

School Resources and Student Achievement in California

Since the early 1970s, ballot initiatives and court rulings have sought to equalize funding across California schools. Yet 30 years later, variations in funding remain both across and within school districts. Moreover, although “funding per pupil” provides a readily available and understandable measure of school resources within a district, it provides little insight into how individual schools spend their revenues. For example, one school might choose to have smaller class sizes, financing this choice by hiring less-experienced teachers. Another might have higher administrative costs and might choose to economize by hiring fewer teachers, thereby increasing class size.

Statewide surveys conducted by the Public Policy Institute of California in 1998 and 1999 found that Californians consider schools and education by far the most pressing problems facing the state. In light of this ongoing concern, three PPIC researchers—Julian R. Betts, Kim S. Rueben, and Anne Danenberg—undertook a study to answer several critical questions about California’s K–12 schools:

1. How do school resources—measured in terms of class size, curriculum, and teachers’ education, credentials, and experience—vary among schools?
2. Do schools serving relatively disadvantaged populations tend to receive fewer resources?
3. Do existing inequalities in school resources contribute to unequal student outcomes?

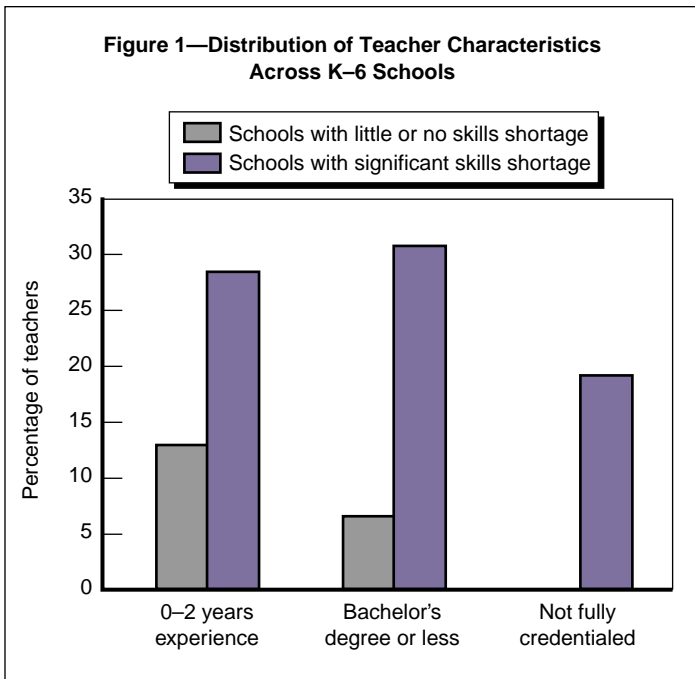
The researchers also examined how school resources and student outcomes vary by geographic location throughout the state. Their report, *Equal Resources, Equal Outcomes? The Distribution of School Resources and Student Achievement in California*, includes separate analyses for three grade spans—K–6, 6–8, and 9–12. The report presents detailed

measures of resources at the school and classroom level and relates these resources to student achievement, as captured in the first statewide administration of the Stanford 9 achievement test in 1998.

Equal Resources?

Average class size differs little across schools. However, teacher preparation and high school curriculum vary considerably. Figure 1 shows how certain teacher characteristics differ among K–6 schools with and without a shortage of teacher skills. (The researchers identified the schools with and without skills shortages by ranking schools on the given skill shortage and identifying the schools ranked 75th and 25th out of 100, respectively.) The three measures in this figure point to much variation across schools in the number of teachers with low levels of preparation. Lack of full certification is especially striking. Among schools with little or no skills shortage, all teachers have full certification; among schools with a significant skills shortage, nearly 20 percent of the teachers lack full certification. Among middle schools and high schools, variations in teacher preparation are similar but slightly smaller.

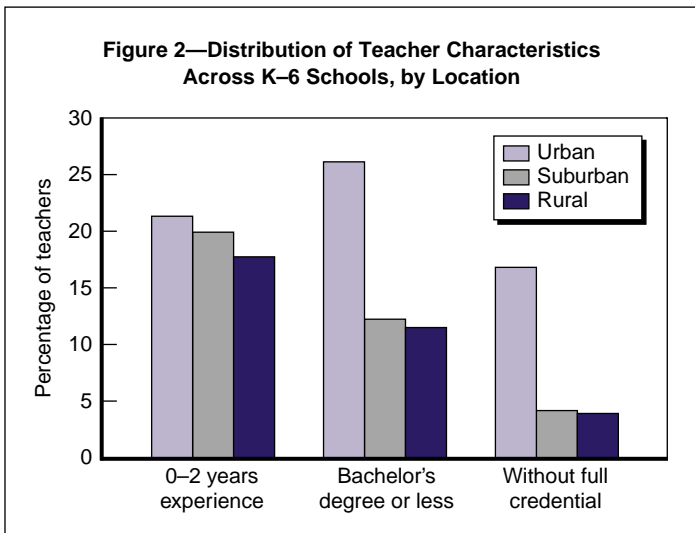
Like teacher preparation, high school curriculum varies considerably in terms of the percentage and number of advanced course offerings—i.e., courses that satisfy entrance requirements at the University of California (the “a–f” courses) and Advanced Placement (AP) courses. The absence of AP courses at a school could reflect a lack of supply, a lack of demand, or both. The school may simply be failing to provide these classes, or the students may not be demanding them. Lack of demand could have several possible causes. For example, poor preparation in their earlier schooling may mean that students are not ready for advanced courses in high school.



Large inequalities in teacher preparation exist among California schools.

Geographic Variations

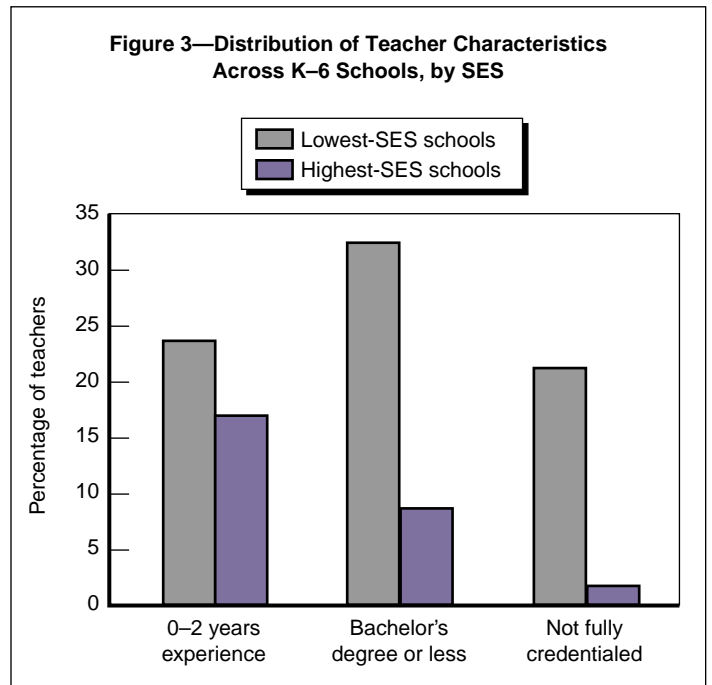
Analysis of teacher preparation and curriculum offerings in urban, rural, and suburban schools revealed that urban schools, by most measures, have a far higher percentage of teachers with low preparation levels. For example, as shown in Figure 2, 26 percent of the teachers in urban elementary schools have only a bachelor's degree or less, compared to 12 percent of the teachers in suburban schools and 11 percent in rural schools. Similar disparities exist in middle schools and high schools. At the high school level, rural schools tend to offer considerably smaller percentages of “a–f” and AP courses than do urban and suburban schools.



K–6 schools in urban areas have a higher percentage of less-prepared teachers.

Disadvantaged Students

Schools serving relatively disadvantaged populations of students receive fewer resources. To conduct this analysis, the researchers divided elementary schools into five socioeconomic status (SES) groups, based on the proportion of students participating in free or reduced-price lunch programs. As shown in Figure 3, the median percentage of teachers with two or less years of experience was 24 percent in the bottom SES quintile and 17 percent in the top quintile. Thirty-three percent of the teachers in the bottom group had only a bachelor's degree or less, compared to 9 percent in the top quintile. Twenty-two percent of the teachers in the bottom quintile were not fully certified, compared to 2 percent in the top quintile.

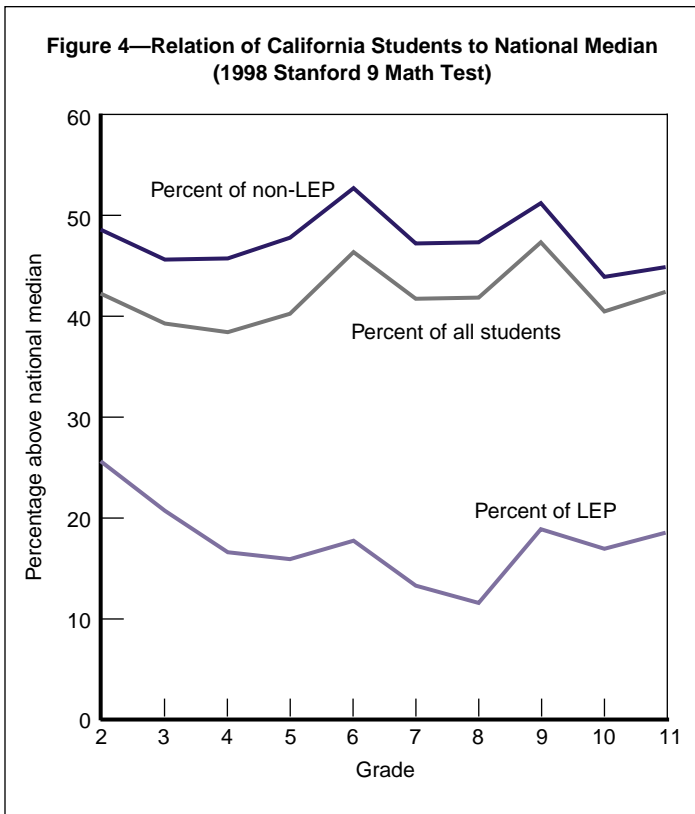


K–6 schools serving more-disadvantaged students have a higher percentage of less-prepared teachers.

The statewide inequities in school resources among disadvantaged students are similarly replicated *within* districts: In other words, within a given district, schools with particularly disadvantaged students are likely to have less-educated and less-experienced teachers and, at the high school level, to offer fewer AP courses.

Equal Outcomes?

California students lagged behind national norms on the Stanford 9 reading and math tests by substantial margins. In a typical grade, only about 40–45 percent of the state's students scored at or above the national median. (If California's students had the same achievement levels as elsewhere, 50



If LEP students are excluded from the sample, 44 to 53 percent of California's students perform at or above national norms in math.

percent of the state's students should score at or above the national median.) The unusually high proportion of limited English proficient (LEP) students in California accounts for at least two-thirds of the gaps in math and reading performance. Figure 4 shows the results for the Stanford 9 math test, with and without LEP students factored into the totals.

One of the study's most important questions was whether and how school characteristics related to student achievement, which varies widely across schools, even when LEP students are excluded from the sample. Among *school resources*, the level of teacher experience and the percentage of teachers without a full credential are the variables most strongly related to student outcomes. However, the most important factor relating to student outcomes is SES, as revealed in Figure 5. The figure shows the predicted change in the percentage of students scoring at or above the national norms in reading in grade 5 that result from changing school characteristics from low to average to high. The first set of bars shows the predicted increase in student performance that results in changing from a low-SES school to a high-SES school, holding everything else constant. Similarly, the other bars show the predicted achievement of students as they move from a low to a high level of a given resource. Clearly, student SES is the characteristic most strongly related to these test scores.

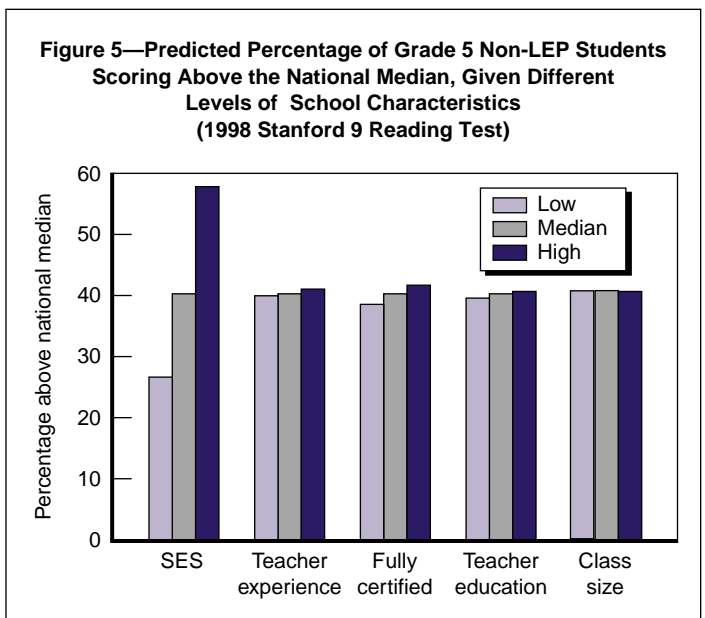
Policy Implications and Recommendations

The findings of this study have strong implications for a number of current policy issues in California.

Supply and Distribution of Teachers

Teacher education, experience, and certification are linked to student achievement. Thus, it follows that the supply of highly trained and fully certified teachers in California should be expanded. However, shortages of qualified teachers are more evident in certain geographic areas and in schools serving the most-disadvantaged populations. Thus, it is unlikely that simply expanding the supply of teachers will eliminate either of these inequities. Differential cost-of-living adjustments across school districts might help reduce particular geographic shortages, especially if accompanied by incentives for districts to direct the additional money toward increasing the level of teacher preparation. Similarly, offering salary incentives to highly qualified teachers who choose to teach in schools in disadvantaged areas might help reduce the other inequalities associated with student SES.

It seems highly likely that the recent initiative to reduce class size in grades K–3 contributed to the high percentage of elementary school teachers who lack adequate preparation. Schools in disadvantaged areas seem particularly hard pressed to recruit experienced, highly educated, fully credentialed teachers. Thus, it would be prudent for the state to postpone any further major reforms to public education until it has conducted a thorough analysis of the likely consequences of the proposed change for the supply of and demand for California teachers.



Student SES appears to play a dominant role in student outcomes.

Devolution of Authority to School Districts

Given the evidence in this study of unequal resource allocations within districts, it seems unlikely that devolution of authority to school districts will equalize resources among schools and, in fact, it could work in the opposite direction. The state may want to require or at least encourage districts to reduce within-district resource inequities, especially those related to teachers, in return for greater local control over teaching methods and curriculum.

Inequalities in High School Curriculum

California's high schools vary considerably in the proportion of college-preparatory "a-f" and AP classes they offer. Three things might help reduce these variations.

First, smaller schools and districts offer fewer AP courses as a percentage of total classes. Such schools could use a combination of course-sharing with other schools, "distance learning" through the Internet, or other innovative solutions to narrow the gaps in AP course availability. The most cost-effective solution might be to encourage promising students to take courses at nearby community colleges.

Second, variations in teacher education partly account for variations in AP offerings. It seems naive to believe that a simple edict that all schools statewide offer identical sets of AP courses can succeed, unless inequalities in teacher preparation are addressed first.

Third, weaknesses in curriculum in middle schools and even elementary schools may limit students' ability to undertake AP courses in high school. Thus, reforms to remedy the situation must begin much earlier than high school.

School Accountability

The 1999 Public Schools Accountability Act rewards schools that meet or make adequate progress toward meeting state standards. It also threatens schools at the bottom end of the state rankings with tough sanctions, should they fail to adequately improve. The schools most likely to be sanctioned are low-SES schools. Thus, an unintended side-effect of the accountability reforms may be to dissuade principals and teachers from working in schools serving disadvantaged populations.

To reduce this risk, rewards and punishments should be based in part on performance relative to other schools serving similar student populations. Measures of performance should also be based on *improvements* in student performance rather than simply on level of achievement relative to other schools.

Finally, the goal of this reform effort might be more effectively realized by funneling considerable additional resources into schools in disadvantaged areas, while phasing in sanctions gradually, so that schools with more disadvantaged populations have a reasonable opportunity to improve outcomes.

This research brief summarizes a report by Julian R. Betts, Kim S. Rueben, and Anne Danenberg, Equal Resources, Equal Outcomes? The Distribution of School Resources and Student Achievement in California (2000, 402 pp., \$25.00, ISBN: 1-58213-015-9). The report may be ordered by phone at (800) 232-5343 [mainland U.S.] or (415) 291-4415 [Canada, Hawaii, overseas]. A copy of the full text is also available on the Internet (www.ppic.org). The Public Policy Institute of California is a private, nonprofit organization dedicated to independent, objective, nonpartisan research on economic, social, and political issues affecting California.
