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SUPERIOR COURT OF THE STATE OF CALIFORNIA

CITY AND COUNTY OF SAN FRANCISCO

ELIEZER WILLIAMS, et al., Plaintiffs, vs. STATE OF CALIFORNIA, DELAINE EASTIN, State Superintendent Of Public Instruction, STATE DEPARTMENT OF EDUCATION, STATE BOARD OF EDUCATION, Defendants.	Case No. 312 236 Date Action Filed: May 17, 2000
STATE OF CALIFORNIA Cross-Complainant, vs. SAN FRANCISCO UNIFIED SCHOOL DISTRICT, et al., Cross-Defendants.	

EXPERT WITNESS DECLARATION RE ERIC A. HANUSHEK, Ph.D.

I, Paul B. Salvaty, declare as follows:

1. I am an attorney with the law firm of O'Melveny & Myers LLP, counsel of record herein for defendant State of California ("the State").

2. The State has provided a list of persons whose expert opinion testimony the State intends to offer at trial of this action, either orally or by deposition testimony. The list includes Dr. Eric Hanushek, to whom this declaration refers.

3. Dr. Hanushek has agreed to testify at trial.

4. Dr. Hanushek will be sufficiently familiar with the pending action to submit to a meaningful oral deposition concerning the specific testimony, including any opinions and their bases, that Dr. Hanushek is expected to give at trial.

5. Dr. Hanushek's fee for providing deposition testimony, consulting with the State, conducting research and other activities undertaken in preparation of the attached report is $295 per hour.

6. Pursuant to Section 2034(f)(2)(A) of the California Code of Civil Procedure, attached hereto as Exhibit A and incorporated herein by reference is a *curriculum vitae* providing Dr. Hanushek's professional qualifications.

7. Attached hereto as Exhibit B and incorporated herein by reference is Dr. Hanushek's expert report. Pursuant to Section 2034(f)(2)(B) of the California Code of Civil Procedure, the following is a brief narrative statement of the general substance of the testimony that Dr. Hanushek is expected to give at trial. Dr. Hanushek rebuts the opinions set forth in several of plaintiffs' expert reports and provides an overview of extensive research showing that the input-based policies of the past -- and advanced by plaintiffs here -- have not led to improved student achievement; and argues that plaintiffs' proposals to make the State directly responsible for all aspects of education would cause inefficiencies and prevent local authorities from making decisions for themselves. The foregoing statements are only a general summary of the issues and conclusions discussed and documented more fully in Dr. Hanushek's expert report.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 18th day of April, 2003, at Los Angeles, California.

Paul B. Salvaty

CURRICULUM VITAE

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Educational Experience:

1965 B.S. (Distinguished Graduate) U.S. Air Force Academy

1968 Ph.D. (Economics) Massachusetts Institute of Technology
Thesis: "The Education of Negroes and Whites"

Learned Societies:

American Economic Association
Econometric Society
Association for Public Policy Analysis and Management
(Policy Council, 1981-85; vice president, 1986-87; president, 1988-89)
Society of Labor Economists

Honors:

Fellow, International Academy of Education, 1997
(Board of Directors, 2002-)

Military Service:

U.S. Air Force, 1961-74

Academic Experience

2000-	Paul and Jean Hanna Senior Fellow, Hoover Institution, Stanford University
2000-	Senior Research Fellow, Cecil and Ida Green Center for the Study of Science and Society, University of Texas at Dallas
1995-	Research Associate, National Bureau of Economic Research
2001-	Professor (by courtesy) of Education, Stanford University
1978-2000	Professor of Economics and Political Science, University of Rochester • Director, W. Allen Wallis Institute of Political Economy (1991-99) • Professor of Public Policy (1992-2000) • Senior Research Associate, Rochester Center for Economic Research (1984- ; Director, 1994-99) • Chairman, Department of Economics (1982-87; 1988-90; 1991-93)
1999-	Member, Koret Task Force on K-12 Education, Hoover Institution, Stanford University
1999-2000	Distinguished Visiting Fellow, Hoover Institution, Stanford University
1994	Visiting Fellow, Australian National University
1975-78	Associate Professor, Department of Economics and Institution for Social and Policy Studies, Yale University
1974	Lecturer, Virginia Polytechnic Institute (Reston Campus)
1968-73	Associate Professor of Economics, U.S. Air Force Academy (Assistant Professor, 1969-71; Instructor, 1968-69)
1970-71	Research Associate, J.F. Kennedy School of Government, Harvard University

Government Experience

2002-	Member, Independent Review Panel, National Assessment of Title I, U.S. Department of Education
2002	Member, Advisory Council on Education Statistics, U.S. Department of Education
2001-	Member, NCES Finance Technical Review Committee, U.S. Department of Education
1994-98	Member, Board of Economic Advisors, New York State Assembly
1994-95	Member, Technical Panel on Trends and Issues in Retirement Savings, Advisory Council on Social Security
1987-95	Consultant, U.S. Department of Education
1986-89	Consultant, U.S. Commission on Civil Rights
1987-89	Chairman, Technical Advisory Panel, Congressional Budget Office
1985-87	Member, Panel of Economic Advisers, Congressional Budget Office
1983-85	Deputy Director, Congressional Budget Office
1974	Systems Analyst, Military Airlift Command, U.S. Air Force

1973-74	Senior Economist, Cost of Living Council
1971-72	Senior Staff Economist, Council of Economic Advisers

Other Experience

2000-01	Member, Committee on Scientific Principles of Education Research, National Academy of Sciences/National Research Council
2000	Member, Historic Preservation Commission, Town of Brighton, NY
1998-2001	Member, Panel on Data and Methods for Measuring the Effects of Changes in Social Welfare Programs, National Academy of Sciences/National Research Council
1992-98	Member, Committee on National Statistics, National Academy of Sciences/National Research Council
1993-97	Chairman, Panel on Retirement Income Modeling, National Academy of Sciences/National Research Council
1990-94	Chairman, Panel on the Economics of Educational Reform (PEER)
1984-95	Consultant, The World Bank
1992	Chairman, Blue Ribbon Commission on Monroe County Finances, Monroe County, NY
1988-91	Chairman, Panel to Evaluate Microsimulation Models for Social Welfare Programs, National Academy of Sciences/National Research Council
1977-83	Consultant, Mathematica Policy Research
1976-78	Member, Mayor's Task Force on Education, New Haven, CT
1975-77	Senior Research Associate, Institute for Demographic and Economic Studies
1975-77	Consultant, Abt Associates
1972-74	Member, RFF-Academy for Contemporary Problems, Metropolitan Governance Research Committee
1969-73	Consultant, The Rand Corporation

Editorial Activities

Editorial Board, *Education Next* (2000-); Editorial Board, *Economics of Education Review* (1982-); Advisory Editor, *Social Science Research* (1978-); Associate Editor, *Review of Economics and Statistics* (1995-2002); Editorial Board, *Educational Evaluation and Policy Analysis* (1997- 2001); Editorial Board, *Journal of Policy Analysis and Management* (1994-2001); Editorial Board, *Socio-Economic Planning Sciences* (1994-96); Associate Editor, *Regional Science and Urban Economics* (1991-97); Editorial Board, *Journal of Economic Education* (1990-95); Advisory Board, *American Journal of Education* (1992-95); Co-editor, *Journal of Human Resources* (1990-94); Associate Editor, *Evaluation Review* (1987-1989).

PUBLICATIONS

Books

Handbook of the Economics of Education (co-editor with Finis Welch). Amsterdam: North Holland, forthcoming 2004.

The Economics of Schooling and School Quality (editor). London: Edward Elgar Publishing Ltd., 2003.
Volume I: Labor Markets, Distribution, and Growth
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Assessing Policies for Retirement Income: Needs for Data, Research, and Models (co-editor with Constance F. Citro). Washington, DC: National Academy Press, 1997.

Improving America's Schools: The Role of Incentives, (co-editor with Dale W. Jorgenson), Washington, DC: National Academy Press, 1996.

Assessing Knowledge of Retirement Behavior (co-editor with Nancy L. Maritato), Washington, DC: National Academy Press, 1996.

Modern Political Economy: Old Topics, New Directions (co-editor with Jeffrey S. Banks), New York: Cambridge University Press, 1995.

Making Schools Work: Improving Performance and Controlling Costs. Washington, DC: The Brookings Institution, 1994.

Educação Rural: Lições do Edurural (with João Batista F. Gomes Neto, Ralph W. Harbison, and Raimundo Hélio Leite). São Paulo: Editora da Universidade de São Paulo, 1994.

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Volume I: Review and Recommendations
Volume II: Technical Papers

Statistical Methods for Social Scientists (with John E. Jackson). New York: Academic Press, 1977

Education and Race--An Analysis of the Educational Production Process. Lexington, MA: D.C. Heath, 1972

Articles

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"Redistribution through Education and Other Transfer Mechanisms" (with Charles Ka Yui Leung and Kuzey Yilmaz), *Journal of Monetary Economics* (forthcoming).

"Why Public Schools Lose Teachers," (with John F. Kain and Steven G. Rivkin), *Journal of Human Resources* (forthcoming).

"Does Peer Ability Affect Student Achievement?" (with John F. Kain, Jacob M. Markman, and Steven G. Rivkin), *Journal of Applied Econometrics* (forthcoming).

"Lessons about the Design of State Accountability Systems" (with Margaret E. Raymond), in Paul E. Peterson and Martin R. West (ed.), *No Child Left Behind? The Politics and Practice of Accountability* (Washington, DC: Brookings, forthcoming 2003).

"Improving Educational Quality: How Best to Evaluate Our Schools", (with Margaret E. Raymond), in Yolanda Kodrzycki (ed.), *Education in the 21st Century: Meeting the Challenges of a Changing World* (Boston, MA: Federal Reserve Bank of Boston, forthcoming 2003).

"Efficiency and Equity in Schools around the World" (with Javier A. Luque), *Economics of Education Review* 20(4) (forthcoming, August 2003).

"High Stakes Research" (with Margaret E. Raymond), *Education Next* 3(3), forthcoming Summer 2003.

"Does Public School Competition Affect Teacher Quality?" (with Steve G. Rivkin), in Caroline Minter Hoxby (ed.), *The Economics of School Choice* (Chicago: University of Chicago Press, forthcoming 2003).

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"The Economics of Structured Judgments Under CPLR Article 50-B" (with Michael J. Wolkoff), *Buffalo Law Review*, 43(2), Fall 1995, pp. 563-582.

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"Interpreting Recent Research on Schooling in Developing Countries," *World Bank Research Observer*, 10(2), August 1995, pp. 227-246.

"Who Chooses to Teach (and Why)?" (with Richard R. Pace), *Economics of Education Review,* 14(2), June 1995, pp. 101-117.

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"A Jaundiced View of 'Adequacy' in School Finance Reform," *Educational Policy*, 8(4), December 1994, pp. 460-469.

"Understanding Entry into the Teaching Profession" (with Richard R. Pace), in Ronald G. Ehrenberg (ed.), *Choices and Consequences: Contemporary Policy Issues in Education* (Ithaca, NY: ILR Press, 1994). pp. 12-28.

"The Causes and Consequences of Grade Repetition: Evidence from Brazil," (with João Batista Gomes-Neto), *Economic Development and Cultural Change*, 43(1), October 1994, pp. 117-148. [reprinted in Nancy Birdsall and Richard H. Sabot (ed.), *Opportunity Foregone: Education in Brazil* (Washington, DC: Inter-American Development Bank, 1996), pp. 425-460.]

"Estimating the Effects of Proposed Legislation: The Case for Model Validation" (with Constance F. Citro), *Chance*, 7(2), Spring 1994, pp. 31-40.

"Education Production Functions," in Torsten Husén and T. Neville Postlethwaite (ed.), *International Encyclopedia of Education*, 2nd Edition, Volume 3 (Oxford: Pergamon, 1994), pp. 1756-1762. [reprinted in Martin Carnoy (ed.), *International Encyclopedia of Economics of Education*, 2nd Edition (Oxford: Pergamon, 1995), pp. 277-282].

"Concepts of Educational Efficiency and Effectiveness" (with Marlaine E. Lockheed), in Torsten Husén and T. Neville Postlethwaite (ed.), *International Encyclopedia of Education*, 2nd Edition, Volume 3 (Oxford: Pergamon, 1994), pp. 1779-1784.

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"Investimentos Autofinanciáveis em Educação," (with João Batista Gomes-Neto, Raimundo H. Leite, and Ralph W. Harbison), *Cadernos de Pesquisa*, 85, May 1993, pp. 11-25.

"Improving Educational Outcomes While Controlling Costs," (with Steven G. Rivkin and Dean T. Jamison), *Carnegie-Rochester Conference Series on Public Policy*, 37 (December 1992), pp. 205-238.

"The Trade-off Between Child Quantity and Quality," *Journal of Political Economy*, 100(1), February 1992, pp. 84-117.

"School Performance and Educational Policy Making," in Gary Libecap(ed.), *The Education and Quality of the American Labor Force* (Greenwich, CT: JAI Press, 1991), pp. 65-94.

"Concepts of Educational Efficiency and Effectiveness" (with Marlaine E. Lockheed) in Torsten Husén and T. Neville Postlethwaite (ed.), *International Encyclopedia of Education,* Supplementary vol. 2. Oxford: Pergamon Press, 1991.

"When School Finance 'Reform' May Not Be Good Policy," *Harvard Journal on Legislation*, 28(2), Summer 1991, pp. 423-456.

"Reforming Educational Reform," (with John E. Chubb) in Henry Aaron (ed.), *Setting National Priorities* (Washington, DC: The Brookings Institution, 1990), pp.213-247.

"Commercial Land Use Regulation and Local Government Finance," (with John M. Quigley) *American Economic Review*, 19(2), May 1990, pp. 176-180.

"The Policy Research Markets," *Journal of Policy Analysis and Management*, 9(2), Spring 1990, pp. 147-154.

"Social Science Research and Policy: A Review Essay," *Journal of Human Resources*, 25(2), Spring 1990, pp. 290-296.

"Alternative Assessments of the Performance of Schools: Measurement of State Variations in Achievement" (with Lori Taylor), *Journal of Human Resources*, 25(2), Spring 1990, pp. 179-201.

"Expenditures, Efficiency, and Equity in Education: The Federal Government's Role," *American Economic Review*, 79(2), May 1989, pp. 46-51.

"The Impact of Differential Expenditures on School Performance," *Educational Researcher*, 18(4), May 1989, pp. 45-51.

"Improving Educational Efficiency in Developing Countries: What Do We Know?" (with Marlaine E. Lockheed), *Compare*, 18(1), 1988, pp. 21-37.

"Non-Labor-Supply Responses to the Income Maintenance Experiments", in Alicia H. Munnell (ed.), *Lessons from the Income Maintenance Experiments* (Boston: Federal Reserve Bank of Boston, 1987), pp. 106-121.

"Formula Budgeting: The Economics and Analytics of Fiscal Policy under Rules," *Journal of Policy Analysis and Management*, 6(1), Fall 1986, pp. 3-19.

"Alternative Poverty Measures and the Allocation of Federal Benefits" (with Roberton Williams), in U.S. Bureau of the Census, *Conference on the Measurement of Noncash Benefits: Proceedings*, Volume I (Washington, DC: U.S. Bureau of the Census, 1986), pp. 104-125.

"The Economics of Schooling: Production and Efficiency in Public Schools," *Journal of Economic Literature*, 49(3), September 1986, pp. 1141-1177.

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Notes, Comments, Reviews, Etc.

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The structure of analysis and argument in plaintiff expert reports for **Williams v State of California**

By Eric Hanushek

April 2003

The structure of analysis and argument in plaintiff expert reports for **Williams v State of California**

By Eric Hanushek

I have analyzed issues of student performance for over thirty years. My work has specifically considered the role of school resources and of alternative financing schemes in determining student achievement. I have written or edited more than a dozen books and over 100 professional articles with a large proportion of them directly related to the issues in this case.

I was asked to review the expert reports of the plaintiffs' experts and to provide an evaluation of the evidentiary basis for their conclusions. I was also asked to put their policy conclusions into the context of existing scholarly work.

The plaintiffs' experts in this case have drawn a large number of conclusions that are not supported by existing evidence. Indeed, many of the central theories and arguments advanced are directly contradicted by extensive research into the determinants of student achievement.

The plaintiffs single out teacher qualifications, textbooks and other classroom resources, and facilities as being particularly important for student achievement. They then assert that there is inequitable distribution of these factors, but they do not provide any systematic evidence about this. Finally, they assert that the State should eliminate any variation in these factors – in essence eliminating any role for local decision making and imposing the decisions of the State everywhere. But here they offer no indication of where any funding necessary for implementing these State policies should come from. In particular, if these policies are to be implemented within currently legislated budgets, it is necessary to reduce spending elsewhere to match any increases, but the plaintiff experts provide no indication of which areas have lower priority. Alternatively, they may be arguing that the legislature should spend more in total on education, but that kind of proposal still requires some indication of what other items in the state budget should be reduced or of what kind of revenue increases they believe are appropriate.

1. Extensive research has failed to establish consistent relationships between commonly identified school inputs and student achievement.

Over almost four decades, researchers have sought to identify the primary determinants of student achievement. A central focus of much of this work has been the impact of variations in basic resources to schools – class sizes, characteristics of teachers and salaries of teachers, differences in facilities, and the like. This quest to identify and quantify the effects of basic resources has generally failed.

a. The aggregate evidence vividly demonstrates that the input-based policies of the past have not led to improved student achievement.

The simplest and perhaps clearest demonstration of the resource story is revealed in aggregate data over the past few decades. Table 1 tracks the patterns of pupil-teacher ratios, teacher education, and teacher experience. Between 1960 and 2000, pupil-teacher ratios fell by almost 40%. The proportion of teachers with a master's degree or higher more than doubled, so that a majority of all U.S. teachers today have at least a master's degree. Finally, median teacher experience – which is driven more by demographic cycles than active policy – increased significantly, almost doubling since its trough in 1970.

As seen in the bottom row of Table 1, real expenditures per pupil more than tripled over this period.[1] In fact, this period is not remarkable in U.S. schools. Over the entire 100 years of 1890-1990, real spending per pupil rose at a remarkably steady pace of 3½% per year (Hanushek and Rivkin (1997)). Over this longer period, real per student expenditure in 1990 dollars increased from $164 in 1890 to $772 in 1940 to $4,622 in 1990 — roughly quintupling in each fifty year period.

The question remains, what was obtained for these spending increases? Since the early 1970s, a random sample of students in the U.S. has been given tests at differing ages in various subjects under the auspices of the National Assessment of Educational Progress, or NAEP. These tests have been designed to provide a consistent measure of performance over time. Fig. 1 provides performance data for the same period as the previously described input data. In this figure the pattern of average performance by 17-year-olds is traced for reading, mathematics, and science. The performance of students in math and reading is ever so slightly higher in 1999 than thirty years before when spending was dramatically lower. The performance of students in science is significantly lower in 1999 than it was in 1970. Writing performance (not shown) was first tested in 1984 and declined steadily until 1996 when testing was discontinued.

The only other test that provides a national picture of performance over a long period of time is the Scholastic Aptitude Test, or SAT. This college admissions test has the advantage of providing data going back to the 1960s but the disadvantage of being a voluntary test taken by a selective subset of the population. Scores on this test actually

[1] The calculation of real expenditures deflates by the Consumer Price Index.

plunged from the mid-1960s until the end of the 1970s, suggesting that the NAEP scores that begin in the 1970s may understate the magnitude of the performance problem.

In simplest terms, policies focused on inputs have been vigorously pursued over a long period of time, but there is no evidence that the added resources have improved student performance, at least for the most recent three decades when it has been possible to compare quantitative outcomes directly. This evidence suggests that the efficacy of further input-based policies depends crucially on improved use of resources compared to past history.

Two arguments are often made, however, for why this simple comparison of expenditures and student performance might be misleading: 1. The characteristics of students may have changed such that they are more difficult (and expensive) to educate now than in the past; and 2. Other expansions of the requirements on schools have driven up costs but would not be expected to influence observed student performance.

Changes in students. One simple explanation for why added resources have yielded no apparent performance improvement is that today's students are more poorly prepared or motivated for school than in the past, requiring added resources just to stay even. For example, there have been clear increases in the proportion of children living in single-parent families and, relatedly, in child poverty rates–both of which are hypothesized to lead to lower student achievement. Between 1970 and 1990, children living in families below the poverty line rose from 15 to 20%, while children living with both parents declined from 85 to 73%. The percent of children not speaking English at home also rose from 9% in 1980 to 17% in 2000. But, there have also been other trends that appear to be positive forces on student achievement. Family sizes have fallen, and parental education levels have improved. Among all families with children, the percentage with three or more children fell from 36 to 20%. Moreover, over the same period, adults aged 25-29 with a high school or greater level of schooling went from 74 to 86% (up from 61% in 1960). Finally, enrollment in kindergarten and pre-school increased dramatically over the period.

It is difficult to know how to net out these opposing trends with any accuracy. Extensive research, beginning with the Coleman Report (Coleman et al. (1966)) and continuing through today (cf. Hanushek (1997)), has demonstrated that differences in families are very important for student achievement. Most of these studies have not focused their primary attention on families, however, and thus have not delved very far into the measurement and structure of any family influences. Grissmer et al. (1994) attempt to sort out the various factors in a crude way. That analysis uses econometric techniques to estimate how various family factors influence children's achievement at a point in time. It then applies these cross-sectionally estimated regression coefficients as weights to the trended family background factors identified above. Their overall findings are that black students performed better over time than would be expected from the trends in black family factors. They attribute this better performance to improvements in schools. On the other hand, white students, who make up the vast majority, performed worse over time than would be expected, leading presumably to the opposite conclusion that schools for the majority of students actually got worse over time.

Exogenous cost increases. The most often discussed cost concern involves "special education," programs to deal with students who have various disabilities. The issue is that these programs are expensive but the recipients tend not to take standardized tests. Thus, even if special education programs are effective (Hanushek, Kain, and Rivkin (2002)), the increased expenditures on special education will not translate into measured student performance.

The magnitude of special education spending and its growth, however, are insufficient to reconcile the cost and performance dilemma. Using the best available estimate of the cost differential for special education -- 2.3 times the cost of regular education (Chaikind, Danielson, and Brauen (1993)), the growth in special education students between 1980 and 1990 can explain less than 20% of the expenditure growth (Hanushek and Rivkin (1997)). In other words, while special education programs have undoubtedly influenced overall expenditures, they remain a relatively small portion of the total spending on schools.

Direct estimates of other exogenous programs and changes resulting from other academic aspects of schools such as language instruction for immigrants or nonacademic programs such as sports, art, or music are not readily available. Nonetheless, no evidence suggests that these can explain the magnitude of spending growth.

b. Detailed econometric evidence reinforces the conclusion that continued input-based policies offer little promise for increased student achievement.

The aggregate story is supported by an extensive body of direct evidence coming from detailed econometric analyses of student achievement. This evidence has been motivated by a monumental governmental study of U.S. achievement that was conducted in the mid-1960s. The "Coleman Report" (Coleman et al. (1966)) presented evidence that was widely interpreted as concluding that schools did not matter. The most important factor in achievement was the family, followed by peers in school. This study led to a great amount of research – research that has supported part of the Coleman study but, more importantly, has clarified the interpretation of its findings.

The statistical analyses relevant to this work have a common framework that has been well-understood for some time (Hanushek (1979)). Student achievement at any point in time is directly related to the primary inputs: family influences, peers, and schools. The educational process is also cumulative, so that both historical and contemporaneous inputs influence current performance.

The summary of results from analyses of United States schools presented here begins with all of the separate estimates of the effects of resources on student performance, and then concentrates on a more refined set of estimates. The underlying work includes all published analyses prior to 1995 that include one of the resource measures described below, that have some measure of family inputs in addition to schools, and that provide the sign and statistical significance of the resource relationship with a measurable student outcome. The 89 individual publications that appeared before 1995 and that form the basis for this analysis contain 376 separate production function estimates. While a large number of analyses were produced as a more or less immediate reaction to the Coleman Report, half of the available estimates have been published since 1985. Of course, a number of subsequent analyses have also appeared since 1995. While not formally assessed, it is clear that including them would not significantly change any of the results reported here, given their mixed results and the large number of prior estimates.

Understanding the character of the underlying analyses is important for the subsequent interpretation. Three-quarters of the estimates rely on student performance measured by standardized tests, while the remainder uses a variety of different measures including such things as continuation in school, dropout behavior, and subsequent labor market earnings. Not surprisingly, test score performance measures are more frequently employed for studying education in primary schools, while a vast majority of the analyses of other outcomes relate to secondary schools. One-quarter of the estimates consider performance in individual classrooms, while 10% focus on school inputs only at the level of the state. Moreover, fully one-quarter of the estimates employing nontest measures rely solely on interstate variations in school inputs.

Table 2 presents an overall summary of basic results about the key resources that form the basis for most overall policy discussions. The standard hypothesis driving policy initiatives is that each of these resources should have a positive effect on student performance. In terms of real classroom resources, only 9% of the estimates considering the level of teachers' education and 14% of the estimates investigating teacher-pupil ratios find positive and statistically significant effects on student performance. These relatively small numbers of statistically significant positive results are balanced by another set finding statistically significant negative results—reaching 14% in the case of teacher-pupil ratios.[2] A higher proportion of estimated effects of teacher experience are positive and statistically significant: 29%. Importantly, however, 71% still indicate either worsening performance with experience or less confidence in any positive effect. In sum, the vast number of estimated real resource effects gives little confidence that just adding more of any of the specific resources to schools will lead to a boost in student

[2] While a large portion of the studies merely note that the estimated coefficient is statistically insignificant without giving the direction of the estimated effect, those statistically insignificant studies reporting the sign of estimated coefficients are split fairly evenly between positive and negative.

achievement. Moreover, this statement does not even get into whether or not any effects are 'large'.

The financial aggregates provide a similar picture. There is very weak support for the notion that simply providing higher teacher salaries or greater overall spending will lead to improved student performance. Per pupil expenditure has received the most attention, but only 27% of the estimated coefficients are positive and statistically significant. In fact, 7% even suggest some confidence in the fact that spending more would harm student achievement. In reality, analyses involving per pupil expenditure tend to be of the lowest quality, and there is substantial reason to believe that even these results overstate the true effect of added expenditure. The per pupil expenditure studies tend to be highly aggregated – sometimes using data for state aggregates; they do not allow for differences in policies across states; and they seldom have any measures of the historical pattern of inputs into learning.

Similarly, looking at the remaining estimates of factors identified as potentially important, few characteristics have a systematic and consistent relationship with student outcomes. Specifically, as shown in Table 2, school facilities (measured in a variety of ways) show no systematic relationship with student achievement. This finding is not particularly surprising, given the relatively small contribution of facilities to overall expenditures. Similarly, common measures of administrative inputs are not systematically related to student outcomes. Finally, even measures of teacher test scores – while more related to achievement than other factors – have modest overall explanation of variations in student achievement.

Furthermore, if these studies are divided by some clear measures of quality, the results do not change. Many have focused on the fact that there are differences of opinions and of analytic results, but the variations in results are closely related to the quality of the underlying analyses. When appropriate adjustments are made for the underlying studies, the results are quite consistent. The standard inputs do not have systematic effects on student performance (Hanushek (2003)).

None of this discussion should be interpreted as suggesting that resources and inputs never matter. While perhaps counter-intuitive, the results of existing research simply suggest that there is little systematic relationship between specific resources – of the kind highlighted by plaintiffs – and student performance. The most plausible interpretation of this is that prior policies, which provide few incentives for schools to improve student performance, are not ones that systematically lead to improvements. Nonetheless, if incentives were changed – say, to be more in line with improved student performance – it is likely that resources could have a more systematic impact. It is just that the policies advocated by the plaintiffs provide no change in performance incentives and thus provide no real hope of leading to better outcomes, either absolutely or in terms of the distribution of student results. In fact, by working against decision making based on local conditions, the plaintiffs would likely harm student outcomes if their policy proposals were implemented.

2. School inputs identified by plaintiffs are not closely related to student performance.

The evidence concerning aggregate resource categories carries down to the level of specific inputs. The plaintiffs have emphasized the necessity of the State to dictate to each district that it provides some (often unspecified) level of textbooks, facilities, and teacher credentials. Unfortunately, there is no evidence that variations in these factors have anything to do with variations of student outcomes. Moreover, as an extension of this, since these factors are not systematically related to student performance, there is no way to dictate any "appropriate" level of these inputs.

As a general approach, the plaintiffs cite extreme situations where actions might be plausible and then simply extrapolate wildly to assert that the matter is an issue throughout California. For example, Oakes (2002) reports extensively on a study of three schools (selected apparently on schooling outcomes) from a study by Social Policy Research Associates that looked for schools with 30 percent or greater uncredentialed teachers. (There were apparently no comparison schools in the original study). Oakes then says (p. 17):

> Notably, Urban Middle School #4, Urban Elementary School #4, and Urban High School #1 are not isolated cases. *Many California schools have similar problems; many are far worse.* [emphasis added] Not all of these troubled schools are in urban centers. The terrible conditions documented in the urban and rural schools represented in Friedlaender and Frenkel's study is consistent with the evidence amassed in this case, much of which is summarized in the following pages.

No evidence is provided to suggest what is reality in the comparison to other California schools. The term "many California schools" is never defined; nor are any data provided.

As noted below, there is some plausibility to some of the extreme cases cited, but this does not generalize to the situation across California. Nor is plaintiffs' simple assertion of a problem persuasive in the absence of data for California and research on its impacts.

The availability of sufficient textbooks has been noted as an important issue in a variety of studies of very poor, developing countries. For example, Harbison and Hanushek (1992) find that textbook availability is a significant determinant of student achievement in rural Northeast Brazil – one of the poorest areas in the world. Here, where the average parent has two years of education, where the average family has few books in the home, and where the average student may not use a textbook everyday in school, textbooks do indeed matter. Similarly, the importance of textbooks in truly deprived schools of developing countries appears to be a significant learning factor (Lockheed and Hanushek (1988)). As Oakes (2002) admits in her summary of the expert reports, "It is worth noting that Oakes' report relies heavily on studies conducted by international organizations, because most of the empirical research on the relative importance of textbooks and instructional materials on student learning has been conducted in developing countries." This is for good reason. Studies of the effects of textbooks find an impact only in places where the level and distribution of textbooks is radically different than found in California.

Asserting that a few districts may not have the most current textbooks is very different than demonstrating that textbook shortages are severe – let alone anything like those in rural Northeast Brazil.

Moreover, plaintiffs offer no evidence to suggest that any lack of textbooks is attributable to insufficient resources. Because the cost of new textbooks is very small portion of total spending on K-12 education, it is inconceivable that many districts would pass up an easy opportunity to boost student achievement through new books – if such opportunities were real. Put differently, some districts undoubtedly do not have the latest editions of some books or extra books around schools. But this may be the result of a judgment by them that gains from such expenditures were not worth the expense. Or it may be the result of some other decision by local authorities that has nothing to do with a lack of resources.

Similarly, as the prior discussions of estimation of factors that affect achievement demonstrate, facility differences have not appeared as a powerful factor in determining student achievement. Again, as with the discussion of textbooks, it is important to be clear about what this means. Specifically, no district should permit unsafe or unhealthy schools. If unsafe or unsanitary schools exist anyplace in the state, they should be immediately corrected or shut down.

But, that is not the primary issue. Student learning is less related to whether the school is "state of the art" than to other factors. Simply asking, 'could this school's facilities be better?' provides no guidance in deciding how to spend limited dollars for education. Again, from the other side, improving the quality of facilities across the state, while undoubtedly an expensive venture, would not according to existing evidence materially change the extent to which students in California learn. Some experts on facilities have provided estimates of the enormous expense that would be required to bring them up to their standards, but they provide little reliable evidence that this would lead to increases in student outcomes.[3]

The final area emphasized by the plaintiffs is teacher credentials. In general, the plaintiffs make an important case that teacher quality is important. What they fail to do is present any evidence that traditional credentials are a good proxy for teacher quality.

Substantial evidence exists to indicate that variations in teacher quality are very important. For example, this is clear in Hanushek (1971, (1992), Murnane (1975), Armor et al. (1976), Murnane and Phillips (1981), and Rivkin, Hanushek, and Kain (2001). What is equally clear, however, is that the effectiveness of a teacher is not directly related to her training, experience, and credentials. Part of this evidence was previously presented, and another part comes from direct investigation of credentials and their effects. Credentials as they exist in states have not been found to have much if any effect on student learning. Some people have argued that "better credentialing" would help student achievement, but the jury is out, awaiting reliable scientific evidence. (See, for example, the debates in Goldhaber and Brewer (2000, (2001) and Darling-Hammond, Berry, and Thoreson (2001)).

Thus, the translation of research evidence about the importance of teacher quality into a statement about teacher credentials can be very misleading. The State is currently moving to improve the credentials of teachers, in part in response to the federal No Child

[3] For example, U.S. General Accounting Office (1995) states: "Based on estimates by school officials in a national sample of schools, we project that the nation's schools need about $112 billion to repair or upgrade America's multibillion dollar investment in facilities to good overall condition."

Left Behind Act of 2001, but the rigid standards suggested by the plaintiffs have little basis in existing evidence.

3. Centralized decision making involves substantial inefficiencies.

A running element of the plaintiffs' arguments is that much more decision making should be centralized with the State and that local decision making should be minimized. While the plaintiffs give lip service to some amount of local decision making, the general thrust of the arguments is to move away from whatever latitude districts currently enjoy. The State should – by plaintiffs' arguments – fund, monitor, and enforce a series of rules and resource allocations – thus eliminating local choices and decisions. There is a certain hubris in the confidence that the experts place in their own judgments about how to run the schools of the State. But on the policy point, it is sufficient to point out the heterogeneity of the State's population and the implications of this for individual districts. They would, in the name of equity, call for dismantling any set of local programs specifically tailored for their student populations whenever they did not meet to the grand rules that are proposed by the plaintiffs. At the very least, this would be a highly inefficient use of resources. In some cases, it would likely lead to setbacks in student achievement.

Because the details of how families and schools interact to produce student achievement are not well understood, it is not possible to dictate the "best" way or even an "appropriate" way to educate all children through intensive central regulation. Regulating the best inputs and processes for education implies considerable knowledge of precisely how various inputs affect student achievement. This is precisely what we do not have.

Centralized decision making also implies that the plaintiffs believe local conditions are relatively unimportant in making educational decisions. To the extent that local districts can identify special needs for their students, to the extent that they can devise local plans to deal with local problems, and to the extent that central authority has only limited information (as it necessarily does), centralized decision making necessarily leads to inefficient use of resources.

A primary, but generally unstated, reason that many support a centralized regulatory model generally appears to be a distrust of local districts to work in the interests of their students. But there is no evidence that local districts are malevolent. Nor is there any reason to believe that local districts, which include locally elected school boards and parental involvement, do not have the interests of their children at heart.

It might be possible to argue that some local districts do not have school boards or administrators that are fully knowledgeable about the best practices that should be applied. In such a case, however, the appropriate response is to provide the districts with better information. It is not to intervene with crude input standards. In fact, a substantial part of the accountability system is its role in alerting local districts for the need to improve in different dimensions. The State also attempts to provide districts with information about "best practices" in various areas and does provide targeted categorical aid to help with various potential concerns.

4. Variations in identified inputs, to the extent they exist, reflect local choices and decision making.

California has a system of school finance that is highly equalized, a result largely of decisions related to *Serrano v. Priest*. It is more equal than the vast majority of other states in the union. Moreover, much of the variation in spending that does exist reflects variation in federal funding (primarily Title 1) that is aimed at strengthening district responses to disadvantaged students.

If all districts are spending roughly the same amount, then variations in the specific allocations of resources must balance out. For example, if one district decides to have somewhat older textbooks than another, it has freed up some funds to spend more in another area. Given the equalization requirements that have resulted from the *Serrano v. Priest* cases, insisting that a district raise expenditures in one area (say, textbooks) is often tantamount to insisting that it lowers expenditures in another area. While this latter area is undefined – it may, for example, be teacher salaries, classroom aides, or lowered class size – the pattern of expenditures is currently a clear choice of the individual local district. Under the plaintiffs' proposals, such decisions would become much more a State function.

While the plaintiffs may believe that forcing increased expenditures in one area only makes districts better off, they ignore the overall finance system. Unless they wish to overturn the state constitutional provisions of Proposition 13 and the state court rulings in *Serrano v. Priest*, they must recognize that they are arguing for reducing the priority spending that the locally-elected school board and local administration of the district sets. Such an approach completely eliminates any local discretion and would move toward a complete State run system. No evidence suggests that this is a superior way to run schools, while substantial evidence suggests that such centralization is not good (Hanushek and others (1994)).

While it is possible that these arguments by the plaintiffs are simply a subterfuge for arguing that resources should be increased – presumably in districts that are not currently making spending decisions in line with the desires of the plaintiffs – such policies would conflict with court rulings in *Serrano*. It would also, to the extent that it required additional State appropriations, conflict with the constitutional role of the legislature.

5. Outcome incentives and school accountability is an appropriate policy for the State to pursue.

The absence of complete information about the determinants of student performance precludes efficient systems based on input regulation and input policies. At the same time, moving to measuring and rewarding student outcomes has considerable merit. Outcome based systems first and foremost focus attention on what we are concerned with – student knowledge and skills. This approach has been shown to be effective on a national basis (Hanushek and Raymond (2002a, (2002b)). Moreover, it opens the possibility for instituting better incentives within the system (Hanushek and others (1994)).

Even though improvements are almost certainly possible in all of the existing state accountability systems – including California's – there is no reason to believe that the existing systems hurt student outcomes.[4] To the contrary. The prior evidence suggests that even imperfect accountability systems lead to benefits for students.

The majority of researchers and policy makers have moved away from input based policies toward standards and outcome accountability. The reason this has swept the country and now dominates thinking about school policy is that the input approach has been shown to fail over and over again. A vast majority of past policy has involved the introduction of new and untested policies in a continual cycle of trying to dictate inputs and schooling processes to local districts. The plaintiffs' emphasis on input-based policies rests on the hope that these new renditions will be more successful than those of the past – but there is no reason to believe that.

It is also difficult to understand the source of the plaintiffs' apparent distain for concentrating on student performance. Student performance is rewarded in the labor market. Student performance affects the distribution of economic success in society. Student performance affects the vitality and growth of the Nation's economy. None of these are directly related to the inputs and school attributes identified by the plaintiffs. The alternative of an outcome focus, based on clear statements of objectives and direct measurement of success, has led to improved school performance in other states and mirrors successful decision making elsewhere in society and the economy.

6. The plaintiffs call for a new approach to school finance and policy that *requires* research breakthroughs.

As plaintiff experts Grubb and Goe (2002) make clear, the current knowledge does not support the input based system implied by plaintiff pleadings and expert reports.

[4] Some people have argued that high-stakes testing hurts students, but these arguments generally rely on flawed studies (see Raymond and Hanushek (2003)).

In their own words (p. 40), "If the "new" school finance is a particular perspective at this stage, rather than a set of concrete recommendations, how can it be useful?" Their specific response is to do the research required to support this radical system.

Moreover, their assessment of the current state of knowledge is also one of the many places where the various experts for the plaintiffs directly contradict each other. They suggest in a variety of places, for example, that the concentration on the three inputs – teacher credentials, facilities, and textbooks – is incomplete and naïve without more in-depth assessment of what goes on in classrooms; see, for example, the discussion of instructional conditions (p. 49-50).

The liability disclosure notes other states that have input requirements similar to those proposed by plaintiffs but makes no attempt to relate these to student performance. Many of the items have been previously researched – as noted above – but plaintiffs provide no reason to believe that these input-based approaches will be any different in the future.

Researchers have been pursuing this line of research since the Coleman Report in 1966 (Coleman et al. (1966)). They have been unsuccessful in the quest to identify and to describe the production function for schools. There is no reason to believe that the vague new research called for by the plaintiffs will be any more successful than the 35 years of prior research.

7. In summary, the plaintiffs' arguments offer little hope for any significant improvement in outcomes for students in California.

The plaintiffs provide a set of arguments that has been totally discredited by the scientific literature and by the facts. Further input-based policies are unlikely to improve student outcomes. If undertaken within the appropriations of the State and within the limitations of past policy initiatives (*Serrano v. Priest* and Proposition 13), they are likely to hurt student performance by eliminating local decision making. Even if we presume that it is appropriate (and constitutional) to override the decisions of the legislature and the votes of the citizens of the State, plaintiffs' proposals are unlikely to lead to improvements. Past performance of schools and prior research has shown clearly that simply mandating specific inputs is unlikely to improve outcomes.

The State currently is pursuing a series of policies that focus on student performance. This is a plausible and reasonable approach. First, past research does not given sufficient guidance to design specific input or process regulations that will ensure improvements in student outcomes. Second, past research has shown that states with a strong outcome orientation have enjoyed greater gains in student outcomes and skills than those that have ignored outcomes. Third, the accountability focus of the State has highlighted specific districts and specific student populations that are not being served well by the schools. This outcome orientation both puts pressure on underperforming schools and raises significant interest in improving the bad schools. The plaintiffs object to such an outcome focus, but it is not clear why they do so.

The input policies of the plaintiffs lack a scientific foundation and instead look like simple extensions of the failed policies of the past. There is little reason to believe that fully enacting their policies would lead to any significant improvements in student outcomes.

On the other hand, the focus on accountability for outcomes that the State is pursuing has been shown to lead to significant improvements in student achievement. While questions remain about the details of some of the State's accountability approach, the existing evidence suggests that this is a plausible and reasonable approach.

Table 1. Public School Resources in the United States, 1960-2000

	1960	1970	1980	1990	2000
Pupil-teacher ratio	25.8	22.3	18.7	17.2	16.0
% teachers with master's degree or more	23.5	27.5	49.6	53.1	56.2[a]
median years teacher experience	11	8	12	15	15[a]
current expenditure/ADA (2000/2001 $'s)	$2,235	$3,782	$5,124	$6,867	$7,591

Note: a. Data pertain to 1995. The statistical data of the National Education Association on characteristics of teachers was discontinued.

Source: U.S. Department of Education (2002)

Table 2. Percentage Distribution of Estimated Effect of Key Resources on Student Performance, Based on 376 Production Function Estimates

Resources	number of estimates	Statistically significant		Statistically insignificant
		Positive	Negative	
Real classroom resources				
Teacher-pupil ratio	276	14%	14%	72%
Teacher education	170	9	5	86
Teacher experience	206	29	5	66
Financial aggregates				
Teacher salary	118	20%	7%	73%
Expenditure per pupil	163	27	7	66
Other				
Facilities	91	9	5	86
Administration	75	12	5	83
Teacher test scores	41	37	10	53

Source: Hanushek (1997) (revised).

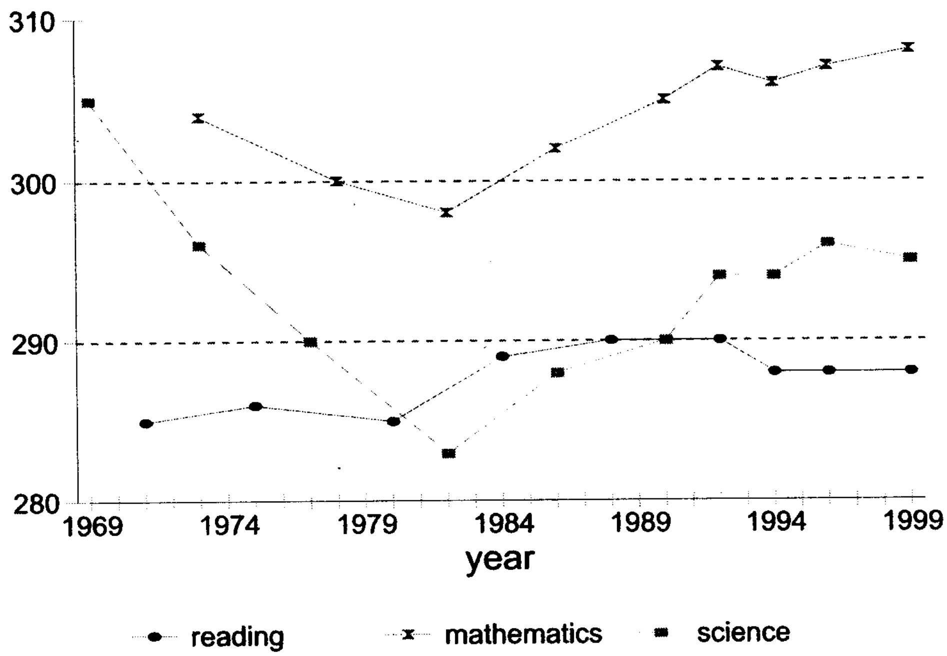

Fig. 1. Scores by 17-year-olds on National Assessment of Educational Progress, 1969-1999

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