

**INTER-OFFICE CORRESPONDENCE**  
**Los Angeles Unified School District**

**INFORMATIVE**

**TO:** Members, Board of Education Date: June 23, 2008

**FROM:** Randy Ross  
Director of Educational Policy

**SUBJECT: ASSESSING THE IMPACT OF SCHOOL SMALLNESS ON STUDENT  
ACADEMIC ACHIEVEMENT – A PRELIMINARY ANALYSIS**

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**Overview**

Pursuant to the resolution, *Small Schools II: A Bold Vision for the Los Angeles Unified School District*, several Board members have asked the IAU to examine the impact of small schools on student achievement.

As noted in the resolution, studies have identified many benefits of small schools (versus large schools):

- Improved academic performance of students with disadvantaged socio-economic status;
- Safer environments with less violence and vandalism;
- More parent and community involvement;
- Greater teacher satisfaction and retention;
- Better attendance;
- Reduced dropout rates; and
- Higher graduation and college-going rates.

Yet, as noted by Linda Darling-Hammond in a report referenced at the May 22 Special Ad Hoc Committee on Small Schools, “‘Small’ is not synonymous with successful. There are ineffective small schools, some of which replicate the very problems they were seeking to solve. Small size is a necessary condition for effective schooling, but it is not enough.”

Given the complex dimensions of this issue, for this paper we conducted a preliminary statistical analysis of performance data for California schools in order to: (1) estimate the

effects of smallness alone on academic achievement; and (2) assess the overall importance of smallness relative to other elements of effective schools. This is a complex undertaking that would benefit from long-term study. However, given the importance of the analysis for the Board's consideration of the *Small Schools II* resolution, we opted to conduct a quick preliminary analysis using a data base we assembled for an earlier analysis of academic achievement in California schools. Ideally, we would continue this work in order to help deepen and strengthen our analysis of the impact of small schools on student achievement and other important outcomes.

The preliminary analysis finds that the impact of school smallness (defined as number of students enrolled) on school performance is positive for elementary and middle schools, but negligible for high schools. However, the overall effect is small. Smallness apparently has the greatest impact on academic performance for middle schools. Should the Board pass the *Small Schools II* resolution, judging by the criterion of improved academic performance, large middle schools would be the best starting place. Moreover, a decision to go small should take into account other important considerations, including the availability of highly effective staffing (school leaders, teachers, etc.) and the availability of facilities. To the extent significant additional resources are required, the cost-effectiveness of going small should be compared to the cost-effectiveness of other strategies for improving student outcomes (for example, expanded high-quality pre-K).

### ***The Impact of Size on Student Achievement in California Schools***

To estimate the impact of size on student achievement, we formulated a statistical model that sought to explain the impact of school size (enrollment) on schools' Academic Performance Index (API), controlling for differences in demographics (California's School Characteristics Index or SCI<sup>1</sup>) and school type (traditional or charter and LAUSD or non-LAUSD). The model includes two variables to capture the effects of size: (1) student enrollment and (2) a term for the interaction between enrollment and SCI. The interaction term is included to explore the hypothesis that the impact of school size (enrollment) varies depending on the characteristics of schools and students.

We developed the model using 2006 data for all California public schools, including charter schools. Moreover, we fit the model separately for elementary, middle, and senior high schools, consistent with California's approach to calculating API ranks. The tabular (multiple regression) results are presented in the appendix.

For elementary and middle schools, the results indicate that the larger a school's enrollment, the lower its academic performance (API). Our preliminary analysis revealed no statistically significant impact of school smallness for high schools.

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<sup>1</sup> SCI was developed by the state in order to develop an API similar schools rank. SCI is based on a weighted average of several factors, including: poverty (as measured by eligibility to participate in the federal lunch program), ethnic distribution of students, language classification (percent EL and RFEP), parent education, teacher credentials, student mobility, class size, year-round indicator, enrollment distribution among grades, percent GATE, percent of students with disabilities, percent of students who participate in migrant education program.

In addition to this core effect of size (enrollment), the results for the interaction term (enrollment and SCI) suggest that schools in low-income communities (lower SCI) would benefit more from smallness than schools in well-to-do communities (high SCI).

To illustrate the potentially differential effects of small schools, Table 1 below contains estimates of the maximum impact of reducing enrollment to 500 students (or 400 for middle schools) on API.

Table 1: Maximum Projected Impact of Smallness on API in LAUSD Schools

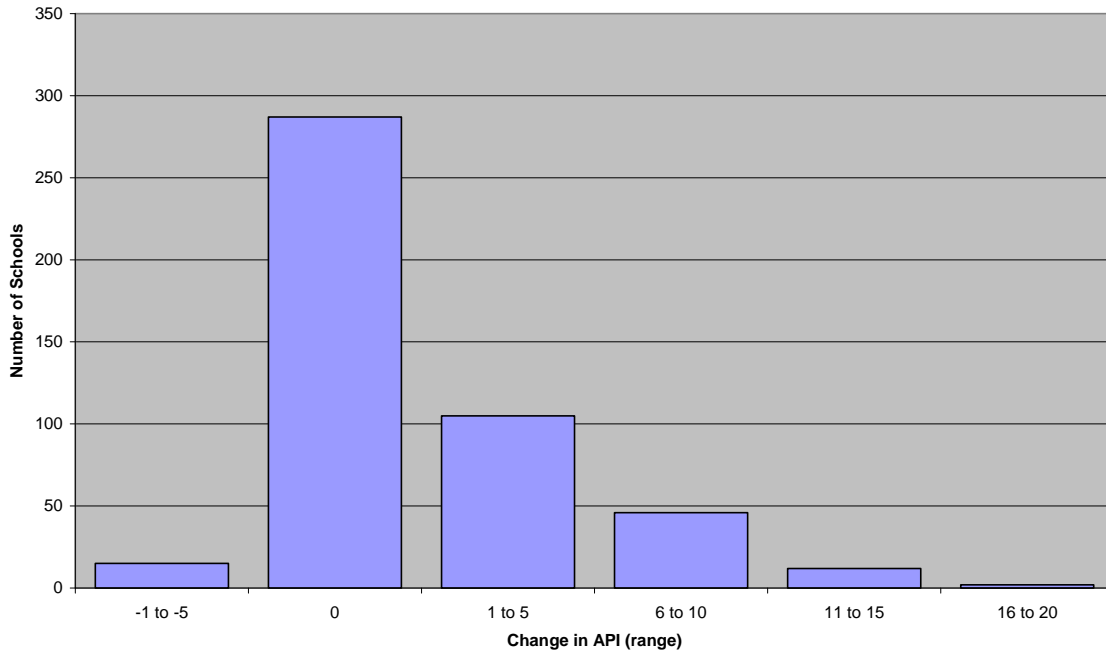
<i>School Level</i>	<i>Increase in number of API Points</i>
Elementary	Miles Ave. (+19 pts)
Middle	Gage (+43 pts)
Senior High	Fremont (+6 pts)

Overall, however, as noted above the preliminary results suggest that a move to smaller schools would not have a major effect on school performance. Figure 1 shows the estimated effect of smallness on LAUSD’s elementary schools. Most elementary schools would not be affected because their enrollment is already below 500 students. For those with enrollments above 500 students, few elementary schools, if made small, would enjoy a rise in performance in excess of 10 API points cumulatively (over several years).<sup>2</sup>

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<sup>2</sup> The term “cumulatively” is used to acknowledge the likelihood that the effects of smallness accrue over some unspecified number of years. Implicitly, if a large school were converted into a small school, the estimated impact reported in this paper represents the cumulative effect once the benefits of smallness are fully realized.

**Figure 1:**  
**Estimated Cumulative Impact of Smallness on API of LAUSD Elementary Schools**



Smallness would have the greatest estimated impact on the APIs of LAUSD's middle schools. Figure 2 shows that smallness would boost the APIs of nearly 50 of LAUSD's middle schools by 11 or more points cumulatively.

**Figure 2:**  
**Estimated Cumulative Impact of Smallness on API of LAUSD's Middle Schools**

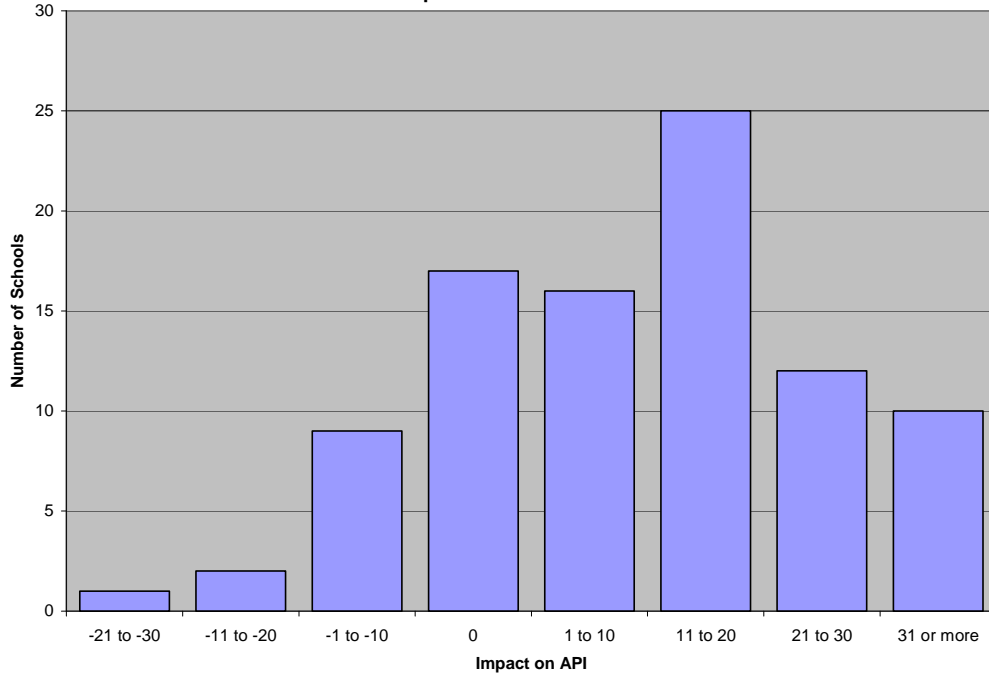
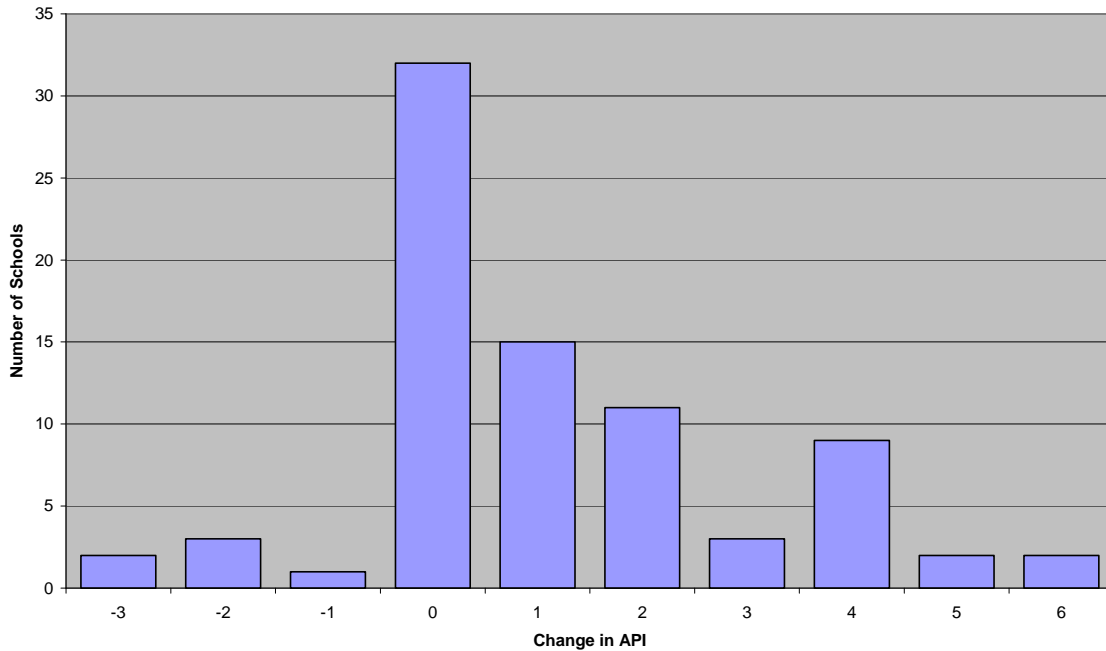


Figure 3 suggests that the estimated impact of smallness on LAUSD's senior high schools would be very low, with a maximum cumulative impact of 6 API points.

**Figure 3:**  
**Estimated Cumulative Impact of Smallness on API of LAUSD Senior High Schools**



A closer examination of California’s API data for 2006 suggests that school smallness has a relatively low estimated effect because the performance of both small schools and large schools varies considerably. The data in Tables 2 and 3 illustrate this. Table 2 lists the 25 LAUSD elementary schools whose APIs fell farthest below expected levels in 2006.<sup>3</sup> Table 3 lists the 25 LAUSD elementary schools whose APIs were farthest above their expected levels. Both lists include small and large schools, as well as traditional and charter public schools. Converting the largest of the listed schools into a small school would yield an estimated increase in API of 15 points, which once attained would account for a small share of the school’s (Miramonte’s) underperformance (65 API points in 2006). More generally, these tables offer a quantitative clarification of the notion that school size (enrollment) alone is far from a sufficient condition for exemplary school performance.

Thus, beyond (or in spite of) smallness, schools whose students perform at high levels – irrespective of class, ethnicity, or language – tend to have caring, highly effective teachers who continually monitor the performance of students relative to high performance standards, and collaboratively plan, implement, and adapt appropriate instructional programs for these students. In this regard, we recently presented to the Board a bold proposal for improving the quality of teachers in LAUSD schools over the long haul (“Star Teacher Engagement Program (STEP) – A Proposal”). In addition, we are preparing a Board Informative that will lay out a high-impact strategy for improving the alignment of school leadership with the goal of improving the impact of teaching on student performance (“Developing School Leadership in LAUSD”).

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<sup>3</sup> Each school’s expected API was estimated using the regression model in the appendix.

**Table 2: LAUSD Elementary Schools whose APIs were Far Below Expected in 2006**

School	Charter	Enrollment	SCI	Actual API 2006	Expected API 2006	<i>Difference Between Actual and Expected API</i>	<i>Est. Impact of Smallness on API</i>
Academia Semillas del Pueblo	D	176	165.47	585	733	-148	0
Griffith Joyner (Florence) Elementary		652	159.93	564	685	-121	3
Multicultural Learning Center	D	128	168.11	640	753	-113	0
Cornerstone Prep Charter	D	242	155.67	567	657	-90	0
One Hundred Seventh Street Elementary		745	158.07	578	667	-89	6
Woodcrest Elementary		775	155.99	561	648	-87	7
West Vernon Avenue Elementary		820	156.48	565	651	-86	8
Hyde Park Blvd. Elementary		542	157.15	581	664	-83	1
Santa Monica Blvd Community Charter	D	803	166.48	653	735	-82	2
Esperanza Elementary		668	158.29	589	670	-81	4
CHIME Charter	D	124	183.60	789	868	-79	0
Nevin Avenue Elementary		593	157.69	592	667	-75	2
Huntington Drive Elementary		394	163.16	642	715	-73	0
Fifty-Second Street Elementary		589	157.35	592	664	-72	2
Century Park Elementary		480	159.75	615	686	-71	0
Evergreen Avenue Elementary		630	160.34	620	688	-68	2
One Hundred Twelfth Street Elementary		371	157.09	600	668	-68	0
Logan Street Elementary		627	161.63	632	699	-67	2
Napa Street Elementary		477	158.09	607	673	-66	0
One Hundred Fifty-Third Street		388	161.54	637	702	-65	0
Miramonte Elementary		1211	158.86	598	663	-65	15
Farmdale Elementary		438	163.09	650	714	-64	0
Russell Elementary		894	159.39	611	675	-64	8
Forty-Ninth Street Elementary		816	158.22	604	666	-62	7
Park Avenue Elementary		535	159.84	624	686	-62	1

**Table 3: LAUSD Elementary Schools whose APIs were Far Above Expected in 2006**

School	Charter	Enroll- ment	SCI	Actual API 2006	Expected API 2006	<i>Diff Betwn Actual and Expected API</i>	<i>Est. Impact of Smallness on API</i>
Camino Nuevo Charter Academy	D	797	154.51	691	632	59	9
Danube Avenue Elementary		288	169.76	827	768	59	0
Fair Avenue Elementary		935	160.89	747	687	60	8
Valerio Street Elementary		908	160.12	741	681	60	8
Shirley Avenue Elementary		473	165.35	792	732	60	0
Solano Avenue Elementary		196	174.12	865	801	64	0
Broadway Elementary		213	159.94	758	693	65	0
Normont Elementary		304	158.36	745	679	66	0
Bryson Avenue Elementary		809	162.20	767	701	66	5
Barrett (Charles W.) Elementary		807	156.34	723	650	73	8
Elysian Heights Elementary		200	164.98	805	732	73	0
Halldale Elementary		418	167.99	827	753	74	0
Park Western Place Elementary		461	180.84	932	856	76	0
Ninety-Second Street Elementary		605	156.17	731	654	77	3
Sterry (Nora) Elementary		206	164.03	802	724	78	0
Nueva Vista Elementary		833	160.11	762	682	80	7
Lemay Street Elementary		240	168.39	838	757	81	0
Cantara Street Elementary		481	162.40	789	708	81	0
Garvanza Elementary		380	161.99	788	706	82	0
Ramona Elementary		551	162.42	794	707	87	1
Mayall Street Elementary		319	165.12	822	731	91	0
Windsor Hills Math Science		529	160.89	789	695	94	1
Stagg Street Elementary		300	166.52	850	743	107	0
Commonwealth Avenue Elementary		753	161.77	820	698	122	4
Watts Learning Center (Charter)	D	161	155.36	801	657	144	0



## ***Selected References***

California Department of Education, “Descriptive Statistics and Correlation Tables for California’s 2006 School Characteristics Index and Similar Schools Ranks, 2006 Supplement to the Public Schools Accountability Act Technical Report 00-1,” By the Technical Design Group of the Advisory Committee for the Public Schools Accountability Act of 1999, California Department of Education Policy and Evaluation Division, May 2007.

S. C. Carter, *No Excuses: Lessons from 21 High-Performing High-Poverty Schools*, The Heritage Foundation, 2001.

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R. Ross, “Is School Success Transferable?” *Education Week*, January 23, 2008.

R. Ross, “Star Teacher Engagement Program (STEP) – A Proposal,” Educational Policy Unit, LAUSD Board of Education, March 26, 2008.

R. Ross and M. Davis, “Developing School Leadership in LAUSD,” Educational Policy Unit, LAUSD Board of Education (in progress).

R. Shields and K. Miles, “Strategic Designs: Lessons from Leading Edge Small Urban High Schools,” *Education Resource Strategies*, May 2008.

## Appendix

### Impact of School Size on API 2006 – California Elementary Schools

<i>Regression Statistics</i>	
Multiple R	0.908735
R Square	0.8258
Adjusted R Square	0.825599
Standard Error	36.76684
Observations	5226

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	33444579	5574097	4123.461	0
Residual	5219	7055046	1351.8		
Total	5225	40499625			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-464.684	22.75916	-20.4175	3.3E-89	-509.302	-420.067
Enrollment	-0.30476	0.05104	-5.97105	2.51E-09	-0.40482	-0.2047
Independent Charter	-2.73364	3.610148	-0.75721	0.448957	-9.81105	4.343756
Other Charter	-15.1987	4.224751	-3.59754	0.000324	-23.481	-6.91644
SCI	7.207867	0.133882	53.83728	0	6.945401	7.470332
LAUSD (dummy variable)	9.391664	1.846992	5.084843	3.81E-07	5.770787	13.01254
Interaction -- Enrollment and SCI	0.001781	0.000302	5.890922	4.08E-09	0.001189	0.002374

## Impact of School Size on API 2006 – California Middle Schools

<i>Regression Statistics</i>	
Multiple R	0.926043
R Square	0.857556
Adjusted R Square	0.856878
Standard Error	34.95127
Observations	1268

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	9273801	1545634	1265.263	0
Residual	1261	1540426	1221.591		
Total	1267	10814228			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>T Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-444.793	32.27858	-13.7798	2.41E-40	-508.119	-381.468
Enrollment	-0.1437	0.031681	-4.53584	6.28E-06	-0.20585	-0.08155
Independent Charter	42.13807	6.335088	6.651537	4.31E-11	29.7096	54.56655
Other Charter	28.53028	8.616744	3.311028	0.000956	11.62555	45.43501
SCI	7.061742	0.196217	35.98954	1E-195	6.676795	7.446689
LAUSD (dummy variable)	9.273155	4.786627	1.937305	0.052931	-0.11747	18.66378
Interaction – Enrollment and SCI	0.000867	0.000194	4.466035	8.68E-06	0.000486	0.001248

## Impact of School Size on API 2006 – California Senior High Schools

<i>Regression Statistics</i>	
Multiple R	0.893814
R Square	0.798903
Adjusted R Square	0.797768
Standard Error	39.85587
Observations	1070

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	6708191	1118032	703.8329	0
Residual	1063	1688565	1588.49		
Total	1069	8396756			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-604.889	38.79452	-15.5921	1.62E-49	-681.012	-528.767
Enrollment	-0.01653	0.025835	-0.6397	0.522505	-0.06722	0.034166
Independent Charter	12.9336	4.894761	2.642334	0.008355	3.329104	22.53809
Other Charter	11.28234	7.487157	1.506892	0.132135	-3.40895	25.97362
SCI	8.020377	0.241753	33.17589	3.1E-166	7.546009	8.494744
LAUSD	2.514052	5.19232	0.484187	0.628353	-7.67431	12.70241
Interaction -- Enrollment and SCI	0.000104	0.000161	0.641691	0.521212	-0.00021	0.00042