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AUTHOR Ogawa, Rodney T.; Stine, Deborah; Huston, Deborah
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ABSTRACT

Early evidence on California's Class Size Reduction (CSR) Program suggests that teacher applicant pools have been depleted and that many teachers who lack experience and credentials were hired. To examine the impact of CSR, a study analyzed whether the experience and qualifications of teachers in reduced-size classes vary across schools and, if so, whether it is possible to identify school characteristics that might account for the variation. The results of the study indicate that teachers in reduced-size classes were less experienced and less qualified than their district counterparts. Schools with higher percentages of Latino students tended to have reduced-size-class teachers with less overall teaching experience and less experience in their current districts. Schools that had a difficult time attracting qualified teachers to begin with were forced to compete for teachers in a severely reduced market. These schools also faced the problem of experienced teachers leaving their schools for more desirable locations. The study cautions policymakers as they consider future actions and suggests the need for further studies employing statewide samples and using a broader range of teacher quality measures to track the movement of teachers across schools and districts. (Contains 5 tables and 11 references.) (RJM)

CALIFORNIA'S CLASS-SIZE REDUCTION INITIATIVE: DIFFERENCES IN TEACHER EXPERIENCE AND QUALIFICATIONS ACROSS SCHOOLS

Rodney T. Ogawa

University of California, Riverside

Deborah Stine

California State University, San Bernardino

Deborah Huston

University of California, Riverside

Abstract

The purposes of this study of the implementation of California's Class Size Reduction program were to determine the experience and qualifications of teachers in reduced-size classes, ascertain if the experience and qualifications of teachers in reduced-size classes varies across schools and, if so, identify school characteristics that might account for the variation. The results indicate that teachers in reduced-size classes were less experienced and less qualified than their district counterparts and suggest that schools with higher percentages of Latino students tended to have reduced-size class teachers with less overall teaching experience and less experience in their current districts. This study, while exploratory, raises a red flag for policy makers and suggests the need for further studies employing statewide samples, using a broader range of teacher quality measures and tracking the movement of teachers across schools and districts.

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Background

In the Fall of 1996, California launched a program of unprecedented scale to reduce the size of primary-grade classes in its public schools. The Class Size Reduction (CSR) Program offered $650 to school districts for each primary-grade class whose pupil/teacher ratio did not exceed 20-1.

Enthusiasts have hailed the CSR program as one of the most important educational policy initiatives ever mounted by a state. They cite the sheer magnitude of the effort, which cost taxpayers more than a billion dollars in the initial year. They also note that it directly addresses class size, which is widely held to be a key determinant of the quality of instruction and therefore of student academic achievement. Karen Humphrey, senior policy advisor to state Superintendent Delaine Eastin, effused: "My gut feeling is that the public simply loves this program. Parents and teachers think this is the greatest thing since sliced bread. I believe it will ultimately strengthen the system" (Brydolf, 1997, p. 27).

Skeptics, however, have raised concerns about several factors that could seriously limit the impact of the CSR program on student outcomes (Lewis, 1997). They note that CSR funding does not fully cover the costs associated with class-size reduction, leaving districts to compromise or even sacrifice

other instructional programs; they suggest that a lack of sufficient classroom space will hamper the quality of instruction; they argue that if teachers do not alter their teaching strategies in adapting to smaller classes, instructional advantages will be lost.

Perhaps the most crucial concern involves the experience and qualifications of teachers in reduced-size classes. This in part arises from the timing with which CSR was enacted and the resulting manner in which CSR was implemented in some communities. Because CSR was initiated in mid-summer, school districts hurriedly scrambled to hire teachers to staff the additional classes created by the reduction of class size. In some instances, the number was substantial. For instance, if the average size of classes targeted for class size reduction was 30, then a school would have to increase the number of classes at those grade levels by 50 percent.

Related Literature

Early anecdotal and recently published case evidence (Lewis, 1997) regarding the implementation of California's CSR program suggest that the depletion of applicant pools and the haste with which teachers had to be employed left many districts to hire teachers who lacked experience and even teaching credentials. The fear, of course, is that inexperienced and untrained teachers will compromise the potential impact of small class sizes on student performance.

Teacher Experience and Qualifications

This is a crucial point because mounting evidence suggests that the knowledge and skill of teachers can have a profound impact on the academic performance of students (Darling-Hammond, 1998). While teacher experience and qualifications are not thoroughly adequate indicators of knowledge and skill, they have been used as proxies in some telling research. For example, Ferguson (1991) included experience along with scores on a licensing examination and possession of a master's degree as a measure of teacher expertise, which accounted for roughly 40 percent of the variance in students' reading and mathematics achievement gains. In their review of research, Greenwald, Hedges and Laine (1996) conclude that teacher education, ability and experience are associated with increases in student achievement. Similarly, Darling-Hammond (1998) draws on published reviews of research (Ashton & Crocker, 1987; Evertson, Hawley & Zlotnick, 1995; Darling-Hammond, 1992; Haberman, 1984; Erekson & Barr, 1985; Greenberg, 1983) to argue that teachers who are "fully prepared and certified...are more highly rated and more successful with students than are teachers without full preparation" (p. 7). Thus, teacher experience and qualifications arguably matter.

Variation Across Schools

A factor that may compound the impact of having relatively inexperienced and under qualified teachers in reduced size

classes is the inequitable distribution of teacher experience and qualifications across schools. Schools that serve high-poverty areas face greater difficulty attracting and retaining highly qualified teachers than schools that serve middle-class communities (Darling-Hammond, 1998). There are signs that the implementation of the state's CSR program may be exacerbating this already troubling pattern. Making Class Size Reduction Work: Stories from California's Public Schools, a publication of the Association of California School Administrators, notes that most of the concern over inequities that the CSR program may produce focus on the relative inability of inner-city schools to hire qualified teachers (Lewis, 1997). In addition, anecdotal accounts indicate that teachers may be fleeing schools in low-income, minority communities for schools in largely white, middle income areas. If such is the case, the very communities in most need of the educational benefits that class-size reduction is expected to provide may be in the greatest jeopardy of having those benefits compromised.

Purpose and Research Questions

This study is exploratory. Its purpose is to examine the issue of teacher experience and qualifications in reduced-size classes created by California's CSR program. Specifically, it sought to answer two questions:

1. Are teachers in reduced-size classes less experienced and less qualified than other elementary teachers in their districts?

2. Do the experience and qualifications of teachers in reduced-size classes vary across schools?
3. If so, what school characteristics account for this variation?

Research Procedures

This study was conducted by the California Educational Research Cooperative (CERC) of the University of California, Riverside's School of Education. CERC is a joint venture of the School of Education, two county offices of education and more than twenty local educational agencies, which include school districts, Special Education Local Planning Areas and Regional Occupational Programs. Representatives of CERC's members identify and select important issues of educational policy and practice which university-based researchers then study. In the Fall of 1996, the Cooperative chose the CSR program as a topic for study. Specifically, it focused on the quality of teachers in CSR classes.

Sample

Initially 10 of CERC's member school districts volunteered to participate in the study. Because data from one district were incomplete, 9 districts were involved in the study. The sample included the 118 schools in these districts that participated in the state's CSR program during the 1996-97 school year. After removing 6 schools due to a lack of complete data, the final study sample was 112 schools. The sample included small schools serving semi-rural communities with large percentages of low-

income families from various ethno-linguistic backgrounds; medium-sized schools serving stable, largely middle class communities; and large schools serving urban communities with families of widely varying socio-economic and ethno-linguistic backgrounds.

Data Sources and Measures

Data were collected in the spring of 1997. The human resource office of each participating school district provided data on all teachers in reduced-size classes during the 1996-97 school year. The study used 2 measures of teacher experience: total years of teaching experience and years teaching in their current district. Data also were collected on one indicator of teacher qualifications: teaching credential status. Credential status was separated into four categories: full credential, intern credential, emergency credential and credential waiver. Because school was the unit of analysis, the following measures served as dependent variables: 1) school means of CSR teachers' total teaching experience, 2) school means of CSR teachers' years teaching in district and 3) percentage of school's CSR teachers in each credential category.

The 1996-97 California Basic Educational Data System (CBEDS) provided data on 7 characteristics or conditions of schools, which were the independent variables: percentage of African-American students, percentage of Latino students, percentage of Asian and other students, percentage of students on Free or

Reduced Lunch, pupil-teacher ratio, total student enrollment and location of school. Location of school ranged from 1 (large metropolitan) to 7 (isolated rural).

Results

Quality of CSR Teachers

The summary of descriptive statistics reveals that the quality of teachers in reduced-size classes was relatively low in the sample schools during the first year of CSR implementation (see table 1). The CSR teachers in these schools averaged just 6.5 years of teaching experience and 5.1 years of experience in their current districts. This compares to a mean of 12.4 years of teaching experience for all elementary teachers in the 9 districts. Moreover, on average of 69.6 percent of CSR teachers in these schools were fully credentialed, while 98.9 percent of all elementary teachers in the 9 districts were fully credentialed.

The experience of teachers varied widely across schools. School means for the total teaching experience of CSR teachers ranged from 1 year to 26 years. Similarly, school means for the number of years of experience of CSR teachers in their current districts ranged from 1 year to 26 years. The qualifications of CSR teachers, as reflected in credential status, also varied across schools. Both the percentage of teachers with full credentials and the percentage of teachers with emergency credentials ranged from .0 percent to 100.0 percent.

The wide range of average experience and credential status of CSR teachers across schools begs the question: What, if any, school characteristics account for the variation?

Explaining the Variation Across Schools

Our intent was to examine the issue of teacher experience and qualifications of those teachers in reduced-size classes. We used the General Linear Models Regression analyses in SPSS. Since the rules and regulations govern all the schools, and thus the teachers, within the same district, we needed to first take the district differences into account. The General Linear Regressions Models were run treating Districts as Covariates. This analysis takes into account variance in teacher experience and qualifications explained by district and then examines which school characteristics contribute to the remaining variance in teacher experience and qualifications. The models tested under these conditions explored the relationships between school characteristics and three qualities of teachers in reduced-size classes: total years of teaching experience, years teaching in current district and credential status.

Total teaching experience. Analysis of the first General Linear Model indicates that, after accounting for the impact of differences across the districts, the school characteristic that predicts the average total experience of schools' teachers is the percentage of Latino students (see table 2). It reveals that the percentages of students from Latino background are negatively associated with the average professional experience of reduced

size class teachers. This implies that the more Latino students there are in a school, the less experienced the reduced size class teachers will be.

Total years in current district. Similarly, the analysis of the second model indicates that above the district difference, the percentage of Latino students predicts the average number of years that reduced-size class teachers have spent in their current school district (see table 3).

Credential status. Finally, the third and fourth models tested the relationship between school characteristics and conditions and the credential status of the teachers in reduced-size classes. These analyses followed similar patterns as the models above, but came up just shy of statistical significance. The percentages of students from Latino background are again negatively associated with those teachers with full teaching credentials, but had a p-value = .095 ($p \leq .05$ is considered significant) (see table 4). In addition, location of school narrowly missed attaining $p \leq .05$ for the teachers with emergency credentials (see table 5).

Summary of findings. The findings of this study indicate, first, that districts account for much of the variance in teacher experience and quality. However, within districts the ethnic composition of schools' student bodies is associated with the professional experience of teachers in reduced-size classes. Specifically, the percentage of Latino students predicted the

average number of years that CSR teachers had spent in the profession and in their current districts. In addition, the findings suggest that the percentage of Latino students and school location (ranging from urban to rural) may be associated with the credential status of CSR teachers.

Discussion

Owing to its exploratory purpose, the present study's findings are more suggestive than conclusive. They do, however, point to a troubling prospect that certainly bears further examination and perhaps will require policy intervention. As California implemented its CSR program amidst plentiful commentary from both enthusiasts and skeptics, little attention was given to the issue of equity. And, why should it? Here, after all, here was a program that paid all participating districts the same dollar amount to underwrite each primary grade class with no more than 20 students. The fiscal incentive and thus support were the same for all reduced-size classes in all schools and districts, regardless of the ethnic backgrounds or social status of the students they served.

But, here is the rub. While California, like other states, has made structural adjustments to equalize school financing, other important resources, including experienced and qualified teachers, are not evenly distributed across schools and districts. Typically, schools and districts that serve low-income, minority communities (Darling-Hammond, 1998) have difficulty attracting high quality teachers. When policy

initiatives, such as California's CSR program, require the hiring of teachers, schools that generally have difficulty attracting high quality teachers potentially suffer dual setbacks. First, they cannot attract quality teachers to staff the new program. If the reduced-size classes in schools with higher proportions of Latino students are staffed by less experienced teachers, as our study's findings indicate, then the additional instructional support and opportunities that class-size reduction can provide may be most compromised in those communities where such support and opportunities are most needed.

Second, more attractive schools may actually draw qualified teachers away from less attractive schools. Anecdotal accounts indicate that California's CSR program contributed to the migration of experienced teachers from inner-city schools to more attractive sites. Such a development would, of course, further compromise the ability of schools serving students from low-income and minority backgrounds to provide quality instruction.

This potential for harm to schools serving minority students requires a response from researchers and the state's policy community. While it is an oft recited cliché, further research clearly is required in the present instance. Future studies should address at least four limitations of the present study.

First, research using broader, perhaps statewide, samples of schools are needed to verify the present study's results. This study was confined to 9 school districts in one region of the state. Absent from the sample, therefore, were large

metropolitan districts, isolated rural districts and high wealth districts.

Second, research on variation of teacher quality across school districts is needed. This is an important consideration because decisions regarding teacher recruitment and placement are generally made at the district level. Because the present study was limited to 9 districts, it could not meaningfully assess variation in CSR teachers' experience or qualifications across districts or determine the relationship between such variation and district characteristics. Future studies might employ statewide samples of schools, nested in districts to enable researchers to conduct multi-level analyses of school and district predictors of CSR teacher quality.

Third, research is needed to determine if CSR precipitated the migration of teachers from less attractive to more attractive schools and districts. This would require mapping the movement of teachers over time, beginning with several years preceding the initial implementation of CSR to establish a baseline and then charting movement in subsequent years.

Fourth, future studies should employ a broader range of teacher quality measures. The present study was limited to two measures of teacher experience and one indicator of teacher qualification, which were readily available through the human resource offices of participating school districts. Because previous research indicates that teacher ability and knowledge

are better predictors of student academic performance than teacher experience, future research should include indicators of these crucial factors.

Finally, despite this study's exploratory intent, its findings and thus the issue it raises must be treated with the seriousness that signs of inequity must command in a democratic society. That schools with higher percentages of Latino students may have teachers in reduced-size classes who are relatively inexperienced and even under-qualified should have the attention of state policy makers and educational officials. While it can be argued that additional research is needed to confirm the existence of this pattern, it can also be argued that in such instances the state should err not on the side of empirical caution but in the interests of students and their families. Specifically, as legislators and executives consider the expansion and refinement of the state's CSR program, they should ponder how the state can allocate its resources so as to equalize the ability of schools and districts to attract and even retain quality teachers to staff the additional classes created by the reduction of class size. In the absence of such mechanisms, however well intentioned policy makers may have been initially in adopting the CSR program, they will have to live with the unintended consequence of further compromising the quality of instruction received by many of the state's minority students.

Table 1

Descriptive Statistics
School Characteristics and Qualities of Reduced-Size Class Teachers

Variable	N	Minimum	Maximum	Mean	Std. Dev.
% Af-Amer Students	115	.00	.45	.126	.0091
% Latino Students	115	.07	.90	.484	.1804
% Other Students	115	.00	.30	.0050	.0046
% Free Lunch	115	.13	.95	.6107	.2263
Teacher /pupil Ratio	115	15.20	31.40	26.96	2.25
Years Teaching	117	1.0	26.0	6.484	4.593
Years in District	117	1.0	26.0	5.083	4.299
% Full Credential	117	0.0	100.0	69.565	25.517
% Emergency Credential	117	0.0	100.0	28.213	25.436
Location	112	2.0	6.0		

Table 2

Reduced-Size Class Teachers:
Years of Teaching Experience x School Characteristics

YRS IN TEACHING	Sum of Squares	df	Mean Square	F value	Prob > F	Parameter Estimate
Main Effect						
DISTRICT	886.6	8	110.82	10.681	**.000**	
Covariate						
% Afr. Amer Students	4.79	1	4.79	.462	.498	-3.84
% Latino Students	58.59	1	58.59	5.65	**.019**	-5.54
% Other Students	8.52	1	8.52	.821	.367	-7.77
Location of School	18.82	1	18.82	1.813	.181	-.707
% Free Lunch	12.741	1	12.741	1.23	.271	-3.384
Teacher/Pupil Ratio	1.56	1	1.56	.151	.699	-.0648
Enrollment	2.58	1	2.58	.248	.619	-.00111
MODEL	994.198	15	71.01	6.39	.000	R^2 = .499
RESIDUAL	996.121	96	10.38			
TOTAL	1990.32	111				

Table 3

Reduced-Size Class Teachers:
Years in Current District x School Characteristics

YRS IN DISTRICT	Sum of Squares	df	Mean Square	F value	Prob > F	Parameter Estimate
Main Effect						
DISTRICT	780.78	8	97.598	11.37	**.000**	
Covariate						
% Afr. Amer Students	1.04	1	1.04	.121	.729	1.786
% Latino Students	42.75	1	42.75	4.98	**.028**	-4.73
% Other Students	.325	1	.325	.038	.293	-1.52
Location of School	9.61	1	9.61	1.12	.846	-.51
% Free Lunch	5.63	1	5.63	.656	.420	-2.25
Teacher/Pupil Ratio	3.2	1	3.20	.373	.543	-.093
Enrollment	.037	1	.037	.004	.948	.000133
MODEL	843.37	15	56.22	6.55	.000	R^2 = .51
RESIDUAL	823.85	96	8.58			
TOTAL	1667.23	111				

Table 4

Reduced-Size Class Teachers:
Percentage of Teachers with Full Credential x School Characteristics

FULL CREDENTIAL	Sum of Squares	df	Mean Square	F value	Prob > F	Parameter Estimate
Main Effect						
DISTRICT	28757.05	8	3594.63	9.58	.000	
Covariate						
% Afr. Amer Students	180.233	1	180.233	.481	.490	23.51
% Latino Students	1066.21	1	1066.21	2.843	.095	-23.63
% Other Students	537.89	1	537.89	1.43	.125	61.8
Location of School	900.19	1	900.19	2.4	.234	-4.887
% Free Lunch	429.17	1	429.19	1.14	.287	-14.64
Teacher/Pupil Ratio	9.01	1	9.01	.024	.877	.155
Enrollment	248.78	1	248.78	.663	.417	.0109
MODEL	32128.53	15	2141.9	5.71	.000	R^2 = .472
RESIDUAL	36006.199	96	375.06			
TOTAL	68134.73	111				

Table 5

Reduced-Size Class Teachers:
Percentage of Teachers with Emergency Credential x School Characteristics

EMERGECY CREDENTIAL	Sum of Squares	df	Mean Square	F value	Prob > F	Parameter Estimate
Main Effect						
DISTRICT	30393.64	8	3799.21	10.88	.000	
Covariate						
% Afr. Amer Students	405.86	1	405.86	1.162	.284	-35.29
% Latino Students	684.896	1	684.896	1.96	.165	18.94
% Other Students	239.24	1	239.24	.685	.410	-41.22
Location of School	1218.95	1	1218.95	3.49	.065	5.69
% Free Lunch	648.82	1	648.82	1.86	.176	24.15
Teacher/Pupil Ratio	110.63	1	110.63	.317	.575	-.545
Enrollment	349.69	1	349.68	1.00	.320	-.0129
MODEL	34051.714	15	2270.11	6.49	R^2 = .504	
RESIDUAL	33530.11	96	349.27			
TOTAL	67581.82	111				

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Printed Name/Position/Title: Deborah Stine / Lecturer

Organization/Address: 837 West Carson Street, Upland, CA, 91784

Telephone: (909) 981-5670 FAX: (909) 981-5676

E-Mail Address: debstine@csupo.edu Date: 8/11/98

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