no strong relationship between differences in reading effects and differences in total exposure in either second or third grade. That is, the points on the graph do not cluster in a positive (upward) or negative (downward) pattern.

Figure 6.5–
Differences in Reading Effects Versus Differences in CSR Exposure



In addition, there was no association between cohort-to-cohort differences in achievement and total CSR exposure for mathematics or language. Figures 6.6 and 6.7 were drawn using the mathematics and language effect differences from Table 6.3 and CSR exposure differences from Table 6.6.

Figure 6.6—
Differences in Mathematics Effects versus Differences in CSR Exposure

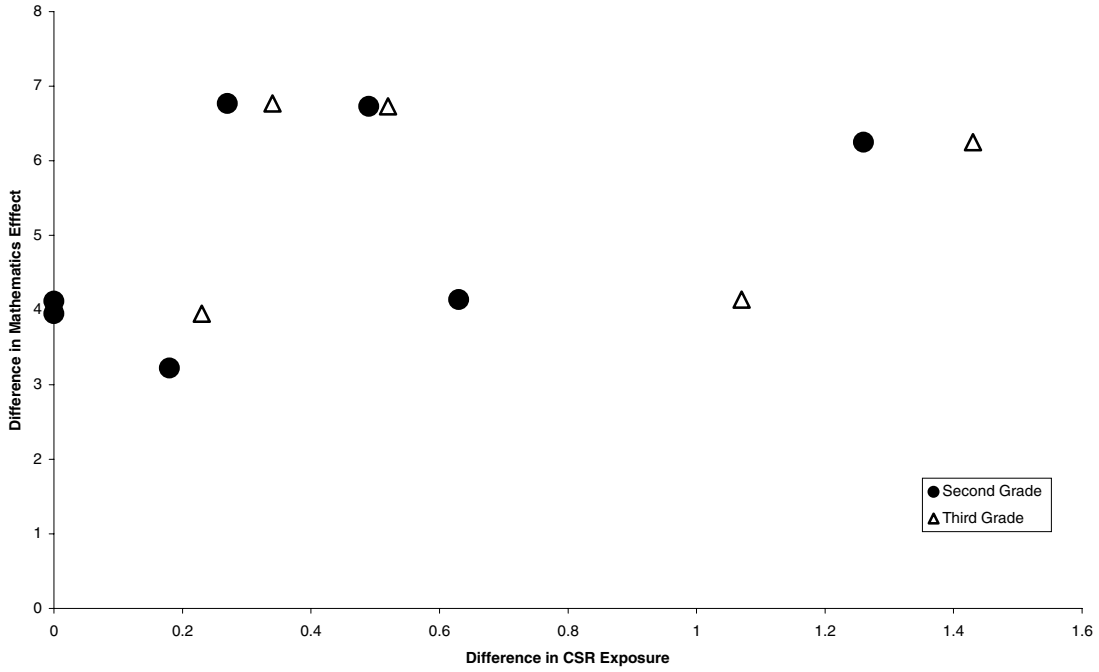
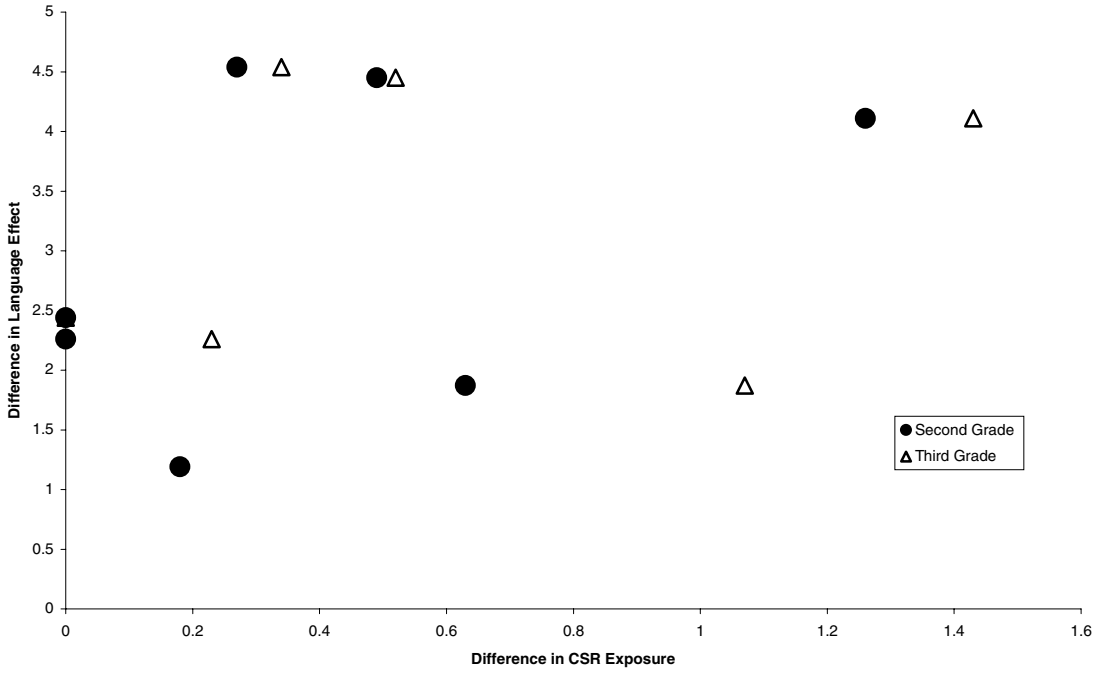


Figure 6.7–
Differences in Language Effects versus Differences in CSR Exposure



We also conducted a separate analysis of the exposure and achievement differences among the four cohorts entering kindergarten from 1995–96 to 1998–99. These cohorts are interesting because the difference among them in CSR exposure occurred almost exclusively in kindergarten. The percentage of students participating in reduced size classes in kindergarten rose from zero in 1995–95, to 0.19 in 1996–97, 0.69 in 1997–98, and 0.86 in 1998–99. However, the percentage of students in reduced classes in first, second, and third grades was almost the same for all four groups. Finding that differences in second- and third-grade achievement correspond to differences in kindergarten exposure would argue that earlier participation makes a difference.

Table 6.8 summarizes the cohort-to-cohort differences in kindergarten exposure and in achievement test scores for these cohorts. The table shows no strong association between exposure and achievement in this subset of the data. The largest differences in achievement are associated with both large and small differences in kindergarten exposure. Of course, there are still external factors at work that may cloud the picture. For example, schools that were unable to implement CSR in kindergarten until 1998–99 probably differed in important ways from schools that implemented earlier, and we cannot control for these factors.

Table 6.8–
Differences in Kindergarten Exposure Versus Differences in Second Grade Achievement

Cohort-to-Cohort	Kindergarten Exposure Difference	Second-grade Achievement Difference		
		Reading	Math	Language
K 95–96 to 96–97	0.19	4.6	7.1	4.2
K 96–97 to 97–98	0.50	5.2	7.2	4.3
K 97–98 to 98–99	0.17	2.8	2.8	1.4

Note: Participation in CSR in first and second grade was similar for the four cohorts included in this comparison.

Caveats

As in years past, it is important to keep in mind some of the limitations of the data, analyses, and interpretations presented here. The use of statewide summary data on CSR participation leads us to treat years of exposure as a continuous variable, when it is actually not. For the most part, student participation in CSR is dichotomous: Students were either in a reduced size class for a school year or they were not. When the state reports that 69 percent of kindergarten students were in reduced size classes in 1997–98, that does not mean that each student was exposed to CSR for 0.69 of a year. However, in these analyses we treat exposure as if the net effect on achievement of 69 percent of students participating for a year is the same as the net effect of each student participating for 69 percent of the year.

Similarly, using cumulative average exposure as the measure of CSR participation assumes that all years of exposure have equal effects on student outcomes. There is some evidence from the Tennessee STAR study that this assumption is unwarranted. Researchers in Tennessee found that early and consistent exposure to reduced class size was associated with larger effects. This suggests that the scale of our exposure measure might not be optimum for finding effects. Fortunately, because of the way CSR was implemented in California, cohorts that have high exposure on our measure are likely to have experienced CSR consistently in two or three consecutive grade levels, whereas cohorts that have low exposure on our measure are likely to have had both less and later exposure to CSR. Recall that for the most part, schools implemented CSR starting with first grade, then added second grade, then third grade and/or kindergarten. As a result, the large differences in cumulative exposure among early cohorts reflect more extreme differences, and the small differences in exposure between later cohorts reflect only marginal increases in the number of students in small classes in kindergarten. Therefore, we believe that our measure of exposure rank orders changes in a meaningful manner and is appropriate for our purposes.

In addition, our analyses do not control for the movement of students in and out of California public schools. We could not track individual students, nor were we able to obtain estimates of the annual migration of students between public and private schools or between California and other states and countries. Similarly, we did not make adjustments for changes over time in student participation in the California STAR testing program (e.g., an increase or decrease in the percentage of students with parental waivers). We assumed the statewide averages are comparable from one year to the next.

As we noted above, there have been modest changes in the demographic characteristics of students during the subject time period that might have affected overall achievement. However, lacking both a theoretical and an empirical basis for knowing how demographic changes would affect CSR's impact, we did not attempt to adjust the analyses to reflect these changes. Table 6.9 shows selected demographic characteristics of California public school students during the 1990s. Others may have a better sense of how these changes might have influenced scores or the effectiveness of CSR policies.

Table 6.9–
Demographic Characteristics of California Students, 1993–2000 (percentages)

			Race/Ethnicity				
School Year	Total Enrollment	Limited English Proficient (LEP)	Asian	Hispanic or Latino	African American	White (not Hispanic)	Other
1993–94	5,267,277	22.2	8.2	37.1	8.7	42.3	3.8
1994–95	5,341,025	23.1	8.2	37.9	8.7	41.4	3.9
1995–96	5,467,224	23.6	8.2	38.7	8.8	40.4	3.9
1996–97	5,612,965	24.2	8.2	39.7	8.7	39.5	3.9
1997–98	5,727,303	24.6	8.1	40.5	8.8	38.8	3.9
1998–99	5,844,111	24.6	8.1	41.3	8.7	37.8	4.2
1999–00	5,951,612	24.7	8.0	42.2	8.6	36.9	4.3
2000–01	6,050,895	24.9	8.0	43.2	8.4	35.9	4.5

Note: Starting in 1998–99, all figures include California Youth Authority (CYA) schools. "Other" includes American Indian or Alaskan Native, Pacific Islander, Filipino, and, beginning in 1998, Multiple or No Response.
Source: California Department of Education, Education Demographics Unit.

Perhaps more importantly, there have been significant policy and program changes during this period that also affected student achievement. These changes include new state standards and curricula, revised grade-level promotion policies, a new test-based school-level accountability system with large rewards for increases in scores, and the elimination of traditional bilingual education programs. Table 6.10 lists some of the major educational policy changes by year of implementation; all of these presumably contributed in some manner to the pattern of achievement described here. Because they occurred simultaneously, we are unable to disentangle their separate effects or to isolate the unique contribution of CSR to score improvement during this period.

Table 6.10–
Selected Educational Reforms in California, 1995–2000

Educational Reform	Year of Implementation
Class Size Reduction	1996–97
Reading Initiative	1996–97
Teaching Reading, Balanced Reading Program Advisory	1996–97
Standardized Testing and Reporting (STAR) System	1997–98
Content Standards (English/Language Arts, Mathematics, History/Social Studies, Science)	1997–98
Proposition 227: English for the Children	1998–99
Social Promotion, Retention and Remediation Policies	1998–99
Mandatory Minimum of 180 Instructional Days	1998–99
High School Exit Examination	1998–99
Public School Accountability Act (statewide accountability system)	1998–99

Finally, there is some reason to doubt the validity of the score gains we used as the basis for these analyses. The California school accountability system has created a high-stakes atmosphere that may lead to changes in test scores that are independent of actual changes in achievement. Researchers have found considerable evidence that high-stakes accountability leads to invalid increases in test scores (Koretz et al., 1991; Linn, 2000). Also, as we noted in our previous CSR evaluation reports, evidence from other states indicates that test scores rise as teachers and students become more familiar with the test. An increase equivalent to 2–5 points on the SAT-9 scale has been observed in other states that have implemented the test under conditions where stakes were lower than they are in California (examples include Alabama, Arizona, and West Virginia). The gains in SAT-9 scores observed in California are well within the range that might be associated with "normal" score inflation.

Conclusions

The goal of this investigation was to determine the extent to which changes in achievement from 1997 to 2001 correspond to the implementation of the CSR program. The analyses show that scores at the elementary level have been rising at the same time that increasing percentages of students have been taught in reduced size classes. However, there is no clear relationship between changes in the amount of exposure to CSR and changes in the average level of achievement: Increased exposure is not associated with greater gains in achievement. Furthermore, many other educational reforms were enacted during this period that might have contributed to the achievement gains; lacking any baseline data or any thoughtful design for implementing the reforms, there is no way to untangle their combined effects. In the end, it is impossible for us to determine how much the various factors may have influenced overall student achievement in California, and we cannot draw any strong conclusions about the effects of CSR.

In our fourth and final CSR evaluation report, we hope to examine similar relationships using school-level data. These data will also permit us to make comparisons based on aggregated student background factors—i.e., to compare patterns of exposure and achievement for schools with high and low percentages of minority, EL, or low-income students. These school-level analyses may be more informative than prior analyses because we can incorporate information about the actual participation of students in CSR in a given year at a given grade level. In a special, supplemental study, we will also explore the relationship between teacher characteristics (including education level, credential status, and experience) and student achievement gains in reduced size classes.

CHAPTER 7

Effects of CSR on Special Education Students and English Learners

Jamie Shkolnik, Michalis Michaelides, Hiroyuki Hikawa, and Freya Makris

Introduction

Both the number of students identified to receive special education services and the number of students classified as English learners (EL)[1] in kindergarten through third grade in California are substantial—over 155,000 and 664,000, respectively, for the 2000–01 school year. Given the size of these two groups (the EL students alone make up over one-third of all K–3 students), it is important to examine ways in which the Class Size Reduction (CSR) program may have affected their education.

This chapter describes our exploration of issues concerning identification and placement of special education students and teacher qualifications as related to special needs students. We examined special education identification rates, class placement of special education students, and the number of teachers credentialed to teach EL students.

Methods

The findings presented here are based on quantitative analyses of state archival data. Data from a number of sources were used to describe changes in the identification of students needing special education services, as well as changes in trends in the distribution of teachers with specialized credentials. Our findings are primarily based on analyses of data from the California Basic Educational Data System (CBEDS) and California Special Education Management Information System (CASEMIS). Data on special education teacher credentials came from the CBEDS Professional Assignment Information Form (PAIF); school-level data came from the CBEDS School Information Form (SIF). Special education identification rates were computed using CASEMIS, which contains individual records for all special

[1] Students for whom English is a second language and who are not fully proficient in English are often referred to as limited English proficient (LEP), English language learners (ELL), and English learners (EL). We use EL throughout this report to reflect the usage in the California law that implemented proposition 227, a proposition passed by California's voters in 1998 that banned the implementation of bilingual education except under special parental waiver conditions.

education students in California. These records were aggregated at the state level for overall analyses.

To examine trends by demographic characteristics, we categorized California schools along two dimensions: percentage of low-income[2] students and percentage of EL students. The groupings contained similar numbers of schools when possible. For consistency, each categorization was based on the schools' percentages during the first year of CSR, 1996–97. Complete definitions and information on the number of schools and districts in each grouping can be found in Appendix D of the first CSR evaluation report (Bohrnstedt and Stecher, 1999).

Results

CSR and Special Education

Special Education Identification Rates

When a teacher believes a student may need special education services, the student is referred for assessment, which is used to determine whether the student is eligible for special education services. The percentage of students identified as eligible for special education services is called the special education identification rate. The distinction between the referral rate and the identification rate is important. As the results here show, even though interview data collected in the second year of the evaluation suggested that the number of *referrals* for special education increased with the introduction of CSR, there was little evidence that the number of *identifications* of K–3 children as eligible for special education services was affected by CSR.

It is important to note that if CSR did result in changes in special education identification rates, one would expect to see changes in these rates beginning in 1996–97, the year CSR was introduced. These changes should also be above and beyond any trends that were occurring prior to CSR's introduction. Furthermore, they would be more apt to occur in grades 1 and 2, since CSR implementation rates were much higher in these two grades than they were in kindergarten and grade 3 during the first few years of CSR.[3]

Table 7.1 compares identification rates for 1994–95 and 1995–96 (pre-CSR years) with those for the subsequent school years through 2000–01 (the first 5 years of the program) for all grade levels. The rates for grade 1 are virtually the same post-CSR as pre-CSR, providing little indication of an effect due to the CSR initiative. The data for grade 2 also fail to demonstrate a relationship between implementation of CSR and identification rates. While there was a small *decrease* in the rates for grade 2 between 1994–95 and 2000–01, inspection of the data shows that the decline first appeared in 1995–96, the year *prior* to the introduction of CSR. The same pattern is seen for grade 3—overall the rates declined, but

[2] Students are referred to as low-income or as being from low-income families in this report if state records classify them as receiving public assistance in the form of Aid to Families with Dependent children (AFDC) or its successor in California, CalWORKS.

[3] SB 1777 required that a school first reduce the size of its grade 1 classes, then its grade 2 classes. Once its grade 2 classes were reduced, the school could choose to reduce its kindergarten or grade 3 classes.

the decline began prior to CSR's introduction. This decline is parallel to the decline in grade 4, in which class size reduction was not a factor.

Overall then, there is no evidence that CSR implementation has had an effect on special education identification rates in the grades affected by CSR (i.e., K–3). There were some interesting trends observed in the data—the percentage of students in special education increased over the years for kindergarten, grade 1, and grades 6–12, and decreased for grades 2 through 5—but they do not appear to have been due to the implementation of CSR in 1996–97.

Table 7.1–
Percentage of Students in Special Education in Grades K–12 from 1994–95 to 2000–01

	Percentage of Students in Special Education						
School Year	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grades 6–12
1994–95	5.1	6.4	9.1	11.6	12.8	12.9	9.0
1995–96	4.8	6.6	8.9	11.3	12.8	13.0	9.4
1996–97	5.2	6.5	8.9	11.0	12.4	13.0	9.7
1997–98	5.3	6.6	8.7	10.8	12.1	12.6	10.0
1998–99	5.3	6.7	8.8	10.6	12.0	12.3	10.3
1999–00	5.6	7.0	8.9	10.6	11.7	12.2	10.5
2000–01	5.9	7.3	8.7	10.4	11.4	11.8	10.5

Source: Consortium analyses of California Department of Education CASEMIS data.

Identification Rates and Low-Income Districts

In addition to an overall examination of identification rates, we looked at whether special education identification rates varied for school districts based on their percentage of low-income students and the degree to which they had implemented CSR by the fifth year of the CSR program (2000–01). Grade 3 was selected for these analyses because as a function of program requirements, it showed the greatest variation in CSR implementation.

Table 7.2 shows trends in special education identification rates for districts with different percentages of low-income students. The purpose of this analysis is to see whether there is variation in the identification rates as a function of the percentage of low-income students in the district. The overall trend shown is a steady decline in special education identification rates for third graders over the seven-year period from 1994–95 to 2000–01. However, the degree of the decline was highest for districts with the lowest percentages of low-income students. For districts with the highest percentage of low-income students, the identification rates declined until 1997–98 and then began to increase, almost reaching its original level. Before the introduction of CSR, students in districts with fewer low-income students were more likely to be identified as needing special education services. By the year 2000-01, the identification rates at districts with fewer low-income students were more in line with the identification rates in districts with more than 20 percent low-income students. Since the declines began in the two years preceding CSR, it is unclear how or whether these trends relate to the implementation of CSR.

Table 7.2–
Percentage of Grade 3 Students in Special Education, by District Percentage of Low-Income Students

District Percentage of Low-Income Students	Percentage of Grade 3 Students in Special Education							
	94–95	95–96	96–97	97–98	98–99	99–00	00–01	Change, 94–95 to 00–01
Less than 10	12.1	11.6	11.3	11.1	10.7	11.2	10.8	-1.3
10–20	11.3	11.2	10.8	10.5	10.0	9.9	9.5	-1.8
More than 20	10.1	9.8	9.7	9.5	9.6	9.7	10.0	-0.1
Total	**11.6**	**11.3**	**11.0**	**10.8**	**10.6**	**10.6**	**10.4**	**-1.2**

Source: Consortium analyses of California Department of Education CASEMIS data.

Class Placement of Special Education Students

Though the majority of students needing special education services are mainstreamed (i.e., placed in general education settings), some students are so greatly disabled that they cannot be accommodated in general education classes. These students instead are placed in what are termed *special day classes* (SDCs). An analysis of the CASEMIS data for the years prior to and following the introduction of CSR provides no evidence that CSR had an impact on the percentage of special education students placed in SDCs. As can be seen in Table 7.3, small increases did occur in the percentage of special education students in grades K–3 assigned to SDCs in the most recent 4 years. However, the increase was not limited to those grades, suggesting that it cannot be attributed to the introduction of CSR.

Table 7.3–
Percentage of Special Education Students in Special Day Classes, 1994–95 to 2000–01

School Year	Percentage of Special Education Students Placed in SDCs						
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grades 6–12
1994–95	22.2	20.9	20.0	20.8	22.4	25.6	32.2
1995–96	25.3	21.4	20.2	20.4	23.1	25.2	31.9
1996–97	23.8	21.6	20.5	20.4	22.6	25.7	31.9
1997–98	24.4	21.3	19.8	20.5	22.6	25.5	32.0
1998–99	26.0	22.7	20.3	20.6	23.0	26.0	32.3
1999–00	25.0	23.2	21.5	21.5	23.8	26.4	33.2
2000–01	25.5	23.0	22.1	22.3	24.4	27.3	33.5
Change	**3.3**	**2.1**	**2.1**	**1.5**	**2.0**	**1.7**	**1.3**

Source: Consortium analyses of California Department of Education CASEMIS data.

CSR and English Learners

EL Instructional Staff

Overall, there was a dramatic increase in the number of teachers with Cross Cultural Language and Academic Development (CLAD) and Bilingual Cross Cultural Language and Academic Development (BCLAD) credentials between 1995 and 2001.[4] With the increased number of classrooms required for class size reduction and the continuing growth in the number of students classified as EL, came an increase in demand for CLAD and BCLAD credentialed teachers. While California's proposition 227 substantially reduced the number of classrooms taught in students' primary languages, it did not reduce the need for teachers credentialed to teach English Learners given the growth in the EL population.

Table 7.4 shows the overall increase in the number of teachers with CLAD or BCLAD credentials as a function of a school's percentage of EL students between 1995–96 (the year prior to the introduction of CSR) and 2000–01. All schools, regardless of the percentage of EL students they served, experienced a statistically significant increase in the number of teachers with a CLAD or BCLAD credential. In addition, schools with the largest share of EL students had the largest numbers of teachers with CLAD or BCLAD credentials.

Table 7.4–
Number of K–3 CLAD- or BCLAD-credentialed Teachers, by Schools with Different Proportions of EL Students

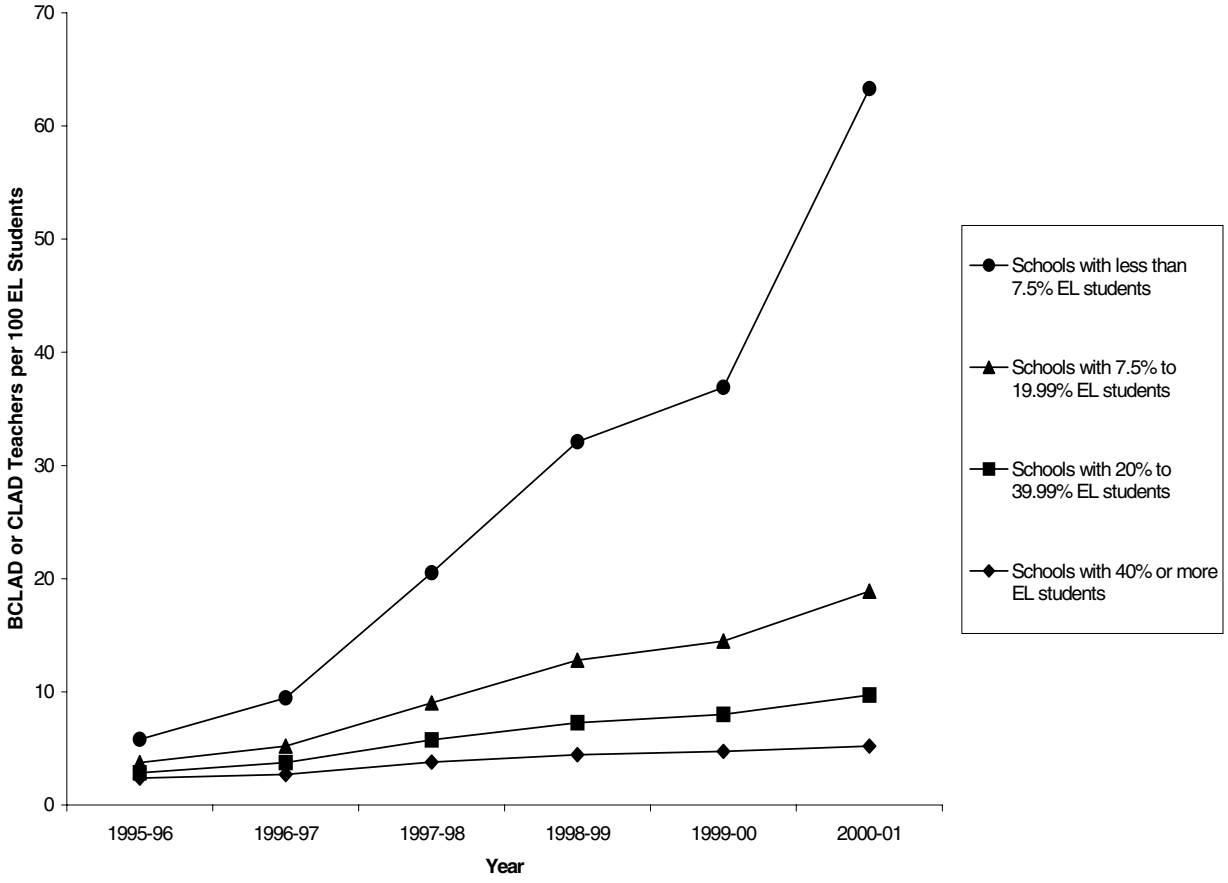
School Percentage of EL Students	Number of K–3 CLAD or BCLAD Teachers					
	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01
Less than 7.5	711	1,097	2,170	3,147	3,940	5,861
7.5–19.99	1,771	2,479	4,396	5,978	6,799	8,212
20–39.99	3,559	4,814	7,189	8,976	9,824	11,429
40 or more	8,298	9,705	14,301	17,236	18,634	19,858

Source: CBEDS and R-30 Language Census Forms.

The distribution of CLAD or BCLAD teachers shown in Table 7.4 appears less equitable, however, when shown in relation to the actual numbers of EL students in the schools. Figure 7.1 shows that, as has been observed in our two earlier reports, the number of CLAD or BCLAD teachers per 100 EL students was appreciably higher in schools with the lowest percentage of EL students. In addition, a dramatic increase in these disparities occurred in 1997–98, and the gap continued to grow through 2001. As the figure indicates, schools with the lowest percentage of EL students ended up with a far greater percentage increase in the number of CLAD or BCLAD teachers than did schools with the highest percentage of EL students.

[4] The CLAD and BCLAD certifications indicate that the holders have completed additional training to provide appropriate instruction to EL students. The CLAD authorizes the teaching of English Language Development (ELD) and specially designed academic instruction in English (SDAIE). The BCLAD authorizes the holder to provide instruction in a language other than English as well as ELD and SDAIE.

Figure 7.1–
Number of K–3 CLAD- or BCLAD-credentialed Teachers per 100 EL Students, by Schools with Different Proportions of EL Students



Source: CBEDS and R-30 Language Census Forms.

More precisely, in 1995–96 (one year prior to CSR), the gap in the ratio of CLAD or BCLAD teachers per 100 EL students between schools with less than 7.5 percent EL students and schools with 40 percent or more EL students was quite small. Schools with the lowest percentage of EL students had an average of 5.8 teachers with CLAD or BCLAD credentials per 100 EL students; schools with the highest percentage of EL students had an average of 2.4.

By 1997–98 (the second year of CSR), however, this gap had widened considerably. Schools with the lowest percentage of EL students had 20.5 CLAD or BCLAD teachers per 100 EL students; schools with the highest percentage of EL students had 3.8. And after five years of CSR, the gap had widened even more: Schools with the lowest percentage of EL students had 63 CLAD or BCLAD teachers per 100 EL students, and schools with the highest percentage of EL students had only 5.

We also found that the distribution of just the BCLAD teachers per 100 EL students increasingly favored districts with the lowest percentages of EL students. (Because of their

presumed facility with more than one language, teachers with BCLAD credentials are especially highly valued in schools with high percentages of EL students.) Table 7.5 compares the number of K–3 teachers with BCLAD credentials per 100 EL students for 1995–96 through 2000–01. It shows that the gap in the number of BCLAD teachers per 100 EL students between schools with high and low percentages of EL students widened.

Specifically, the number of BCLAD teachers per 100 EL students in schools with less than 7.5 percent EL students rose from 2.8 in 1995–96 to 16.0 in 2000-01—a 471 percent increase. By contrast, the rise was from 2.0 to 2.5 BCLAD teachers per 100 EL students in schools with more than 40 percent EL students—a 25 percent increase. In other words, schools with the smallest percentage of EL students gained substantially more BCLAD teachers per 100 EL students than did schools with the largest percentage of EL students in the first five years of CSR implementation. The difference between the lowest income quartile schools was very close to the two middle quartiles, however.

Table 7.5–
Number of K–3 BCLAD Teachers per 100 EL Students, by Schools with Different Proportions of EL Students

School Percentage of EL Students	K–3 BCLAD Teachers per 100 EL Students						
	1995–96	1996–97	1997–98	1998–99	1999–00	2000–01	Change
Less than 7.5	2.8	4.3	4.9	6.0	5.8	16.0	13.2
7.5–19.99	1.9	2.4	2.3	2.9	2.6	3.3	1.4
20–39.99	2.0	2.2	2.2	2.3	2.2	2.5	0.5
40 or more	2.0	2.0	2.3	2.6	2.5	2.5	0.5

Source: CBEDS and R-30 Language Census Forms.

In summary, the number of teachers with a CLAD or BCLAD credential grew substantially during CSR implementation. However, on a proportional basis, it was precisely those schools with the greatest need for such teachers (i.e., those with the highest percentage of EL students) that had the fewest of them per 100 EL students.

Discussion

CSR and Special Education Students

In California, special day classes have had an implied target size of 12 students per class as a reflection of the belief that special education students with more severe disabilities require more physical space and more teacher time and attention than do non-disabled students. While CSR's standard of no more than 20 students per class (in order to qualify for supplemental CSR funds) is inflexible, the SDC standard of 12 students per class is not. Moreover, local officials reported that they generally try to keep K–3 class size below the maximum so that they can add students who appear mid-year and still not exceed CSR's 20-student limit. In contrast, there are no strict limits preventing SDCs from increasing in size

over the generally accepted number of 12 students. However, our findings do not indicate that SDC placements rose as CSR was implemented.

The data in Chapter 3 of this report show that the statewide shortage of facilities encountered at the inception of CSR seems to have adversely impacted the availability of space needed to meet the needs of special education students. This is a matter that should be addressed by state policymakers.

CSR and English Learners

As pointed out in the first two CSR evaluation reports, EL students appear to be adversely affected by the distribution of teachers with CLAD or BCLAD credentials. The good news is that the overall number of teachers with these credentials continued to grow for all schools through 2000–01. The bad news, however, is that the gap in the number of such teachers per 100 EL students in schools with low and high percentages of EL students widened even further. That is, schools with the highest percentage of EL students again had the smallest number of teachers with CLAD or BCLAD credentials.

Conclusions

Summary of Findings

Our main findings from the examination of how CSR might have affected special education are as follows:

- The statewide data show no CSR-related change in the percentage of K–3 students identified as needing special education services since CSR was introduced.
- With the inception of CSR, there was no CSR-related change in the percentage of K–3 students in special education who were placed in special day classes.

Our findings pertaining to the possible effects of CSR on EL students are as follows:

- Schools with the largest proportion of EL students received the largest number of teachers specifically credentialed to work with EL students.
- The distribution of such teachers per 100 EL students actually favored schools with fewer EL students.

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Appendix A

Appendix to Chapter 2: Implementation of CSR

Table A.1–
Percentage of K–3 Teachers in Reduced Size Classrooms, by Percentage of Asian/Pacific Islander Students in the School

Percentage Asian/Pacific Islander Students in School	K–3 Teachers				
	1996–97	1997–98	1998-99	1999-00	2000-01
Less than 6%	42.7	79.5	91.5	92.1	92.5
6% or more	41.8	79.7	91.9	93.2	94.0
Low-High Difference	**0.9**	**–0.2**	**-0.4**	**–1.1**	**-1.5**

Table A.2–
Percentage of K–3 Teachers in Reduced Size Classrooms, by Percentage of African American Students in the School

Percentage African American Students in School	K–3 Teachers				
	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 3%	45.3	80.0	91.0	92.4	93.2
3% or more	39.8	79.2	92.2	92.8	93.2
Low-High Difference	**5.5**	**0.8**	**-1.2**	**-0.4**	**0.0**

Appendix B

Appendix to Chapter 4: Teacher Characteristics

Eleven parts comprise this appendix. Part 1 provides information on demographic changes in the California teacher workforce for grades 4–5, 7–8, and 10–12. Parts 2–5 present distributions of K–3 teacher characteristics across various school characteristics. The teacher characteristics considered for these analyses are as follows: years of teaching experience, education level, and credentialing status. Teachers categorized as 'novice,' are those with three or fewer years of teaching experience; those categorized as 'Bachelor's degree only,' possess a bachelor's degree and less than thirty additional semester hours.[1] We present distributions of teachers classified as novice, BA only, and not fully credentialed, across schools with differing percentages of low-income, EL, minority, and Hispanic students, as well as distributions across school enrollment and location type (rural, suburban, or urban). Parts 6–9 contain the results of comparing these same school characteristics with the characteristics of grade 4–5 teachers. Parts 10 and 11 compare characteristics of grade 7-8 teachers and grade 10-12 teachers, respectively, with schools grouped by percentage of low-income and minority students.

Part 1: Demographic Changes in the CA Teacher Workforce for Grades 4–5, 7–8, and 10–12

This section provides basic demographic information, similar to what is presented in Table 4.2, for the grades 4–5, 7–8, and 10–12 teacher workforces. The proportion of new teachers is not available for 1996–97 due to an unusual amount of missing data on teachers' years of experience.

[1] Teachers responded to a question on the PAIF form that asked about their highest educational level. Choices included: Doctorate, Master's plus 30 or more semester hours, Master's degree, Bachelor's degree plus 30 or more semester hours, Bachelor's degree, and Less than bachelor's degree. The cutoff was made at the Bachelor's degree category.

Table B.1—

Demographic Changes in the CA Teacher Workforce for Grades 4–5, from 1995–96 to 2000-01

Demographics	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Total Number of 4–5 Teachers	22,248	22,519	23,333	24,322	25,820	26,571
Percentage of First-Year Teachers	5%	N/A	12%	13%	11%	12%
Mean Number of Students per Teacher	29.7	29.6	29.3	29.0	29.3	29.0
White	79%	79%	77%	75%	74%	73%
Hispanic	9%	10%	11%	11%	13%	13%
Asian	6%	6%	7%	6%	5%	6%
African American	5%	5%	5%	5%	6%	6%
American Indian	0.7%	0.7%	0.8%	0.7%	0.7%	0.6%
Male	22%	23%	25%	26%	26%	26%

Source: CBEDS-PAIF

Note that the percentage of male teachers in 1995-1999 was reported incorrectly in the year 1 and 2 evaluation reports. This table has been amended to accurately reflect the percentage of male teachers during those years.

Table B.2—
Demographic Changes in the CA Teacher Workforce for Grades 7-8, from 1995–96 to 2000-01

Demographics	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Total Number of 7–8 Teachers	27,738	29,061	29,608	30,599	34,715	35,964
Percentage of First-Year Teachers	7%	N/A	8%	9%	10%	11%
Mean Number of Students per Teacher	34.5	33.0	33.0	33.3	30.4	29.0
White	81%	81%	80%	79%	78%	77%
Hispanic	8%	8%	9%	9%	9%	10%
Asian	4%	4%	4%	4%	4%	5%
African American	6%	6%	6%	6%	6%	6%
American Indian	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%
Male	43%	43%	43%	43%	41%	41%

Source: CBEDS-PAIF

Table B.3—
Demographic Changes in the CA Teacher Workforce for Grades 10-12, from 1995–96 to 2000-01

Demographics	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Total Number of 10–12 Teachers	33,802	35,664	38,260	39,083	39,870	42,134
Percentage of First-Year Teachers	5%	N/A	6%	6%	7%	7%
Mean Number of Students per Teacher	32.0	31.0	31.6	31.9	29.5	27.9
White	82%	82%	81%	80%	78%	78%
Hispanic	8%	9%	9%	10%	10%	10%
Asian	4%	4%	4%	4%	5%	5%
African American	4%	4%	5%	5%	5%	5%
American Indian	0.9%	0.9%	1%	0.9%	1%	0.9%
Male	56%	56%	55%	55%	54%	53%

Source: CBEDS-PAIF

Part 2: K–3 Teacher Experience for School Descriptors

The following six tables show the proportion of novice (teachers with three or fewer years of teaching experience) K–3 teachers in the given school categories for school years 1995–96, 1997–98, 1998–99, 1999-00, and 2000-01. Data for school year 1996–97 are not included due to an unusually high proportion of missing teacher experience data. The first column of each table shows the school categories. Columns two, three, and four show the percentage of novice teachers in each quartile for the respective school years. Each cell represents the percentage of novice teachers in schools in that quartile, in that year. For example, in 1995–96, 14.2 percent of the K–3 teachers in schools in income quartile 1 were novices, which means 85.8 percent (100–14.2) of the teachers in these schools had four or more years of teaching experience.

Table B.4—
Percentage of Novice Teachers in Grades K-3, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	14.2%	24.9%	24.2%	18.8%	16.5%
7.5% - 17.49%	14.4	25.9	26.0	21.0	17.7
17.5% - 29.99%	17.4	29.2	30.1	25.9	22.7
30% or more	21.6	31.0	34.1	30.4	26.6

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.5—
Percentage of Novice Teachers in Grades K–3, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	12.5%	22.6%	22.5%	17.1%	14.6%
7.5% - 19.99%	13.7	25.4	25.4	19.9	17.0
20% - 39.99%	18.0	28.6	29.9	25.3	22.0
40% or more	22.6	33.3	35.7	32.4	28.5

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.6—
Percentage of Novice Teachers in Grades K–3, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 25%	11.7%	22.3%	21.4%	15.4%	13.1%
25% - 49.99%	14.0	24.5	24.2	18.8	16.1
50% - 74.99%	15.4	27.2	28.4	23.1	19.6
75% or more	22.1	32.4	34.9	31.6	28.0

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.7—
Percentage of Novice Teachers in Grades K–3, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	12.8%	23.3%	22.8%	17.5%	15.0%
16.68% - 49.99%	15.8%	27.0%	27.8%	21.8%	18.5%
50% or more	22.2%	32.6%	35.0%	31.1%	27.4%

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.8—
Percentage of Novice Teachers in Grades K–3, by Enrollment Quartiles

Number of Students in the School	1995–96	1997–98	1998–99	1999-00	2000-01
Fewer than 250	14.9%	25.3%	24.7%	20.8%	19.5%
250 - 499	15.0	26.0	26.6	22.0	18.8
500 - 749	15.8	27.3	27.8	22.8	19.8
750 or more	20.1	30.0	32.0	28.3	24.7

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.9—
Percentage of Novice Teachers in Grades K–3, by School Location

School Location	1995–96	1997–98	1998–99	1999-00	2000-01
Rural	13.2%	24.6%	24.6%	19.0%	16.1%
Suburban	15.8	28.0	27.9	22.6	19.3
Urban	20.7	29.6	32.5	29.1	25.8

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Part 3: K–3 Teacher Education for School Categorizations

The following six tables show the proportion of bachelor's degree only teachers (those teachers with a bachelor's degree and less than 30 semester hours) in the given school categories for school years 1995–96 to 2000-01. The first column of each table shows the school categories. Columns two through five show the percentage of bachelor's degree only teachers in each quartile for the respective school years. Each cell represents the percentage of bachelor's degree only teachers in schools in that quartile, in that year. For example, in 1995–96, 9.9 percent of the K–3 teachers in schools in income quartile 1 had only a bachelor's degree, which means 90.1 percent (100–9.9) of the teachers in these schools had at least 30 semester hours beyond a bachelor's degree.

Table B.10-—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	9.9%	11.3%	12.9%	12.9%	12.3%	11.8%
7.5% - 17.49%	12.0	15.5	17.6	18.4	18.1	16.6
17.5% - 29.99%	17.0	21.8	24.5	26.3	24.8	23.5
30% or more	25.2	28.5	31.4	34.1	32.7	31.8

Source: CBEDS-PAIF.

Table B.11—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	10.8%	12.3%	13.9%	13.5%	12.8%	12.6%
7.5% - 19.99%	13.2	15.7	17.2	17.5	16.8	15.7
20% - 39.99%	15.5	18.8	21.3	23.3	22.5	20.9
40% or more	24.7	29.8	33.0	36.1	34.6	33.2

Source: CBEDS-PAIF.

Table B.12—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	9.1%	10.2%	10.9%	11.0%	10.2%	10.0%
25% - 49.99%	11.7	13.2	14.9	14.5	13.7	13.6
50% - 74.99%	14.4	18.5	20.9	21.6	20.3	18.9
75% or more	23.8	28.4	31.6	34.9	33.7	32.1

Source: CBEDS-PAIF.

Table B.13—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	10.1%	11.8%	12.9%	13.5%	13.3%	12.0%
16.68% - 49.99%	14.8%	17.7%	19.6%	21.2%	19.6	18.2
50% or more	24.0%	29.0%	32.5%	34.4%	31.5	30.7

Source: CBEDS-PAIF.

Table B.14—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by Enrollment Quartiles

Number of Students in the School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Fewer than 250	9.9%	12.1%	12.8%	15.1%	16.1%	12.7%
250 - 499	13.9	17.1	18.3	21.1	20.9	18.3
500 - 749	13.6	17.3	19.6	20.7	19.7	18.9
750 or more	22.0	25.2	28.2	29.5	28.3	27.8

Source: CBEDS-PAIF.

Table B.15—
Percentage of Bachelor's Degree Only Teachers in Grades K-3, by School Location

School Location	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Rural	9.6%	11.9%	14.6%	15.2%	13.7%	13.6%
Suburban	13.4	15.3	16.5	16.8	16.5	15.3
Urban	23.9	29.0	32.6	35.5	33.7	32.3

Source: CBEDS-PAIF.

Part 4: K–3 Teacher Credentialing for School Groupings

The following six tables show the proportion of not fully credentialed teachers in the given school categories for school years 1995–96 to 2000-01. The first column of each table shows the school categories described in Part 1 of this appendix. Columns two through seven show the percentage of not fully credentialed teachers in each quartile for the respective years. Each cell represents the percentage of not fully credentialed teachers in schools in that quartile, in that year. For example, 0.4 percent of the K–3 teachers in schools in income quartile 1 were not fully credentialed, which means 99.6 percent (100–0.4) of the teachers in these schools were fully credentialed.

Table B.16—
Percentage of Not Fully Credentialed Teachers in Grades K-3, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.4%	1.5%	4.3%	4.3%	4.6%	4.3%
7.5% - 17.49%	0.7	3.0	8.2	8.4	8.8	8.4
17.5% - 29.99%	1.9	4.9	14.2	15.3	15.7	15.0
30% or more	3.2	5.7	19.6	21.2	22.1	21.0

Source: CBEDS-PAIF.

Table B.17—
Percentage of Not Fully Credentialed Teachers in Grades K-3, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.3%	1.4%	4.1%	4.1%	4.4%	4.0%
7.5% - 19.99%	0.6	2.5	7.0	6.9	7.2	7.0
20% - 39.99%	1.5	4.2	11.3	12.1	12.5	11.8
40% or more	3.7	6.7	22.3	24.4	25.1	23.9

Source: CBEDS-PAIF.

Table B.18—
Percentage of Not Fully Credentialed Teachers in Grades K-3, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	0.3%	0.8%	2.4%	2.2%	2.5%	2.0%
25% - 49.99%	0.4	1.7	5.3	5.3	5.4	5.2
50% - 74.99%	0.8	3.3	9.4	9.7	9.7	9.0
75% or more	3.4	6.7	21.1	23.1	23.9	22.9

Source: CBEDS-PAIF.

Table B.19—
Percentage of Not Fully Credentialed Teachers in Grades K-3, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	0.4%	1.2%	3.6%	3.5%	4.2%	3.5%
16.68% - 49.99%	1.1	3.5	8.8	9.4	8.8	8.3
50% or more	3.4	6.5	22.2	23.8	23.1	22.2

Source: CBEDS-PAIF.

Table B.20—
Percentage of Not Fully Credentialed Teachers in Grades K-3, by Enrollment Quartiles

Number of Students in the School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Fewer than 250	0.4%	3.7%	6.1%	7.3%	8.7%	7.5%
250 - 499	1.1	2.6	7.7	8.3	9.1	7.9
500 - 749	1.3	3.5	9.8	10.5	10.9	10.4
750 or more	2.6	5.1	17.7	18.6	19.4	18.8

Source: CBEDS-PAIF.

Table B.21—
Percentage of Teachers Not Fully Credentialed in Grades K-3, by School Location

School Location	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Rural	0.7%	2.8%	7.2%	7.8%	7.9%	7.6%
Suburban	0.9	3.2	7.7	7.9	8.1	7.4
Urban	3.1	5.3	19.7	21.3	22.1	21.3

Source: CBEDS-PAIF.

Part 5: Novice K–3 Teacher Characteristics in 2000–01 for School Groupings

The following six tables give information on novice K–3 teachers (teachers with three or fewer years of teaching experience) in schools during 2000-01 by school category. The first column shows the familiar category definitions. The second column is taken directly from the tables in Part 1 and shows the increase in novice K–3 teachers for schools in the different quartiles between 1995–96 and 2000-01. The third column shows the percentage of novice teachers with bachelor's degree only in school year 2000-01 for schools in the given quartile. The final column shows the percentage of novice teachers who were not fully credentialed in schools in the given quartile in 2000-01. For example, in 2000-01, 32.7 percent of the novice teachers in income quartile 1 schools had a bachelor's degree only, and 17.8 percent of the same novices were not fully credentialed. In other words, 67.3 percent of the novice teachers in income quartile 1 schools had education beyond a bachelor's degree and 82.2 percent were fully credentialed.

Table B.22—
2000-01 Novice K-3 Teachers, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 7.5%	2.3 percentage points	32.7%	17.8%
7.5% - 17.49%	3.3	43.8	33.3
17.5% - 29.99%	5.3	54.2	46.1
30% or more	5.0	63.2	52.8

Source: CBEDS-PAIF.

Table B.23—
2000-01 Novice K–3 Teachers, by Student EL Quartiles

Percentage of EL Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 7.5%	2.1 percentage points	36.4%	18.8%
7.5% - 19.99%	3.3	42.0	29.9
20% - 39.99%	4.0	46.3	36.5
40% or more	5.9	64.7	56.6

Source: CBEDS-PAIF.

Table B.24—
2000-01 Novice K–3 Teachers, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 25%	1.4 percentage points	30.5%	10.8%
25% - 49.99%	2.1	36.8	22.8
50% - 74.99%	4.2	44.3	32.2
75% or more	5.9	63.0	55.3

Source: CBEDS-PAIF.

Table B.25—
2000-01 Novice K–3 Teachers, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 16.68%	2.2 percentage points	34.0%	16.2%
16.68% - 49.99%	2.7	44.3	30.7
50% or more	5.2	62.0	55.1

Source: CBEDS-PAIF.

Table B.26—
2000-01 Novice K–3 Teachers, by Enrollment Quartiles

Number of Students in the School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Fewer than 250	4.6 percentage points	32.7%	25.4%
250 - 499	3.8	43.8	29.1
500 - 749	4.0	47.3	36.2
750 or more	4.6	60.1	51.5

Source: CBEDS-PAIF.

Table B.27—
2000-01 Novice K–3 Teachers, by School Location

School Location	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Rural	2.9 percentage points	42.6%	33.1%
Suburban	3.5	39.7	26.3
Urban	5.1	64.5	55.7

Source: CBEDS-PAIF.

Part 6: Grades 4–5 Teacher Experience for School Descriptors

The following six tables show the proportion of grades 4–5 novice teachers (teachers with three or fewer years of teaching experience) in the given school categories for school years 1995–96, 1997–98, 1998–99, 1999-00, and 2000-01. Data for school year 1996–97 is not included due to an unusually high proportion of missing experience data. The first column of each table shows the school categories. Columns two, three, and four show the percentage of novice teachers in each quartile for the respective school years. Each cell represents the percentage of novice grades 4–5 teachers in schools in that quartile, in that year. For example, in 1995–96, 13.9 percent of the grades 4–5 teachers in schools in income quartile 1 were novices, which means 16.1 percent (100–13.9) of the teachers in these schools had four or more years of teaching experience.

Table B.28— Percentage of Novice Teachers in Grades 4-5, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	13.9%	20.4%	25.4%	25.1%	24.5%
7.5% - 17.49%	13.2	23.5	28.4	28.5	27.0
17.5% - 29.99%	15.3	25.5	33.2	33.7	32.3
30% or more	18.6	28.5	36.6	38.1	36.4

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.29— Percentage of Novice Teachers in Grades 4-5, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	12.7%	19.6%	24.4%	23.7%	22.3%
7.5% - 19.99%	12.8	22.2	27.8	27.9	26.5
20% - 39.99%	16.6	26.6	33.1	33.7	32.4
40% or more	18.9	29.5	38.2	39.8	38.3

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.30—
Percentage of Novice Teachers in Grades 4-5, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 25%	11.8%	18.8%	22.5%	21.2%	20.0%
25% - 49.99%	13.0	21.7	27.0	26.9	25.5
50% - 74.99%	14.7	24.4	31.1	30.8	29.8
75% or more	18.8	29.1	37.5	39.5	37.8

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.31—
Percentage of Novice Teachers in Grades 4–5, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	12.6%	19.9%	24.6%	23.5%	22.3%
16.68% - 49.99%	14.5	25.2	31.2	31.3	29.1
50% or more	18.9	28.3	37.0	37.7	36.9

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.32—
Percentage of Novice Teachers in Grades 4-5, by Enrollment Quartiles

Number of Students in the School	1995–96	1997–98	1998–99	1999-00	2000-01
Fewer than 250	10.7%	14.7%	26.1%	23.7%	22.7%
250 - 499	14.4%	15.3%	28.8%	29.1	28.0
500 - 749	14.6%	17.1%	30.8%	30.3	29.5
750 or more	17.0%	16.3%	33.0%	34.9	33.1

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.33—
Percentage of Novice Teachers in Grades 4–5, by School Location

School Location	1995–96	1997–98	1998–99	1999-00	2000-01
Rural	11.8%	20.5%	24.7%	23.1%	23.0%
Suburban	14.7	24.2	29.7	30.0	28.9
Urban	17.8	27.0	35.6	37.1	35.1

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Part 7: Grades 4–5 Teacher Education for School Categorizations

The following six tables show the proportion of grades 4–5 bachelor's degree only teachers (those teachers with a bachelor's degree and less than 30 semester hours) in the given school categories for school years 1995–96 to 2000-01. The first column of each table shows the school categories. Columns two through seven show the percentage of bachelor's degree only teachers in each quartile for the respective school years. Each cell represents the percentage of bachelor's degree only teachers in schools in that quartile, in that year. For example, in 1995–96, 8.6 percent of the grades 4–5 teachers in schools in income quartile 1 had only a bachelor's degree, which means 91.4 percent (100–8.6) of the teachers in these schools had at least 30 semester hours beyond a bachelor's degree.

Table B.34—
Percentage of Bachelor's Degree Only Teachers in Grades 4-5, by Students' Family Income Quartile

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	8.6%	9.0%	10.9%	12.7%	13.0%	13.4%
7.5% - 17.49%	11.3	12.0	15.7	19.5	20.1	19.9
17.5% - 29.99%	16.3	19.2	23.0	26.6	27.7	27.8
30% or more	21.9	24.6	28.6	34.5	35.9	35.6

Source: CBEDS-PAIF.

Table B.35—
Percentage of Bachelor's Degree Only Teachers in Grades 4–5, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	9.3%	10.1%	12.5%	13.9%	14.0%	14.4%
7.5% - 19.99%	12.3	12.5	14.6	17.8	18.3	19.5
20% - 39.99%	14.8	16.3	19.3	23.9	25.1	24.2
40% or more	22.0	25.9	31.3	36.9	38.7	37.6

Source: CBEDS-PAIF.

Table B.36—
Percentage of Bachelor's Degree Only Teachers in Grades 4-5, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	8.2%	8.3%	9.5%	10.9%	11.2%	11.5%
25% - 49.99%	10.6	10.6	12.7	15.0	15.1	15.8
50% - 74.99%	13.2	15.1	18.4	22.0	22.5	22.9
75% or more	21.6	25.0	29.9	35.8	37.5	36.4

Source: CBEDS-PAIF.

Table B.37—
Percentage of Bachelor's Degree Only Teachers in Grades 4–5, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	9.2%	9.8%	11.4%	12.9%	13.9%	13.7%
16.68% - 49.99%	13.4	14.8	17.9	22.7	21.9	21.7
50% or more	21.7	24.7	29.9	34.5	34.9	34.9

Source: CBEDS-PAIF.

Table B.38—
Percentage of Bachelor's Degree Only Teachers in Grades 4–5, by Enrollment Quartiles

Number of Students in the School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Fewer than 250	8.3%	11.6%	11.2%	13.6%	16.1%	12.2%
250 - 499	12.8	14.4	16.8	20.6	21.8	20.8
500 - 749	12.5	14.4	17.6	21.3	21.2	21.5
750 or more	19.0	20.4	24.7	28.7	30.8	31.1

Source: CBEDS-PAIF.

Table B.39—
Percentage of Bachelor's Degree Only Teachers in Grades 4–5, by School Location

School Location	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Rural	8.1%	9.2%	11.9%	14.0%	14.2%	15.7%
Suburban	10.9	11.8	13.8	16.6	17.5	17.2
Urban	22.3	25.5	30.7	36.2	37.3	36.8

Source: CBEDS-PAIF.

Part 8: Grades 4–5 Teacher Credentialing for School Groupings

The following six tables show the proportion of not fully credentialed grades 4–5 teachers in the given school categories for school years 1995–96 to 2000-01. The first column of each table shows the school categories. Columns two through seven show the percentage of not fully credentialed teachers in each quartile for the respective years. Each cell represents the percentage of not fully credentialed teachers in schools in that quartile, in that year. For example, in 2000-01, 5.0 percent of the grades 4–5 teachers in schools in income quartile 1 were not fully credentialed, which means 95.0 percent (100.0 – 5.0) of the teachers in these schools were fully credentialed.

Table B.40—
Percentage of Not Fully Credentialed Teachers in Grades 4-5, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.3%	0.7%	3.2%	4.6%	5.2%	5.0%
7.5% - 17.49%	0.6	1.4	7.4	10.1	11.4	11.1
17.5% - 29.99%	1.2	3.1	12.6	17.1	19.3	19.4
30% or more	2.7	4.0	18.1	23.3	26.8	26.7

Source: CBEDS-PAIF.

Table B.41—
Percentage of Not Fully Credentialed Teachers in Grades 4-5, by Student EL Quartiles

Percentage of EL Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.3%	0.7%	3.6%	5.1%	6.2%	5.6%
7.5% - 19.99%	0.5	1.4	6.7	9.4	9.9	10.1
20% - 39.99%	1.1	2.9	11.4	14.4	16.2	16.3
40% or more	2.9	4.2	19.5	25.7	29.7	29.1

Source: CBEDS-PAIF.

Table B.42—
Percentage of Not Fully Credentialed Teachers in Grades 4-5, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	0.2%	0.4%	1.8%	2.7%	3.4%	2.7%
25% - 49.99%	0.3	0.9	5.2	6.9	7.5	7.1
50% - 74.99%	0.7	2.2	8.3	12.2	12.9	13.4
75% or more	2.7	4.3	19.3	24.8	28.8	28.4

Source: CBEDS-PAIF.

Table B.43—
Percentage of Not Fully Credentialed Teachers in Grades 4-5, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 16.68%	0.2%	0.5%	3.1%	4.4%	5.3%	4.7%
16.68% - 49.99%	0.9	2.1	9.3	12.2	12.5	11.6
50% or more	2.6	4.3	18.9	24.9	27.1	27.7

Source: CBEDS-PAIF.

Table B.44—
Percentage of Not Fully Credentialed Teachers in Grades 4-5, by Enrollment Quartiles

Number of Students in the School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Fewer than 250	0.5%	2.8%	6.0%	6.8%	7.6%	8.9%
250 - 499	0.9	1.4	7.5	9.3	11.7	11.1
500 - 749	1.0	2.0	8.8	12.0	13.0	13.0
750 or more	1.9	3.2	14.7	19.3	22.5	22.6

Source: CBEDS-PAIF.

Table B.45—
Percentage of Not Fully Credentialed Teachers in Grades 4-5. by School Location

School Location	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Rural	0.6%	1.9%	6.3%	8.6%	8.9%	9.2%
Suburban	0.6	1.7	6.5	8.8	10.0	9.7
Urban	2.4	3.4	17.6	22.9	26.4	26.3

Source: CBEDS-PAIF.

Part 9: Novice Grades 4–5 Teacher Characteristics in 2000-01 for School Groupings

The following six tables give information on novice grades 4–5 teachers (teachers with three or fewer years of teaching experience) in schools during 2000-01 by school category. The first column shows the familiar category definitions. The second column is taken directly from the tables in Part 5 and shows the increase in novice grades 4–5 teachers for schools in the different quartiles between 1995–96 and 2000-01. The third column shows the percentage of novice teachers with bachelor's degree only in school year 2000-01 for schools in the given quartile. The final column shows the percentage of novice teachers who were not fully credentialed in schools in the given quartile in 2000-01. For example, in 1998–99 in income quartile 1 schools, 31.5 percent of the novice teachers had a bachelor's degree only, and 15.7 percent of the same novices were not fully credentialed. In other words, 68.5 percent of the novice teachers in income quartile 1 schools had education beyond a bachelor's degree and 84.3 percent were fully credentialed

Table B.46
2000-01 Novice Grades 4–5 Teachers, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 7.5%	10.6 percentage points	30.5%	15.7%
7.5% - 17.49%	13.8	42.8	30.5
17.5% - 29.99%	17.0	54.6	46.2
30% or more	17.8	59.3	54.2

Table B.47—
2000-01 Novice Grades 4–5 Teachers, by Student EL Quartiles

Percentage of EL Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 7.5%	9.6 percentage points	34.5%	18.1%
7.5% - 19.99%	13.7	43.3	28.9
20% - 39.99%	15.8	44.1	37.5
40% or more	19.4	62.6	57.3

Table B.48—
2000-01 Novice Grades 4–5 Teachers, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 25%	3.3 percentage points	29.0%	9.9%
25% - 49.99%	5.2	36.2	21.7
50% - 74.99%	9.7	44.7	33.1
75% or more	14.8	60.6	56.3

Source: CBEDS-PAIF.

Table B.49—
2000-01 Novice Grades 4–5 Teachers, by Hispanic Groupings

Percentage of Hispanic Students in School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Less than 16.68%	9.7 percentage points	32.5%	15.3%
16.68% - 49.99%	14.6	42.9	29.5
50% or more	18.0	60.4	56.9

Source: CBEDS-PAIF.

Table B.50—
2000-01 Novice Grades 4–5 Teachers, by Enrollment Quartiles

Number of Students in the School	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Fewer than 250	12.0 percentage points	24.6%	25.0%
250 - 499	13.6	41.9	30.0
500 - 749	14.9	43.9	33.6
750 or more	16.1	58.2	50.9

Source: CBEDS-PAIF.

Table B.51—
2000-01 Novice Grades 4-5 Teachers, by School Location

School Location	1995–96 to 2000-01 increase in share of novice teachers	2000-01 percentage of novice teachers who have a bachelor's only	2000-01 percentage of novice teachers who are not fully credentialed
Rural	11.2 percentage points	41.8%	31.3%
Suburban	14.2	36.6	25.1
Urban	17.3	63.0	56.0

Source: CBEDS-PAIF.

Part 10: Grade 7–8 Teacher Characteristics by Income and Minority (non-white) Classifications

This section provides information on the distribution of grade 7–8 teacher qualifications by school classification. The first set of three tables shows the distribution of teachers by family income. The second set shows the teachers in schools classified by proportion of minority students. The first table in each set shows the distribution of novices, followed by bachelor's degree only teachers, and then not fully credentialed teachers.

Table B.52—
Percentage of Novice Teachers in Grade 7–8, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	16.0%	17.8%	18.3%	18.3%	19.6%
7.5% - 17.49%	17.0	18.1	19.5	20.9	21.8
17.5% - 29.99%	19.2	20.0	21.6	24.5	25.7
30% or more	21.9	20.2	23.7	28.2	30.3

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.53—
Percentage of Bachelor's Degree Only Teachers in Grades 7-8, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	9.6%	10.0%	11.0%	12.3%	12.6%	13.4%
7.5% - 19.99%	12.8	14.0	14.6	15.6	18.0	17.5
20% - 29.99%	19.1	20.1	20.1	22.8	24.8	25.2
30% or more	19.9	20.1	19.9	25.3	29.4	29.8

Source: CBEDS-PAIF.

Table B.54—
Percentage of Not Fully Credentialed Teachers in Grades 7-8, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.8%	1.2%	3.9%	5.3%	7.6%	8.5%
7.5% - 17.49%	1.4	2.7	6.6	7.9	11.1	12.7
17.5% - 29.99%	2.1	3.7	9.8	11.7	17.5	18.6
30% or more	3.2	4.0	12.3	15.6	23.4	24.1

Source: CBEDS-PAIF.

Table B.55—
Percentage of Novice Teachers in Grades 7–8, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 25%	16.7%	17.5%	17.1%	16.3%	16.7%
25% - 49.99%	14.8	17.2	17.9	18.3	19.2
50% - 74.99%	18.2	19.3	21.3	23.8	25.0
75% or more	21.4	20.5	23.5	27.5	29.3

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.56—
Percentage of Bachelor's Degree Only Teachers in Grades 7-8, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	9.5%	9.1%	9.7%	10.7%	11.1%	11.1%
25% - 49.99%	9.5	9.8	10.3	11.1	12.6	13.8
50% - 74.99%	16.2	17.8	18.0	18.9	20.3	21.2
75% or more	20.6	21.6	21.9	27.2	30.6	29.5

Source: CBEDS-PAIF.

Table B.57—
Percentage of Not Fully Credentialed Teachers in Grades 7-8, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	0.7%	1.1%	3.1%	3.2%	4.5%	4.6%
25% - 49.99%	1.1	1.5	4.6	5.7	8.4	9.2
50% - 74.99%	1.5	2.7	7.0	9.3	13.3	15.5
75% or more	3.0	4.7	12.9	15.8	23.3	24.1

Source: CBEDS-PAIF.

Part 11: Grade 10–12 Teacher Characteristics by Income and Minority (non-white) Classifications

This section provides information on the distribution of grade 10–12 teacher qualifications by school classification. The first set of three tables shows the distribution of teachers by family income. The second set shows the teachers in schools classified by proportion of minority students. The first table in each set shows the distribution of novices, followed by bachelor's degree only teachers, and then not fully credentialed teachers.

Table B.58—
Percentage of Novice Teachers in Grades 10-12, Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	12.0%	15.3%	15.9%	16.6%	15.9%
7.5% - 17.49%	12.6	15.7	17.0	18.3	19.8
17.5% - 29.99%	14.9	15.4	17.8	19.5	21.02
30% or more	13.0	16.4	17.9	20.3	21.0

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.59—
Percentage of Bachelor's Degree Only Teachers in Grades 10-12, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	8.5%	9.3%	10.1%	10.4%	12.0%	12.5%
7.5% - 17.49%	11.8	13.8	14.8	17.4	18.3	17.7
17.5% - 29.99%	15.1	16.3	17.4	20.4	21.1	21.1
30% or more	12.3	13.7	15.2	18.4	22.0	21.8

Source: CBEDS-PAIF.

Table B.60—
Percentage of Not Fully Credentialed Teachers in Grades 10-12, by Students' Family Income Quartiles

Percentage Low-Income Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 7.5%	0.9%	1.6%	3.9%	5.3%	7.9%	7.8%
7.5% - 17.49%	1.3	2.5	6.0	8.0	10.8	12.2
17.5% - 29.99%	1.7	3.2	8.3	10.2	14.4	15.0
30% or more	2.5	3.7	8.3	10.6	16.0	17.3

Source: CBEDS-PAIF.

Table B.61—
Percentage of Novice Teachers in Grades 10-12, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1997–98	1998–99	1999-00	2000-01
Less than 25%	11.6%	13.7%	14.0%	14.6%	14.6%
25% - 49.99%	11.5	15.8	16.0	16.8	16.6
50% - 74.99%	14.2	17.1	18.7	19.3	19.9
75% or more	13.8	15.2	17.7	20.1	21.9

Source: CBEDS-PAIF.
The percentage of novices in 1996-97 is omitted due to an unusually high proportion of missing teacher experience data.

Table B.62—
Percentage of Bachelor's Degree Only Teachers in Grades 10-12, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	8.0%	7.7%	8.7%	10.0%	11.0%	11.7%
25% - 49.99%	7.3	7.8	9.1	9.7	11.1	12.7
50% - 74.99%	12.9	16.3	17.1	17.3	17.2	17.7
75% or more	15.7	16.7	17.6	22.5	25.0	23.0

Source: CBEDS-PAIF.

Table B.63—
Percentage of Not Fully Credentialed Teachers in Grades 10-12, by Minority (non-white) Quartiles

Percentage of Minority Students in School	1995–96	1996–97	1997–98	1998–99	1999-00	2000-01
Less than 25%	0.7%	1.0%	2.2%	3.4%	5.1%	5.2%
25% - 49.99%	1.0	2.0	4.6	6.0	8.2	8.7
50% - 74.99%	1.3	2.8	6.8	8.8	11.2	13.1
75% or more	2.2	3.5	9.1	11.3	16.6	16.9

Source: CBEDS-PAIF.

Appendix C

Appendix to Chapter 6: Achievement

Table C.1
Average SAT-9 Mathematics Scores for California Students By Cohort and Grade

Cohort	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
K 1991-92					656.4
K 1992-93				638.7	660.5
K 1993-94			614.2	642.4	664.8
K 1994-95		590.7	619.0	647.8	668.3
K 1995-96	564.9	598.4	625.7	652.2	
K 1996-97	572.0	606.5	630.0		
K 1997-98	579.2	611.3			
K 1998-99	582.0				

Table C.2
Average SAT-9 Language Scores for California Students By Cohort and Grade

Cohort	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
K 1991-92					643.8
K 1992-93				634.6	646.0
K 1993-94			620.9	636.4	648.5
K 1994-95		596.7	623.0	639.2	650.6
K 1995-96	581.2	602.4	626.9	641.9	
K 1996-97	585.4	607.7	630.3		
K 1997-98	589.7	611.4			
K 1998-99	591.1				

Table C.3
Cohort-to-Cohort Differences in Mathematics Effects and CSR Exposure

Cohort-to-Cohort	Reading Effect Difference	Second Grade CSR Exposure Difference	Third Grade CSR Exposure Difference
K 91-92 to 92-93	2.01	0	0
K 92-93 to 93-94	1.29	0	.23
K 93-94 to 94-95	1.69	.63	1.07
K 94-95 to 95-96	2.98	1.26	1.43
K 95-96 to 96-97	4.15	.27	.34
K 96-97 to 97-98	4.78	.49	.52
K 97-98 to 98-99	3.23	.18	--

Table C.4
Cohort-to-Cohort Differences in Language Effects and CSR Exposure

Cohort-to-Cohort	Reading Effect Difference	Second Grade CSR Exposure Difference	Third Grade CSR Exposure Difference
K 91-92 to 92-93	2.01	0	0
K 92-93 to 93-94	1.29	0	.23
K 93-94 to 94-95	1.69	.63	1.07
K 94-95 to 95-96	2.98	1.26	1.43
K 95-96 to 96-97	4.15	.27	.34
K 96-97 to 97-98	4.78	.49	.52
K 97-98 to 98-99	3.23	.18	--

Appendix D

Topics to Be Covered in the Final CSR Evaluation Report

The fourth and final report of the Class Size Reduction (CSR) evaluation will include:

- A review and synthesis of the major findings drawn from the first three years of the evaluation
- A summary and review of CSR local-level research and evaluations done throughout California
- A summary and review of evaluations of class size reduction initiatives in other states
- A supplemental examination of the relationship between teacher characteristics and student performance in reduced size classrooms in selected California districts
- An additional analysis of the relationship between CSR and student achievement using statewide school-level data
- An additional analysis of the movement of teachers into and out of K–3 for the 2 years before CSR and 4 years after the implementation of CSR
- Policy implications and recommendations for California

Review and Synthesis of Three Years of the CSR Consortium's Evaluations

This portion of the report will provide an update of all findings as of the end of the 2000–01 school year. In addition, the Year 4 report will provide an overall summary of all findings from the previous three evaluations, covering the school years 1996–97 through 2000–01. We will synthesize the information, examine trends over time, and draw as rigorous conclusions as possible about the effects of the CSR initiative to date.

Summary and Review of CSR Local-Level Research and Evaluations Done Throughout California

In addition to the state-sponsored evaluation, many local districts have conducted their own evaluations of CSR. Districts are in a unique position to reflect on the impact of CSR in

terms of student achievement, local school operations and budgets, community satisfaction, quality of instruction, and more. District evaluations can also provide valuable insight into future policy options and their potential effects. Reviewing these locally generated research results will enhance our understanding of how CSR is affecting local schools and students. We will also examine the extent to which districts have evaluated CSR in their schools and the quality of those evaluations.

Summary and Review of Evaluations of CSR initiatives in States Other Than California

California's extensive class size reduction initiative makes it a showcase state. Policy makers from other states who are in the process of reducing class sizes and those who are considering implementing CSR are able to learn from the California experience. Similarly, evaluations of CSR programs in other states can provide California with a better understanding of the effects of CSR. Evaluations and reports of CSR efforts in states outside of California such as Wisconsin, Nevada, and Tennessee, will be obtained, reviewed, and summarized with an emphasis on what can be learned that is relevant to the future of CSR in California.

Examination of the Relationship Between Teacher Characteristics and Student Performance in Reduced Size Classrooms in Selected California Districts

The Year 1 and Year 2 evaluation reports detail a small positive relationship between being in a reduced class and academic achievement. Since California's implementation of CSR, however, average education and credential levels of the state's teachers have dramatically declined. Furthermore, a disproportionate percentage of less-than-fully-qualified teachers ended up in districts with high percentages of at-risk students. These results suggest the importance of studying the relationship between teacher characteristics and student achievement in California, where most K–3 classes have now been reduced in accordance with the CSR initiative.

This study will link data from teachers in a subset of large districts to STAR (SAT-9) scores of their students. The main question to be answered using the student-level data for each district is, "What is the relationship between teacher qualifications and academic achievement in reduced classrooms?" To the degree that the data will allow, we will also examine the relationship between teacher characteristics and achievement as a function of student characteristics such as English learners, poverty level, and minority status.

Analysis of the Relationship Between CSR and Student Achievement, Using Statewide School-level Data

By 2001, almost all California students in grades K–3 were enrolled in reduced classes, which eliminates the possibility of making direct comparisons between students participating in CSR and students who are not participating in the reform. Instead, this analysis compares

trends in exposure to CSR with trends in test scores among successive cohorts of students. Each cohort had, on average, greater exposure to CSR during the 4 years from kindergarten through third grade than the previous one. We will supplement the statewide analysis presented in this report with a school-level analysis that will allows us to distinguish relationships between CSR participation and achievement trends for different types of schools, e.g., those serving different proportions of low-income students, minority students and students who are English Learners.

Analysis of Teacher Mobility

The K–3 workforce has undergone significant changes since the implementation of CSR; additionally, we know that these changes are related to the income level and minority status of students within schools. The mechanisms by which these changes have occurred are not well understood, however. The level of teacher education, experience, and credentialing across schools and grade levels may be changing due to inflow of new teachers, transfer of current teachers across grade levels or schools, and the return of experienced teachers after having left the classroom. This longitudinal analysis of teacher flows will provide greater insight into the mechanisms that give rise to school-level changes in teacher qualifications.

Policy Implications and Recommendations for California

One of the key elements in the Year 4 report will be the policy recommendations chapter. We will interview key policy players from the legislature and its staff, the Governor's office, the Department of Education, the State Board of Education, the Analyst's Office, and the Department of Finance to assist us in tailoring our policy recommendations to meet their information needs.