Responding to the State's Expert Reports
Williams V. State of California

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EXECUTIVE SUMMARY

The State's experts have responded to the plaintiffs and their experts' initial reports with a set of 13 reports. Their collective response fails to address the fundamental issues of the case. This report responds by returning to the fundamental issues of the case and shows how the State's experts have avoided and/or distorted them. It exposes the narrow, misapplied, and/or irrelevant assumptions that permeate the State's experts' arguments, reveals empirical flaws in the evidence they offer, and explains mistakes they make as they critique the reports submitted by the plaintiffs' experts. The aim is not to provide a comprehensive review of each report, but rather to show fundamental errors that cut across their arguments and analyses and to provide specific examples of these errors. These errors, taken together, cast serious doubt on the accuracy, credibility, and usefulness of the entire set of State expert reports.

This report summarizes the plaintiffs' case and the responses offered by the State's experts. It identifies conceptual and empirical errors in the State's experts' framing of the case, and in their arguments and evidence. It considers five of the State's experts' most troubling errors, detailing how they distort the case and misrepresent the plaintiffs' concerns; employ faulty reasoning in their argument; and offer inadequate and inaccurate evidence. These errors include:

- Disregarding inequalities;
- Substituting overall school productivity for individuals' right to educational equality;
- Denying that teachers, textbooks, and facilities are essential;
- Claiming that California has "near state of the art" accountability policies that constitute a sufficient system of management and oversight;
- Distorting and offering irrelevant critiques of plaintiffs' recommendations for realizing equal opportunity.

The report also includes two appendices. The material in Appendix A responds to issues that are tangential to this case. Specifically, it responds to the State's experts' efforts to rebut the plaintiffs' arguments and evidence by comparing California with other states. Appendix B provides some detailed analysis of errors that the State's experts make in their analyses of teachers. Because the focus of my report is not on teachers specifically, I append these details rather than embedding them in the body of the report.

I. The plaintiffs' case

The *Williams* plaintiffs have identified qualified teachers, a sufficient supply of instructional materials, and adequate school buildings as the "floor" required to provide a basic and equal education to young people in 21st century California. That is, these are foundational elements of schooling, in part because they contribute to students' academic achievement. The plaintiffs also argued that the State's current policies have either created the problems, exacerbated them, or have allowed them to go unremedied. To remedy these problems and promote high achievement, they argued, the State must create and maintain an educational system that ensures that all students have the basic educational resources, conditions, and opportunities that the system now provides most students—i.e., qualified teachers, an adequate supply of instructional materials, and safe, healthy, well-maintained, uncrowded school facilities.

II. The State's response

The State's expert reports do not focus their attention on defending California's state educational system as meeting basic standards of equality in the distribution of teachers, instructional materials, and facilities. Instead, the State's experts try to discredit the plaintiffs' claim that California's state education system has deprived large numbers of its students of essential educational tools. They critique the evidence offered by the plaintiffs' experts; they offer some new analyses that they assert show that California has a sufficient supply of basic educational resources; and they offer some new analyses of the distribution of these essential tools among California's schools that they claim show basic equality. However, they do not counter the plaintiffs' claim that, although the State provides most California's students with these educational resources, it deprives significant numbers of students—disproportionately low-income, African American and Latino students—of them. The State's experts do not reject the plaintiffs' complaint that the State's current policies are unable to prevent or discover and correct basic inequalities in California's education system. In fact, the State's experts rarely address equality at all. They respond to the plaintiffs by reframing the case and avoiding this central issue.

III. Disregarding inequalities

Williams v. California is fundamentally about inequalities in the basic educational tools that California school children receive in their schools—qualified teachers, a sufficient supply of appropriate textbooks and instructional materials, and adequate school facilities. These inequalities are the immediate manifestations both of shortages of basic tools and the maldistribution of resources that the State makes available. Neither the shortages nor the maldistribution are neutral or natural occurrences that stem from the flaws or merit of the children themselves or their families or their communities; instead, the shortages and maldistribution stem directly and in predictable patterns from the State's education policies and other policies that affect education. The State's experts' fail to counter the plaintiffs' charge and the plaintiffs'

experts' considerable evidence that, although the educational system provides most California students with the fundamental tools of education, it deprives many students, primarily low-income students of color, of them. Their argument is flawed in the following ways:

- The State's experts pay little attention to the plaintiffs' concerns about inequality. Most of their argument and analyses attend to issues only tangential to this central issue of the case.

- By their own admission, some of the State's experts know little about the distribution of qualified teachers, appropriate textbooks and instructional materials in California.

- The State's experts who do look at inequality, do so inadequately. They offer analyses of the distribution of these essential tools. These analyses are filled with errors, omissions, and contradictions and that do not meet a minimum threshold for valid or credible research. Others expert trivialize the claim of inequality.

- The State's experts' efforts to disprove the claim of inequality often rests on their assertions and analyses that the proportion of students denied the essential tools of schooling is small. With such arguments they ignore constitutional protections that are afforded to all students, not just to most.

- Considerable new research supports the plaintiffs' experts' original reports and provides compelling new evidence that counters the State's experts' efforts to dismiss concerns about equality.

IV. Substituting overall school productivity for individuals' right to educational equality

The State's experts rely on a limited theory of educational improvement, and they use flawed analyses to support it. Considerable scholarship illuminates that the State's experts' approach is far too conceptually limited and methodologically inaccurate to guide California education policy or to judge the merits of the plaintiffs' case.

- The State's experts' view of how best to achieve high quality education contradicts the Constitution's guarantee of the rights of all students to education on equal terms. The State's experts assert that the only critical issue in the case is whether California schools are productive—that is, whether they efficiently increase *overall* standardized test scores or other proxies for achievement.

- The State's experts' claim, based on their flawed application of econometric methods and without evidence, that increased overall levels of school productivity can be achieved best through market mechanisms that set standards,

administer tests, and hold students and schools accountable through incentives, such as public rankings, rewards, and sanctions.

- Even if their assertion that overall levels of productivity are more important than individuals' rights to educational equality were correct, the State's experts' analyses are not. Their analytic strategies fail to account for the multiple goals of education and for the complex and non-linear dynamics of schooling. They mask important relationships that are relevant to this case—including the relationship between basic educational resources to educational quality.

- The econometric analyses on which the State's experts rely most—education production function analyses—can provide insight into the educational process. However this strategy is error-prone. To avoid the potential for error, analysts must be explicit about the assumptions built into the production function model, use high-quality data that capture the full range of relevant inputs and accurately measure the output of interest, and acknowledge that the result provides a partial and limited view of the complexities of schooling. The State's experts do not take these precautions.

- The State's experts' analyses in this case are flawed by the many errors to which this approach is vulnerable.

    - They rely on studies employing large data sets that have poor measures of school inputs;

    - They mask, rather than uncover, the relationships between inputs and outcomes;

    - They are limited to showing correlations among inputs and outputs. Unlike much stronger experimental research designs or in-depth qualitative studies, they cannot explain the nature of the relationships they do find;

    - They confound poverty with the lack of school resource that is associated with poverty.

- The State's experts use the same arguments and analytical approaches in this case that they have used previously. Their prior work has been widely criticized as conceptually and methodologically flawed by some of the nations' most prominent scholars, including leading economists who study education. These criticisms also apply to the State's experts' analyses in this case.

V. Denying that teachers, textbooks, and facilities are essential

The State's experts' argument goes beyond their failed attempt to show that disparities don't exist. They argue, also unsuccessfully, that qualified teachers,

appropriate instructional materials, and adequate school facilities aren't really essential. Then, they assert that, because they are not essential, the provision of these basic tools is not a problem that either the State or the court should concern itself with. Examining this argument carefully reveals the following:

- Contrary to the State's experts' assertions, the plaintiffs are pursuing this case to create conditions that make it possible for students to achieve, including achievement of the performance goals that the State has for them. The plaintiffs maintain that schools can and do matter—that California students' academic performance results from their participation in safe, uncrowded schools where they learn from qualified teachers and appropriate materials.

- To counter the plaintiffs' claim, the State's experts attempt to set an extraordinary burden of proof for the plaintiffs. Even if the case did hinge on whether increases in each of these educational basics will increase students' measured achievement demonstrably, no reasonable social scientist would agree to the standard of "proof" they say must be met.

- The State's experts spend a great deal of their energy attempting to show that the supply and distribution of qualified teachers, appropriate materials, and adequate facilities do not increase educational productivity—i.e., do not *cause* student achievement to rise. Therefore, their equitable distribution should not be of central concern.

- The State's experts rely on three flawed strategies in their attempt to prove that the plaintiffs' concerns about qualified teachers, appropriate materials, and adequate facilities are ill founded.

    - They use inappropriately the narrow and questionable body of research discussed in the previous section—principally reviews of production function studies—to assert that the most "scientific" research does not support that these schooling factors are essential.

    - They use these same narrow analytic tools in an attempt to demonstrate that increasing the supply of these three schooling factors wouldn't increase school productivity in California.

    - They argue that, even if these factors are of use in the schooling process, local management decisions rather than the lack of state-guaranteed resources underlies differences in achievement. Moreover, the presence or absence of these tools is also a function of these local choices, rather than insufficient state dollars.

- Finally, again using production function analyses, the States' experts lay the blame for low achievement on students' families and neighborhoods.

The State's experts make these claims because both their logic and their methods are flawed. They attempt to dismiss the obvious fact that qualified teachers, appropriate instructional materials, and adequate school facilities are the fundamental building blocks of schooling. They won't admit that, although the presence of these basic resources won't guarantee high quality schooling, creating high quality schooling in the absence of these resources is virtually impossible.

VI. Claiming that California's "near state of the art" accountability policies constitute a sufficient system of management and oversight

Given their reframing of the central issues of the case, the State's experts credit California's state accountability system with managing and overseeing schools in ways that promote productivity. This section examines this claim, and concludes the following:

- The State's experts' version of accountability is conceptually inadequate as a model for a state management and oversight of schools that ensures educational equality.

- The State's experts' claims about the current status and future of California's accountability policies are not credible because of the factual and methodological errors that pervade their analyses.

- The available empirical evidence provides no support for their claims that California's current accountability policies are "near state of the art." Some of their claims are simply assertions without supporting evidence. Some rely on a selective use of state comparisons consisting of ratings published in non-scholarly reports. Many of the studies the State's experts cite are not studies of test-based accountability. The studies that do examine the effects of test-based accountability do not provide positive evidence about California.

- The State's experts' claim about the positive impact of incentives on productivity is little more than speculation. Moreover, they err in failing to address the considerable risks to the plaintiffs caused by incentives in the absence of the necessary resources, capacity, and opportunity needed to gain the rewards of their hard work. Matched with undisputed inequalities, the State's incentives create a "no-win" scenario with destructive impact on the state's most vulnerable students. This is the central issue of the case. No matter how motivated, hundreds of thousands of California students remain deprived of the most fundamental resources of schooling—teachers, books, and safe, uncrowded schools in which to learn.

- Some of the State's experts know little about the accountability policies they defend and praise.

VII. Distorting and offering irrelevant critiques of plaintiffs' recommendations for realizing equal opportunity

I conclude the report with an analysis of the State's experts' strong objections to the plaintiffs' experts recommendations for remedying California's current unequal distribution of essential educational resources and for creating a State policy system that would prevent, or discover and correct future inequalities. These objections follow from the State's experts' view of overall levels of achievement (productivity) as the most valued aspect of schooling and of the means by which that productivity can be achieved best (test-based accountability with strong incentives). The following points stand out:

- The State's experts mischaracterize, even caricaturize, the plaintiffs' experts' recommendations for remedy. They assert that the plaintiffs' experts are opposed to educational goals and processes that the plaintiffs' experts actually support. They then proceed to critique the recommendations as they have mischaracterized them.

- Given the State's caricatures of the plaintiffs experts and their recommendations, it is necessary to set the record straight. The accurate and truthful positions are the following:

    - The plaintiffs' experts seek to increase students' academic performance.
    - The plaintiffs' experts support standards.
    - The plaintiffs' experts endorse accountability.
    - The plaintiffs' experts applaud efficiency.
    - The plaintiffs' experts seek good management.
    - The plaintiffs' experts support local community control and flexibility for local educators.
    - The plaintiffs' experts also believe that these can only be accomplished in a state system that ensures that all students are provided with the essential tools of education.

- The State's experts say very little about the relief that the plaintiffs' actually seek. Instead they fill the pages of their reports on matters unrelated to the plaintiffs' claims, and they respond to hypothetical and groundless problems.

- By calling the plaintiffs' recommendations failed input policies of the past, the State's experts circumvent the essential issues of this case. In fact, the State's experts express preferences for policies that continue to promote a highly centralized education system that could undermine local community control of schools, stifle professional decision making, impede good management, discourage parent involvement, undermine achievement, and excuse poor performance—all charges they level against the plaintiffs.

- Some of the State's experts are advocates for breaking the tradition of common public schools and replacing that tradition with privatization and competition.

Their arguments in this case are closely aligned with this agenda, and it may be that they frequently disagree with current State policy because it is contrary to these goals.

- The State's experts claim that the plaintiffs' experts' recommendations counter the will of the people as enacted by state government. In making this claim, the State's experts ignore the role of the judicial system to place checks on legislative overreaching. The three branches of government protect the plaintiffs' right to seek the court's intervention to secure their constitutional rights. They also are wrong about what the public prefers.

- The plaintiffs argue that qualified teachers, adequate materials, and safe and healthful facilities are essential. They also argue that it is the State's constitutional responsibility to ensure the equitable distribution of these resources to all children in the state. The State's experts concede, generally, that it is desirable for schoolchildren to have qualified teachers, adequate materials, and a safe and healthful facility for learning, but they reject the State's role in specifying and providing these essentials. As to the question of the equitable distribution of qualified teachers, adequate materials, and a safe and healthful facility, the State's experts say almost nothing at all.

In the end, the State's experts' argument would undermine the state's efforts to maintain and oversee a system of equitable public schools provided for in California's constitution and that have been the primary focus of California's State government for more than 150 years. In a 1925 article posted on the website of the Museum of the City of San Francisco, Will C. Wood, California State Superintendent of Instruction during the 1920s, provides this apt account of the centrality of public education to California's founding.

> "I regard education as a subject of particular importance here in California, from our location and the circumstances under which we are placed, the immense value of our lands and the extent and wealth of the country."
>
> So spoke Robert Semple, delegate from Solano county in the first Constitutional Convention of California, held in the quaint old city of Monterey in 1849. He was voicing the hopes and aspirations of hardy pioneers who had come "round the Horn," across the plains or over the Isthmus of Panama to lay the foundations of the first American state established on the shores of the Pacific.
>
> "I think," continued Mr. Semple, "that here, above all places in the Union, we should have, and we possess the resources to have, a well regulated system of education. Education, sir, is the foundation, sir, is the foundation of republican institutions; the school system suits the genius and the spirit of our form of government. If the people are to govern themselves, they

should be qualified to do it. They must be educated; they must educate their children; they must provide means for the diffusion of knowledge and the progress of enlightened principles."

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Williams v. State of California is grounded in two fundamental principles. One is that the State has a responsibility to ensure that every student has the essential tools of education.[1] The second is that, in California, education is a fundamental right that must be provided to all students on equal terms. These principles require the State to create and maintain a system of management and oversight that either prevents inequalities in the provision of the essential tools of education, or discovers and corrects inequalities that arise. The plaintiffs have charged, and their experts have provided a wealth of evidence, that California's educational system fails to fulfill this fundamental obligation.

The State's experts have responded to the plaintiffs and their experts with a set of 12 reports. These reports fail to address the fundamental issues of the case. They do not dispute the plaintiffs' charge that the State of California fails to provide equal education to all California school children. In fact, in the few instances where equity is addressed in these reports, the State's experts largely concede that inequalities do exist—including those claimed by the plaintiffs. They do not claim that the State's current policies are sufficient to prevent or discover and correct basic inequalities in California's education system. Instead, the State's expert reports take the narrowest avenues of argument, attempting to prove that providing the qualified teachers, [2] appropriate instructional materials, and safe, uncrowded facilities to all students is not a wise, necessary, or possible goal of state policy. Chief among the State's experts' arguments is that test-based accountability is more likely than qualified teachers, appropriate materials, or adequate facilities to cause increases in students' scores on standardized achievement tests—a statement that is unsupported by educational research.

This report responds to the State's experts. It returns to the fundamental issues of the case and shows how the State's experts have avoided and/or distorted them. It exposes the narrow, misapplied and/or irrelevant assumptions that permeate the State's experts' arguments, reveals empirical flaws in the evidence they offer, and explains mistakes they make as they critique the reports submitted by the plaintiffs' experts. The aim of this report is not to provide a comprehensive review of each report, but rather to expose fundamental errors that cut across their arguments and analyses and to provide specific examples of these errors. These errors, taken together, cast serious doubt on the accuracy, credibility and usefulness of the entire set of State expert reports.

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[1] As I note throughout this report, neither the plaintiffs nor their experts believe that the State must actually deliver these essential tools. That delivery might be accomplished best by local or regional entities (such as school districts or county offices of education), at the State's delegation. However, the State must have in place management and oversight policies that ensure that they are provided to all students, since its ultimate responsibility cannot be delegated.

[2] Throughout I use the term "qualified teachers" to refer to teachers with a provisional or clear California teaching credential.

Section I below reviews the approach the plaintiffs' experts have taken to address the central issues of the case. Section II summarizes the responses offered by the State's experts, and identifies conceptual and empirical errors in their framing of the case, and in their arguments and evidence. Sections III-VII consider five of the State's experts' most troubling errors, detailing how they distort the case and misrepresent the plaintiffs' concerns, employ faulty reasoning in their argument, and offer inadequate and inaccurate evidence. These errors include

- Disregarding inequalities;
- Substituting overall school productivity for individuals' right to educational equality;
- Denying that teachers, textbooks, and facilities are essential;
- Claiming that California's "near state of the art" accountability policies constitute a sufficient system of management and oversight;
- Distorting and offering irrelevant critiques of plaintiffs' recommendations for realizing equal opportunity.

In addition to showing how each of these errors represents a reframing of the case, faulty reasoning, and inadequate evidence, I provide specific examples of these errors from the State's expert reports.

I also provide two appendices. The material in Appendix A responds to issues that are tangential to this case. Specifically, I respond to the State's experts' efforts to rebut the plaintiffs' arguments and evidence by comparing California with other states. Appendix B provides some detailed analysis of errors that the State's experts make in their analyses of teachers. Because the focus of my report is not on teachers specifically, I append these details rather than embedding them in the body of the report.

My focus throughout is on the substance of the State's expert reports. Although the State's experts adopt an arrogant, disrespectful, and highly personalized tone when addressing the plaintiffs' experts' evidence, I do not respond to these comments. My view is that an aggressive posture inhibits, rather than advances, a thoughtful consideration of the issues in this case.

I. The plaintiffs' case

A. The complaint

In their complaint, the *Williams* plaintiffs identified qualified teachers, a sufficient supply of instructional materials, and adequate school buildings as the rock-bottom "floor" required to provide a basic and equal education to young people in 21st century California. That is, these are foundational elements of schooling, in part because they contribute to students' academic achievement. The plaintiffs do not argue that the presence of teachers, books, and decent school buildings guarantees high achieving schools; rather, that without them, local communities simply cannot create or maintain schools that provide students an education to which California's students have a right.

Without them, students can't achieve the educational goals that the State has for them, including, but not only, high academic achievement. The plaintiffs' chief complaint is that, although California's education system provides the basic tools of schooling to most students, it has neglected many others. Moreover, the State's low-income children, children of color, and children still learning English are deprived of these essentials more often than other children. Many suffer the cumulative impact of attending schools plagued by multiple problems over several years. These students' opportunities to realize the benefits of high quality schooling are severely compromised. The plaintiffs also argued that the state's current policies have created the problems, or exacerbated them, or allowed them to go unremedied. To remedy these problems and promote high achievement, they argued, the State must create and maintain an educational system that ensures that all students have the basic educational resources, conditions, and opportunities that the system now provides most students—i.e., qualified teachers, an adequate supply of instructional materials, and safe, healthy, well-maintained, uncrowded school facilities.[3]

B. The central issues

In his order of November 14, 2000, Judge Busch laid out the central issues of the case:

> The student Plaintiffs allege that they are required to try to learn under conditions that, accepting their allegations as true for purposes of the demurrer, include lack of sufficient textbooks, lack of sufficient trained teachers, and lack of adequate facilities. They further allege that other students at other schools do not suffer from these inadequacies, and that, therefore, they are denied equal protection, among other violations of law.
>
> The State of California has taken it on itself through its Constitution, statutes, and regulations to provide universal public education and to do so on a basis that satisfies basic standards of equality, among other legal requirements. That the State has chosen to carry out certain of its obligations through local school districts does not absolve the State of its ultimate responsibility. Butt v. State of California, 4 Cal. 4th 668, 685 (1992). Plaintiffs' allegations, if believed, would demonstrate that, despite the State's obligations with respect to public education, these plaintiffs do not enjoy the level of educational opportunity to which they are entitled (pp. 1-2).

And,

> The lawsuit is aimed at ensuring a system that will either prevent or discover and correct such deficiencies going forward. The specific deficiencies that take up so much of the Complaint are evidence of an

[3] These recommendations are outlined in my synthesis report that summarizes the collection of expert reports submitted by the plaintiffs.

> alleged breakdown in the State's management of its oversight responsibilities.
>
> . . . this case will deal with the oversight and management systems the State has in place to determine if they are legally adequate and whether they are being properly implemented.
>
> Of course, to carry out that inquiry, it will be necessary to know what systemic inadequacies Plaintiffs claim exist at the State level (pp. 2-3).

C. The plaintiffs' experts' analyses and evidence

Following from Judge Busch's articulation of the central issues of the case, the plaintiffs' experts addressed four fundamental questions in their reports:

1. Is it reasonable to characterize qualified teachers, appropriate instructional materials, and adequate school facilities as fundamental to education in 21st century California.

2. Is the state currently providing these educational essentials equitably?

3. Are the state's current policies adequate to prevent systematic inequalities in the provision of these essentials, or to discover and correct them if they arise?

4. Do there exist examples of state policy strategies for maintaining and overseeing a state educational system that would be more likely to prevent, or discover and correct, inequalities in students' access to fundamental elements of education?

Because California law has established that the State has ultimate responsibility for ensuring educational equality, the plaintiffs' experts did not argue whether the State or local districts should have that ultimate responsibility. Rather, they focused their analysis on whether basic equality exists and, if not, what might be done to provide a systemic, statewide remedy for an unequal state system.

To address whether qualified teachers, sufficient instructional materials, and adequate school facilities are fundamental elements of education, the plaintiffs' experts rely on academic research, educational and state leaders, and the State's own policies. All three of these sources of evidence attest to the criticality of these elements to education. Further, the plaintiffs' experts are mindful that the provision of these fundamental elements exists in the context of the state's movement toward a highly centralized, standards-based educational system with uniform accountability mechanisms. The successful implementation of education standards and accountability requires an equitable provision of the fundamental elements of education. Standards reform does not diminish or replace the need for educational resources and capacity, as the State's experts claim.

To address whether the state is currently providing these educational essentials equitably, the plaintiffs' experts use both new and existing data. They document that qualified teachers, appropriate instructional materials, and adequate school facilities are provided to most, but not to all, students in the state, and that the State's uneven distribution of these essential resources systematically disadvantages California's low-income children of color and those still learning English.

To address whether the State's current management and oversight of the educational system are sufficient to prevent or discover and correct inequalities, the plaintiffs' experts offer new and existing evidence about the efficacy of California's current education policies. They find flaws in the State's development and implementation of specific policies. They also reveal more fundamental deficiencies in how the State has conceptualized and enacted standards-based educational reform—the primary flaw being the failure to recognize the state's responsibility for ensuring that local schools have the capacity to educate their students.

Finally, to provide insight into how the State might craft policies that could prevent or discover and correct the systemic inequality that pervades the current system, the plaintiffs' experts offer principles to guide state policy. They argue that a combination of standards, capacity building, oversight and monitoring, and robust accountability can enable the State to either prevent, or discover and correct, shortages and inequalities. These principles are aimed at providing the basic resources that local educators and communities require to design local policies and practices that enable their students to reach the state's high content standards and score well on the state's assessments.

The plaintiffs also provide policy examples from other states. Notably, these examples are not posed as recipes that must be followed, nor are the states from which these examples are drawn offered as models that California should blindly imitate without consideration of its own context. Rather, they illustrate the feasibility of policies meant to prevent or detect inequalities such as those that plague California, and they furnish concrete instantiations of the principles that California's policymakers could follow to fulfill its responsibilities to provide equitable schooling.

II. The State's response

The State's expert reports do not focus their attention on defending California's state educational system as meeting basic standards of educational equality, in the distribution of teachers, instructional materials, and facilities, or in any other sense. Instead, the State's experts try to discredit the plaintiffs' claim that California's state education system has deprived large numbers of its students of essential educational tools. They critique the evidence offered by the plaintiffs' experts; they offer some new analyses that they assert show that California has a sufficient supply of basic educational resources; and they offer some new analyses of the distribution of these essential tools among California's schools that they claim show basic equality. However, they do not counter the plaintiffs' claim that, although the State provides most California students with these educational resources, it deprives significant numbers of students—disproportionately low-income, students of color—of them. The State's experts do not reject the plaintiffs' complaint that the State's current policies are unable to prevent or discover and correct basic inequalities in California's education system. In fact, the State's experts rarely address equality at all. As described below, they respond to the plaintiffs by trying to reframe the case and avoiding this central issue.

A. Reframing the Case

Instead of focusing on whether large numbers of California students suffer from educational inequalities and whether the State's management or oversight mechanisms are adequate to prevent, or discover and correct, them—the State's experts defend California's current educational system on completely different grounds. They argue that California's educational standards- and test-based accountability system is the best approach that the State could take to increase its overall educational productivity—i.e., realize higher overall achievement-test scores cost-effectively. They also assert that ensuring an equitable distribution of qualified teachers, instructional materials, and decent school facilities would not be a productive way to improve California schools.

The State's experts arrive at this conclusion because they rely exclusively on a limited theory of educational improvement—that effective and efficient production of achievement is a function exclusively of local educators', students', and families' motivation and efforts. This assumption eschews attention to other factors, such as educational resources, the effects of which they have been unable to document with statistical models that are themselves incomplete and based on faulty assumptions.

Arguing from this flawed theory, the State's experts assert that California's system of state tests, based on state content standards accompanied by sanctions for poor test performance, is sufficient to provide the incentives educators and students need to increase achievement. If these incentives prove insufficient, the State's experts argue that local educators and/or families and communities are to blame, rather than the lack of school resources or learning conditions—or anything else other than motivation. In fact,

they argue that providing additional basic resources such as teachers, instructional materials, and adequate facilities or managing such resources effectively would have little or no effect on students' learning. If schools enrolling similar students differ in the levels of achievement they produce, the state's experts assert that the fault lies exclusively with unmotivated teachers or faulty local management, rather that with any inequality in basic resources or learning conditions. Finally, they reject the proposition that the State is ultimately responsible for ensuring that local mismanagement not abridge students' educational rights. Thus they leave parents and students with no place to turn.

To mount this defense of California's current educational system, the State's experts need to shift the focus of *Williams v. California* from equality to overall educational productivity. Ignoring the massive amount of empirical evidence marshaled by plaintiffs' experts that teachers, textbooks and facilities matter to learning and achievement, the State's experts assert that unless the plaintiffs can use their chosen econometric methods to provide proof that teachers, instructional materials, and facilities actually *cause* higher overall levels of achievement—as measured by test scores—their concerns about shortages and inequalities are entirely misplaced. Higher test scores can be an admirable policy goal, particularly if the scores are indicators of meaningful learning and progress toward desirable educational ends. However, invoking the primacy of overall achievement, the State's experts dismiss the plaintiffs' arguments that State policies should ensure that all students have access to the basic tools of education that provide them with a meaningful opportunity to achieve well.

Labeling the guarantee of qualified teachers, sufficient materials, and adequate facilities, as advocacy for failed input policies of the past, the State's expert reports argue that such policies are unnecessary, unwise, and far too costly with no evidence to back up their claims. They claim that the State's attention to these issues would be potentially damaging to student achievement, professional authority, and to democratic local participation. Instead, they defend California's narrow focus on content standards, tests, and negative consequences for poor performance as far more likely than a focus on ensuring equality of meaningful learning opportunities to raise student achievement. Mounting this argument, however, the state's experts ignore a fundamental element of standards-based reform: standards and accountability are meant to drive investments in schooling and align resources with the higher expectations. Notably, in their argument against any State policies that manage and oversee the provision of appropriate resources and opportunities, the State's experts actually undercut many of the policies and values that the State itself has adopted (e.g., standards for certifying teachers, adopting textbooks, and certifying new school construction).

Finally, the State's experts argue that the plaintiffs have no reasonable basis for bringing their complaint to the court; and they accuse the plaintiffs of attempting to subvert democracy by seeking to install their own policy preferences over the will of the people of California.

B. Limited arguments and flawed evidence

The overly narrow view of education improvement and education research proffered by the State's experts not only distorts the fundamental issues of the case, it also prevents the State experts from offering a coherent counter-argument to the plaintiffs' claims and evidence. They dismiss all educational research that does not follow their preferred methods, asserting that studies from these other disciplines are unscientific. They accuse the plaintiffs' experts who draw on the breadth of this research of shoddy scholarship.

As I discuss in more detail in the remainder of this report, the State's experts' interpretation of academic research is extremely limited, and sometimes simply incorrect. They cite a narrow range of scholarship to support their claims, and they often fail to include important counter-evidence of their claims that appear in the sources that they do cite. In some cases, they ignore what they themselves have asserted in other contexts. (Reminded in their depositions of instances of their agreement with the plaintiffs' claims, some of the experts modified their reports' arguments.) They establish standards for evidence that most of their own analyses fail to meet. Some of them rely primarily on flawed techniques for their own data analyses, and, thereby, reveal little about the complex processes and outcomes of schooling. They often make serious errors in those analyses. They also misrepresent the data and analyses offered by the plaintiffs. These conceptual and methodological problems may result from the fact that some of the State's experts lack the expertise necessary to speak knowledgeably on the topics of their reports or about the case generally.

III. Disregarding inequalities

Williams v. California is fundamentally about inequalities in the basic educational tools that California school children receive in their schools—qualified teachers, a sufficient supply of appropriate textbooks and instructional materials, and adequate school facilities. These inequalities are the immediate manifestations both of shortages of basic tools and of the maldistribution of resources that the State makes available. Neither the shortages nor the maldistribution is a neutral or natural occurrence that stems from the flaws or merit of the children themselves or their families or their communities; instead, the shortages and maldistribution stem directly and in predictable patterns from the State's education policies and other policies that affect education. This section addresses the State's experts' failure to counter the plaintiffs' charge and the plaintiffs' experts' considerable evidence that, although the educational system provides most California students with the fundamental tools of education, it deprives many students, primarily low-income students of color, of them. The State's experts' response is flawed in the following ways:

- The State's experts pay scant attention to the plaintiffs' concerns about inequality. Most of their arguments and analyses attend to issues only tangential to this central issue of the case.

- By their own admission, some of the State's experts know little about the distribution of qualified teachers, appropriate textbooks and instructional materials.

- The State's experts who do focus on inequality do so inadequately. They offer analyses of the distribution of these essential tools among California's schools that are filled with errors, omissions, and contradictions and that do not meet a minimum threshold for valid or credible research. Others expert trivialize the claim of inequality.

- The State's experts' efforts to disprove the claim of inequality often rests on their assertions and analyses (usually incorrect) that the proportion of students denied the essential tools of schooling are small. With such arguments they ignore the fact that constitutional protections are afforded to all students, not just to most.

- Considerable new research supports the evidence provided in the plaintiffs' experts' original reports, and it also provides compelling new evidence that counters the State's experts' efforts to dismiss concerns about equality.

A. Little understanding of California's inequality

The State's experts' attempt to defend California's provision of basic educational tools must be seen in light of the fact that some of them—even some who report on this issue—appear to know very little about the distribution of teachers, materials, and facilities in California. Herbert Walberg, for example, admits in his deposition that he doesn't know whether California schools are adequately funded or have sufficient resources, or about California students' access to textbooks (Walberg Depo. pp. 658-59). Christine Rossell admits that she has no data on the quality of school facilities in any California school district (Rossell Report, p. 21). Margaret Raymond, when asked in her deposition if there is a significant equality issue in California, says that she cannot answer, and that she doesn't feel qualified to speak on these issues (Raymond Depo. p. 31). She says that she has no expertise on issues such as whether California experienced an uneven distribution of qualified teachers as a consequence of class size reduction (Raymond Depo. p. 62). When asked whether the State has an effective practice for measuring or enforcing students' access to instructional materials, Raymond responded, "I do not know enough about the State's policy to be able to speak" (Raymond Depo. p. 290). When asked whether the State has an effective practice for measuring or enforcing clean and decent facilities, she responded, "I'm not aware of programs operated by the State at this time that are highly influential on school facility conditions" (Raymond Depo. p. 291).

B. Scant attention to inequality

An indicator of how little attention the State's experts give to inequality can be found in the brief narrative summaries of the experts' reports that appear in counsel's Expert Witness Declarations that accompany the reports. Only four of the twelve

declarations—those preceding the reports of Drs. Ballinger (Decl. F. Virjee, p. 2), Berk (Decl. P. Salvaty p. 2), Kirlin (Decl. P. Savalty, p. 2), and Rossell (Decl. P. Salvaty, p. 2) include any reference to equality or inequality. Only three of those reports, Ballinger's, Rossell's, and Kirlin's, provide new analyses that attempt to show that California schools provide essential educational resources and conditions in ways that meet basic standards of equality. Despite repeated assertions that California schools are equal within acceptable and legal margins, these experts fail to provide evidence of such equality. The remaining experts relegate issues of inequality to the margins of the case or dismiss them altogether.

C. The State's experts who try, fail to disprove inequality.

- Defense counsel presents Ballinger's report as concluding "multi-track, year-round calendar students are afforded educational opportunities equal to those afforded traditional/single track calendars" (Decl. F. Virjee, p. 2).

- Introducing Rossell's report, defense counsel notes that "Professor Rossell addresses the arguments raised in several of plaintiffs' expert reports, including plaintiffs' claims that poor and EL students are disproportionately taught by teachers with emergency credentials" (Decl. P. Salvaty, p. 2).

- Kirlin's treatment of equity is portrayed as follows: "Dr. Kirlin analyzes the resources available to and used by districts and schools where plaintiffs are enrolled in comparison to other districts in California." (Decl. P. Salvaty, p.2).

- Berk's report is represented as showing that the Louis Harris survey that some of the plaintiffs' experts relied upon "fails to estimate disparities in the distribution of educational resources in California's public schools" (Decl. P. Salvaty, p. 2-3).

On closer inspection, however, none of these experts offers analyses that refute the claims that large numbers of California students lack sufficient textbooks, sufficient trained teachers, and adequate facilities, while most other students do not; and that California's oversight and management systems are insufficient to protect students from such inequality.

Charles Ballinger relies on a conceptual misunderstanding to assert equality. The flaws in Dr. Ballinger's analysis are detailed in a separate report, and I will not repeat them all here. In a nutshell, Ballinger masks inequality by incorrectly applying the general research on year-round education to the Concept 6 schools that are the focus of the plaintiffs' complaint. Because he does not look at Concept 6 schools as a distinctly different program from other multi-track programs, but instead subsumes Concept 6 within a broader category of "multi-track," he concludes that Concept 6 schools share some of the benefits attributed to other year-round calendars and that these schools create no particular disadvantages to students who attend them. Plaintiffs are seeking relief from schools that programmatically disadvantage them. These disadvantages do not "wash

out" simply because they are conflated with and statistically diluted by other evidence about programs that are very different but may share similar nomenclature.

In fact, Concept 6 schools operate on a fundamentally different calendar than other schools—including other multi-track schools. Concept 6 is not an educational reform: it is a desperate response to severe overcrowding that provides fewer annual days of instruction than any other school calendar. The Concept 6 calendar contributes significantly to students' disadvantage. The two California school districts still using the Concept 6 calendar would like to eliminate it in order to bring greater educational opportunity and improve student achievement. The Concept 6 calendar's utility in *housing* students in emergencies cannot justify its large-scale and long-term implementation as a means to *educate* students. I offer new evidence that supports each of these conclusions in my rebuttal report focused specifically on Concept 6 schools.[4]

Kirlin uses the wrong units of analysis to assert equality. Like Ballinger, Dr. Kirlin uses inappropriately inclusive units of analysis. He fails to disprove the plaintiffs' claim of inequality, in part, because he offers only district- and state-level analyses, ignoring the plaintiffs' concerns about inequality between *schools* and *students*—i.e., that large numbers of California students attend *schools* where they lack access to qualified teachers, sufficient materials, and adequate facilities. State and district-level data do not alone demonstrate equality or detect inequalities in what students experience. Although between district inequalities exist in California, and are larger than the State's experts imply, between-school inequalities can be more striking and consequential than between-district inequalities.

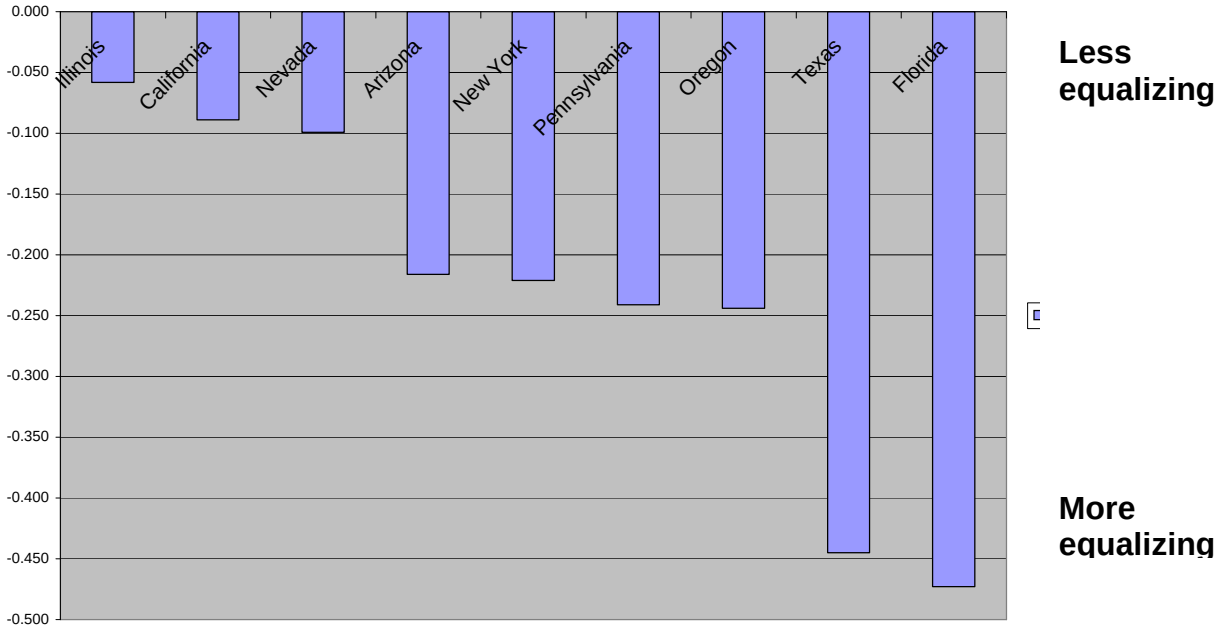
It is essential to underscore this deficiency in Kirlin's analysis: it is schools, not school districts where plaintiffs experience their educations. School district averages of qualified teachers, for example, often mask substantial disparities in the percentage of qualified teachers on the staffs of the districts' schools. This is particularly the case in large and/or diverse school districts, such as Los Angeles Unified School District or Oakland Unified School District. Facilities in one part of a district may be in quite different conditions than schools elsewhere in the same system. Again, Los Angeles Unified School District provides clear examples of such disparities. Kirlin's analyses don't allow us to examine such intra-district disparities. Gross inequalities could continue to exist and be undetected even if competent comparisons of relevant data showed two districts to be comparable or that California compares well to some other states.

For example, Kirlin glosses over significant problems in the between-state comparisons he uses to argue that there exists basic equality among California schools. For example, he asserts that the inequities the plaintiffs' claim are trivial because California was rated as a C+ on the equitable distribution of its between-district funding in the 2003 *Quality Counts* report published by *Education Week*. Kirlin uses this grade—average at best—as evidence of "California' success in targeting resources to

[4]Jeannie Oakes, *The Inequality of Concept 6 Schools: A Response to Charles Ballinger*, September 15, 2003.

higher need students" (Report, p. 10). However, Kirlin fails to acknowledge that California scores quite poorly on the *Quality Counts*' indicator that actually reports the relative degree to which the state targets state funding toward low-income communities. Figure 1 below shows that California ranks lower on this indicator than seven of the eight states that Kirlin identifies as comparable to California—doing only slightly better than Illinois, and significantly worse that several other of Kirlin's comparison states.

Figure 1. State's Targeting of Funds to High Poverty Districts
California Compared to 8 "Kirlin" States[5]



More significantly, California ranks a poor 34th on this measure.

Numerous fundamental errors mar Rossell's analyses. Rossell attempts to show that California schools are equal in the areas of the plaintiffs' complaint, but her attempts fail in several ways. First, Rossell's attempt to counter the plaintiffs' experts' evidence that poor students and English learners are less likely to be taught by less-than-fully certified teachers fails, in part, because she limits her analysis to a small fraction of California's less-than-fully certified teachers, and in part because her numbers are wrong. Second, Rossell's attempts to show an unproblematic distribution of the smallest of the four categories of less-than-fully-certified teachers—those holding waivers—must also be dismissed because her numbers are wrong. Third, like Kirlin, Rossell uses the wrong level of analysis to support her arguments that California schools are equal. Specifically, she attempts to show that schools are equally funded in California, based on her analyses

[5]*Quality Counts* derives the targeting score using multiple regression techniques to determine the extent to which district property wealth influences state aid, controlling for other factors that influence state funding, including student enrollment, physical size of districts, and the number on students in low-income families or in special education.

of the distribution of state funding to school districts. In sum, Rossell's chain of analyses attempting to show equality in students' access to qualified teachers begin with incorrect categories and inexplicable numbers that produce results consistent with those of the plaintiffs' experts. Using no stated criteria, she opines that findings that are significant are really not important. This is the jumping off point for a series of analyses that rest upon her initial confusion, inaccurate information, or uninterpretable results. I provide more details about the errors in Rossell's teacher analyses in Appendix 2.

In another analysis, Rossell attempts to counter the plaintiffs' claims of inequality by arguing that in 2001, the state's per pupil allocation to districts enrolling large numbers of low-income students (defined as the districts that fell in the bottom half of the distribution in terms of the percentage of students who qualify for free or reduced price meals) was higher than the per pupil allocation to districts enrolling mostly higher-income children (defined as districts in the top half of the distribution). Rossell's characterization of her comparison is troubling. Rossell misleadingly calls her analysis a comparison between high and low poverty schools, when what she offers is a comparison of the top and bottom halves of the districts in the states, based on their enrollments of students who qualified for subsidized meals. Finally, given that Rossell admits that her analysis tells us nothing about differences in spending among schools (Rossell Report p. 20), it's hard to know why she even included it.

Richard Berk doesn't attempt to prove equality. Dr. Berk's report only peripherally addresses the plaintiffs' charge of inequality. He offers a technical critique of the 2002 survey conducted by Louis Harris and argues that this instrument, isolated from the other evidence plaintiffs provide, does not on its own prove inequality. He does not seek to demonstrate that the inequalities that are the basis of the plaintiffs' claim do not exist, or that, by any criterion, equality does exist. He does not attempt to discredit the other evidence the plaintiffs' offer. In fact, Berk acknowledges in the final section of his report that, "There are surely schools in California whose educational infrastructure is unsatisfactory. And just as surely, many of those schools are in low-income areas" (Berk Report, p. 21). Ultimately, Berk's critique of the Harris survey fails because he provides no counter evidence. Certainly, Berk could have easily conducted a survey himself. He is well qualified to do so, and the State certainly has the access to schools and the resources a survey would require.

D. The State's experts trivialize inequalities

Only Ballinger, Kirlin, and Rosell offer new analyses of the plaintiffs' inequality claim, but they and some other of the State's experts simply trivialize the claim.

Eric Hanushek minimizes the plaintiffs' claim that the state has failed to ensure that all students have access to teachers who are fully certified by the state (Hanushek Report p. 14). He dismisses the plaintiffs' concern about instructional materials as limited to the fact that "a few districts may not have the most current textbooks" (Hanushek Report p. 13). Likewise, he trivializes the plaintiffs' claim that many students suffer from deteriorating, unhealthy, and overcrowded school facilities. Here, he

reframes the concern as being about the fact that school facilities are not “state of the art” (Hanushek Report p. 13). Nowhere do the plaintiffs ask for state of the art facilities, unless Hanushek believes that school buildings that meet basic health and safety standards and are not crowded far beyond their state-defined capacity are “state of the art.”

Thomas Duffy barely touches plaintiff’s expert Robert Corley’s assertions about the scope of the State’s facilities problems. He just makes vague assertions like "There is no doubt that the schools in California are not yet out of the woods” (Duffy Report p 21), and "To suggest that all is perfect is not appropriate" (Duffy Report p. 23). He never discusses, much less addresses any of the reports Corley relied on to demonstrate that there are schools in terrible shape.

Rossell also offers an analysis that dismisses the plaintiffs’ claim that Concept 6 schools place a significant number of California students at a greater disadvantage than other students. Rossell reports inexplicitly that the enrollment in Concept 6 and modified Concept 6 schools together represents only 11 percent of the state’s students. Perhaps Rossell sees 11 percent as a small fraction. However, in California, 11 percent is about 660,000 students—about the same number as the total student population of Kentucky, or South Carolina, or Oklahoma, and more than the student enrollments in 24 other states. She also claims, even more explicitly, that the low numbers of students affected mean that “Concept 6 is thus not widespread nor inevitable” (Rossell Report p. 23). Can it be that Rossell has not read the multiple statements from California State and local school officials that Concept 6 is a last-resort option for schools and districts? I provided examples of these statements in my plaintiff’s expert report on Concept 6 schools.

Margaret Raymond attempts to use the API scores at the named plaintiffs’ schools to show that, because some of the schools have API scores above the state average, they could not possibly suffer meaningful inequalities in teachers, instructional materials, or facilities (Raymond Report p. 12). In other words, Raymond is asserting that if these schools really had shortages of these basic resources, their test scores wouldn’t be that high. This is a puzzling logic, particularly from an expert who argues vociferously elsewhere in her report that qualified teachers, instructional materials, and facilities don’t really have an effect on student achievement. Raymond does not opine on how well students in these schools might be doing if they had equal access to the tools of learning.

E. Additional evidence of inequality

Given the State’s experts’ reports attack on the plaintiffs’ claims of inequality, it is useful to provide recent evidence that the pattern of inequalities revealed in the plaintiffs’ initial expert reports remain strong. Most of the evidence below about the uneven distribution of teachers, instructional materials, and adequate facilities has become available since the time that the plaintiffs’ expert reports were submitted to the court.

Large numbers of California students lack qualified teachers. The 2002 report from California's Center for the Future of Teaching and Learning (CFTL) makes clear that both the shortage and inequitable distribution of qualified teachers remains a serious problem, as does the most recent data from the California Department of Education. The CFTL reports that in the 2001–02 school year, there were almost 42,000 teachers who had not completed a teacher preparation program and did not have a preliminary credential issued by the state. This represented about 14 percent — one in seven — of all the public school teachers in California.[6] The CDE data for 2002-2003 show a worsening of these numbers. The number of less-than-fully qualified teachers jumped to 46,596, or 15 percent of the total teaching workforce.

Table 1. Credential Status of California's Teachers, 2002-2003

Teaching Credentials
State of California, 2002-03

	Number of Credentials[1]	Percent of Total
Full Credential	272,464	85.4%
University Intern	6,128	1.9%
District Intern	2,587	0.8%
Pre-Intern	9,548	3.0%
Emergency	26,061	8.2%
Waiver	2,272	0.7%
Total	**319,060**	**100%**

[1] Teachers may hold more than one credential.

Source: Educational Demographics Office, CBEDS (paift02 6/23/03)

More importantly, the distribution of underprepared teachers also has remained unequal. California's poorest and most vulnerable children are by far the most likely to face teachers with the least training and the least experience. While the 2001-2002 numbers show a very small improvement, it was the case that schools with the highest number of students of color (i.e., more than 75 percent) had more than one in five teachers who are underprepared, while schools with the lowest number of students of color had fewer than one teacher in 20 underprepared. Nineteen percent of faculty were underprepared in schools where between 76 percent and 100 percent of the students were eligible for free or reduced-price lunch.

[6]Center for the Future of Teaching and Learning. *California's Teaching Force: Key Issues and Trends 2002*. http://cftl.org/keyissues2002/notenoughteach/intro.html

The schools with the fewest fully credentialed teachers are also those with the lowest scores on the state's STAR test and on California's High School Exit Exam. As I discuss later in this report, the State's experts argue that this shouldn't matter, since their econometric analyses don't find that adding qualified teachers to a school's faculty will increase its test scores very much. What is undisputable, however, is that, in the words of the CFTL's report, "The sad truth is that those students who need the most help have the least-trained and least-experienced teachers to help them succeed in a system with very high stakes."[7]

A 2002 PPIC study of elementary, secondary and postsecondary education in the Central Valley paints a picture of disparities within the Central Valley consistent with the analyses the plaintiffs' experts offered in their initial reports. The study reveals disparities that negatively impact the Valley's large number of Hispanic students and, to a lesser extent, African Americans. On average, Central Valley Hispanic students were nearly twice as likely as the region's white students (11 percent compared to 6 percent) to be taught by a less-than-fully certified teacher. These disparities are a result, in part, of the varying ability of the Valley's four sub-regions to attract and keep qualified teachers. However, within regions, racial differences also occur, and whites in all four sub-regions were more likely than Latinos and Blacks to be taught by fully qualified teachers. Whites were also more likely than Asians to have fully credentialed teachers, although not by as large a margin.[8]

Large numbers of California students lack appropriate instructional materials. The Center for the Future of Teaching and Learning also provided us with unpublished data from their 2001 survey of a random sample of California teachers. These data corroborate those of the Harris survey. The Center asked teachers, "Do you have the following resources for your classroom?" Table 2 displays their responses.

[7] Center for the Future of Teaching and Learning, http://cftl.org/keyissues2002/notenoughteach/intro.html
[8] Anne Dannenberg, Christopher Jensen, and Pedro Cerdan, Student and School Indicators for Youth in California's Central Valley, San Francisco: Public Policy Institute of California, 2002.

Table 2. Teachers' responses to the question, "Do you have the following resources for your classroom?

		Yes	No	N
a.	A classroom that was built to be an instructional space	90.4%	9.6%	570
b.	Adequate classroom space for your class size(s)	79.8%	20.2%	571
c.	Up-to-date print resources (e.g., books)	81.1%	19.0%	571
d.	Enough print resources (e.g., books, photocopies) for every student in your class	75.4%	24.6%	572
e.	Internet connection in your classroom	62.3%	37.7%	571
f.	Access to enough computers that students can use for meaningful work	37.1%	62.9%	568
g.	A budget for supplies and resources for your classroom that you can spend at your discretion or the discretion of your instructional team	57.6%	42.5%	568
h.	A budget for professional materials (for your own use) that you can spend at your discretion or the discretion of your instructional team	36.2%	63.9%	566
i.	Adequate number of substitute teachers to cover absences	50.8%	49.2%	564
j.	A daily preparation period	53.0%	47.0%	568
k.	A quiet workspace for preparation	67.1%	32.9%	566

Source: Center for the Future of Teaching and Learning, unpublished data. (Weighted frequencies w/ sample size)

Most notable among these responses is that, as in the Louis Harris survey, large percentages of teachers report that they lack basic instructional materials. Here, even larger percentages of teachers than in the Harris survey report that they don't have enough print resources (e.g., books, photocopies) for every student in their class. A full quarter reported shortages.

The most recent report to the CDE about the educational system's preparedness for California's High School Exit Exam (CAHSEE) by the Human Resources Research Organization (HumRRO) provided an update on the extent to which the State's schools have, among other things, appropriate materials and resources to prepare students for success on the CAHSEE—recent textbooks, supplementary materials, as well as tools,

manipulatives, and technology.[9] ??Teachers were asked to indicate the extent to which the lack of materials and resources limited the overall effectiveness of a course they teach that covers the California content standards.

Table 3: High School Teachers Reporting That a Lack of Materials Limits the Effectiveness of their Content Standards-Related Courses[10]

	Lack of Materials	Frequency	Percent
Valid	1. Not at All	1822	49.75
	2. Slight	914	24.96
	3. Moderate	403	11.00
	4. Great	181	4.94
	5. Very Great	108	2.95
	Total	3428	93.61

[9] Human Resources Research Organization, Independent Evaluation of the California High School Exit Examination (CAHSEE): AB 1609 Study Report—Volume 1. California State Department of Education and California Department of Education, Sacramento, CA, May 1, 2003.

[10] Human Resources Research Organization, Independent Evaluation of the California High School Exit Examination (CAHSEE): AB 1609 Study Report—Volume 1. California State Department of Education and California Department of Education, Sacramento, CA, May 1, 2003.

Table 4: Feeder Middle School Teachers Reporting That a Lack of Materials Limits the Effectiveness of their Content Standards-Related Courses[11]

	Lack of Material	Frequency	Percent
Valid	1. Not at All	1152	56.06
	2. Slight	469	22.82
	3. Moderate	190	9.25
	4. Great	86	4.18
	5. Very Great	54	2.63
	Total	1951	94.94

These data show that, while most teachers (and, presumably, most students) have adequate materials to prepare for California's High School Exit Exam, many do not. Even if we consider only those who say the negative effect is moderate or great, a quarter of the responding high school teachers and 21 percent of teachers at feeder middle schools and junior highs report that a lack of materials limits the effectiveness of their teaching of the content standards.

Large numbers of California students attend school in unsafe and overcrowded facilities. In addition to the evidence of students' unequal access to safe and healthy facilities the plaintiffs' experts presented in their earlier reports, new evidence attests further of the problems. A 2003 report to the California Legislature by the Department of Health Services California Air Resources Board documents troubling environmental conditions in California's portable and regular classrooms. The Board found that, although classrooms and most schools have few problems, some suffer from very serious conditions. Among the problems the report cites are the following:

- The amount of outdoor air was inadequate about 40% of the time and seriously deficient for about 10% of classroom hours. Serious deficiencies have been associated with increased eye and throat irritation, lethargy, headache and other symptoms that are incompatible with an acceptable learning environment.

- 60% of teachers in portables indicated they turn off the ventilation system at times due to excess noise; 23% of teachers in traditional classrooms reported doing this.

- 27% of portables and 17% of traditional classrooms were colder than the standards suggest during the heating season. Some classrooms of both types also

[11] Human Resources Research Organization, Independent Evaluation of the California High School Exit Examination (CAHSEE): AB 1609 Study Report—Volume 1. California State Department of Education and California Department of Education, Sacramento, CA, May 1, 2003.

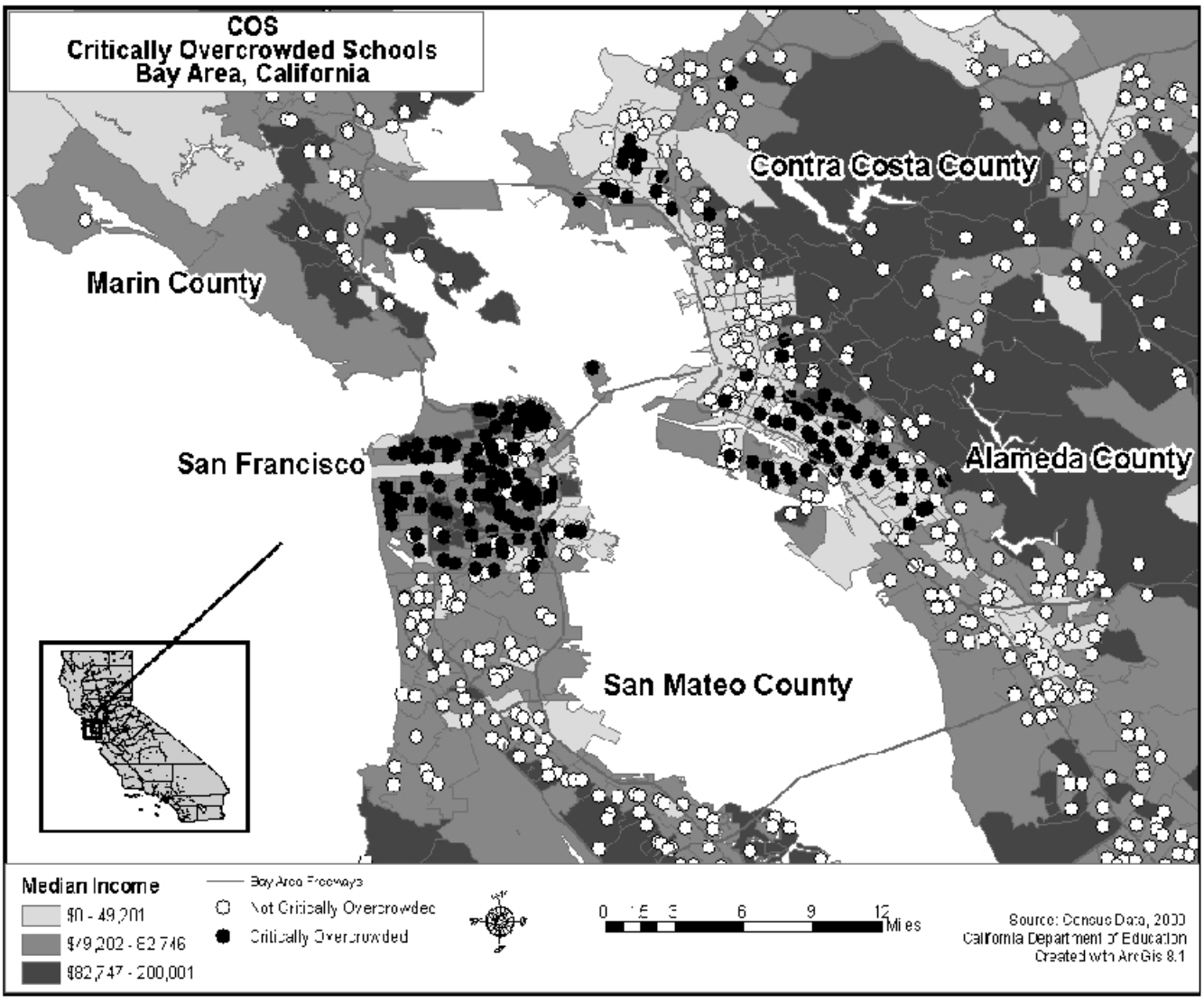
experienced temperatures above the standard range for acceptable indoor temperature during cool weather.[12]

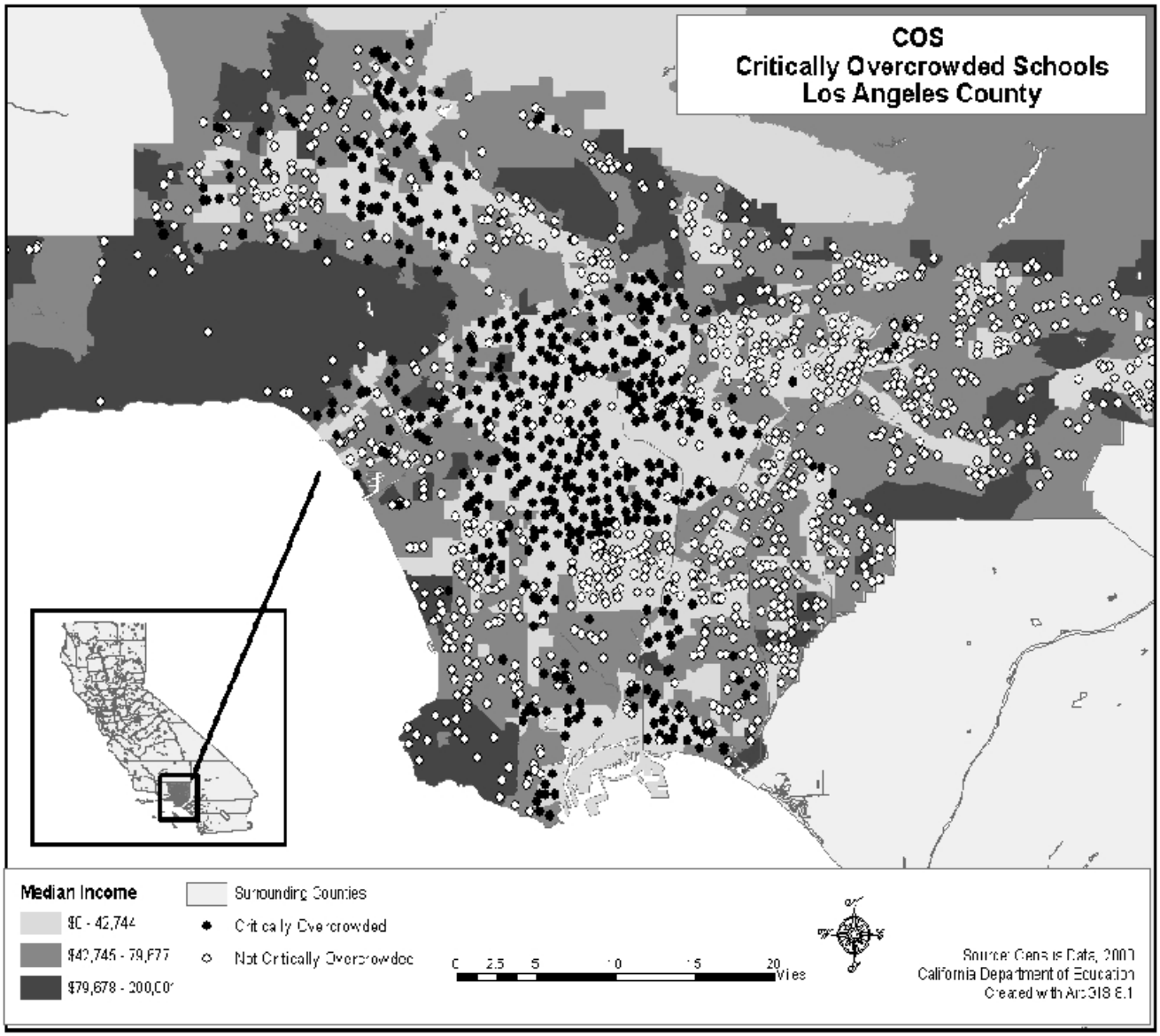
New data are also available that show that overcrowded schools are heavily concentrated in schools serving low-income communities of color. In 2002, Assembly Bill (AB) 16 created the Critically Overcrowded School (COS) program. The COS program allows qualifying districts to receive a four-year reservation of funds for school site acquisition and construction. The program is being funded by Proposition 47, passed by the voters on the November 2002 ballot. In order to be eligible for the COS program, a district must meet all other requirements of the School Facility program and have school sites with a student density in the school year 2001-02 greater than 115 kindergarten to sixth grade students per acre or 90 seventh to twelfth grade students per acre. Such schools are defined as "critically overcrowded."

As of April 2003, the CDE had identified 945 schools that qualify for this program. Notably, not all schools on multi-track, year round calendars—even those on Concept 6 calendars—are included on this list.[13] As illustrated on the maps that follow, this list provides compelling evidence that overcrowded school facilities are concentrated in low-income communities. To generate these maps, I combined CDE data identifying the schools with 2000 Census data reporting income levels of the neighborhoods in which the schools are located. The maps clearly show that COS and Concept 6 schools are concentrated in the lowest income communities in the Los Angeles basin and in the San Francisco Bay area.

[12] California Department of Health Services, California Air Resources Board, DRAFT Report to the California Legislature *Environmental Health Conditions in California's Portable Classrooms*, July 18, 2003, pp. 11-12.

[13] Recall that when districts accept operational grants to implement and maintain year-round calendars at overcrowded schools, the students who can only be housed in a school because of the move to the multi-track year-round calendar are no longer considered unhoused.


COS
Critically Overcrowded Schools
Bay Area, California
Contra Costa County
Marin County
San Francisco
Alameda County
San Mateo County
Median Income
$0 - 49,201
$49,202 - 82,746
$82,747 - 200,001
Bay Area Freeways
Not Critically Overcrowded
Critically Overcrowded
0
3
6
9
12
Miles
Source: Census Data, 2000
California Department of Education
Created with ArcGis 8.1



F. The State's expert reports circumvent an opportunity to consider the plaintiffs' inequality claim seriously

It is particularly important to place the State's meager consideration of inequality in the context of what its experts should have been able to do to shed light on the issue. After all, the State has access to incredible data collection resources and can freely compile information already collected by districts or access schools. But they did not. Instead, as noted above, the State critiqued the Harris survey on the narrowest technical grounds, as if the overwhelmingly confirming responses of more than 1000 California teachers collected by one of the nation's best known and respected survey firms could be so easily dismissed.

Finally, the State's experts also attempt to undermine the plaintiffs' claim of inequality by arguing that progress is being made, and that the State's test-based accountability policies will drive equity of the most important sort. I discuss the inadequacies of these arguments later in this report. It is useful, however, to note here how circular this argument is. The state argues both that schools are not inequitable now and that accountability measures will make schools less unequal.

IV. Substituting overall school productivity for individuals' right to educational equality

In this section, I review the State's experts' limited approach to understanding and achieving educational quality and the analytical strategies they use to support their approach. I also review the considerable scholarship that illuminates the State's experts' opinions, relying as most of the State's experts do, on this limited approach, which is far too conceptually inappropriate and methodologically inaccurate to guide California education policy or to judge the merits of the plaintiffs' case.

- The State's experts' view of how best to achieve high quality education contradicts the Constitution's guarantee of the rights of all students to education on equal terms. The State's experts assert that the only critical issue in the case is whether California schools are productive—that is, whether they efficiently increase *overall* standardized test scores or other proxies for achievement.

- The State's experts claim, based on their flawed application of econometric methods and without evidence, that increased overall levels of school productivity can be achieved best through market mechanisms that set standards, administer tests, and hold students and schools accountable through incentives, such as public rankings, rewards, and sanctions, without regard to equal access to basic resources.

- Even if the State's experts' assertion that overall levels of productivity are more important than individuals' right to educational equality were correct, the State's experts' analyses are not. Their analytic strategies cannot account for multiple valued educational outcomes or for the complex and non-linear dynamics of schooling. They mask important relationships that are relevant to this case—including the relationship between basic educational resources to educational quality.

- The econometric analyses on which the State's experts rely most—education production function analyses—can provide insight into the educational process. However this strategy is error-prone. To avoid the potential for error, analysts must be explicit about the assumptions built into the production function model, use high-quality data that capture the full range of relevant inputs and accurately measure the output of interest, and acknowledge that the result provides a partial and limited view of the complexities of schooling. The State's experts do not take these precautions.

- The State's experts' analyses in this case are flawed by the many errors to which production function analyses are vulnerable.

    - They rely on studies employing large data sets that have poor measures of school inputs;

- They mask, rather than uncover, the relationships between inputs and outcomes;

- They are limited to showing correlations among inputs and outputs. Unlike much stronger experimental research designs or in-depth qualitative studies, they cannot explain the nature of the relationships they do find;

- They confound poverty with the lack of school resources that is associated with poverty.

The State's experts use the same arguments and analytical approaches in this case that they have used previously. Their prior work has been widely criticized as conceptually and methodologically flawed by some of the nations' most prominent scholars, including leading economists who study education. These criticisms also apply to the State's experts' analyses in this case.

A. A Flawed Approach to Understanding and Improving Education

California's Constitution defines the purpose of education in California as the "diffusion of knowledge and intelligence" essential "to the preservation of the rights and liberties of the people."[14] And, it establishes that such an education is a fundamental right that must be provided to all students on equal terms.[15] Yet, the State's experts, relying on narrow and flawed analyses, trivialize basic educational opportunities and resources—instructional materials, qualified teachers, and adequate facilities—and lump them collectively with characteristics of students, their families, and their neighborhoods as "inputs." They claim, wrongly, not only that these particular schooling inputs do not matter, but also, that schools, in general, matter little. And still further, they argue that State policies intended to ensure that all students have basic resources would be counterproductive to good schooling—in terms of both quality and cost—degrading them repeatedly as "failed input-based policies of the past" (Hanushek Report p. 21).

The State's experts proceed as if the valued outcomes of schooling can be achieved through the application of a flawed approach to the improvement of schooling that they have been instrumental in designing—an approach that marries marketplace economics with psychological motivational theories that rest on little more than rewards and punishments—and then only for teachers, principals, and other school staff. They assert that the best hope for improving education is to establish incentives (rewards and sanctions) that will motivate educators, families, and students to overcome the obstacles to educational "productivity" in their local context. Notably absent from the categories of people to be motivated are those who control resources at the district and state level. In line with this narrow economic approach, the State's experts write their reports as if limited information about the causes of overall levels of student achievement gleaned from standardized tests should be the central focus of the case. Doing so, they eschew an

[14]California Constitution, Article IX, Section 1.
[15]Serrano v. Priest, 18 Cal. 3rd 728, 767-68 (1976); Butt v. State of California, 4 Cal. 4th 668 (1992).

emphasis on ensuring that all students have access to the conditions and resources essential to teaching and learning.

B. State's argument: Econometric "productivity" analyses should guide education policy decisions and the court's judgment in this case.

At the core of the State's experts' approach to understanding and improving education is the "production function" analysis. Economists for two hundred years have used production function analyses to produce a "function summarizing the process of conversion of factors into a particular commodity"[16]—in other words to describe with a mathematical formula the relationship of an output to its underlying inputs. In its general form, the production function is expressed as follows:

$$y = ? (x_1, x_2, ..., x_m)$$

The *y* is the commodity (or output) of interest, and the *x*'s are a series of factors (or inputs) that contribute to *y*'s production. The production function assumes that the more we use of each input (each *x*) the greater the output will be, and that we can quantify how much gain in the output (*y*) will be realized from each additional unit of an input (*x*)—the "marginal" return—when all other inputs (the other *x*'s) remain the same. Because the production functions specify both the combination of inputs that contribute to the production of the output and the marginal return of each of the inputs, producers can use them to inform their decisions about the most efficient way to get the greatest output. They will know which bundle of inputs (which *x*'s and what amounts of each *x*) will produce the greatest output. This is particularly useful when available budget is limited, since one would want to spend one's money on the bundle of inputs that will produce the greatest output for the money available.

In education, production function analyses have been used in the attempt to pinpoint statistically the impact of various features of students, schools, and teachers on outcomes (productivity) of schooling—that is, to specify an educational "production function." Defining productivity as increased achievement at the least cost, production function analyses use correlational or multivariate statistical techniques (usually regression) in the attempt to determine the relative contribution of various system, school, and student characteristics to measured achievement. Most often, such analyses seek to "predict" (in statistical terms) what incremental increases or decreases in students' achievement, as measured by test scores, would be produced if the amounts of other school and non-school factors were increased or decreased—that is, which educational investments and policies will get the biggest achievement bang for the buck.

Education production functions can provide insight into the educational process if they are explicit about their assumptions, use high-quality data that capture the full range of relevant inputs and accurately measure the output of interest, and acknowledge that the

[16] Paul A. Samuelson, Collected Scientific Papers, 1972: p.174 (http://cepa.newschool.edu/het/essays/product/prodfunc.htm#function).

result provides a partial and limited view of the complexities of schooling. As I detail below, this is not the case with the State's experts.

C. The State's experts' exclusive reliance on econometric analyses of school productivity limits their understanding of education

Several of the State's experts proceed as if production function analyses are the most, if not the only, trustworthy form of research to guide decisions about schooling. Educational economists Hanushek, Hoxby, Podgursky, Raymond, and Summers rely almost exclusively, here and elsewhere, on these analyses to examine which inputs (student inputs, family inputs, and school inputs) contribute to educational outputs, and how much each input contributes. Political scientist Rossell and educational psychologist Walberg also use them to inform their opinions in this case.

Hanushek, Rossell, and Walberg, for example, have used these analyses in several school desegregation cases to argue that it is minority students' poverty (a student "input"), not their lack of educational resources or opportunities (school inputs), that lie at the root of their low achievement and lack of school success. For example, Hanushek, as the State's primary expert witness in the St. Louis case, argued that his meta-analysis of 277 studies focusing on the relationship of class size (an input) to achievement (the output) proved that reducing class size would not lead to improvements in student scores. Although Hanushek had not studied St. Louis, he opined that it would make no difference if a class had 40 students to a teacher or 15 students to a teacher. His reasoning was that, since the production function did not show that reducing class size would yield marginal increases in test scores, the funds spent reducing class size in racially isolated schools in that city would be money wasted, and that class size could be increased without any harm to children.[17]

In this case, these experts use production function analyses to argue that the plaintiffs' complaints about inequalities in the distribution of teachers, instructional materials, and facilities should not be of concern to the court. Production function analyses, they argue, do not show that increases in these inputs will increase test scores. Therefore state policies that require all students be provided these "inputs" won't improve California's education system. However, in addition to the fundamental conceptual problem—that increased test scores are the ultimate indicator of school quality, and takes precedence over equal opportunity, the production function analyses on which the State's experts rely are flawed methodologically in several ways:

The State's experts dismiss a wealth of credible and useful knowledge about education from the fields of sociology and education research, and they assert that studies from these other disciplines are unscientific. Hoxby, in fact, argues in her report that qualitative research is not helpful for understanding the causes of achievement, implying

[17] Eric Hanushek, "Are Resources Important?" (Testimony of Eric Alan Hanushek, March 11, 1996), excerpted in William L. Taylor, Dianne Piché, and William T. Trent, The Role of Social Science in School Desegregation Efforts: The St. Louis Example, special issue of the *The Journal of Negro Education*Volume 66, Number 3 (Summer 1997).

that even rigorous anthropological and sociological studies are "anecdotal" (Hoxby Report p. 2). Hoxby sets out criteria for "good," "better," and "best," research that virtually eliminates all but econometric studies from consideration (Hoxby Report p. 2-3). Although she pulls back from this position considerably in her deposition (Hoxby Depo. pp. 534-535), this stance underlies her (and other of the State's experts') accusation that the plaintiffs' experts who draw on the breadth of scholarly research engage in shoddy scholarship.[18]

More problematic than the State's experts' narrow view of education research in general, and of the plaintiffs' experts in particular, their own near-exclusive reliance on production function analyses leaves the State's experts unable to either understand the complex dynamics of schooling or think comprehensively about how schools might become more equitable. Here, I review some particular problems with production function studies and show how these problems are evident in the State's experts' work.

An exclusive reliance on economic analyses ignores important educational goals. Production function methods are limited when isolated from other specific and contextual data to inform education policy. Because the technique can accommodate only one outcome, they force analysts to assume that there is only one desired educational outcome—academic achievement—and that outcome can be represented accurately by one metric—usually a test score. Academic achievement is an extraordinarily valued outcome of schooling, but reducing all of the valued outcomes of schooling to a single metric distorts the complexity of education. Production function analyses must ignore, for analytic purposes, that public schools do more than 'produce' achievement. They simply can't account for the fact that some fundamental educational inputs—even those that contribute to achievement—retain value beyond their contribution to measured outcome. For example, healthy and safe facilities, as the plaintiffs have shown, contribute to educational achievement. They also have considerable value independent of that contribution. As plaintiffs' experts Michelle Fine and Thomas Sobol demonstrate compellingly, schools are the primary context where young people first encounter the state. As such school conditions—including the conditions of facilities—contribute to the development of young people in ways that cannot be captured in a production function.

The State's experts' near exclusive use of econometrics to shape schooling policies requires that they focus on a single goal: increases in standardized measures of student achievement—most often tests. As such, their analyses cannot begin to portray how well schools are fulfilling the goals that the State sets for them that are not measured by its tests. David Monk, considered by many to be the leading U.S. scholar in the use

[18] Hoxby is particularly harsh in her criticism asserting that "Very little of the evidence [the plaintiffs' experts] cite would be publishable in any of the peer reviewed journals for which I provide reviews, and very little of it would be considered worthy of funding by organizations that use strong peer-review systems to evaluate proposals. This is the research they cite typically [sic] falls short of the standards that experts (peers) impose when they review work." (Hoxby Report p. 2). More than being insulting, Hoxby's assertion is pure nonsense. Most of the evidence cited by the plaintiffs' experts has appeared in peer-reviewed journals—some of it in the very top journals in education research—and much of the research has been funded with grants awarded by organizations that employ peer review.

of econometric models for studying education, expresses concerns about these limits.[19] He notes that educational goals and outcomes are multiple, jointly produced, and difficult to weigh against one another, and that they are not easily translated into a standard metric. He writes, "It is not at all obvious that educational phenomena can adequately be represented in a strict production function framework."[20] The State's experts give no indication that they attend to this concern.

Narrow economic analyses of schooling are blind to complex dynamics of schooling. Narrow economic analyses also treat schooling as if it is a black box, looking only at whether "inputs" produce "outcomes." They shed no light on the dynamic processes through which students, teachers, instructional materials that convey knowledge, and conditions of schools and classrooms work together to promote (or not) educational goals. Wenglinsky notes, for example, that, although large-scale quantitative research has studied those aspects of teaching that are easily measurable, such as teacher experience, scores on teacher tests, etc., these aspects tend to be far removed from what actually occurs in the classroom. To study whether teachers affect student learning, one must examine teachers' classroom practices and the kinds of training and support that are pertinent to these practices that teachers have received.[21] Notably, few, if any, studies using economic analyses include the curriculum and instructional factors that State expert Herbert Walberg cites as "indicators of school quality associated with achievement"[22]

Production function analyses also treat students as an undifferentiated mass. David Monk has also raised concerns about this limitation of production function analyses. Schools educate individuals. Individual students learn at different rates, at

[19]Monk, David H. (1992). "Education Productivity Research: An Update and Assessment of its Role in Education Finance Reform," *Educational Evaluation and Policy Analysis*, 14,4: 307- 332.
[20] Monk, Monk, David H. 1990. *Educational Finance: An Economic Approach*. New York: McGraw-Hill, p. 315.
[21] Wenglinsky, H. (2002, February 13). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives*, *10*(12). Retrieved 8-25-03, from http://epaa.asu.edu/epaa/v10n12/.
[22] For a recent example of Walberg's analysis, see Herbert J. Walberg, "Teaching Methods," in Lance T Izumi and Williamson M. Evers, eds., Teacher Quality. Stanford: Hoover Institution, 2002.

different times and in different arrangements. Conceptions of schooling that view educational productivity in the aggregate simply cannot account for these important dynamics. Monk argues that education productivity research has failed to consider the ways in which production in education is different from other kinds of production.[23] Researcher Benjamin Levin put it succinctly, "There may be, however, a fundamental problem with the production metaphor when applied to schooling. In a school, it is not evident what (or who) the raw materials are, nor who is doing the producing, nor what the product is. All of these problems are illustrated clearly when we consider the role of students in education."[24]

In contrast to the State's experts' near-exclusive reliance on production function analyses, the plaintiffs' experts use a broad mix of research to convey just this complexity. They do not attempt to show discrete causal links between isolated inputs and students' measured schooling outcomes. Rather, they marshal a body of evidence that, together, provides systematic substantiation of what most educators, parents, and students know from their own experience. Becoming educated requires, at the very least, that students' have access to the knowledge they are expected to learn, engage with others and materials that can make that knowledge accessible to them, and engage with that knowledge, those others and materials in a safe and healthy setting in which they can focus on the task of learning. California has established the parameters for these "floor" conditions by setting curriculum content standards, establishing teacher certification requirements, reviewing and adopting textbooks and instructional materials, and regulating new school construction. The evidence provided by the plaintiffs' experts is not meant to prove that each additional increment of these basics will necessarily have a measurable impact on California students' test scores, though in many instances it does. It is meant to support the State's own policies establishing them as an essential part of schooling in California.

Economic perspectives can misconstrue government's role in society. A more general concern, and one that helps explain the two education-related problems above, is that the use of economic frameworks and analyses confuses marketplace norms, values, and behaviors for the broader purposes and activities of society. State's expert John Kirlin, in a 1996 article, "What Government Must Do Well: Creating Value for Society," expressed his deep dissatisfaction with the tendency to undervalue "the large roles governments must successfully perform in providing the institutional framework for all human activity" (abstract). Kirlin cautions

> Some economists err by basing their analysis on an understanding of government developed to allow the application of tools of economic analysis. Their approach defines government as responding to market failures. This construction encourages seeing individual expression of preferences through markets as the preferred institutional design of

[23] Monk, David H. 1990. *Educational Finance: An Economic Approach*. New York: McGraw-Hill.
[24] Benjamin Levin, "Students And Educational Productivity, Education Policy Analysis Archives, Volume 1 Number 5, May 4, 1993, http://epaa.asu.edu/epaa/v1n5.html.

society, and suggest that efficient markets, at least of goods and services, can exist without governmental action (p. 168).[25]

D. The State's experts' reliance on econometric analyses in this case are too methodologically flawed to produce credible conclusions.

Although economic analyses can provide some insight about educational systems, the flawed approach to analyzing education and to informing education policy that the State's experts advocate is neither widely used nor highly regarded by most social scientists, or even by many economists. Since the early 1990s, for example, Eric Hanushek's analyses have been harshly criticized by some of the nation's most prominent scholars. Among those who have written peer-reviewed critiques of Hanushek's work include University of Chicago sociologist Larry Hedges[26], RAND economist, David Grisssmer[27], Princeton economist Alan Krueger, and Economic Policy Institute researcher, Richard Rothstein. These scholars' criticisms identify serious conceptual and methodological problems in Hanushek's macro-analyses and his reviews of production function studies that undermine both his general (and oft repeated) conclusion that resources do not relate positively to student achievement, and the related claims he makes in this case. I summarize briefly below the thrust of their arguments and evidence, since these problems undermine the analyses and conclusions he makes as an expert for the State.[28]

In their expert reports, many of the State's experts argue, as they have argued for years, that econometric analyses have failed to specify a robust production function for education that can inform policy decisions about the inputs that produce achievement.[29] They use this argument to denigrate the value of teachers, instructional materials, and facilities. Eric Hanushek is most notable for his reliance on production function studies. Hanushek has repeatedly used both aggregate analyses and reviews of empirical studies as the basis for his assertion that additional resources fail to improve educational productivity.

Inferring from macro-level trends. Hanushek argues that, nationally, real expenditures per pupil doubled between the late 1960s and the early 1990s, but student achievement remained stagnant. He infers from this analysis that, "The aggregate data provide a prima face case that school spending and school resources are not linked to

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[25]John Kirlin, "What Government Must Do Well: Creating Value for Society," *Journal of Public Administration, Research & Theory*, Vol. 6, No. 1 (Jan., 1996), 161-185.

[26] Hedges, L.V., Laine, R.D., & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23*(3), 5-14.

[27]David W. Grissmer, Ann Flanagan, Jennifer Kawata, Stephanie Williamson, *Improving Student Achievement: What State NAEP Test Scores Tell Us*, Santa Monica, CA: RAND, 2000. .

[28] In 1993, education researcher Jim C. Fortune detailed the following methodogical problems in Hanushek's studies: failure to disclosure the sample sizes in the studies he reviewed; inadequacy in size and representativeness of the studies he includes; misinterpretation of the results of the hypothesis testing; failure to use research that is not consistent with the ideas being promoted; and inadequate specification of the key variables.

[29]Hanushek, Eric A. "The Impact of Differential Expenditures on Student Performance," *Educational Researcher*, vol. *18*, 1989, no. 4, 45-52.

performance."[30] He repeats this argument in his report for the State in this case. Walberg and Hanushek both cite macro-level trends using international comparisons. Walberg claims, for example, that resources don't matter, given that the U.S. spends more on schooling than other countries, but realizes less in achievement productivity (Walberg Report p. 7). This analyses is irrelevant, particularly without any evidence about the costs of education resources elsewhere.

Critics have challenged Hanushek's interpretations of national trends, and strongly disagree with his conclusion that increased school spending is not related to increased student achievement. Princeton economist Alan Krueger has recalculated Hanushek's analyses of national trends, finding a very different result. Unlike Hanushek, Krueger finds that, even at this gross level of analysis, increases in educational spending are associated with increased achievement as evidenced by increases on the NAEP test at nine data points over the past 30 years. Krueger explains the divergence between his results and Hanushek's as a function of two of Hanushek's reporting decisions. First, Hanushek displays the change in NAEP scores over the past 30 years on a very wide scale—one that makes the actual changes in scores almost impossible to detect visually. Second, Hanushek only reports the change in 17-year-olds scores, the group that had the smallest increases (Hanushek Report p. 3). Krueger notes that if Hanushek had used the NAEP scores of 9-year-olds or 13-year-olds, he would have obtained a coefficient for the effect of spending 33 percent larger.[31]

Economic Policy Institute scholar, Richard Rothstein criticizes Hanushek's analysis of the national trends, claiming that he fails to adjust for changes in labor costs or account for the large proportion of additional funding directed to provide services to special education students. Since most special education students are not tested, any changes in their achievement are not reflected in the outcome measures Hanushek's uses to judge the efficacy of spending.[32] RAND economist David Grissmer argues that in the decades that Hanushek considers, most of the spending increases have been targeted to disadvantaged students. Therefore, an appropriate analysis of whether the additional funding has increased achievement should focus on these students. Grissmer's own analyses find that during this period, substantial gains occurred for both Hispanic and black students and for lower-scoring white students. Grissmer suggests an alternative explanation to Hanushek's claim that resources don't matter. That is, that additional resources matter most for minority and disadvantaged students but may matter much less, if at all, for majority students and those from more advantaged families. [33]

Inferring from meta-analyses of production function studies. Hanushek's meta-analyses of production function studies, beginning in 1986, juxtapose James Coleman's,

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[30]Eric Hanushek, "School Resources and Student Performance," in Gary Burtless, ed., *Does Money Matter: The Effect of School Resources on Student Achievement and Adult Success*. Washington, D.C.: Brookings, 1996, p. 51.
[31]Alan Krueger, "Reassessing the View that American Schools are Broken," *Economic Policy Review*, March 1998, pp. 29-44.
[32]Richard Rothstein and Karen .H. Miles *Where's the Money Gone: Changes in the Level and Composition of Education Spending.* Washington, DC: Economic Policy Institute, 1995.
[33]Grissmer et al., 2000.

et al.'s 1966 study, *Equality of Educational Opportunity* with analyses drawn from a wide variety of published studies. In 1986, he concluded that, "Variations in school expenditures are not systematically related to variations in student performance" and that ". . . schools are operated in an economically inefficient manner." Hanushek also argued that "increased school expenditures by themselves offer no overall promise for improving education" and that "school decision making must move away from the traditional "input directed" policies to ones providing performance incentives."[34] Hanushek has published updated versions of this analysis repeatedly, the one he cites here is a 1997 analyses including 376 production function analyses from 89 publications. His conclusion has remained the same.[35]

Walberg also repeatedly reviews the research on the impact of various school and classroom factors. This work led him to develop an "educational productivity" theory. Walberg concluded that seven of the nine "productivity factors" that he has identified involve neither the quality nor the quantity of education, but are "out of school" factors—personal characteristics (ability, chronological development, and motivation) and psychological environments (home life, the classroom social group, the general peer culture, and television viewing). Only two have to do explicitly with instruction: the quality of teaching and the amount of time students are engaged in learning. Walberg concludes that educators can alter none of the most important productivity factors, since they are related to the intractable connections between social class and achievement.

Both Walberg and Hanushek insist in this case, as they have in many other places, that there is no credible evidence that schooling resources, such as credentialed teachers, textbooks, facilities, and class size, contribute to the production of educational achievement. Hanushek's report repeats this claim, "This quest to identify and quantify the effects of resources has generally failed" (Hanushek Report p. 2), arguing that "[I]ndeed, many of the central theories and arguments advanced [by the plaintiffs] are directly contradicted by extensive research into the determinants of students achievement" (Hanushek Report pp. 1; 2-4).

Raymond, Podgursky, and Summers all rely on Hanushek's analyses as the basis of their own opinions. Some simply reiterate his conclusions, but provide no new analyses of their own. Caroline Hoxby displays a chart of the analyses that Hanushek reviews in a 2002 paper, and she repeats his conclusion, "There is *inherently* no set of inputs that can make a public school good" (emphasis in the original) (Hoxby Report p. 4). Put bluntly, the State's experts argue that differences in educational resources have no bearing on the considerable variation in productivity among schools. On the other hand, they argue that students' background characteristics, particular socio-economic characteristics (race, social class, parents' education level), have an extraordinarily powerful effect. (I review these arguments in more detail later in this report).

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[34] Eric Hanushek, "The Economics of Schooling: Production and Efficiency in Public Schools." *Journal of Economic Literature* 24 (September 1986):1141-1171.

[35] Hanushek, Eric A., "Assessing the Effects of School Resources on Student Performance: An Update." *Educational Evaluation and Policy Analysis.* 19 (2), 1997, pp. 141-164.

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Flawed methods result in inappropriate analytic models and statistical procedures. The State's experts' conclusion that resources don't matter has been contested by social scientists and education researchers who argue that flaws in production function studies obscure rather than illuminate important relationships between schooling inputs and outcomes. Hanushek's work has drawn particularly strong criticism, both for its almost exclusive reliance on production function studies and for methodological problems in the way he conducts meta-analyses of these studies.

In 1994, University of Chicago sociologist Larry Hedges and his colleagues conducted a sophisticated meta-analysis of all seven cost variables investigated by Hanushek, correcting for some of the problems in Hanushek's methods, to determine their relationship to student achievement. Hedges' findings, published in *Educational Researcher* under the title "Does Money Matter? A Meta-Analysis of Studies of the Effects of Differential School Inputs on Student Outcomes" strongly contradict those of Hanushek. Hedges found that an increase in per pupil expenditure of five hundred dollars was associated with a nearly 24 percent (.7 standard deviation units) increase in student achievement compared with similar students in a school that did not receive an increase in per pupil expenditure. They found an even bigger increase in student achievement from investments in teachers' salaries. [36]

In 2000, Krueger reanalyzed the studies included in Hanushek's 1997 article that reviewed 227 analyses from 55 studies. In contrast to Hanushek, Krueger concluded that a positive relationship exists between resources and outcomes. He criticized Hanushek's inclusion and equal weighting of multiple measurements from single published studies. For example, Krueger notes that Hanushek included up to 24 separate measurements from a single study, treating them as different analyses because the study presented separate results for many subgroups. Krueger noted that because the average sample size declined as the number of subgroups increased, many of the measurements lacked the statistical power to detect policy-significant effects. As a result, they yielded many insignificant coefficients. Krueger's reanalysis shows that Hanushek's inclusion of these multiple measurements significantly affected his conclusions, and that if less weight is placed on these multiple measurements, the result supports an overall positive relationship between higher per-pupil expenditures and lower pupil-teacher ratios and student outcomes.[37]

Most significantly for this case, David Grissmer and his RAND colleagues, conducted an extensive new review of the non-experimental studies (including Hanushek's) and experimental studies of the impact of resources on student outcomes,

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[36] Hedges' criticism and Hanushek's reponses can be found the in the following series of acticles: Hedges, Larry V., Laine, Richard D., & Greenwald, Rob. (1994). Does money matter? A metaanalysis of studies of the effects of differential school inputs on student outcomes. *EducationalResearcher, 23*(3), 5-14; Hanushek, Eric A. (1994). Money might matter somewhere: A response to Hedges, Laine, and Greenwald. *Educational Researcher, 23*(4), 5-8; Hedges, Larry V., Laine, Richard D., & Greenwald, Rob. (1994). Money does matter somewhere: A reply to Hanushek. *Educational Researcher, 23*(4), 9-10.

[37] Alan Krueger, "Economic Considerations and Class Size," Working Paper #447, Princeton University, Industrial Relations Section, September 2000, www.irs.princeton.edu/pubs/working_papers.html.

and concluded that the impact of resources is generally positive. To pursue this line of analyses further, Grissmer and his colleagues examined state-level National Assessment of Educational Progress achievement data in light of data about different levels of per-pupil expenditures and different policies that have significant resource implications. These included those resources that Hanushek and others often cite in their studies (teacher experience, degrees, and salaries, teacher-pupil ratios, etc.). Their analyses yielded robust, positive findings about the potential of states' increased expenditures for improving achievement, particularly if it is targeted at schools with disproportionately large numbers of minority and low-income students. That is, they found that higher levels of resources have been most effective for minority and disadvantaged students; resources directed toward more-advantaged students have had only small, if any, effects. The most effective types of resources identified by the RAND group were lower teacher-pupil ratios, higher pre-kindergarten participation, lower teacher turnover, and higher levels of teacher-reported adequacy of resources for teaching. Notably, they found the very large gap in achievement between Texas students and California students with similar backgrounds to be the result of much lower teacher-pupil ratios, larger percentages of children in public pre-kindergartens, and teachers with more resources for teaching in Texas.[38]

The fundamental problem here is that the production function studies that are the basis for Hanushek's conclusions often obscure the very relationships between schools and achievement that the State's experts are attempting to explain. I describe these problems briefly below, and in the next section of this report, I show how they mar fundamentally the State's experts' analyses for this case.

- ***Fails to detect "threshold" or "tipping point" effects***. In some cases, a resource will have no discernable impact on achievement until a "floor" or threshold is reached. In 1979, education researchers Bridge, Judge, and Mook provided a useful "threshold effect" analogy: "Throwing a bucket of water on a raging fire will not keep a building from burning to the ground, but no one would argue on the basis of this experience that water has no value in fire-fighting. The value of water is apparent only when enough is applied to overcome the fire by reducing the heat below a critical point, degrading the fuel, or temporarily removing the air needed for combustion. An analogous situation often occurs in education."[39] Indeed, this pattern emerges throughout the State's experts' analyses, as they consistently, look only at the ineffectual "buckets" to demonstrate how little the State can do to put out the fire. As I detail later in this report, the State's experts'

[38] Grissmer, 2000.
[39] Bridge, G.R., C.M. Judd, and P.R. Moock, The determinants of educational outcomes: The impact of families, peers, teachers, and schools, Cambridge, Mass., Ballinger Publishers, 1979.

analyses of the impact of teachers only consider the potential impact (the "marginal returns") of making small, incremental increases in the proportion of qualified teachers at low-income, minority students' schools, and they make no attempt to understand how student achievement might be improved if such schools actually had high proportions of qualified teachers.

- ***Artificially isolates factors that have a combined impact in the real world***. Econometric analyses treat each feature of schooling as if it has an effect independent of other factors, estimating the contribution of each factor in isolation of the others. So, for example, analyses of the effect of teachers' backgrounds and qualifications on achievement are considered separately from the resources, conditions, and practices in the schools in which they teach. Thus, for example, it allows for no positive synergy when highly qualified teachers teach in well-resourced schools with reasonable class sizes, lots of experienced knowledgeable colleagues, and so forth. Conversely, it cannot reveal how even well qualified teachers are constrained in schools where the conditions are so difficult (large class sizes, materials shortages, overcrowding, few knowledgeable colleagues) that they are unable to teach effectively. We see this problem in the States' experts analyses as they attempt to show, for example, that increasing the proportion of credentialed teachers in low-income students' schools would not increase achievement. As I detail in Section VI in this report their analyses make no effort to examine how teacher effects on low-income children might be different if their schools were not also plagued with resource and facilities problems. In fact, the analyses they cite don't even measure the effect of most of these schooling factors.

- ***Allows some factors to "explain" outcomes when, in fact, other factors actually share the credit or blame***. Related to the point above, some important relationships between student characteristics, school resources, and outcomes disappear in the conduct of production function analyses because student characteristics and school resources are highly correlated. School effects often involve a multi-step process, in which one school characteristic influences another that may, in turn, influence the outcome of interest. Regression techniques, in particular, are not adept at measuring how the interrelationships among independent variables impact achievement. This means that, one—usually students' characteristics—gets the full credit for the effect that both should share. Consider the case where students' race, social class, and percent of qualified teachers at their school, for example are highly related to one another, as well as to students' achievement outcomes. The analysis is likely to find that students' social class and race explain their current achievement outcomes, and that teachers matter little, even though race and social class may have their "effect," at least in part, by attracting or repelling qualified teachers from particular schools.

In 1993, education researcher James C. Fortune showed how Walberg's failure to address the problems created by the order in which analysts enter variables into regression equations undermines Walberg's analysis of the three-way relationship among socio-economic status, school size, and educational expenditures. Walberg's regression model enters socio-economic status as the first predictor of students' test performances, size as the second prediction variable, and finally expenditures as the third predictor variable. The amount of variance (or "explanation") shared by socio- economic status and size and the amount shared by socio-economic status and expenditures are only presented as the amount explained by socio- economic status; the amount of variance shared by size and expenditures is attributed to size alone. This strategy leaves very little variance to be explained by expenditures. Thus Walberg's conclusion that resources don't matter is a function of his analytic strategy, rather than a representation of any reality. Fortune concludes that if Walberg had entered the variables in a different order, he would have produced a very different result."[40]

- ***Can't account for prior cumulative effects of resources on achievement***. Production function studies often bury the effect of school resources on achievement by controlling for students' prior achievement. Doing so, they assign the impact of all of a student's earlier schooling experiences to a student characteristics, his or her previous test scores. So, to use the example above once again, consider the case where students' background characteristics, their prior achievement scores, and percent of qualified teachers at their school are all highly related to one another, as well as to current student achievement. The analysis is likely to find that students' background characteristics and prior achievement explain their current achievement outcomes, and that teachers matter little. However, such an analyses would obscure the fact that students' prior achievement was, at least in part, related to the percentage of qualified teachers at

[40] Jim C. Fortune, "Why Production Function Analysis is Irrelevant in Policy Deliberations Concerning Educational Funding Equity," Educational Policy Analysis Archives, Vol. 1, No 11, November 2, 1993, http://epas.asu.edu/epaa/v1n11.html..

a school. By burying this impact in a statistical control for "prior achievement," the analyses diminish the real impact of the percent of qualified teachers.

- ***Uses levels of aggregation that fail to detect important relationships at other levels***. Relationships can also be masked by the level of aggregation that studies use—i.e., whether studies measure relationships at the state, district, school, classroom, or students level. For example, Professor Gary Ritter—the analyst whose research provides the basis for much of State expert Anita Summers's report—cautions that, "when production functions are based on aggregate units of analysis such as schools or even districts, the estimation does not account for the substantial internal variation within the schools or districts. Thus, important aspects of educational productivity, such as what happens at the classroom level, might be overlooked."[41]

  A new study by Jennifer King Rice analyzes a broader set of empirical studies that conform to a variety of accepted methodological approaches and use a range of measures of teacher effectiveness. She also carefully disaggregates the studies by important contextual factors. She finds that the effect of teacher characteristics is obscured when teacher effects are aggregated across grade levels, subject areas, and student populations. Her more refined analyses show that a particular teacher attribute (e.g., a subject-specific master's degree) may be an important predictor of teacher effectiveness in some contexts (e.g., high school math), but may not matter in other contexts (e.g., first-grade reading). This careful disaggregating of to the context of teaching, wherever possible, helps to tease out some effects that might otherwise go undetected.[42]

  Another recent, more carefully done study, by economist Julian Betts and his Public Policy Institute of California research team found that teacher qualifications tended to have less overall impact on learning because they affected elementary and secondary school students differently.[43] Specifically, teachers' holding of advanced degrees and having teaching experience was more strongly related to students' achievement in secondary schools than in elementary schools. Betts told an *Education Week* reporter, "[t]he message we seem to be getting is, different types of spending matter differently at different levels of schooling."[44]

  The new Betts study may have given State expert Hanushek second thoughts about his prior work. He told the Education Week reporter, "I think what we're

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[41] Ritter, Gary, "Notes on School Funding Litigation and the Effectiveness of Education Spending: What Does the Literature Tell Us?" http://policy.uark.edu/ritter/school-finance-litigation.html, last visited August 22, 2003.

[42] Jennifer King Rice**,** *Teacher Quality: Understanding the Effectiveness of Teacher Attributes*, Washington, DC: Economic Policy Institute, 2003.

[43] Julian Betts, Andrew C. Zau, and Loren A. Rice, *Determinants of Student Achievement: New Evidence from San Diego*, San Francisco: Public Policy Institute of California, 2003.

[44] Debra Viadero, "Study Evaluates Peers' Effect on Achievement," *Education Week*, September 10, 2003.

starting to do is find that schools and teaching are a lot more complicated than we had thought in the past—at least from a policy standpoint."[45]

- ***Omitting key input variables from the analysis***. In some cases, the most critical variables are not even included in the analysis, and, therefore, their relationships with the outcome of interest are not even considered. As a hypothetical example, consider how one might misconstrue a case in which minority children went to schools with leaky roofs, and majority children went to schools with roofs secure against the elements. Would it be reasonable to argue that race was the reason why children under the leaky roofs got wet and the others didn't, even if the production function analysis revealed that getting wet was strongly predicted by minority status. Of course not. There is an intervening variable—secure roofs—that was obscured by the analysis that could ensure that nobody would get wet. As will become clearer later in this report, the schooling resources of most interest in this case have rarely been included in production function analyses. In this case, the important input variables left out of the studies the State's experts use to argue against the plaintiffs' case are the very schooling factors that are the focus of the plaintiffs—fully credentialed teachers and appropriate instructional materials.

- ***Definition and measurement problems mask relationships***. Harold Wenglinsky, from the Educational Testing Service, among others, notes that which variables are included in an analysis and the way they are specified also can mask relationships. This can be a problem with all the variables in production function analyses, since analysts often have inadequate data about much of what they'd like to study,[46] and David Monk argues that "the seriousness of the problems surrounding the identification of outcomes and inputs for educational production functions make it difficult to believe that existing production functions have captured all of the effects of resources."[47] Dollars spent are the most obvious and

[45] Eric Hanushek, as quoted in Debra Viadero, "Study Evaluates Peers' Effect on Achievement," *Education Week*, September 10, 2003.

[46] For example, the percentage of students on free or reduced price meals is a crude proxy for the percentage of poor students at the high school level, since it often underestimates the number of low-income students. This is because many high school students who qualify do not sign up for the program because of the stigma associated with it. Nevertheless, it is usually the best measure of student poverty that is available.

[47] Monk, David H. 1990. *Educational Finance: An Economic Approach*. New York: McGraw-Hill, p. 332.

the most often included in production function analyses, but how those dollars are spent is far more important. Production function analyses rarely include the full range of resources. Former Assistant Secretary of Education, Marshall Smith notes that production function analyses rarely include measures of school characteristics and processes that other research has shown to increase achievement.[48] For example, while considerable research has established that teachers' content knowledge and skillful engagement of students in particular types of learning activities promote achievement, teacher quality is most often measured in the production function analyses on which Hanushek and others rely with crude proxies such as teachers' verbal ability (often measured by their scores on the Scholastic Aptitude test in high school) or by whether they have masters' degrees.

As critical is that the outcomes of schooling are defined and measured inadequately. Wenglinsky points out that the outcome measures themselves are often highly questionable. Many production function studies use quite unsophisticated achievement measures. Some do not use achievement measures at all, but used proxies (such as graduation rates). Some use measures as simple as whether a student passed a minimum competency test.[49] Marshall Smith observes, in fact, that

> the most common dependent measures in education production function research is largely independent of the instructional and curriculum content in any particular school, district, or state. . . . In the language of systemic school reform, if the dependent variable is not aligned with the teaching and learning going on in the school. It is no wonder that it does not pick up variations in school resources.[50]

Smith also notes, that given the insensitivity of the outcome measures used to differences in school resources, it is not at all surprising that a long series of analyses that depend on such measures, beginning with James Coleman's 1966 study and including most of those relied upon by Hanushek and others for their conclusions, end up using students' out of school experiences—especially those linked to social class and community opportunities—to explain differences in their achievement.[51]

The direction of causality may actually be reversed. Production function analyses may actually identify effects as causes and the reverse. For example,

[48]Marshall S. Smith, Brett W. Scoll, and Jefferey Link, "Research-Based School Reform: The Clinton Administration's Agenda," in Eric A. Hanushek and Dale W. Jorgenson, *Improving America's Schools: The Role of Incentives*, Washington: D.C. National Academy of Science, 1996.
[49] Howard Wenglinsky, How Money Matters, Princeton, NJ: ETS, 1997.
[50] Smith, et al, 1996.
[51] Smith, et al, 1996.

> federal and state policies often target additional resources for schools with the most challenging teaching conditions—e.g., large number of special education students, English learners, and low-income students. However, studies that fail to account for policies where the spending is targeted to special needs may conclude erroneously that the schools' additional resources simply didn't make a difference in students' achievement. At worst, these analyses may reverse the direction of causality, and fail to note that the schools' low achievement actually triggered the additional flow of money, rather than the reverse.[52]

Does this mean that production function analyses are useless? Acknowledging the significance of David Monk's 1990 analysis, University of Arkansas Professor Gary Ritter concludes the following:

> The challenges facing productivity research can be responded to in one of three ways, as categorized by Monk. First of all, the worst response is to assume away all the problems and proceed with the analysis. The most common response is to point out the problems to the reader and then proceed with the analysis with several caveats. According to Monk, "the third and most defensible approach is to view the research as being at the earliest of stages where it is premature to derive policy implications. The numerous difficulties associated with specifying the model must be resolved before a definitive assessment can be made of how serious the technical inefficiency problem is. Moreover, there is still the possibility that there really is no such thing as an educational production function."[53]

Wenglinsky, similarly, concludes that the major problems with most production-function studies make it nearly impossible to draw any solid conclusions from them. [54] (Although, as we see in the next section of this report), Wenglinsky provides an example of a production function study that avoids most of the methodological pitfalls that shows, in context, how well-prepared teachers matter. Ritter cautions, "Surely, there are various methodological and identification problems which afflict this line of research," and that "the conclusions of production function research for education are the source of much controversy."[55] Without doubt, the problems noted above eliminate many production-function studies, including many of those on which Hanushek and other State experts rely from Hoxby's categories of good, better and best research (Hoxby Report pp. 2-3).

E. State's Argument: Lacking a robust education production function, incentives provide the best means for enhancing productivity

[52] Smith, et al, 1996; Alan Krueger, 1998.
[53] Gary Ritter, "Notes on School Funding Litigation and the Effectiveness of Education Spending: What Does the Literature Tell Us?" http://policy.uark.edu/ritter/school-finance-litigation.html, last visited August 22, 2003.
[54] Wenglinsky, 1997.
[55] Ritter, 2003.

For the State's experts, "good" schools are "productive" schools. Because they conclude from their production function analyses that specific school resources, policies, or practices don't increase students' measured achievement, the State's experts turn to other explanations for how schools might become more productive. Here, with no empirical findings to guide them, they speculate: The problem is not a lack of resources, but rather how the available resources are used. For example, Hanushek has accompanied his "resources don't matter" findings with the conjecture that resources do not impact achievement because the absence of appropriate incentives within the public education system does not motivate schools to use resources effectively and efficiently.[56] He, and other of the State's experts, theorize that productivity is a function of something ephemeral in the local conduct of schooling—processes that can't be measured—that they variously call management (Hoxby) or operational factors (Raymond). Hoxby argues, in fact, that incentives promote good management—that is, the effective use of resources—thereby fixing conditions that drive good teachers away (Hoxby, Report p. 4; 27).

The State's experts invoke another economic principle to explain why achievement has remained low, and what might spur greater educational productivity—the power of incentives to shape behavior. They argue that the bureaucratic structure of the educational system and the lack of performance incentives have prevented schools from using resources effectively. Walberg, Hoxby, Hanushek, Raymond, Podgursky, and Summers all hypothesize that the right performance incentive schemes, without the addition of new resources, will release the local creativity and effort it takes to make schools productive (Hanushek Report pp. 10, 18). The schemes they recommend reward schools for reaching student achievement goals and sanction those that fail; link educators' hiring, promotion and firing decisions to students' achievement outcomes; award or deny high school diplomas to students based on their demonstrated achievement of particular outcomes; establish choice programs that put schools at risk of losing students by allowing parents to send their children elsewhere if schools don't perform. Without such schemes, they argue that additional money spent on education will be wasted. Such incentive schemes remain untested in the context of schooling, and there is strong evidence that the conditions under which incentives may work in other settings are not present in education, let alone in resource- and capacity-poor states like California. The negative consequences of educational incentives, particularly in circumstances like those in California, may far outweigh any potential for increased achievement.

However, the State's experts' enthusiasm for California's current standards-based reform must be placed in the context of the rest of their scholarship and advocacy. Several of the State's experts—notably, Hanushek, Hoxby, and Walberg have made clear that the most promising reforms, in their view, are ones that inject marketplace competition into the educational system through choice and privatization.[57] One may

[56] See, for example, Eric Hanushek, "Outcomes, Costs, and Incentives in Schools ," in Eric A. Hanushek and Dale W. Jorgenson, *Improving America's Schools: The Role of Incentives*, Washington: D.C. National Academy of Science, 1996.

[57] Eric Hanushek, "Applying Performance Incentives to Schools for Disadvantaged Populations," *Education and Urban Society*, 29(3), May 1997, pp. 296-316, p. 312; Caroline Minter Hoxby, "Are

well wonder why these experts don't make such recommendations in the context of this case, since they have argued strongly elsewhere that privatization and competition would be most likely to increase productivity.

In sum, the State's experts' flawed economic argument goes like this: Average levels of educational productivity is the only schooling outcome that warrants intense scrutiny. Production function analyses provide no evidence that additional school resources increase productivity, particularly for low-income students and students of color whose background characteristics have such an overwhelmingly negative influence on their achievement. Consequently, inequalities in the distribution of school resources should not be troubling, and the State should not focus its policies on equalizing these resources. In fact, doing so would drive up costs unnecessarily. Rather, the State's job should be to set goals for educational productivity and create performance incentives that spur local educators to reach those productivity goals. Of course, they are wrong.

Efficiency and Equity in School Finance Substitutes or Complements? *Journal of Economic Perspectives*, vol. 10, no 4 (Fall 1996), pp. 51-72, p. 70; Herbert Walberg, "School Choice Works," Stanford: Hoover Institution Weekly Essay, April 21, 2003 (www-hoover. Stanford.edu/pubaffairs/we/2003/walberg04.html).

V. Denying that teachers, textbooks, and facilities are essential

> It simply cannot be the case that experienced teachers are important if it is possible to identify cases where they've not influenced the outcome of students. (Raymond Depo. p. 66)
>
> Though inconvenient, students can share books, use copied materials or Internet resources, wear coats in cold classrooms, or use a restroom on another floor. (Philips Rept. p. 75)
>
> I have toured many hundreds of schools in California over the last three decades and I have never seen a public school in California whose facilities were so bad that children could not learn in them. (Rossell Rept. p. 22)

The plaintiffs' experts provide evidence that, although California's educational system provides most students qualified teachers, appropriate instructional materials, and adequate school facilities, its system of management and oversight fails to ensure that all students have these basic educational tools, and, in fact, substantial numbers of California students don't have them. The plaintiffs also argue that the State's management and oversight mechanisms cannot prevent these problems, detect them when they arise, or intervene in ways that correct them. As I clarify in other sections of this report, the State's experts attempt unsuccessfully to show that disparities don't exist. But, their argument goes further. They argue, also unsuccessfully, that qualified teachers, appropriate instructional materials, and adequate school facilities aren't really essential. Then, they assert that, because they are not essential, the provision of these basic tools is not a problem that either the State or the court should concern itself with. Examining this argument carefully reveals the following:

- Contrary to the State's experts' assertions, the plaintiffs are pursuing this case to create conditions that make it possible for students to achieve, including achievement of the performance goals that the State has for them. The plaintiffs' maintain that schools can and do matter—that California students' academic performance results from their participation in safe, uncrowded schools where they engage with qualified teachers and appropriate materials for learning.

- The State's experts' efforts attempt to set an extraordinary burden of proof for the plaintiffs. Even if the case did hinge on whether increases in each of these educational basics will increase students' measured achievement demonstrably, no reasonable social scientist would agree to the standard of "proof" they say must be met.

- The State's experts spend a great deal of their energy attempting to show that the supply and distribution of qualified teachers, appropriate materials, and adequate facilities do not increase educational productivity—i.e., cause student achievement to rise—and are therefore meaningless in regards to the legal rights of all students to have these resources.

- The State's experts rely on three flawed strategies in their attempt to prove that the plaintiffs' concerns about qualified teachers, appropriate materials, and adequate facilities are ill founded.

    - They use inappropriately the narrow and questionable body of research discussed in the previous section—principally Eric Hanushek's reviews of production function studies—to assert that research does not support that these schooling factors are essential.

    - They use these same narrow analytic tools in an attempt to demonstrate that increasing the supply of these three schooling factors wouldn't increase school productivity in California.

    - They argue that, even if these factors are of use in the schooling process, local management decisions, rather than the lack of state-provided resources underlies differences in achievement. Moreover, the presence or absence of these tools is also a function of these local choices, rather than insufficient state dollars.

- Finally, again using production function analyses, the States' experts lay the blame for low achievement on students' families and neighborhoods.

The State's experts make these claims because both their intentions and their methods are flawed. They attempt to dismiss the obvious fact that qualified teachers, appropriate instructional materials, and adequate school facilities are the fundamental building blocks of schooling. They won't admit that, although the presence of these basic resources won't guarantee high quality schooling (including high achievement), creating high quality schooling in the absence of these resources is virtually impossible. Making this argument, the State's experts ignore the fact that California's current state policies have made perfectly clear that the State believes that qualified teachers, appropriate instructional materials, and adequate school facilities are very important. Governor Davis' September 2003 signing of AB 1124, a bill seeking to ensure that schools provide all students with safe and clean bathrooms is only the most recent example. Davis noted, "Clean and working facilities are elements of a well-run school and important to student health."[1] State policies set rigorous standards that specify the characteristics of qualified teachers, appropriate instructional materials, and adequate school facilities; and California's education system now provides these essentials to most students in the state. The issue in this case is not to determine whether these educational tools are important—the State itself has already done that. The issue here is to determine whether the State's system of educational management and oversight is adequate to ensure that students have access to these educational basics on equal terms. That they do not is well documented in the plaintiff's expert reports.

[1]"Governor Davis to Sign Clean School Bathroom Bill—09-10-2003," press release from the Office of the Governor, www.governor.ca.gov/state/govsite/

A. An unreasonable standard of proof

The State's expert's use of narrow economic approaches also may explain their conviction that the plaintiffs' case can not be taken seriously by the court unless the plaintiffs' establish independent causal links between qualified teachers, appropriate instructional materials, adequate school facilities and student achievement. Of course, such a burden implies that the only aspect of value in schooling is achievement test scores. In fact, the plaintiffs have provided considerable evidence from studies using a range of accepted methods that support relationships between the essential elements of schooling that are the focus of this case and students' outcomes.

For example, Caroline Hoxby writes, "If the State is to succeed by pursuing input policies, *it must establish that the relationships between inputs and student performance are causal*: (emphasis in the original). (Hoxby Rept. p 2), and " . . . the plaintiffs also must demonstrate that the relationship they highlight are [sic] *causal* if the appropriate remedy is a series of input policies" (Hoxby Rept. p. 3).

Margaret Raymond sets an even higher bar. She asserts, "Even if the input standards proposed by plaintiffs do impact student achievement, the burden would still rest with them to prove that these factors were the most significant drivers of student outcomes and, therefore, worthy targets for limited educational resources. . . . that the magnitude of the effect was larger than other potential factors" (Raymond Rept. p. 8). She claims, "if the three inputs at issue in this case were essential, then it would not be the case that students and schools could overcome the odds of not having them" (Raymond Rept. p. 11), and that such factors can't be considered important if there are "cases where students do well where the factor is scarce" (Raymond Rept. p. 6).

Raymond's logic is akin to saying that it simply cannot be the case that seat belts are important if it is possible to identify cases where they've not influenced the outcome of a car crash. One might equally make the claims that (a) a road is safe to drive on if some drivers (not necessarily *most* or a majority) can get to their destinations without incident; (b) poorly stored food is safe if a few people can overcome the microbes and not get sick from eating it; or (c) high quality military equipment issued to all soldiers is not imperative since not all ill-equipped soldiers will be killed.

Further, Raymond argues that " . . . there needs to be a high standard of proof that these elements are essential to all schools and to all students in the same way" (Raymond Rept. p. 11). Here, "in the same way" is just a bizarre qualifier. We might say that auto mechanics do not require a complete set of automotive tools unless they can claim not only that they are essential, but also that they all use them "in the same way." Here, Raymond raises the bar absolutely out of sight. Even in the rigorously empirical worlds of physics and chemistry, observed variability sends investigators back to their measurements to confirm the observations or back to their theory to account for the previously unaccountable; it does not, *ipso facto*, discredit or make insignificant a general rule or trend.

Raymond's views are not unique among the State's experts. The State's experts claim that, if such proof can't be marshaled, there should be little concern that these schooling basics are in short supply or unevenly distributed across students. If Raymond's standard is to be followed, it will be perfectly acceptable to have two very different classes of California students: those who must overcome odds, and those who do not.

B. Inappropriate extrapolation from Hanushek's earlier reviews

Eric Hanushek repeats in his report for this case the findings of his reviews of production function studies that differences in school inputs don't account for differences in educational productivity (e.g. Hanushek Rept. pp. 2, 10, 21). He also claims that these findings show that the resources at issue in this case—credentialed teachers, instructional materials, and adequate facilities are not systematically related to student performance. He asserts without any supporting evidence that, "[t]he evidence concerning aggregate resource categories carries down to the level of specific inputs" (Hanushek Rept. p. 11). And, more specifically, "[s]ubstantial evidence exists to indicate that variations in teacher quality are very important." He also asserts that "[w]hat is equally clear, however, is that the effectiveness of a teacher is not directly related to her training, experience, and credentials" (Hanushek Rept. p. 14).

Hanushek is not alone in relying on his prior studies. Experts Hoxby, Podgursky, Raymond, and Summers all claim that Hanushek has established that the basic tools of education at issue in this case don't matter (Hoxby Rept. pp. 3-6; Podgursky Rept. pp 8-10; Raymond Rept. pp. 21-22; Summers Rept. p. 19).

This is simply false. The basic resources that are of concern to the plaintiffs are have not been regularly included in the studies that Hanushek has reviewed repeatedly. As Hanushek's report's Table 2 makes clear, the studies he considers focus primarily on dollars spent and on teacher-pupil ratio (most often represented in studies), whether teachers have masters' degrees, and their years of experience (Hanushek Rept. p. 9). Facilities are far less often considered in the studies Hanushek has reviewed, and teacher credential status and instructional materials are not included on Hanushek's list at all.

Nevertheless, relying on Hanushek's work, Margaret Raymond concludes, "Plaintiffs' position is precarious from both theoretical and applied perspectives. The claim that textbooks, certificated teachers, and facilities are critical factors pre-supposes that these are the 'right' things to focus on . . . . [T]he proof to support that position is entirely lacking" (Raymond Rept. p. 4). Raymond would only be correct if she were to report, ". . . is entirely lacking" *in the studies selected since these factors were not systematically studied.*" Raymond extrapolates incorrectly, "[T]he case presented by the plaintiffs ignores a considerable amount of evidence—developed under stricter scientific research conditions than the research cited by the plaintiffs—that the elements they

propose to regulate are not the most influential in creating good student academic achievement" (Raymond Rept. pp. 4-5).[2]

Summers, too, cites Hanushek as the source for her conclusion that,

"What we know is that there is no conclusive evidence that the number of text [sic] books, the condition of the infrastructure of the school, greater stakeholder improvement [sic], or the degree of school-based management has a significant impact on student learning. We know that the traditional credentialing characteristics of teachers that determine salary, the number of degrees and credits of education a teacher possess, has no effect on the cognitive performance of their students;. . . . we do know that an excellent teacher is the single most important school-controlled input, and that the credentialing characteristics that set salaries are not related to student performance" (Summers, p. 19-20).

Similarly, Hoxby provides no new review of her own, but rather relies on Hanushek's review and his conclusions about what they mean. Podgursky credits Hanushek for providing sophisticated, high quality studies on the links between resources and achievement. (Podgursky Rept. p. 9)

The previous section of this report establishes the very shaky scientific ground on which any reliance on Hanushek stands.

C. Error-filled new analyses

The main problem with the State's experts' reports is substantive. They provide no new evidence that qualified teachers, appropriate materials, and adequate facilities are *not* essential; that basic educational equality in the provision of these essentials actually exists; or that that the State's management and oversight mechanisms ensure their provision to all students. The State's experts' analyses don't even prove their own case that more resources would fail to make California schools more productive. However, it is also important to note that the State's experts new analyses are also so filled with methodological errors that they are useless for shedding light on any of these claims. I describe some examples of these substantive and methodological problems below.

State's assertion: Qualified teachers don't matter.

Margaret Raymond provides a clear example of how the State's experts' new analyses are deeply flawed, both substantively and methodologically.

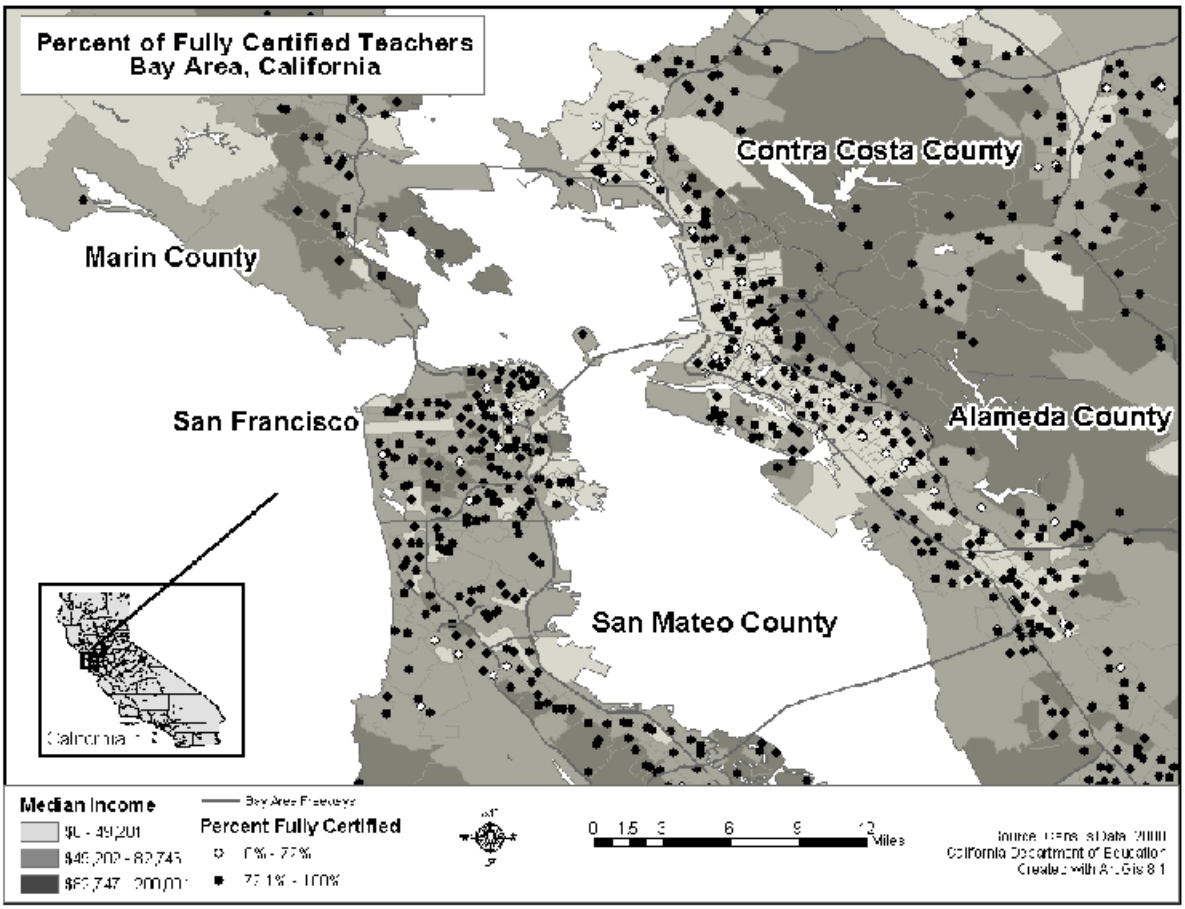
Raymond makes multiple errors. In an attempt to establish that qualified teachers aren't essential, Raymond analyzes the impact of students' background

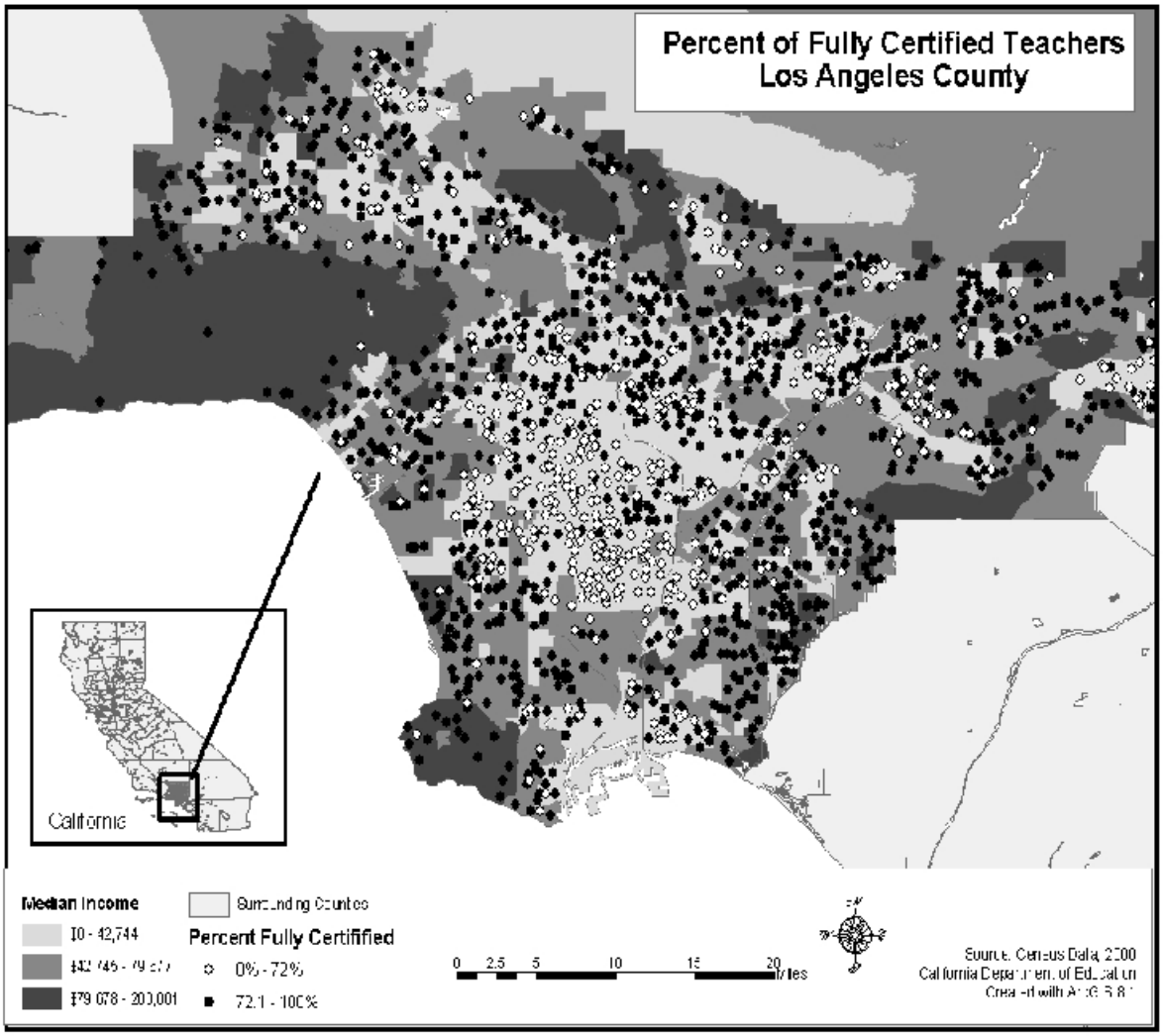
[2]Note, however, Raymond also acknowledges in her deposition that she does not "know enough of – or the entirety of the research that exists" on these topics to judge whether "it's credible and reliable" (Raymond Depo. p. 11), and that her own work has identified the condition of school facilities, for example, as related to achievement (Raymond Depo. p. 12).

characteristics and the availability of fully credentialed teachers on student achievement in a sample of California's most disadvantaged schools—schools that she calls "educationally challenged." (Raymond Rept. p. 12) She represents her analyses as showing that productivity increases wouldn't be obtained by increasing the proportion of credentialed teachers at schools like the ones the plaintiffs attend. In fact, her analysis shows just the opposite—credentialed teachers actually do matter in this sample of schools. After accounting for the effect of students' background characteristics on API scores, the schools with larger proportions of fully certified teachers did significantly better—that is, their higher scores than schools with fewer qualified teachers could not have occurred by chance. Raymond spends most of her analytic efforts seeking to show that this positive finding is really unimportant. (Raymond Rept. pp. 12-14; Tables 2, 3) However, her analyses and her conclusions are deeply flawed both conceptually and methodologically. I provide additional detail about the problems in Raymond's analyses in Appendix 2.

Notably, Raymond isn't the only State expert who makes such errors. For example, Rossell, like Raymond, uses the limited API variable measuring the percentage of emergency credentials to under-represent the number of less-than-fully certified teachers at a school by excluding teachers on pre-intern and intern credentials. State expert Susan Phillips, who as a long time observer and participant in California's education policymaking should be familiar with California's multiple teacher credentials, also uses this tactic (Phillips Rept. p. 76).

Raymond ignores evidence of inequalities in her own data. Raymond's data set itself provides ample evidence of California students' unequal access to qualified teachers. As it is, her skewed sample of the plaintiffs' schools and the 543 other schools constitute a very disadvantaged 7-8 percent of the State's schools based on a combination of their enrollment of low-income students of color and their low levels of certified teachers. This in itself is evidence of shortages and inequalities in the distribution of basic resources to the state's most vulnerable students. To illustrate what Raymond's data reveal, I mapped the location of schools that meet Raymond's criteria for percentage of qualified teachers against census data showing the average income levels of those communities. The results are striking, as shown in the maps below of the San Francisco Bay area and the Los Angeles basin. In both cases, the schools that meet Raymond's criteria for shortages of qualified teachers are concentrated in the communities' lowest income neighborhoods.


Percent of Fully Certified Teachers
Bay Area, California
Contra Costa County
Marin County
San Francisco
Alameda County
San Mateo County
Median Income
Bay Area Freeways
Percent Fully Certified
0 1.5 3 6 9 12
Miles



Notably, if Raymond had used a fairer comparison sample, she would have revealed even more dramatic disparities in students' access to qualified teachers. A very large number of schools in the state (at the very least, twice the 543 she compared with the plaintiffs' schools) that enroll large percentages of low-income and minority students are also schools with large numbers of less-than-fully certified teachers.

Rossell's analysis also masks the relationship between teachers and student achievement. Christine Rossell's conclusion from her analyses that emergency credentialed teachers don't harm achievement is flawed beyond the definitional and calculation errors described earlier in this report. Rossell's analysis, like many production function analyses, also masks some of the relationship between teachers and achievement because she includes students' 2000 achievement scores among her

"independent" variables. This variable "explains" most of the variation in the 2001 scores. Yet, the students' "2000 achievement" variable is not independent of school resources. It includes the influence of school resources or lack thereof—including less-than-fully-qualified teachers—on students' achievement during all their previous years in school. Therefore, even if her analysis were error free, it would hide, rather than reveal, the relationship between qualified teachers and achievement. (Rossell Rept. pp. 4-7)

State's assertion: Textbooks and instructional materials don't matter.

> "Studies of the effects of textbooks find an impact only in places where the level of distribution of textbooks is radically different from California" (Hanushek Rept. p. 12).

Eric Hanushek rejects the plaintiffs' claim that textbooks and instructional materials are a basic educational resource that should be made available to all students. He mischaracterizes the plaintiffs' complaint that "a few districts may not have the most current textbooks" and he contends, incorrectly, that their complaint is "very different than demonstrating that textbook shortages are severe" (Hanushek Rept. p. 13). Finally, he chides the plaintiffs for linking a lack of textbooks to insufficient resources. He asserts, without any evidence, that "[b]ecause the cost of new textbooks is a very small portion of total spending on K-12 education, it is inconceivable that many districts would pass up an easy opportunity to boost achievement through new books—if such opportunities were real" (Hanushek Rept. p. 13).

Textbooks and instructional materials matter. There is considerable evidence that having a sufficient supply of appropriate textbooks and other instructional materials matter in U.S. schools. As I noted in my earlier report on this topic California state policy as well as empirical evidence position instructional materials as central in student access to the knowledge they are expected to learn. Without textbooks or curriculum to take home, for example, homework assignments will be limited to what students can learn without having access to the core knowledge of schooling. As State expert Herbert Walberg has asserted for years, the absence of effective homework negatively affects student achievement. For example, in 2000, Walberg wrote:

> A synthesis of more than a dozen studies of the effects of homework in various subjects showed that the assignment and completion of homework yields positive effects on academic achievement. . . . Districts and schools that have well-known homework policies for daily minutes of required work are likely to reap benefits. . . . The quality of homework is as important as the amount. Effective homework is relevant to the lessons to be learned . . . .[3]

Note that Walberg defines "effective" homework as homework that is "relevant to the lessons to be learned." Surely textbooks and curriculum materials aligned with the state's

[3] Walberg, 2002, p. 61-62.

content standards will be essential tools as teachers construct and students complete such homework.

Literacy researcher Jeffrey McQuillan concludes from his research that, "While instruction can profoundly influence children and their approach to reading, the best way to explain large-scale differences in reading achievement is first to focus on the access to reading materials."[4]

In my initial textbook report, I cited a study by Wang, Haertel, and Walberg that found that good curricular materials had a significant effect on student learning.[5] As a part of the Third International Math and Science Study (TIMSS) studies, a sub-sample of U.S. students was drawn from a group of schools in affluent school districts in Illinois (called the First World (FiW) Consortium). Students in this sub-sample achieved test scores that significantly exceeded the national average for U.S. students. Examination of other data about these students shows that their teachers used textbooks at much higher rates than their U.S. peers. For example, teachers of these students used textbooks that incorporate algebraic thinking, regardless of whether the students were in high or low math tracks.[6]

More generally, a yearbook of the National Society for the Study of Education—a century-old society devoted to education scholarship with which State expert Walberg has been associated with for years, devoted its 1990 yearbook to the textbook. In the opening chapter of this edited volume, Ian Westbury, one of the world's foremost curriculum scholars summarizes the importance of textbooks as follows:

> What role does the textbook play in moderns systems of schooling? In all modern school systems the textbook has long served not only to support instruction but to symbolize that instruction—in other words, the textbook defines the curriculum. In the American school system, however, this latter function of the textbook assumes a special force because of the absence of effective national regulation of the curriculum or textbooks . . .
>
> Teaching which has the textbook at its necessary heart is the sine qua non of all modern forms of teaching—and, with all of its faults, such teaching is much more effective than most of us realize. . . .

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[4] Jeff McQuillan, *The Literacy Crisis False Claims, Real Solutions*, Heinemann, 1998

[5] Wang, M.C., Haertal,G.D., and Walberg, H.B.. Toward a Knowledge Base for School Learning, *Review of Educational Research*, 63:3,.1993, 249-294.

[6] United States Department of Education, A First Look at What We Can Learn From High Performing School Districts: An Analysis of TIMSS Data from the First in the World Consortium. Washington, DC: Office of Educational Research and Improvement, 1999.

> The textbook is, in fact, the heart of the school and without the ubiquitous text there would be no schools, at least as we know them.[7]

Textbooks matter in California. Do California students really need textbooks? Hanushek asserts, without any evidence, that, in a place like California, textbooks wouldn't matter (Hanushek Rept. p. 12). He trivializes the plaintiffs' complaint by reframing their argument, "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 Northeastern Brazil" (Hanushek Rept. p. 13). He contrasts the California situation with the Brazilian, 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." Citing his own 1998 study with Lockheed, he acknowledges, " . . . the importance of textbooks in truly deprived schools of developing countries appears to be a significant learning factors" (Hanushek Rept. p. 12).

Clearly, Hanushek is decidedly unfamiliar with the conditions in California's most disadvantaged communities. In contrast to Hanushek's assertion, Smith, Constantino, and Krashen documented large differences in children's access to books in different California communities.[8] They studied three neighboring communities in southern California: Beverly Hills with a medium income of $83,000, Compton with a medium income of $20,000, and Watts with a medium income of $15,000. They found great disparities in children's access to books, as shown in the following table:

Table 5. Lack of Access to Books in the Home and Library

	Average Number of Books in the Home	Average Number of Books in the Classroom	Total Number of Books in Average School	Total Number of Books in the Entire City	Total Number of Bookstores in the City
Beverly Hills	199.2	392.4	60,000	200,595	5
Watts	0.4	53.8	23,000	110,000	0
Compton	2.67	47.3	16,000	90,000	1

With less than one book, on average in the home in Watts, it is hard to imagine that these students' circumstances with regard to the availability of books in their homes is so different from the situations that Hanushek describes.

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[7] Ian Westbury, "Textbooks, Textbook Publishers, and the Quality of Schooling," In David L. Elliott and Arthur Woodword, editors, *Textbooks and Schooling in the United States*, Eighty-ninth Yearbook of the National Society for the Study of Education, Part 1, Chicago: University of Chicago Press, 1990, p. 3.

[8] Smith, C., Constantino, R., & Krashen, S. (1997). Difference in print environment for children in Beverly Hills, Compton and Watts. *Emergency Librarian, 24, 4, 8-9.*

Additionally, these researchers' data also show extraordinary inequalities. The average number of books in Beverly Hills homes compared to homes in Watts demonstrate a difference of 192 books per home**.** Between Beverly Hills and Compton, the difference is almost the same, with a difference of 196 books per home. Moreover, if we combine the average number of both classroom books and books within the city of Watts and Compton, the total still falls below the listed number of total classroom books and citywide books for Beverly Hills. This difference is further demonstrated in the table below.

Table 6. Comparison of Beverly Hills with Watts and Compton

Ratios	Books in Home	Classroom	School	Public
Watts	498 to 1	7.3 to 1	2.6 to 1	2.4 to 1
Compton	75 to 1	8.3 to 1	3.75 to 1	2.1 to 1

Neuman and Celano also found striking differences in access to print materials between middle-income neighborhoods and low-income neighborhoods. They found children in middle-income neighborhoods have a large variety of resources to choose from while children in low-income neighborhoods have to rely on public institutions that provide unequal resources, both in quantity and quality, across communities.[9]

Hanushek's own report, *Efficiency and Equity in Schools Around the World*, states that 73% of nine-year olds in the United States have more than 25 books at home, and 75% of thirteen-year olds in the United States have more than 25 books at home.[10] That means, of course, that a full quarter of young people in the U.S. had fewer than 25 books. Because "fewer than 25" was the least number of books that respondents could indicate, we have no way of knowing how many young people may have no books in their homes at all.

Finally, McQuillan analyzes students' access to books and other print materials, by examining "print access," including the number of books in children's homes: (1) The percentage of families having more than 25 books in the home; (2) The percentage of families subscribing to at least 1 magazine; (3) The percentage of families subscribing to 1 newspaper. He also documents children's total print access in school: (1) The number of books per person in the public library; (2) The number of magazine subscriptions per person in the public library. The results were listed by state.[11] Based on these analysis, McQuillan's analysis ranks California 40th out of 42 states, including the District of

[9]Neuman, S.B. and Celano, D. (2001). Access to print in low-income and middle-income communities: An ecological study of four neighborhoods. *Reading Research Quarterly, 36, 1, 8-26.*

[10] Hanushek, E., Luque, J. (2002). *Efficiency and Equity in Schools Around the World.* The report focused on data results from the Third International Mathematics and Science Study (TIMSS).

[11]McQuillan, Jeff. (1998), *The Literacy Crisis: False Claims, Real Solutions*. Heinemann, Portsmouth, NH. (Table 7.6, p. 75).

Columbia.[12] McQuillan describes California as "a print wasteland, ranking nearly last in reading test scores" (p. 82). California elementary schools average 13 books per student, while the rest of the nation averages 18 books per student. California middle schools average 11 books per student, while the rest of the nation's middle schools average 16 books per student. Lastly, California high school libraries average 8 books per student, while the rest of the nation's high schools average 15 books per student. This places California 49th in the nation in books per pupil.

Together, these studies provide evidence that, despite many other differences, with respect to access to books at home, the situation in low-income California communities is not all that different from that in Northeastern Brazil where even Hanushek acknowledges that textbooks are a critical learning resource. Moreover, these are also the same communities and schools that have far less access to high technology tools for disseminating information, such as high power computers and bandwidth that someday may make the internet more essential to education than textbook and print materials. Of course, when that day comes, schools in low-income communities should also have the choice to use either textbooks or essential internet and other high tech tools, and these choices should not be constrained by the failure of the state to provide to all the essential tools that it provides to most.

Such evidence is unlikely to alter Hanushek's views, however. He rests his case on the most simple, and unfounded, assertion: It is inconceivable that California school districts would fail to provide textbooks if they made a difference (Hanushek Rept. p. 13).

State's assertion: Facilities don't matter

> [I]f 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 for how to spend limited dollars for education. (Hanushek Rept, p. 13).

Once again, the State's experts misunderstand the fundamental nature of plaintiffs' claim. Plaintiffs *are* complaining about unsafe and unsanitary schools, conditions that Robert Corley documented in his expert report. They are not seeking "state of the art facilities." Given Hanushek's concession about the importance of fixing unsafe and unsanitary schools, it appears that his production functions studies about the value of making "this school's facilities better," are irrelevant to the issues in this case. Hanushek is not alone among the State's experts in recognizing that children should attend schools in clean, decent facilities. Defendants' expert Dr. Thomas Duffy agreed that "school facilities are an integral part of the package of the resources necessary to provide a high quality education for students." (Duffy Depo. p 314).

[12]McQuillan, p. 77.

Margaret Raymond counters plaintiffs' expert Sobol's claim that facilities are important with the assertion, "It simply cannot be the case that facilities are important if it is possible to identify cases where they have not influenced the outcome of students" (Raymond Rept. p. 8). Here, again, Raymond logic is like saying that it simply cannot be the case that seat belts are important if it is possible to identify cases where they've not influenced the outcome of a car crash.

Rossell argues that plaintiffs have not "presented any scientific evidence that the quality of facilities makes a difference in the achievement of students" (Hanushek Rept. p. 9) and contends that California school facilities don't negatively impact achievement, based on a regression analyses she conducted in Georgia (Rossell, p. 21). However, Rossell never mentions the numerous studies cited by Plaintiffs' expert Dr. Glen Earthman that show strong correlations between school facilities conditions and student achievement after controlling for students' socioeconomic status.

Although there are many studies that make the link between school facilities conditions and student achievement, and plaintiffs do cite them, adequate school facilities are important for far more basic reasons. Uncrowded buildings in good repair, reasonable temperatures, functioning bathrooms, and rooms free of vermin are simply basic health and safety standards that should be applied to all public buildings in which California residents and their children are required to spend their time. Enough said.

D. Blaming local educators

> . . . some districts undoubtedly do not have the latest editions of some books or extra books around schools. But this may be a result of a judgment by them that gains from such expenditures are not worth the expense. Or it may be the result of some other decisions by local authorities that has nothing to do with expense. (Hanushek Rept. p. 13).
>
> Clearly, the adoption of Concept 6 or Modified Concept 6 is a choice made by a few school districts with regard to how they spend their money. It is neither forced by state policy nor by low per pupil expenditures (Rossell Rept. p. 24).

The State's experts argue that it is the responsibility of local educators to translate state dollars into the specific resources, conditions, and practices that will result in productive schools. Their choices do and should dictate whether and how qualified teachers, appropriate instructional materials, and adequate facilities are provided. If shortages or uneven distributions of teachers, instructional materials, and facilities inhibit productivity, the State's experts claim that it is a matter of local, rather than state concern. The plaintiffs' experts agree that local mismanagement is a serious problem in many districts. But local mismanagement does not relieve the State of its responsibility to ensure that essential education resources are provided to all students on equal terms. Making this argument, the State's experts dismiss one of the most central issues of the

case. Local mismanagement is exactly why the State needs to exercise its responsibility to oversee the local provision of essential resources. Such oversight can both guarantee that students' rights are met, and it can lead to greater efficiency.

State's assertion: Local mismanagement underlies low productivity. Hoxby's analysis of her so-called "management effect" illustrates the flaws in the State's argument that local management of resources, rather than the lack of resources themselves, is responsible for low levels of achievement in California's schools.

To make her case, Hoxby first notes that there are "literally hundreds of studies that demonstrate that there is considerable variation in achievement among schools that have similar resources, similar student bodies, and similar neighborhoods" (Hoxby Rept. p. 5). However, she provides no evidence, or even an example, of such studies. Second, she runs new regressions using national and California data that demonstrate that schools enrolling similar student populations do not all have the same average achievement scores (Hoxby Rept. pp. 6-10). Hoxby reported analyses of national data about 10th graders in 1994, and California STAR test data on all grades from the year 1998-1999. She then provides figures that show the range of achievement among "similar" schools forms a bell-shaped curve.

Hoxby makes a huge and unwarranted leap in these analyses. She claims that a "management effect" explains the differences among the school's average achievement scores. She claims that this "management effect" measures the "quality of management at each school" and that her figures show that the quality of management differs greatly, even among schools that have "extremely" similar students, neighborhood, and school resources. (Hoxby Rept. pp. 5-6) Without the details of what variables Hoxby controlled for or how she categorized schools on these variables, or why she chose to report the particular grade levels and years she did, it is impossible to know how similar the schools represented in her figures actually are and how representative the patterns she presents are of what one might find over all grades or all testing years. Hoxby's later submission of notes regarding her analyses provides the list of variables she used, but the notes fail to explain her other analytic decisions, or the "density" or "management effect" labels and scores that she reports as the axes in her figures. In any case, her management effect is nothing more than unexplained variance.

The national data set that Hoxby uses allow her to link information about many features of students schools and families with achievement. However, the California data sets she analyzed did not include variables that measured teachers' certification status, textbooks and instructional materials availability, the condition or crowdedness of facilities. In short, Hoxby's work exhibits many of the problems found in weak production function analyses noted in the previous section of this report.

Hoxby's methodological and reporting problems are really beside the point. The assertion that she has controlled for everything except local school management is patently absurd. Her analysis is grounded in problematic assumptions, for example, that a) no school condition or resource is essential to schooling unless it has an isolated effect

on students' tested achievement; and 2) that the measured outcome in a national test that is designed to be independent of any particular curriculum or that California's SAT9 test, badly misaligned with the State's standards, will reflect what California students have learned in school; and, most important.

State assertion: Local choices about spending are responsible for resource differences. Hanushek argues that local, contextually appropriate decisions may lead educators to emphasize some resources over others. Hoxby, too, argues that local circumstances may dictate different resources (Hoxby Rept. p. 5). More specifically, Raymond testified in her deposition that educators in low-income communities like Compton, California might decide that laptop computers are not appropriate for their students, even if they had the funds to purchase them, even if they were thought to be essential and even if most students in California have them (Raymond Depo, pp. 283-284).

Raymond's explanation of purchasing laptops for Compton students may not resonate with many people's sense of how money might be spent frivolously. Others might disagree. However, Raymond's comments also reveal her narrow conception of educational outcomes and her disregard of equality. Laptops (and other computers) allow students to develop particular skills that the state has deemed important in its curriculum standards. Some schools might promote these skills by loaning laptops to all students. Other schools may invest in desktop computers in classrooms and labs. But, when the state has deemed computer skills important learning goals, then it must provide computer access to all students.

In any case, the latitude all these experts argue for cannot exist unless local schools have the resources that permit them to decide whether laptops or other resources would be most effective for their students. In California, few schools have such resources, particularly those in communities like Compton.

Moreover, it stretches credulity to assume that such discretionary local decisions would or should ever include decisions that qualified teachers are unnecessary, that teachers and students don't really need textbooks and instructional materials, or that the school buildings serve just as well when they are in need of repair, uncomfortably hot or cold, infested, or plagued with other health and safety issues. It's hard to imagine local educators preferring to crowd schools with students at 150 percent of their capacity. Given, as I demonstrated in my initial report on Concept 6 schools, these schools often suffer cumulative effects of a lack of qualified teachers, shortages of textbooks and instructional materials, and deteriorating facilites, it is almost inconceivable that operating such schools could ever be a choice if local educators had other options.

However, Christine Rossell actually attempts to make just this argument. She frames the adoption of Concept 6 calendars as a local preference. Offering data showing that the districts who operate Concept 6 schools have per-pupil expenditures that match those of many district that don't, Rossell claims that the adoption of this calendar "is a choice made by a few school districts with regard to how they spend their money. It is

neither forced by state policy nor by low per pupil expenditures" (Rossell Rept., p. 24). Here, Rossell is either blatantly disingenuous or simply ignorant of the fact that it is the lack of construction funds, not per pupil funding, that forces districts to adopt Concept 6 schedules, and that State policies offering financial incentives for adopting such schedules strongly influenced local decisions. This may, in fact, be one of the clearest examples of how a state incentive has influenced local school system behavior.

E. Blaming families and communities

In the end, most of the State's experts assign most of the credit and blame for California students' school achievement to their families and communities for school achievement. This is not surprising, since it is the very argument that most of them have made many times before. Anita Summers, for example, simply asserts in her report, without citation, that "The set of inputs not under the control of school systems—the family and peer group background of the student—has been clearly established as the input that has, by far, the strongest effect on student learning. . . . In educational policy, as in the areas of health and crime, the handicaps of impoverished and uneducated backgrounds have proven to be very intractable" (Summers Rept. pp. 18-19). Ballinger argues that family background factors should be blamed for why students achieve less well in overcrowded Concept 6 schools. (Ballinger Rept. pp. 14-18)

The new analyses that Hoxby includes in her report illustrate just how flawed such arguments are. Hoxby claims that, "In fact, the vast majority of variation in students' achievement is explained not by their schools, but by what their parents do and how much their neighborhood supports education" (Hoxby Rept. p. 11). She even asserts that the local management problems that she finds to be the cause of low achievement can also be traced to families and communities. That is, poor management can result from a local failure to enact the democratic prerogatives of electing or hiring competent leaders (Hoxby Rept. p. 11). Here she chooses a different data point to "prove" her point—national data about 12th graders. She divides the possible influences on student achievement into three groups—school, family, and neighborhood—and then tests the power of each in "explaining" students' achievement. She claims that family background variables account for 93.4 percent of 12th grade achievement, neighborhood factors for 3.8 percent, and school factors for only 2.8 percent. This analysis exhibit many of the problems of production function analyses that I discussed earlier. The most egregious one is that the analysis cannot sort out the effects of background and schools, since these are so highly correlated. Poor students and students of color attend schools with fewer school advantages. More advantaged students attend more advantaged schools. To determine with any confidence whether families or schools is what causes achievement, we'd need to randomly assign students to good and bad schools. Of course, families of advantaged students would never stand for such an experiment because they, unlike those who rely on production function analyses, know that schools matter.

In sum, the State's experts would have us believe that the State can have no influence over the only things that matter or the things that matter most (race, family income, parent education, and neighborhood). They also seem to be saying that, because

it is difficult to address these broader environmental and contextual influences on achievement, the schools are excused from taking useful mitigating steps, such as ensuring that all students have the minimum set of basic and essential educational tools—qualified teachers, appropriate textbooks and instructional materials, and adequate school facilities. However unless one believes that these low-income students and students of color actually can't learn, the sobering findings about the impact of home and community environments should drive the educational system to invest more to help these students overcome the challenges they face.

F. Careful production function analyses show that schools do matter

As noted in the previous discussion, careful new studies by economists, including Betts, King, and Krueger show that school resources do positively affect achievement. One of the most useful of these new studies was conducted in 2002 by Harold Wenglinsky. Wenglinsky used multi-level quantitative methods that overcome many of the problems in production function studies (detailed in the previous section) to study the link between student achievement in mathematics and school resources. Specifically, he not only considered the impact of the teacher background characteristics usually included in production function analyses—experience, holding of a bachelors or masters degree, and major or minor—he also included teachers' classroom practices and the professional development teachers received in support of their practices.[13] Using the National Assessment of Educational Progress (NAEP), database he employed the statistical technique of multilevel structural equation modeling (MSEM) to address the major methodological shortcomings of the production function literature: the failure to distinguish between school- and student-level effects, to measure relationships among independent variables, and to explicitly model measurement error.

Wenglinsky found that schools and teachers really do matter. Specifically, he found that when measures of what teachers actually do in the classroom and the training they receive to support these practices are included in the analysis along with their backgrounds, and when the interrelationships among the independent variables are accounted for, two hypotheses are confirmed about the importance of schools' resources. One is that teachers affect learning, not because of their experience or education per se, but because of their skill at focusing students on higher-order thinking skills, teaching them to apply problem-solving techniques, and engaging them in hands-on learning. Students whose teachers received training in how to teach different groups of students substantially outperformed other students. The second confirmed hypothesis is that the impact of such teaching is not only comparable to that of SES, but somewhat greater.

Wenglinsky also found important interrelationships among the aspects of teaching he studied. Teacher training seems to influence teachers' classroom practices strongly, and the more training teachers receive in hands-on learning, and indeed the more professional development they received regardless of topic, the more likely they are to engage in hands-on learning activities. And the more professional development teachers

[13] Citation: Wenglinsky, H. (2002, February 13). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives*, *10*(12). Retrieved [date] from http://epaa.asu.edu/epaa/v10n12/.

received in working with special student populations, the less likely they are to engage in lower-order activities. Wenglinsky concluded

> Schools matter because they provide a platform for active, as opposed to passive, teachers. Passive teachers are those who leave students to perform as well as their own resources will allow; active teachers press all students to grow regardless of their backgrounds. Passive teaching involves reducing eighth-grade mathematics to its simplest components. All lessons are at a similar level of abstraction; problems are solved in a single step and admit of a single solution; and all students are treated as if they had entered the class with the same level of preparation and the same learning styles. In contrast, active teaching does justice to the complexities of eighth-grade mathematics. Lessons work at multiple levels of abstraction, from the most mundane problem to the most general theorem; problems involve multiple steps and allow multiple paths to their solution; and teachers tailor their methods to the knowledge and experience of each individual student. Schools that lack a critical mass of active teachers may indeed not matter much; their students will be no less or more able to meet high academic standards than their talents and home resources will allow. But schools that do have a critical mass of active teachers can actually provide a value-added; they can help their students reach higher levels of academic performance than those students otherwise would reach. Through their teachers, then, schools can be the key mechanism for helping students meet high standards.[14]

Although Wenglinsky didn't assess the impact of teachers' certification status in his analyses (the NAEP variables don't include it), he makes clear that a teachers' training in teaching and learning matters a great deal. His analyses make absolutely clear that teachers matter, and also that trained and untrained teachers have very different effects on student learning.

[14] Wenglinsky, 1997 .

VI. Claiming that California's "near state of the art" [15] accountability policies constitute a sufficient system of management and oversight

The previous sections of this report establish that the State's expert reports fail to counter the plaintiffs' claim that fundamental elements of schooling are inequitably distributed in California and that the State's management and oversight have led to these inequalities. They argue instead that the case should focus on whether teachers, instructional materials, and facilities actually *cause* achievement, and, thereby, contribute to the overall "productivity" of California's schools, and whether they do so cost effectively. This reframing of the case allows the State's experts to argue that, if the plaintiffs' complaint is to be taken seriously, they must *prove* that providing all students with qualified teachers, sufficient instructional materials, and adequate facilities increases achievement as measured by test scores. In fact, the plaintiffs have provided substantial evidence of the strong relationships between resources and student achievement that the State's experts have simply ignored. By claiming to prove that school productivity would not increase if the plaintiffs received an equitable share of basic schooling resources, the State's experts allow the State to deny relief to the plaintiffs without actually disputing the undeniable findings of inequality. Their flawed analysis of schooling also leads them to speculate, without evidence, that incentives will be far more powerful for increasing educational productivity than insuring that all students have qualified teachers, appropriate instructional materials, and adequate facilities, and that creating those incentives is the proper role of the state. To underscore this last point, their contention is not simply that incentives are useful as part of a comprehensive approach to schooling and school reform; rather, they contend that incentives so overpower the effects of inequalities of other schooling opportunities and resources that the plaintiffs are actually asking for relief that is useless and ultimately harmful.

Given their reframing of the central issues of the case, the State's experts credit California's state accountability system with managing and overseeing schools in ways that promote productivity.[16] This section examines this claim, and concludes the following:

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[15] Walberg, Rept. p. 4.

[16] Several of the State's experts focus on California's accountability policies. State's counsel characterizes Herbert Walberg's contribution as an expert as follows: "[Walberg] provides an analysis of California's implementation of a standards-based system, which independent experts have found to be one of the best in the country; and explaining why plaintiffs' proposals for changing that system are misguided, unsupported, and premature." Counsel describes Anita Summers' expert contribution as "setting forth the ideal features of a state accountability program; evaluates the extent to which the systems in the 50 states possesses those features; and then concludes that, contrary to plaintiffs' assertions, California has one of the best accountability programs in the country." Susan Phillips' contribution is also limited by counsel as follows: "provide a comprehensive overview of California's API, including how it was created, how it's been implemented, and how it will be refined and improved in the next few years." Curiously, Summers and Phillips characterize their own reports differently than state counsel. Summers reports that she analyzes the State's assessment system, rather than the accountability system (although she includes "consequences" as part of the assessment system). However, Phillips says that the purpose of her report is broader and includes the accountability system (not just the API) "to provide an overview of the California academic accountability system and to document how that system is evolving over time" (p. 1). This discrepancy speaks to a general tendency of state counsel and experts to conflate accountability, assessment, and

- The State's experts' version of accountability is conceptually inadequate as a model for a system of state management and oversight of schools that ensures educational equality.

- The State's experts' claims about the current status and future of California's accountability policies are not credible because of the factual and methodological errors that pervade their analyses.

- The available empirical evidence provides no support for their claims that California's current accountability policies are "near state of the art." Some of claims are simply assertions without supporting evidence. Some rely on a selective use of state comparisons consisting of ratings published in non-scholarly reports. Many of the studies the State's experts cite are not studies of test-based accountability. The studies that do examine the effects of test-based accountability do not provide positive evidence about California.

- The State's experts' claim about the positive impact of incentives on productivity is little more than speculation. Moreover, they err in failing to address the considerable risks to the plaintiffs caused by incentives in the absence of the necessary resources, capacity, and opportunity needed to gain the rewards of their hard work. Matched with undisputed inequalities, the State's incentives create a destructive "no-win" scenario with destructive impact on the state's most vulnerable students. This is the central issue of the case. No matter how motivated, hundreds of thousands of California students remain deprived the most fundamental resources of schooling—teachers, books, and safe, uncrowded schools in which to learn.

- Some of the State's experts know little about the accountability policies they defend and praise.

A. High praise for California's test-based accountability policies as the means for managing and overseeing the State's educational system

The State's experts heap praise on California's test-based accountability policies. Consistent with their flawed economic analyses of schooling, the State's experts assert that California has adopted the best types of state policies for managing and overseeing its schools. These are policies that set standards, administer tests, and create incentives to motivate schools, teachers, and students to perform well (i.e., "test-based accountability," in the current jargon). These policies purport to free up local districts and schools to

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incentives. Hanushek, Hoxby, and Raymond also comment on California's accountability policies, although none of them frame accountability as the central focus of their work. Since Walberg is the only expert that State's counsel has charged with reviewing California's combined use of standards, testing, and mechanisms for holding schools and students accountable, review below focuses on Walberg's report and his deposition testimony.

make their own decisions about the day-to-day conduct of schooling. In reality, these policies are very prescriptive. However, the State's experts' enthusiasm for this scenario and their high hopes for its future are not warranted, particularly if the State hopes to meet its responsibility to provide education equitably to all students.

There can be no mistaking the State's experts admiration for California's accountability policies: Walberg writes, "The California Legislature has initiated a K-12 accountability system that is near the state of the art as indicated by independent evaluations and by its effective, cost-effective, balanced, and comprehensive features" (Walberg Rept., p. 4). Summers concludes that, "California's assessment system ranks high in the nation on the merits of the plan it is currently using. There are improvements that would be beneficial, but the fundamentals of its usage of outputs and inputs puts it in the top group of state educational assessment systems" (Summers Rept. p. 5). Phillips writes, "The API accountability system did not create the social problems faced by ethnic and SES(d) subgroups but it is contributing to their improvement" (Phillips Rept. p. 77). Hanushek, Hoxby, and Raymond also praise California's test-based accountability (Hanushek Rept. p. 21; Hoxby Rept. p. 1; Raymond Rept. pp. 19-22).

However, the State's experts also hedge their praise. Confronted with evidence that California's schools are plagued with professional capacity inadequacies and achievement problems, the State's experts argue that there has simply not been enough time for California's accountability policies to have their salutary effects. Phillips calls California's Academic Performance Index "a work in progress" (Phillips Rept. p. ii). Margaret Raymond argues that because the state's accountability system is "but three years old, . . . it is too soon to judge the full impact of the State policy" (Raymond Rept. p. 20). Hoxby cautions, "[I]t is too early for a full evaluation because school administrators are still adjusting their management to reflect what they have learned through performance monitoring. Many benefits of the accountability system have yet to be seen" (Hoxby Rept. p. 1).

However, none of these experts' comment on California's very recent history of changing and backtracking on important promises for investment and incentives within the current system (e.g., the elimination of school rewards), on California's longer history of changing its entire assessment system every few years, or on the inconsistency between assurances that there are "enough resources and investment" (not to mention, commitment and will) contrasted with the State's budgetary concerns expressed elsewhere in this case. This history carries substantial concern for the plaintiffs in addition to the substantial lack of evidence that the current policies could, even if sustained, address plaintiffs' complaints.

C. Defending California's flawed enactment of standards-based reform

As I discuss in my earlier report synthesizing the plaintiffs' expert reports, California's recent state education reform initiatives (and, principally, the Public Schools Accountability Act of 1999) have exacerbated the existing weaknesses in the state's education policies. The plaintiffs' experts have shown that California's inadequate

enactment of standards-based reforms limits the State's ability to manage and oversee the provision of education on equal terms.[17]

Standards based reform emerged in the early 1990s as the dominant paradigm for state-level education policy. Standards-based reform rests on a three-legged stool of content standards that define what students should learn, performance standards that establish the competence levels for students, and the provision to all students of sufficient resources and capacity—including teacher training, instructional materials, and assessments—that are aligned to the standards.[18] As former California State Superintendent of Public Instruction, Bill Honig noted recently:

> . . . while standards, assessment, and consequences are important, even more important to improving achievement is an implementation triad—teacher knowledge, quality instructional materials, and site and district leadership. When these are done well, achievement skyrockets.[19]

California's policies attempt to balance the State's education system on two legs. Although, as the plaintiffs' expert reports demonstrate, most California students are provided the essential tools of education, California policy does not ensure that the plaintiffs have these resources. This failure results from the fact that California has no standards requiring these resources, and it lacks policies that allow it to discover and correct resource problems when they arise. The effects of a truncated version of standards-based reform have been particularly harsh in California. The States' low level of educational funding, deteriorating infrastructure, and increasing shortages of qualified teachers over the past 25 years have created serious inequalities in students' access to essential educational resources. Nevertheless, the State's experts ignore the fact that the plaintiffs' schools lack resources and capacity to reach the performance goals the State sets.

This two-legged version has also found its way into the 2002 reauthorization of the federal Elementary and Secondary Education Act (the so-called "No Child Left Behind" reforms) that specifies how federal funding will be allocated to high-poverty schools. However, No Child Left Behind does not require that states forego careful management and oversight of resources and opportunities and their equal distribution. Given California's history, it is particularly critical that it not use "No Child Left Behind" as an excuse to avoid its constitutional obligation to provide basic educational resources on equal terms. The need for these adequate management and oversight policies increases as the State imposes more and higher standards and takes an increasingly large role in distributing incentives and sanctions.

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[17] Jeannie Oakes, *Education Inadequacy, Inequality, and Failed State Policy: A Synthesis of Expert Reports Prepared for Williams v. State of California*, 2002, p.

[18] Jennifer O'Day & Marshall S. Smith, "Systemic Reform Educational Opportunity," *Designing Coherent Education Policy: Improving the System*, edited by Susan H. Fuhrman. San Francisco: Jossey-Bass Publishers, 1993, pp. 250-312.

[19] Bill Honig, Comment," in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 2001, p. 176.

The version of reform that has surfaced in California over the past five years and elsewhere reflects inappropriately applied economic analyses as the basis for improving schools, as I described in the previous section of this report. At the center of this application is the conviction that resources don't affect student performance and test-based incentives do. This theory of incentives and "efficiency" is overly narrow and conceptually inadequate to guide state management and oversight policies in ways that realize the State's obligation to provide educational essentials to all students on equal terms.

In this case, the State's experts bolster their defense of California's test-based accountability with two types of evidence: selective use of state comparisons consisting of rankings published in non-scholarly reports; and a small number of research studies. As I discuss below, none of this evidence withstands close scrutiny.

Selective reporting of state comparisons.

The ranking used most often by the State's experts to establish California's standing among the states is *Quality Counts*, an annual set of state-by-state comparisons published by the national education newspaper, *Education Week*. *Quality Counts* rates and ranks each state on several dimensions of state policy, including standards and accountability.

In 2003, the *Education Week* research team collected details about state tests, report cards, and intervention policies to reflect some of the changes in testing and accountability required by the federal "No Child Left Behind" law. Walberg relies heavily on the *Quality Counts* rankings to defend California's policies, as do Kirlin, Rossell, Phillips, and several other State's experts (Kirlin Rept. pp. 15, 18-20, 27-29; Phillips Rept. p. 4; Rossell Rept. pp. 24-28; Walberg Rept. pp. 13, 35; Podgursky Rept. pp. 13-14). *Quality Counts* gave A grades to New York, Florida, Kentucky, Maryland, Massachusetts, Louisana, and Delaware for their standards and accountability policies. California got a B+, along with Oklahoma, Kansas, and Missouri.

In 2001, *Quality Counts* 5th annual 50-state report focused its attention on state policies related to standards.[20] A crucial distinction must be made to place California's relatively high grade in the proper context. The grade is assigned on the basis of the State's *policies;* it is not a grade that reports whether the education system as a whole delivers education to all of its students on equal terms; it does not comment on the fidelity of implementation. If other states have additional systems, capacity, and will to monitor and ensure equality, these policies and capacities are not noted. To underscore this very point, *Quality Counts* clearly warns against imposing accountability systems without the resources and support that students need to achieve the standards—an admonition that the State's experts neither report nor follow. I cite at some length

[20] *Quality Counts*, 2001, "A Better Balance". Each year, in addition to grading the states, *Quality Counts* focuses on a key policy issue. Other years, the focus has been on teacher quality, testing, and technology.

Quality Counts' concerns about the need to achieve a balance, since so many State experts rely on this document as support for California's test-based system.[21]

> . . . the fifth annual 50-state report by *Education Week* concludes that states must strike a better balance among standards, assessments, and the tools students and schools need to succeed. Without it, not only could standards-based improvement efforts stumble, but public support for public education also could totter. What's more, tens of thousands of students could fail to meet the goals their states have set for them, limiting the potential of today's children, with implications well into the future.
>
> Specifically, *Quality Counts* found, state tests are overshadowing the standards they were designed to measure and could be encouraging undesirable practices in schools. Some tests do not adequately reflect the standards or provide a rich enough picture of student learning. And many states may be rushing to hold students and schools accountable for results without providing the essential support. . . . The conclusion is simple and one voiced repeatedly by classroom teachers: If states really want to improve teaching and learning, they must find a better balance among standards, tests, and the support needed to do the job.[22]

The report later places particular emphasis on the importance of teachers and curriculum materials.

> Without adequate classroom materials tied to state standards, or a teaching force prepared to teach them, experts are certain that teachers are going to continue to tailor their instruction to state tests—not to the standards the tests are supposed to measure. And that, in turn, will reinforce the current perception that standards-based reforms are driven by tests.[23]

Notably, *Quality Counts* did not simply rely on its own editors' judgments in issuing these cautions about test-based accountability. They turned, also, to key practitioners and researchers for their views. For example, LAUSD Superintendent Romer opined,

> When the standards movement began in the late 1980s, its political patrons promised that professional development and classroom materials would be available, along with the standards and tests by which schools would be judged. . . . There's still some distance in what we expect students to be able to do and what our curriculum does."[24]

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[21] *Quality Counts*, 2001.
[22] *Quality Counts*, 2001.
[23] *Quality Counts*, 2001.
[24] *Quality Counts*, 2001.

Quality Counts also cites RAND accountability researcher Brian Stecher's considerable misgivings about systems like the one California has adopted:

> I think where we've gone overboard is the notion that if you set clear targets, and you have some way of measuring them, you can then step out of the picture and somehow it will be the responsibility of local professionals to figure out how to get there. While we were probably wrong two decades ago to be only focusing on accreditation, process-types of measures and not outcomes, I think we've probably gone overboard now in the other direction.[25]

John Kirlin and others rely on nationally recognized think tanks such as RAND for judgments about the quality of California's policy system. (Kirlin Rept. p. 4)

Not only does *Quality Counts* send a message quite different from the high praise for test-based accountability that the State's experts attribute to it, its actual state ratings paint a very different picture than the experts claim. Here we find concrete evidence that it is California's standards, not its tests and its incentives that have been heralded.

For example, *Quality Counts* assesses states on how well they employ multiple measures of assessment system quality, rather than relying disproportionately on tests. It reports that California is one of only 12 states nationally who use a test-only accountability system. Among the 8 states that Kirlin suggests are reasonable comparisons, Florida is the only other state with a test-only system.[26]

[25] *Quality Counts*, 2001.

[26] The discussion in the Appendix of this report about Kirlin's highly questionable selection of comparison states applies here as well. Here, as in that section, I use Kirlin's states, simply because these are the comparisons the State's experts rely on.

Table 7: Test-Only Accountability
Comparing California and 8 "Kirlin States" [27]

State	Test Only?	Test and Other Info?	Site visit or review?
Florida	Yes	No	No
California	Yes	No	No
New York	No	Yes	No
Oregon	No	Yes	No
Nevada	No	Yes	No
Texas	No	Yes	No
Illinois	No	No	No
Pennsylvania	No	No	No
Arizona	No	No	No

I used *Quality Counts* data to rate the states on their use of multiple item formats in their tests--a condition identified by *Quality Counts* as an indicator of good state assessments. I gave each state one point for their use of each of the item formats that *Quality Counts* considered. On this measure, California's ranked 44th nationally, and it ranked dead last among the states that Kirlin prefers for comparisons.

Table 8: Use of Multiple Test Item Formats in
Comparing California with 8 "Kirlin States"[28]

State	Multiple Choice	Short Answer	English-extended response	Other subject(s) - extended response	Portfolio	Point total
Florida	ES MS HS	ES MS HS	ES MS HS	ES MS HS		12
New York	ES MS HS	ES MS HS	ES MS HS	ES MS HS		12
Oregon	ES MS HS		ES MS HS	ES MS HS		9
Pennsylvania	ES MS HS		ES MS HS	ES MS HS		9
Arizona	ES MS HS	ES MS	ES MS HS			8
Illinois	ES MS HS		ES MS HS	ES MS		8
Nevada	ES MS HS	ES	ES MS HS			7
Texas	ES MS HS	HS	ES MS HS			7
California	ES MS HS		ES MS			5

[27] *Quality Counts*, 2003
[28] *Quality Counts*, 2003.

Quality Counts is not the only standards rating system that the State's experts reference. Walberg, Phillips and other of the State's experts also support their praise for California's test-based accountability system with a 2000 report grading states on their academic standards produced by Chester Finn and Michael Petrilli of the Fordham Foundation (Phillips Rept. p. 36).[29] Finn and Petrilli used the same truncated version of standards-based reform strategy as the State's experts. They considered content standards, tests to evaluate progress toward meeting the standards, and "tangible incentives and disincentives" (p. 133). Like the State's experts, the Fordham group excluded from their description of standards-based reform the resources and capacity schools and students need to succeed in such a system.

Finn and his Fordham colleagues graded each state's standards in English, geography, history, mathematics, and science separately, and calculated a "GPA" for each state. They gave California's standards an A- overall (GPA of 3.60), based on A grades for all subjects but geography, which they gave a C. They also placed California on their "honor roll" of states, along with Alabama, North and South Carolina, and Texas. Honor roll status was awarded to states that have both solid academic standards and what they call "strong" accountability. In Finn and Petrilli's scheme, strong accountability consists of five elements—report cards for schools, ratings for schools, rewards for successful schools, authority to reconstitute failing schools, and the actual exercise of these sanctions. This sort of grading is the equivalent of giving a track coach a "Coach of the Year" award because he set the high-jump bar higher than any other coach. Does it matter that no one on his team could jump that high, that the coach himself knew little about coaching, and that the athletes left the team mid-season, each one with a failing grade? Not at all. The five states on Finn's "honor roll" vary wildly in their achievement gains over the past several years on the NAEP, even after controlling for the composition of their student enrollments and for their resource policies. North Carolina has achieved the largest gains, Texas' gains are considerably lower, and South Carolina, Alabama, and California gains fall in the bottom half of the states.[30]

Economist Richard Rothstein offers a searing critique of the Fordham report and the account of it that Finn and his Fordham colleague, Marci Kanstoroom, provide in a Brookings paper.[31] Rothstein faults the Fordham for not grading states on whether they actually provide students with the resources and opportunities to learn what is required to meet the standards and pass state tests. He criticizes their failure to assess whether states employ multiple measures for assessing students to ensure that the assessments match the

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[29]Chester E. Finn, Jr. and Michael J Petrilli, eds., *The State of State Standards 2000*, Washington, DC: The Fordham Foundation. Walberg mischaracterizes Finn's report as a study by the Brookings Institution, rather than a Fordham Foundation Report (Report, p. 6). Finn is President of the Fordham Foundation, whose mission includes building support for education competition and choice.[29] Finn is a close associate of many of the State's experts, and with them, a strong advocate for test-based accountability, the rejection of concern about resources, and champion of privatizing public education.

[30]Ann Flanagan and David Grissmer, *Estimating State Achievement Trends by Racial/ethnic Group Using State NAEP Data*, Unpublished paper. Santa Monica: RAND, 2003.

[31] Chester E. Finn, Jr. and Marci Kanstoroom, "State Academic Sandards" in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 2001, pp. 164-174.

standards. He notes the failure to employ reasonable timetables for implementing accountability policies, and more.[32] California would be unlikely to earn high grades if Finn and Kanstoroom had included these obvious grading criteria.

It is also worth noting that, except for California, none of the highest ranking states in Finn's ranking overlap with those ranked most highly by *Education Week's Quality Counts*. In fact New York, Florida, Kentucky, Maryland, Massachusetts, Louisiana, Delaware, Oklahoma, Kansas, and Missouri—Quality Count's A and B+ -- states do quite poorly in Finn's rankings. Finn puts Missouri in his lowest group that he calls, "irresponsible states." Massachusetts has "unrealized potential." New York, Florida, Maryland, Kansas, and Oklahoma have "shaky foundations." Louisiana, and Delaware—"going through the motions." "Trouble ahead" for Kentucky. [33] Like Finn's "honor roll" states, the *Quality Counts* A and B+ states also span the range of states in terms of their gains in achievement scores on NAEP, after controlling for the impact of students' background characteristics and increased resource investments. New York ranks fourth from the top, Missouri and Delaware are right at the bottom, and the remainder are scattered in between.[34]

Finn and Kanstoroom, themselves, undermine the State's experts' citing the Fordham ratings as evidence of California's accountability superiority. In explaining the subjectivity of these ratings, Finn and Kanstoroom explain that organizations rate states differently because they have "different views about what a high-quality standard looks like." They cite Douglas Archebold's conclusion in his report to the National Educational Goals Panel that ratings given by different national groups diverge because there is a "a lack of consensus on how state standards should be organized, how specific they should be, and how they should transform instruction."[35] Finn and Kanstoroom conclude, "[N]o consensus has been reached for 'standards for standards.'" [36] They also write, "[P]olicymakers who are serious about boosting achievement might think twice before putting all of their eggs in this one reform basket."[37] However, they remain unequivocal in their preference for "[m]arket based reform . . . including charter schools, open enrollment, public school choice, and vouchers." In sum, the most that one can conclude from the Fordham Foundation's (or any other ranking group's) high grades for California is that the report reflects the particular analyst's (Chester Finn's, in this case) view of accountability.

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[32] Richard Rothstein, "Comment," in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 20012001.
[33].Finn and Kanstoroom, 2001.
[34]Flanagan and Grissmer, 2003.
[35]Douglas Archebold, as cited in Chester E. Finn, Jr. and Marci Kanstoroom, "State Academic Sandards" in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 2001, p. 141.
[36] Douglas Archebold, as cited in Chester E. Finn, Jr. and Marci Kanstoroom, "State Academic Sandards" in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 2001, p. 141.
[37]Finn and Kanstoroom, p. 163.

D. Overstating and misapplying empirical research on the links between accountability and outcomes.

The State's experts claim that empirical research on links between test-based accountability and student outcomes supports California's accountability policies. Some of these claims are simply assertions without supporting evidence. For example, Hanushek argues (without citation) that "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" (Hanushek Rept. p. 21).[38] Many of the actual studies the State's experts cite are not studies of test-based accountability. Those cited studies that do examine the effects of test-based accountability do not provide positive evidence about California.

Referencing irrelevant studies. Walberg, in particular, cites studies that have no bearing on whether state accountability systems contribute to student achievement. He relies on psychological studies of goal setting, international studies of curriculum-based examination systems, and studies of the low achievement of U.S. students who move frequently.

Walberg also cites irrelevant national surveys of schools that purport to have identified the factors that permit schools with high concentrations of minority students to "defy the myth" that such schools can't score well on achievement tests. (Walberg Rept. p. 11) These are not surveys assessing the impact of state accountability systems. Moreover, the cited survey conducted by Education Trust is highly suspect on methodological grounds.[39] Even if these surveys were studies of state accountability systems or if they met conventional research standards, their findings would still be of little use in defending California's approach to accountability. The factors that the survey authors associated with achievement in these schools that supposedly defy the odds (outlier schools) included increased instructional time, aligned curriculum and instructional materials, comprehensive monitoring and feedback processes at the school, resources for teachers' professional development, as well as a context of standards and accountability. These are similar to the types of educational tools that the plaintiffs seek.

Walberg also misrepresents and overstates the few empirical studies that have been conducted on the effects of state accountability systems. He references this research to argue that California's accountability system will increase students'

[38]It is important to note here that I know of no states that ignore outcomes. Hanushek is setting up a false dichotomy that allows him to make any assertion whatsoever about the states that do and do not focus on outcomes.

[39] For example, in the 12th Annual Bracey Report on the Condition of Education, published in the *Kappan*, Gerald Bracey provides a detailed critique of Education Trust's California selection process showing that the very lax criteria employed to identify schools considered high achieving, high poverty, and high minority essentially invalidates the results. Gerald W. Bracey, The 12th Bracey Report on the Condition of Public Education, Phi Delta Kappan, Vol. 84, No. 02, October 2002, pp. 135-150.

achievement without increasing the rates of students who fail to be promoted or who drop out of school altogether. (Walberg Rept. p. 15) He is not alone among the State's experts in this regard. The errors and mis-statements in Walberg's report are particularly notable, however, since he was retained by the State specifically to rebut the plaintiffs' concerns that California's current test-based accountability system is unlikely to be sufficient to ensure that the State provides education to all students on equal terms.

Misrepresenting relevant studies. The State's experts rely on a small number of studies that have explored whether test-based accountability policies have increased student achievement. Recent studies by educational economists Carnoy and Loeb, RAND, and Betts and Costrell are represented as showing that accountability policies like those used in California have a positive impact on students' achievement.[40] None of these studies, however, provides any positive evidence about California. Moreover, in each case, the analysts' conclusions fail to support the plaintiffs' contention that California's policies will allow the State to fulfill its obligation to maintain a productive and equitable system of public schools.

Walberg relies heavily on the Carnoy and Loeb's study of the impact of "strong" accountability on student achievement. Using Carnoy and Loeb as his source, Walberg lists nine states as in the "upper ranks of accountability" (Walberg Rept. , Table 1 and p. 15). The nine states are Texas, North Carolina, New York, New Mexico, Maryland, Kentucky, California, Alabama, and West Virginia. Here, we have a different set of top ranked states than those cited above, with some overlap. Notably, New Mexico and West Virginia appear on this list, but not on *Quality Counts* or the Fordham Foundation list. In terms of NAEP achievement gains over between 1990 and 2002, New Mexico's achievement gains are among the very lowest nationally, and West Virginia's are near the top.[41]

The "upper rank" states in the Carnoy and Loeb analysis were assigned a 4 or 5 (out of a 5-point scale) based on the "strength" of their accountability systems. By "strong," Carnoy and Loeb don't mean "good," in that they serve students well, but more in the sense of "powerful," in that they exert leverage and control by using test results as the basis of rewards or sanctions for schools and students. They rate California's system as a 4, explaining that this rating is given to states "that test and place *strong* pressure on schools or districts to improve student achievement (threat of reconstitution, principal transfer, loss of students) but do not require a high school exit test" (p. 12).

Carnoy and Loeb argue from their analysis that states with "strong" accountability have tended, on average, to have higher measured achievement than other similar states without such accountability schemes. However, Carnoy and Loeb made no effort to incorporate any resource variables in their analysis, so it is impossible to determine to what extent findings about the impact of "strong" accountability systems can be attributed to the accountability measures rather than to something else.

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[40]Martin Carnoy and Susanna Loeb, "Does External Accountability Affect Student Outcomes: A Cross-State Analysis," Educational Evaluation and Policy Analysis, 24, No. 4, Winter 2002, pp. 305-331;
[41] Flanagan and Grismer, 2003.

Most important for this case, is that Carnoy and Loeb's overall findings do *not* apply to California. California is a low scoring outlier among the "strong accountability" states. Carnoy and Loeb conclude that, "despite positive effects on math achievement of stronger accountability, we observe considerable variation among states with similarly weak or strong accountability systems" (page 20). The state-by-state data are displayed in Figures 1a through 1c (reproduced below), showing the gains in the percent of 8th graders reaching the basic level on the NAEP math exam from 1996-2000. For Whites, Blacks, and Hispanics the gains in California depart from the pattern; they are far lower than the gains in other states with comparably "strong" states' accountability systems. For Blacks, California had the lowest gain among all 50 states; for Whites, only three states showed lower gains than California; and for Hispanics, only five states showed lower gains than California. Thus, although Carnoy and Loeb's aggregate conclusions could be correct, the data demonstrates that California does not follow the national trend—i.e., California is a clear outlier. This may well be because California, unlike some other states, has not provided schools with the resources and capacity they need to respond to the pressure of their state accountability systems in ways that increase achievement. In turn, this would appear to support the plaintiffs' contention that "strong" accountability in the absence of adequate resources distributed on equal terms places a greater burden on the state's most vulnerable students. Carnoy and Loeb do not test out this hypothesis.

Figure 2: White students' achievement and strong accountability[42]

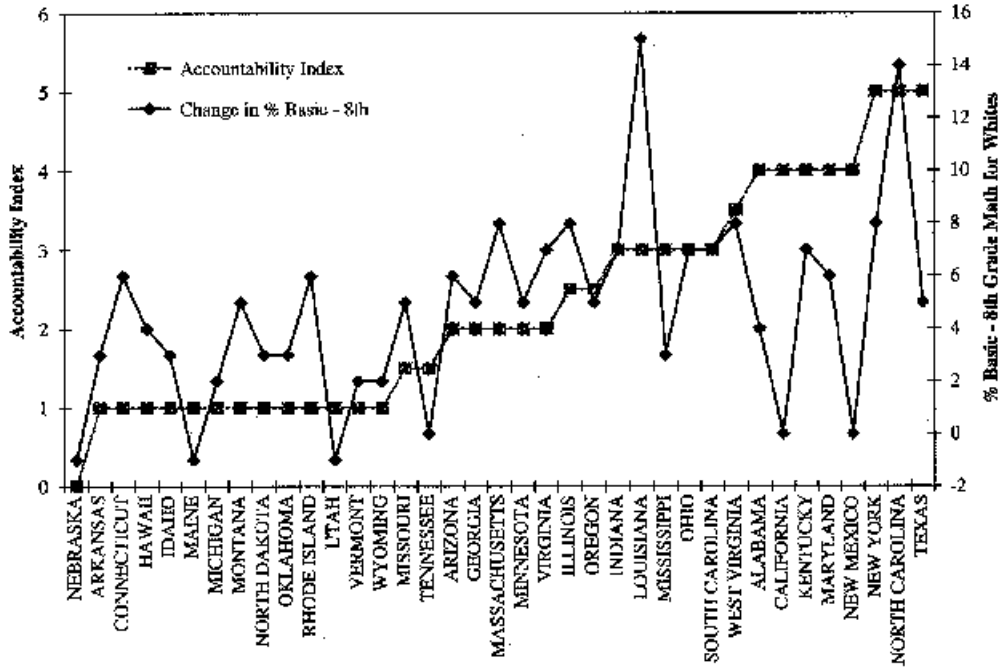

FIGURE 1A. *Accountability index and the gain in the percent of 8th graders reaching the basic level on the NAEP math exam from 1996–2000, Whites.*

Figure 3: Black students' achievement and strong accountability[43]

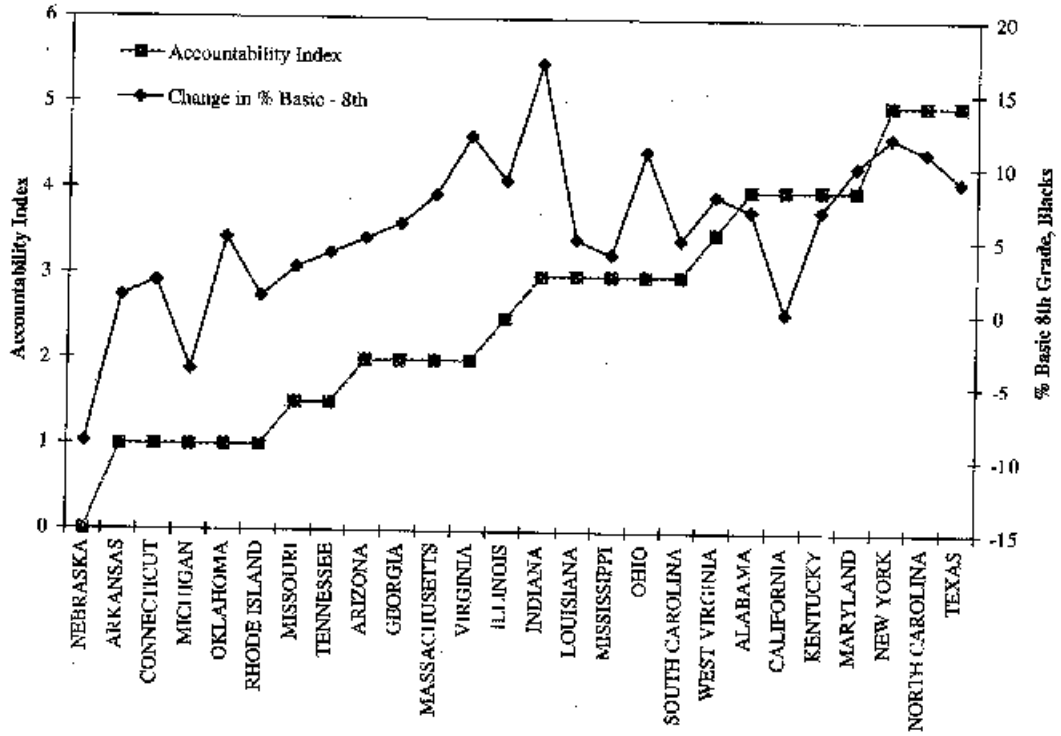

FIGURE 1B. *Accountability index and the gain in the percent of 8th graders reaching the basic level on the NAEP math exam from 1996–2000, Blacks.*

[42]Carnoy and Loeb, p. 315.
[43]Carnoy and Loeb, p. 315

Figure 4: Hispanic students' achievement and strong accountability[44]

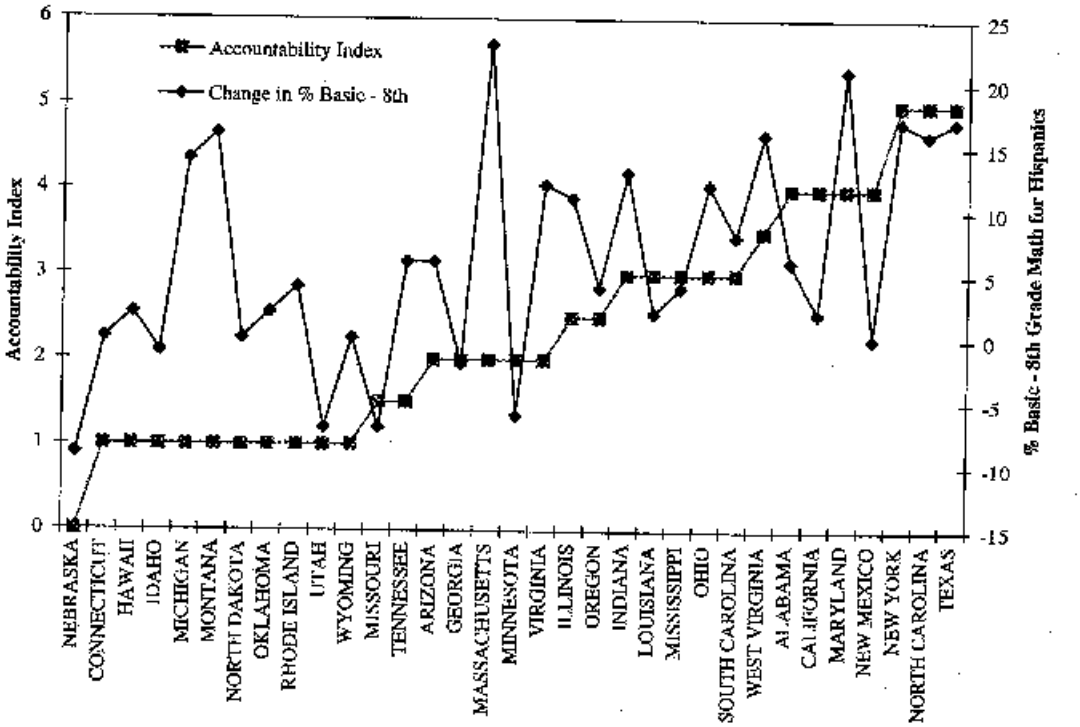

FIGURE 1C. *Accountability index and the gain in the percent of 8th graders reaching the basic level on the NAEP math exam from 1996–2000, Hispanics.*

[44] Carnoy and Loeb, p. 316.

Walberg also relies on a study conducted by economists David Grissmer, Ann Flanagan, and their associates at RAND for the National Goals Panel finding that achievement score gains on the NAEP in North Carolina can be attributed to standards, linked assessments, and accountability for results. (To his credit, Walberg also notes that the study found that aligned curricula and textbooks as well as feedback systems that provided data to teachers regularly were also important. Walberg Rept. p. 12) However, the Texas and North Carolina case studies were simply one part of a series of studies Grissmer and Flanagan conducted that examine state gains on NAEP.

Several findings of these studies not mentioned by the State's experts warrant consideration here. First, in their most recent national studies, Flanagan and Grissmer found that resource increases usually account for about 20 percent of the gains within states for 8th grade math, and for one-third to one-half of the 4th grade math score gains.[45] Thus, their study suggests that resources do matter. Second, Grissmer and Flanagan's results do not support the State's experts' contention that California's accountability system is in the top ranks. Flanagan and Grissmer place California in the lowest half of the states in terms of gains on the NAEP, even after controlling for students' background characteristics and changes in resources. Moreover, California's success in reducing the gap between minority and white students was close to zero.

Flanagan and Grissmer also find that, in most states, there remain statistically significant gains in achievement over the past several years that cannot be accounted for by family and resource variables. As such, their findings leave open the possibility of positive effects of statewide reform. However, they make clear that their findings provide no insight about what types of reform might have contributed to these gains and they emphasize that additional research is needed before links can be made between test-score gains and specific reform initiatives.

Flannagan and Grissmer also caution more generally, and appropriately, that inferences from analyses such as their own, as well as those of other scholars, such as Carnoy and Loeb, do not provide trustworthy evidence about the impact of state reforms on achievement.

> In the absence of more precise and detailed systemic reform data, evidence for the effects of systemic reform will have to be inferred by looking at the pattern of achievement gains across states that cannot be linked to resources. Such an analysis has the possibility of providing compelling evidence that the effects of systemic reform are small if no achievement gains remain after accounting for resources. However, it cannot provide satisfactory evidence for effects of systemic reform even if significant gains remain after resources have been considered (p. 9)

The State's experts also reference a study by economists Julian Betts and Robert Costrell as supporting the positive effects of accountability on achievement. The study

[45] Ann Flanagan and David Grissmer, "Estimating State Achievement Trends by Racial/ethnic Group Using State NAEP Data, Santa Monica: RAND, 2003

they reference, but don't fully describe, also names five states as having implemented standards, tests, and accountability policies. In addition to California, Betts and Costrell identify Georgia, North Carolina, South Carolina, and Virginia. This list, like the others, only partially overlaps with the Fordham Foundation list. In fact, the Fordham Foundation categorized Georgia as simply "going through the motions" and Virginia as on "shaky foundations" in their standards-based reforms. The Betts and Cantrell accountability "winners" also diverge in their record of NAEP achievement gains. In addition to North Carolina at the top and California and South Carolina near the bottom, Flanagan and Grissmer show that Virginia ranks near the middle of the states and Georgia even lower than California and South Carolina in terms of achievement gains.[46]

The State's experts do not report Betts and Costrell's conclusion that a major obstacle to standards-based reform is the "equity concern created by the large gap in school resources that currently exists among students from various socioeconomic groups in some states." In fact, they argue that school finance systems should meet state requirements for adequacy or equity across districts before high-stakes standards take hold. They also suggest that "judicious additional spending targeted at students likely to fail to reach standards without help would make sense."[47]

Hanushek cites, without detailing any findings, two of his own recent papers with Margaret Raymond.[48] Raymond cites these papers as well. She characterizes them as providing evidence that states with accountability systems produced greater gains on NAEP scores than states that lacked them. However, the paper identified as including the underlying data and analyses provides no analysis of the impact of "strong" accountability systems.[49] Moreover, Hanushek and Raymond classified states as having accountability systems if they used either report cards or rewards and sanctions. They conclude that "the results show that the use of sanctions and rewards does not create a significant positive effect over the use of report cards," but that states with either type did better than states with neither. Additionally, they report that states showed gains immediately after adopting accountability measures, but they do not continue to improve.[50] Because Hanushek and Raymond do not provide us with either the names of the states with "no accountability" or even tell us how many they categorized that way, we have no way of judging the credibility of their reported findings.

Despite their strong defense of California's system in their expert reports, Hanushek and Raymond admit in their other writings that there is no solid evidence to support this position. They note, "While research on the outcomes of accountability systems is growing rapidly, it still represents a young and highly selective body of work.

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[46] Flanagan and Grissmer, 2003

[47] Betts and Costrell, 2001, p. 54.

[48] Eric A.. Hanushek and Margaret E. Raymond, "Improving Educational Quality: How Best to Evaluate Our Schools? Federal Reserve Bank of Boston conference, Education in the 21st Century: Meeting the Challenges of a Changing World (June 2002); Eric A.. Hanushek and Margaret E. Raymond, "Sorting out Accountability Systems," in Williamson M. Evers and Herbert J. Walberg, editors, School Accountability, Stanford: Hoover Institution Press, 2002, pp. 75-104.

[49] Hanushek and Raymond, "How Best to Evaluate our Schools," 2002

[50] Hanushek and Raymond, "How Best to Evaluate our Schools," p. 31

The existing research suggests that schools definitely respond to the incentives of accountability systems, but the form and strength of such responses is highly variable."[51] They also conclude, "more extensive and focused analysis is needed before we can make many strong statements about the effectiveness of accountability for raising student performance."[52] They also write

> . . . the existing body of evidence about accountability systems is fairly sparse. Moreover, much of it does not help to diagnose the various sources of incentive impacts. Without greater attention across states to understanding the "signal to noise" characteristics of the systems in place, policy makers run the risk of confounding the true effects of their efforts with factors outside of their control. (p. 36)[53]

The plaintiffs agree, and contend that the "'signal to noise' characteristics" are also likely to include factors *within* the State's control, such as resources, qualified teachers, and adequate facilities available on equal terms to all students.

E. Dependence on an untested and unproven theory of incentives

Integral to the State's experts' argument is the idea that incentives, in the absence of increased resources, are the key to making schools more productive in that they will induce people to make more efficient choices. Their claim about the impact of incentives on productivity is little more than speculation. What they don't address, and that is of central importance here, is that incentives in the absence of the necessary resources, capacity, and opportunity exacerbate the impact of existing inequalities and have their most destructive impact on the state's most vulnerable students.

Considerable research has established that a set of baseline conditions must be in place for participants to be able to make efficient choices. Bandura's research on social efficacy, for example, suggests that people are likely to exert greater effort when they believe that their efforts will be successful—hence a baseline of decent conditions that support this belief becomes important.[54]

Eric Hanushek is probably the leading proponent of using incentives as the most economic leverage for improving schools, but he is not alone. (Hoxby Rept. pp. 4-5, 27-28; Raymond Rept. pp. 19-22) For example, State's expert Walberg conveys his enthusiasm and his common sense rationale in a opinion piece in *Education Week* and in a chapter included in a book he edited for the Hoover Institution:

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[51] Eric Hanushek and Margaret Raymond, "Lessons and Limits of State Accountability Systems," paper presented at *Taking Account of Accountability: Assessing Policy and Politics*, Harvard University June 9-11, 2002, abstract.
[52] Hanushek and Raymond, p. 34.
[53] Hanushek & Raymond, 2002a & 2002b (nearly identical papers).
[54] See, for example, Albert Bandura, *Social Learning Theory*, Englewood Cliffs, NJ: Prentice-Hall, 1977.

> "Most economists, psychologists, and lay people think humans respond to significant incentives. Parents, managers, and others responsible for improving performance routinely use incentives to encourage desirable behavior."[55]
>
> Simply publishing results appears insufficient for progress. People and groups responsible for accountability should be able to offer incentives and sanctions for performance. Praise and recognition may go a long way, but money talks. The prospect of being hanged in the morning, wrote Samuel Johnson, concentrates the mind. There is much interest in superintendent bonuses for results, "merit pay" for teachers, and even payments to students. Schools have been closed for repeated failure; more students are being held back a grade because they haven't met standards. Schools of choice risk closing if they attract no students. Analogous thinking dominates much of the rest of society. Why not schools?[56]

The theory is that faced with either the promise of rewards or the threat of punishment, students, parents, teachers, and administrators will act more efficiently and more vigorously. That is, they will evaluate the costs and benefits of the situation, and change their behavior in ways that support learning.

Incentives can't work in the absence of resources, capacity, and opportunity. Central to the theory of incentives is the presumption that students, parents, teachers, and administrators have the wherewithal to change their behaviors in ways that support learning. For students, this means that they have resources and opportunities—such as qualified teachers, appropriate textbooks and instructional materials, and school environments that are conducive to learning. Teachers need to have capacity and resources—that is, knowledge of the content students need to learn; knowledge and skill in teaching that content to diverse groups of students; and materials, supplies, and equipment for making content accessible to the students. As Phillips and Chin explain:

> Suppose policymakers created the ideal package of incentives that encouraged students to pay attention and complete their schoolwork, parents to help with their children's homework, and teachers to spend extra time preparing lessons and helping students. All this effort would probably not raise students' math scores much unless the students also had high-quality textbooks that they could take home, parents who had learned and still remembered some geometry and algebra, and teachers who both knew and could teach math. In other words, imposing consequences on students is unlikely to pay off in achievement unless it comes packaged with other standards-based reforms that encourage parents, teachers, schools, school

[55] Herbert J. Walberg, Incentivized School Standards Work, *Education Week*, November 4, 1998
[56] Walberg, "Principles for Accountability Designs," Williamson M. Evers and Herbert J. Walberg, Eds., *School Accountability: An Assessment by the Koret Task Force on K–12 Education.* Stanford: Hoover Institution, 2002, p. 159.

districts, states, and the federal government to provide both the effort and the resources needed to raise achievement.

Providing sufficient resources for students to meet the standards will also make standards-based reform fairer for the students it impacts the most. When schools raise the bar for promotion to the next grade or for high school graduation, the consequences (both positive and negative) will be greater for disadvantaged children than advantaged children.[57]

Of course, the presence of these resources and conditions won't guarantee that students learn well or that teachers teach well. But without them, the strongest incentives won't allow even the most highly motivated students and teachers to "produce" higher achievement. The presumption that the requisite resources and capacity are available is fundamental to theories of incentives driving rational changes in behavior.

This is the central issue of the case. No matter how motivated students are or motivated to become, hundreds of thousands of California students have been deprived the most fundamental resources of schooling—teachers, books, and safe, uncrowded schools in which to learn. Without these fundamental conditions, students do not have a meaningful opportunity to learn and to achieve high test scores. Without these fundamental conditions, incentives neither encourage educators, students, and parents to act more efficiently or more vigorously.

Flawed evidence that accountability incentives raise school achievement. Walberg provides two sources of "evidence" of the positive impact of incentives. One is his from his own evaluation of the Advanced Placement Incentive Program, initiated by the O'Donnell Foundation of Dallas—a program that, among other things, rewards students financially for succeeding on Advanced Placement exams. (Walberg Rept. pp. 14-15) Walberg touts the plan as "what is to my knowledge the first clear-cut, large-scale trial of monetary incentives for public school students." He concludes from his evaluation, "The AP incentive program shows that standards and incentives work in schools as they do in many other spheres of life." "This experiment and common sense suggest that we try further incentives and evaluate the results." [58]

In fact, the O'Donnell program is far more than an incentive program. In addition to the cash awards for students and their teachers, the O'Donnell money also provides training for teachers and tutoring services for students. The foundation also is underwriting development of curriculum guides for middle school pre-AP teachers in English, science and math, so that students have the background needed for AP classes. They have provided funds to hire curriculum experts who help the teachers. As the Dallas program has gained in popularity, the Texas Education Agency has given $450,000 a year to conduct pre-AP English training in seven other school districts. In a recent article about the program, Brenda Bradford, the Dallas school district's AP

[57] Phillips and Chin, 2001, p. 63-64.
[58] Herbert J. Walberg, "Incentivized School Standards Work," *Education Week*, November 4, 1998.

coordinator told the reporter that the program kept many teachers in the classroom who were thinking about retirement. They now have better resources-extra novels or more science equipment. The reporter concluded:

> For the teachers in this AP incentive program, it's not the money that matters (although most are happy to have it for the extra work). Instead, it's the support they receive from lead teachers who suggest ways to teach difficult material, as well as the sense that the school system-and people outside that system-care about their efforts.
>
> Some students, like Michael Boyles, a senior in the science and engineering magnet at Townview High School, see the financial incentives as "a nice little bonus when you're done" but say they don't take the classes for the money.[59]

Walberg may be correct in praising the O'Donnell program, but his conclusion that it "shows that standards and incentives work in schools as they do in many other spheres of life," is unwarranted. In fact, the success of the O'Donnell program is as likely to be a result of ensuring that students have what the Williams plaintiffs' do not. Highly qualified teachers, materials and support for learning to very high standards.

Walberg also cites a study of a Chicago Public Schools program by economists Betts and Costrell as evidence for the power of incentives.[60] The Chicago program, as Walberg describes it, gave students who "lagged behind grade-level standards" a choice of either being retained in grade or attending an "intensive, academic summer school program." Walberg notes that between "38 and 50 percent of the students succeeded, showing gains during the summer program of between .5 and 1.0 grade-levels" (Walberg Rept. pp. 14-15).

As in the O'Donnell program, the incentive (in this case, the disincentive of being retained in grade) may have played some role in capturing the attention of the students initially, and requiring them to participate a good opportunity (Walberg is not correct about the students having a choice to attend; Betts and Costrell report that they were required to attend). But what if they were pointed in the direction of very little opportunity? What if the incentive (or threat) simply pointed to a slack, uninspired, under-resourced, poorly taught program, or a program that was cancelled in a budget cut? What matters most was that the students were provided additional teaching and learning resources in the form of an intensive summer program. The additional support and resources clearly deserve credit for their learning. If the incentives drove the school

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[59]Kay Mills, "Pushing Advanced Placement: Dallas business and philanthropic communities lead the way in promoting incentives program," *Crosstalk*, Spring 2003. (http://www.highereducation.org/crosstalk/index.shtml).

[60]Julian R. Betts and Robert M. Costrell, "Incentives and Equity under Standards-Based Reform," In Diane Ravitch, editor, Brookings Papers on Education Policy 2001, Washington, DC: Brookings Institution, 2001, pp. 9074.

system to invest in these additional resources for struggling students, it should be credited with that, but not, in itself, with causing the students' learning gains.

Without resources, capacity and opportunity, incentives may trigger perverse responses. Incentives are based on a behaviorist theory of motivation—i.e., that carrot-and-stick consequences will propel schools and students to work harder to gain rewards and avoid punishment. This assumption has a number of flaws, particularly in the context of inequitable schooling. Among the several flaws of this approach summarized by Phillips and Chin in a commentary paper on accountability policies for the Brookings Institution, are some that speak specifically to the potential of incentive strategies to exacerbate, rather than ameliorate, the impact of California's educational inequalities.[61] For example, struggling students (perhaps those burdened with limited English skills or parents unable to help with home work) who work hard in hopes of receiving a reward (or avoiding punishment) and still fail, will learn that hard work brings punishments rather than rewards. As a result, these children will exert less effort in the future, rather than more.[62]

Incentives offered under adverse conditions—that is, in the absence of a reasonable opportunity to achieve a positive result—may actually backfire and produce a counterproductive result. For example, as economists Betts and Costrell note, students who already are struggling to succeed in school may become discouraged and give up altogether (e.g., drop out of school), if standards are raised and the stakes for failing are high. To ward off such perverse effects, Betts and Costrell argue that policies should be put in place that will support students and help make meeting the standards realistic. Incentives aimed at schools, teachers, and school systems based on students' performance can result in the inappropriate exclusion of students whose performance is likely to lessen the chances of meeting the standard. Flanagan and Grismer note in their most recent analyses of NAEP scores, for example, that exclusion rates, reflecting the increasing accommodations given in state administered tests, especially in 1998 and 2000, are responsible for a non-significant part of state's achievement gains—as much as 25 percent of the overall trend gains might be accounted for by changing exclusion rates. Flanagan and Grissmer caution that these exclusion rates must be taken into account in any evaluation that attempts to assess and compare state trends. For example, in Texas, when exclusion rates among Hispanics were factored into the test score gains, the group's achievement score gains slipped by a third.[63] Significantly, these patterns of exclusion are products, not aberrations, of an incentive-based model. Educators respond to incentive signals (promises of rewards and threats of punishment) by adopting strategies that meet the narrow goals laid out by the state. Because these narrow goals are imperfect proxies for the real goal of promoting aggregate learning, they drive counter-productive action.

[61]Meredith Phillips and Tiffani Chin, "Comment" in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*. Washington, DC: Brookings Institution, 2001.
[62] Bandura, 1977.
[63] Flannagan and Grissmer, 2003.

Other perverse effects, widely discussed in the standards-based reform literature is a reallocation away from high-level teaching toward instruction that emphasizes lower-level knowledge and skills that is the content of most accountability tests ("teaching to the test") and outright cheating. Hanushek and Raymond also acknowledge these problems:

> A review of the extant information on how schools react to accountability systems suggests that schools do indeed react to the introduction of accountability systems. At the same time, not all of the reactions appear to be desirable. A variety of investigations of attempts of schools to alter measured achievement without necessarily changing the reality indicates that schools do operate on this margin. Nonetheless, while discovering such unintended consequences is good sport for academics, one would expect the immediate gaming to be much more important than any continual gaming. In other words, this kind of behavior appears largely self-correcting.
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> Most of the initial investigations also show that the introduction of accountability systems leads states to improve on performance. The confusion with artificial increases through gaming or with responses tailored very specifically to the state testing, however, makes the evidence a little difficult to interpret [64]

Incentives can exacerbate inequality. California's recent experience with incentives provides additional evidence that incentives can exacerbate inequality if they are not linked to resources. My UCLA colleague John Rogers and I analyzed the distribution of the state's merit scholarships. Merit scholarships were awards toward college fees that were offered as an incentive for students to score high on either the state assessments or on Advanced Placement exams. A vastly disproportionate share of these state-provided scholarships were awarded to students living in high wealth neighborhoods. Students in low-wealth neighborhoods received no more than the minimum number of scholarship guaranteed to every school. As a result, the incentives for hard work and high achievement provided additional state resources to students who were already advantaged.[65] Of course, incentives can also be created to reward growth and avoid this problem, but this was not the case in California.

Incentives may increase grade retention or dropout rates. Walberg implies that Carnoy and Loeb's study demonstrates that "stronger accountability did not reduce promotion and dropout rates" (Walberg Rept. p. 15). Again, he misrepresents Carnoy

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[64]Hanushek and Raymond, "How Best to Evaluate our Schools," p. 19.

[65]Jeannie Oakes, John Rogers, Patricia McDonough, Daniel Solorzano, Hugh Mehan, Pedro Noguera, "Remedying Unequal Opportunities for Successful Participation in Advanced Placement Courses in California High Schools," Paper prepared in conjunction with Daniel v. State of California, January 10, 2000

and Loeb's conclusions. Carnoy and Loeb describe their doubts about the reliability of their analysis on retention and promotion; they also concluded that stronger accountability may be associated with decreased progression for Hispanic students:

> The longer-term effects of stronger accountability are less clear [than the effects on NAEP math test scores]. Our measures of progression through high school are not as reliable as we would like. Because they are based on state-by-grade enrollment in each year we cannot distinguish well among progression, migration and enrollment changes due to demographic population bulges. We find no evidence of a relationship between accountability and 9th grade retention, progression from 10th to 12th grade or progression from 8th to 12th for black or white students. However we cannot rule out the possibility that accountability is associated with increased retention and decreased progression for Hispanic students. Of the many specifications, only a few show a significant relationship between accountability and these outcomes, but the point estimates are not accurate. Certainly the results show no evidence of a positive affect of accountability on student progression through high school (p. 332).

Recent evidence from Texas and New York suggest that decreased progression is indeed occurring as a result of accountability pressures. In June 2003, state investigators revealed that educators at 12 Houston high schools and four middle schools had altered students' records to hide the fact that they had dropped out of schools. During his tenure as Houston superintendent, Rod Paige, current U.S. Secretary of Education, instituted performance contracting as a way to provide school administrators with incentives that would spur higher productivity in Houston schools. Principals forfeited their job security for higher pay under performance contracts. In plain terms, this policy meant that the principals would lose their jobs—no questions asked—if they didn't reach measurable objectives, including raising test scores and lowering dropout rates. The pressure on Houston educators to fudge the numbers was great, and they did. In an investigation by the Texas Education Agency, auditors reviewed records of 5,458 students who left school in 2000-2001 and found the records of 2,999 of them had wrong or missing information. Those students now are considered dropouts. In 2001, the district graduated 7,089 students and had reported just 1,251 dropouts. District and school officials wrongly reported that the students who had dropped out (and many suspect had been encouraged to drop so their low test scores wouldn't bring down the schools' average) had moved or transferred to another school. To set the records straight, the state had to reclassify nearly 3000 students as dropouts who school officials reported as having left school for other, legitimate reasons. The district faces being rated as "academically unacceptable" by the Texas Educational Agency if it doesn't improve its record-keeping in six months. In the meantime, the Agency has added "Special Accreditation Investigation" to the district's rating, a sign of serious problems that is applied to only three of the state's 1,040 school

districts. The agency lowered the ratings of 15 schools to "academically unacceptable" from their prized ratings as "exemplary" or "recognized."[66]

In July 2003, the *New York Times* investigators followed up on a report issued in 2002 by Advocates for Children of New York (AFC) and the Office of Public Advocate Betsy Gotbaum reviewed discharge data published by the New York City Department of Education (DOE) and found that over 160,000 high school age students were discharged during the 2000-2001, 1999-1998, and 1998-1997 school years.[67] The *Times* reporters discovered a situation similar to that in Houston. Thousands of the city's lowest achieving students were being "pushed out" by officials desperate to make their schools look good on the state's graduation tests. After "encouraging" students who were likely to fail to leave school, the educators covered their tracks by reporting falsely that the students had " transferred to another educational setting." The explanation was that, because schools with low graduation rates are likely to be designated as failing schools and risk losing their federal funding, schools are facing real temptations to make their results look good by getting rid of low performers.[68]

Clearly, the State's experts do not promote unprofessional and illegal manipulation of student data. Nonetheless, incentive systems prod educators to take vigorous action to realize goals. When rewards and punishments are great enough, some educators will seek to cut corners to achieve the goals—hence creating a greater need for oversight, which raises costs. Further, as noted above, as educational goals (meaningful learning and educational advancement) diverge from the proxies for these goals (generally test scores), educators often will take actions that conflict with the broader goals.

The State's experts venture into untested and risky territory when they offer their theory of test-based accountability driven by incentives as the best way (indeed, it appears that they think it is the *only* way to improve students' performance. Their scheme is not simply untested, it asks policymakers to disregard current inadequacies and inequalities and do nothing to reverse the growing trend toward more sever inadequacies and inequalities. The consequences of "incentives" for individual students are life changing. Being retained in grade often is a precursor of dropping out of school altogether. Dropping out or being denied a diploma can make the difference between a living wage job and poverty. To recommend that State put students in such jeopardy, and, at the same time, deny that the State needs management and oversight mechanisms to ensure that students have the teachers, instructional materials, and facilities they need is unconscionable.

Ultimately, the States' experts' offer no evidence that California's standards-tests-consequences approach to maintaining and overseeing schools is achieving or will achieve the results they claim. It is fair for the plaintiffs to ask, "If the

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[66] Associated Press story reported on cnn.com, September 9, 2003.

[67] Public Advocate for the City of New York. *Pushing Out At-Risk Students: An Analysis of High School Discharge Figures*, November 2002.

[68] Tamar Lewin and Jennifer Medina, "To Cut Failure Rate, Schools Shed Students," New York Times, July 31, 2003.

accountability/incentive system is so good, why are California's achievement scores so low?" and "When will my opportunities at my school achieve some parity with the opportunities available to most of the students in the State?" The State's answers: "It is too soon to judge the full impact of the program," and "It is not efficient to provide you with immediate relief," are not responses based on data or in law. Hanushek's and Raymond's own work tells us if improvements are forthcoming, they should have been produced upon implementation.[69] They have not.

Throughout their reports, the State's experts' insist that the plaintiffs must supply rigorous research evidence about the efficacy of their claims that all students should be provided basic educational resources. The plaintiffs have provided such evidence in abundance, which the State's experts ignore. The State's experts provide no such research evidence about the impact of their own policy preferences—standards, tests, and incentives—on student achievement. They cannot because none exists.

E. The State's primary expert on California's accountability system knows very little about it.

Finally, it is important to observe that the State's experts may defend California's current policy system partly out of ignorance. Herbert Walberg was retained by the State specifically to defend California's testing and accountability system, and he makes lots of claims about the worthiness of the system. However, Walberg also admits that he has only second-hand knowledge of California's policies and practices. He admits that he has not read California's regulations regarding K-12 education (Walberg Depo. p. 264), or the legislation regarding the State's accountability system (Walberg Depo. p. 320). He has read no state produced documents or data, and he's not inquired into experiences of California educators, etc. As such, he has very little knowledge of California's testing, and incentive-based accountability policies or their effects. A few examples will serve to make this clear.

Walberg cannot describe California's standards, tests, or incentives, or say whether they have changed over the years (Walberg Depo. p. 174). In fact, he has not actually looked at California's standards (Walberg Depo. p. 392) or the state's tests, noting "I haven't made a specific analysis of the content of the California State examinations. So I wouldn't be prepared to compare them with any of the others" (Walberg Depo. p. 398). He doesn't know how well the Stanford 9 or any other test used by California is aligned with California's standards, and admits that he has never examined that alignment. (Walberg Depo. pp. 152-53) He doesn't know whether the Stanford 9 is currently being used, or whether other tests are used, or the grades at which students are tested (Walberg Depo. p. 410). He seems to be completely unaware of the California Standards Tests (Walberg Depo. p. 429). He knows almost nothing about California's High School Exit Exam—its history, current status, or how it fits into the accountability system. In his deposition, Walberg presumably mistakes California's current STAR testing program for its former testing system:

[69]Hanushek and Raymond, "How Best to Evaluate our Schools," p. 31

> "[I]t was my impression that the STAR system was a system that was tried many years ago here in California, and it was to use a number of what might be called exotic items that normally would not be given on standardized tests, particularly for surveys of a whole state or large numbers of people. (Walberg Depo. p. 137:9-13)"

Walberg has no understanding of how California's Academic Performance Index (API) is constructed, or reported (Walberg Depo. p. 236). Walberg admits, "I'm not an expert on the API." (Walberg Depo. p. 235:10-13) "I don't consider myself an expert on, let's say, the numerical degree of alignment or the calculation of the API and certain other things that you asked me about." (Walberg Depo. p. 183:3-6). He doesn't know what the SARC is (Walberg Depo. p. 244:7), or whether the state now requires schools do any reporting (Walberg Depo. p. 257-59) or whether that reporting harms achievement (Walberg Depo. 261).

Finally, despite Walberg's claim that California's accountability is "near state of the art," he has no knowledge of whether California's assessment system has raised achievement in California, whether more schools have failed than succeeded in meeting expectations on the API (Walberg Depo. p. 236-237), or whether there are schools that have repeatedly failed to meet expectations on the API, or whether any schools have been sanctioned as part of the state's accountability system (Walberg Depo. p. 367).

Walberg has little or no knowledge of whether California's accountability system includes or promotes the features of the schools he pointed to as good examples of standards-based reforms in the Ed Trust study (Walberg Depo. p. 432), including the ability "to identify and provide early support to students in danger of falling behind in their instruction?" (Walberg Depo. p. 434) or to provide "activities addressing parents' knowledge of standards?" (Walberg Depo. p. 435) or to encourage parents' "involvement in curriculum and involving them in reviewing student's work." (Walberg Depo. p. 436). Or, whether it provides intensive student support of the type that he admired in the Chicago study (Walberg Depo. p. 454). Walberg has very little knowledge about the topic of Professor Mintop's report—the mechanisms California has in place to intervene in troubled schools. During his deposition, Walberg had no knowledge of either FCMAT or II/USP, and could recall doing no research on either (Walberg Depo. pp. 189-190). He's not familiar with CCR (Walberg Depo. pp. 359-360). He said that he didn't know whether California provides any assistance to low-performing schools (Walberg Depo, p. 444). Walberg admits, "I'm not an expert on governance issues" (Walberg Depo. p. 210:12-13), and he claims no expertise on school finance (Walberg Depo. p. 228:8).

VII. Distorting and offering irrelevant critiques of plaintiffs' recommendations for realizing equal opportunity

I conclude this report with an analysis of the State's experts' strong objections to the plaintiffs' experts recommendations for remedying California's current unequal distribution of essential educational resources and for creating a State policy system that would prevent, or discover and correct future inequalities. These objections follow from the State's experts' view of overall levels of achievement (productivity) as the most valued aspect of schooling and of the means by which that productivity can be achieved best (test-based accountability with strong incentives). The following points stand out:

- The State's experts mischaracterize, even caricaturize, the plaintiffs' experts' recommendations for remedy. They assert that the plaintiffs' experts are opposed to educational goals and processes that the plaintiffs' experts actually support. They then proceed to critique the recommendations as they have mischaracterized them.

- The State's experts say very little about the relief that the plaintiffs' actually seek. Instead they fill the pages of their reports on matters unrelated to the plaintiffs' claims, and they respond to hypothetical and groundless problems.

- By calling the plaintiffs' recommendations failed input-based policies of the past, the State's experts circumvent the essential issues of this case. In fact, the State's experts express preferences for policies that continue to promote a highly centralized education system that undermines local community control of schools, stifles professional decision making, impedes good management, discourages parent involvement, undermines achievement, and excuses poor performance—all charges they level against the plaintiffs.

- The State's experts claim that the plaintiffs' experts' recommendations counter the will of the people as enacted by state government. In making this claim, the State's experts ignore the role of the judicial system to place checks on legislative overreaching. The tripartite division of government protects the plaintiffs' right to seek the court's intervention to secure their constitutional rights. They also are wrong about what the public prefers.

- The plaintiffs argue that qualified teachers, adequate materials, and safe and healthful facilities are essential to education. They also argue that it is the State's constitutional responsibility to ensure the equitable distribution of these resources to all children in the state. The State's experts concede, generally, that it is desirable for schoolchildren to have qualified teachers, adequate materials, and a safe and healthful facility for learning, but they reject the State's role in specifying and providing these essentials. As to the question of the equitable distribution of qualified teachers, adequate materials, and a safe and healthful facility, the State's experts say nothing at all.

B. What the plaintiffs experts recommend

The plaintiffs' expert reports recommend a set of principles to guide California's efforts to create and maintain a more equitable educational system. The aim is to create a management and oversight system that would provide all California students with the essential tools of education on equal terms. This goal is modest: to ensure a "floor" of basic resources, below which no students' educational opportunities should fall, and equitable access to opportunities for learning. Each student should have a qualified teacher, appropriate textbooks and instructional materials to use in class and to complete homework, and a safe, healthy, and uncrowded school building in which to learn. The State should develop a system of management and oversight that prevents, or discovers and corrects, inequalities in the provision of these essential resources.

To accomplish these goals, the State should develop policies for a standards-based State education system that includes all three legs of the standards-based reform stool. They also outline the fundamental elements of an accountability system that a) places valid, fair, and useful measures of students' achievement of the State's standards in the context of measures of the learning resources and conditions under which students were expected to learn; b) clarifies the lines of State, regional, and district responsibility for ensuring that all students have these learning resources and conditions, with mechanisms that hold the appropriate officials at each of these levels accountable; and c) includes a two-way flow of accountability information; and provides legitimate roles for local community, parent, and students in holding the system accountable. More elaborate explanations of these principles can be found in the report I prepared that synthesizes the plaintiffs' expert reports.[70]

Plaintiffs' experts also offer examples in their initial reports of management and oversight policies from other states. These references to examples in other states are not to be considered as models or prescriptions to be followed, but as existence proofs that demonstrate that these principles can and have guided state policy. These examples are also summarized in my synthesis of the collection of plaintiffs' expert reports.

B. Setting the record straight

My response to the State's experts' critique of the plaintiffs' experts' recommendations must begin by simply setting the record straight. The State's experts fabricate incorrect positions to represent the plaintiffs' beliefs and intentions. Although it seems unnecessary to have to counter these inaccurate representations, I do so here. The bold headings represent the accurate and truthful positions of the plaintiffs' experts.

The plaintiffs' experts seek to increase students' academic performance. The whole point of this case is to create the conditions that make it possible for students to achieve, including achievement of the performance goals that the State has for them. The State's experts frequently advance their view that students' family and community characteristics are so determinative of student achievement that there is little that schools

[70]Oakes, 2002.

can do to change patterns of low achievement among low-income and students of color. The plaintiffs don't buy that. They maintain that schools can and do matter—that California students' academic performance results from their participation in schools. The plaintiffs argue that California can again take great pride in an educational system that enables all students to learn well. That many Californians are poor, and a majority of California's students now come from communities of color must not be used as an excuse for either poor performance or for not providing all students with basic educational resources.

The plaintiffs' experts support standards. California's standards provide an important anchor to this case. The plaintiffs' ground their complaint in their goal to have all students meet those standards. But without qualified teachers and the aligned textbooks and instructional materials to make the knowledge and skills accessible, standards are a cruel trick. As plaintiffs' expert William Koski describes in his report, the standards ground the plaintiffs' claim that all California students have a right to these basics. They show how essential resources and opportunities to learn are for meeting California's content and performance standards. Moreover, the plaintiffs' first and perhaps most important recommendation for a remedy in this case is that the State needs more, rather than fewer, standards. They argue that standards specifying that all students must have qualified teachers, sufficient texts and materials, and facilities conducive to learning would strengthen California's standards-based system immeasurably, since they would establish that all students must have the basic tools they need in a standards-based educational system.

The plaintiffs' experts endorse accountability. The plaintiffs argue for a real system of accountability that expands the current system, but is neither costly nor intrusive. Real accountability spreads responsibilities for meeting education goals across the entire system, and the key to this accountability is good information about learning and resources throughout the system. It's the State's job to provide that information—not only about how well students are doing, but how the State itself is doing. The plaintiffs' experts support the development of valid and reliable measures of meaningful schooling outcomes. They also support the positions of the American Psychological Association, the American Educational Research Association on the appropriate conditions for the use of high-stakes tests. Information about outcomes and school conditions can inform the State, the district, the school, and the public about the status of schools and the educational system as a whole, and trigger actions that are powerful enough to improve the State's lowest-performing schools. What the plaintiffs' experts oppose is a form of accountability based on a hollow carrot-and-stick theory of school improvement layered onto a system that fails to provide the tools for succeeding on an equal basis.

The plaintiffs' experts applaud efficiency. The principles the plaintiffs offer to guide the State's remedies place a strong emphasis on ensuring that the State's resources are used efficiently. Standards for ensuring that all students are provided essential educational tools must be accompanied by policy instruments that build the capacity of local districts to implement these policies and monitor how well that is done. Adequate monitoring will enable the State to intervene quickly when the implementation does not

meet the standards. All of these measures have the efficient use of State resources, as well as educational effectiveness, as their goal. The State's experts use scare tactics to warn about unrestrained expenditures. However, the State's current monitoring and reporting of resources and the effectiveness of their use is so inadequate that we don't know whether enough money is already in the system for meeting basic resource standards.

The plaintiffs' experts seek good management. The principles the plaintiffs offer to guide the State's remedies promote good local management. They require the State to provide mechanisms to allow the State to prevent, or discover and correct, the local management problems that interfere with students' access to basic educational tools. If the State chooses to delegate the day-to-day management of school resources to local districts (which most agree is a reasonable decision), the State cannot relinquish its management and oversight responsibilities. Therefore, if appropriate textbooks sit in warehouses for months instead of being distributed to the students who need them, the State is not free to deem mismanagement simply a local district problem. The ultimate management responsibility for determining whether or not students have access to basic educational equality necessarily lies with the State.

The plaintiffs' experts support local control for communities and flexibility for local educators. The plaintiffs' experts endorse state standards and accountability that ensure that all students must have qualified teachers, sufficient texts and materials, and adequate facilities, and they also recognize that the state should not prescribe the specifics of school practice. Armed with the basic tools that education requires, local communities and their educators are the ones who can decide how best to use these tools to help students to meet educational goals. The State's experts are correct when they argue that the details of school practice should not be dictated from the State capitol. Nevertheless, the State's provision of essential resources makes the local generation of good practice possible. It's disingenuous to argue for local flexibility and then claim that fundamental resources are not necessary.

The plaintiffs' experts also believe that these can only be accomplished in a state system that ensures that all students are provided with the essential tools of education.

B. <u>The State's experts caricaturize the plaintiffs' experts' recommendations and then critique the caricatures</u>

The State's experts employ a two-step strategy to counter the plaintiffs' recommendations. First, they mischaracterize them completely. They distort the substance of the recommendations, and they misrepresent the plaintiffs' experts' motives for offering them. Then, they critique the distorted substance and the misrepresented motives that they themselves have created. In what follows, I expose State's experts' mischaracterizations of the plaintiffs' recommended remedies. And, even though it seems unnecessary to do so, I show how they have manufactured the set of dire

consequences that they claim would follow from plaintiffs' recommendations as they have distorted them.

The State's experts mistakenly argue that plaintiffs' experts' remedies will waste money creating state-of-the art schools. The point of the State's experts' efforts to demonstrate that resources don't matter is to bolster their flawed argument that, if the State provides all students with qualified teachers, appropriate instructional materials, and decent facilities, it will be simply wasting money. Walberg puts it this way in his report:

> The plaintiffs' experts seek to turn back the clock to a failed system of testing and a failed top-down scheme of close regulation of operations, burdensome reporting, and costly monitoring of the policies and practices of districts and schools -- this at a time when the State of California is severely pressed financially and educators are in the midst of enacting the carefully planned accountability system. (Walberg Rept. p. 4).

To make their argument the State's experts caricature the plaintiffs' desire for basic educational tools as wanting state-of-the-art schools. Phillips, Hoxby, and others of the State's experts point to Kansas City's desegregation remedy as an example of what would happen if the plaintiffs' experts' recommendations that all students be provided essential educational tools were attempted. The fact that a desegregation effort in one other state was not successful does not undermine the efficacy of the relief the plaintiffs seek. Phillips, for example, identifies the Kansas City plan as a "remedy for decaying school facilities, poor teachers, outdated instructional materials, and low-performing students." She asserts that in the desegregation order, "a federal judge imposed an inputs model similar to that described by Russell on the Kansas City, Missouri Public Schools" (Phillips Rept. p. 35). However, the very research on which the State's experts rely shows that Kansas City desegregation experience was materially different from what is at stake in this case.

Phillips relies on a Cato Institute report by Paul Ciotti. Looking at Ciotti's account carefully, it is clear that, contrary to his claims, the Kansas City experiment in no way parallels plaintiffs' desired remedy in California. The text of Ciotti's article, as biased as is, provides concrete details that make clear how different the Kansas City remedy was from the relief that the *Williams* plaintiffs seek. Although the plaintiffs' experts do suggest that salary increases could attract teachers to hard-to-staff communities, a suggestion that State's expert Hanushek has also made,[71] none of the rest of the "resources" described by Ciotti bear any resemblance to the essential tools the plaintiffs' seek.

> The money bought higher teachers' salaries, 15 new schools, and such amenities as an Olympic-sized swimming pool with an underwater viewing room, television and animation studios, a robotics lab, a 25-acre wildlife sanctuary, a zoo, a model United Nations with simultaneous translation

[71]Eric A. Hanushek, John F. Kain, and Steven G. Rivkin, "Why Public Schools Lose Teachers," *Journal of Human Resources*, forthcoming.

> capability, and field trips to Mexico and Senegal. The student-teacher ratio was 12 or 13 to 1, the lowest of any major school district in the country. [72]

The plaintiffs in this case seek only a guaranteed "floor" of essential educational tools—qualified teachers, appropriate instructional materials, and decent buildings. They do not seek 25-acre wildlife sanctuaries, but classrooms free of rats.

The State's experts mistakenly argue that plaintiffs' remedies will centralize control of educational in ways that will undermine local control, prohibit educators from making professional decisions, and undermine student achievement. One of the most repeated false assertion in the State's expert reports is that the plaintiffs' seek to replace local decision making with State regulation of the details of school practice. They caricaturize the plaintiffs' experts' recommendations as measures that would over regulate the day-to-day operations of local schools. For example, Walberg mischaracterizes plaintiffs' experts as seeking to regulate

> The teaching, the curriculum, the development, testing and things of that nature, class sizes and the various choices that a teacher and a principal might have, and it also pertains to district decisions to some extent. Regulation of those means that the State would have specifications of what those things should be (Walberg Depo. p. 256).

Hanushek erroneously accuses plaintiffs of calling for an approach that "completely eliminates any local discretion and would move toward a complete State run system" (Hanushek Rept. pp. 17-18). He argues without any basis that the plaintiffs' experts' recommendations "call for dismantling any set of local programs specifically tailored for their student populations whenever they did not meet to [sic] the grand rules that are proposed by the plaintiffs" (Hanushek Rept. p. 15). Raymond argues similarly, "Plaintiffs' argument is founded on a view of centralized control that runs deeply counter to the current organization of education in the United States and ignores many of the advantages local control can offer" (Raymond Rept. p. 5)

This is just not the case. The plaintiffs' experts have been clear throughout that they simply want to ensure that all students have access to basic educational tools. These tools—qualified teachers, instructional materials, and facilities—are the raw materials of schooling. Having them available expands, rather than constricts the array of choices available to educators and communities as they decide how to conduct schooling best in their local context.

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[72]Cato is a conservative organization dedicated to "individual liberty, limited government, free markets, and choice." Cato's education work, according to its website, "develops measures to clear the path for entrepreneurial activity and increase parental power in education. Through books, monographs, conferences, forums, op-eds, speeches, congressional testimony, and TV and radio appearances, the Center's scholars seek to shift the terms of public debate in favor of the fundamental right of parents and toward a future when state-run schools give way to a dynamic, independent system of schools competing to meet the needs of American children." http://www.cato.org/research/education/index.html

Dire warnings without evidence. Having distorted the plaintiffs' experts' recommendations (and, in Hoxby's report, calling the plaintiffs' experts' expressed support for local decision making "disingenuous" (Hoxby Rept. p. 1)), the State's experts warn that the recommendations, in their caricaturized form, would have dire consequences. They would, in the State's experts' view, undermine local community control, stifle professional decision making, frustrate good managers, discourage parent involvement, depress achievement, and provide destructive excuses for students' low achievement.

Hoxby focuses specifically on the detrimental effect on school management, parental engagement, and local control of the recommendations that she misrepresents as "forcing a set of inputs and policies on schools" (Hoxby Rept. p. 5). She argues without evidence that, under such policies, "a good manager may find himself unable to use resources effectively . . . " (Hoxby, Rept. p. 5). Later, she speculates, again with no evidence, that "making the state responsible might even cause local administrator [sic] to abdicate their responsibility to correct the facilities and grounds problems they see" (Hoxby Rept. p. 28).

She provides three pages of discussion of the importance of parents on students' achievement, and hints that the plaintiffs' recommendations would decrease constructive parental contributions to students' achievement. But, her actual analyses focus primarily on the impact of parents' social class characteristics (or the proxies for them that her data set includes), not on parent involvement. Moreover, her analyses, like many other flawed production function analyses, can't sort out the impact of social class from the impact of the quality of school resources and conditions. As noted before, the two are so highly correlated (i.e., nearly all high-SES students are in well resourced schools, and nearly all low-SES students in poorly resourced schools), she cannot possibly determine which has the greater effect. However, the more central problem is that these analyses are irrelevant to her suggestion that the plaintiffs' experts' recommendations will decrease parental involvement.

Hoxby also makes a failed attempt to show that the centralized approach that she describes erroneously as the plaintiffs' experts' recommendation "makes schools worse, not better" (Hoxby Rept. p. 14). She acknowledges, however, that the evidence available to support this contention is "highly suggestive" (Hoxby Rept. p. 14) and that "we cannot say that California's greater centralization is responsible for its poorer performance" (Hoxby Rept. p. 21). She uses this evidence anyway, violating the standards that she established at the beginning of her report for research that can be used responsibly when investigating influences on student achievement. She claims that the evidence shows that states with more centralized policies have lower student performance, and provides a figure with an arrow that shows the centralized policies *causing* lower performance. Hoxby's evidence shows no such thing. The far more likely explanation (and one made by others, including Carnoy and Loeb[73]) is that the states with large populations of low-income students and students of color have adopted the policies that she calls "centralized." These are also mostly Southern states with a long history of segregated

[73] Carnoy and Loeb, p. 312.

schooling. Because students in these states tend to score less well on achievement tests, have higher dropout rates, and lower college going, there is a correlation between the policies and outcomes, but this correlation provides no evidence of causation as Hoxby asserts.

Hoxby's specific comparison of California with just a few other states is also flawed. Hoxby chooses to compare California's achievement specifically with a handful of what she characterizes as "other high-income states." She is wrong on several counts here. She asserts, without citation, "California has the highest median family income of any state" (Report, p. 21). In fact, according to US Census Bureau data, California's median family income is lower than several other states.[74] Even if she were correct, her selection of comparisons based on median income is also inappropriate because that measure does not reflect California's large proportion of low-income parents of school children. Moreover, Texas and North Carolina are right at the top of Hoxby's centralization list, and yet they are consistently touted by the State's experts as showing more improvement in achievement than other states.

Hoxby also argues, but does not prove, that centralization of policies at the level of the state can be "alienating" to parents and residents and make them "less willing to make efforts that are complementary to the schools' activities," "suppress parental or neighborhood support for education," and fewer donations of time, effort, and resources (Hoxby, Hanushek Rept. pp. 15-16, 21). Here, again, she uses crude and inappropriate correlational analyses to show that parents are less involved in states that have centralized policies. Doing so, she violates her own standards for good research. Hoxby makes similarly flawed assertions and analyses to show that centralization likely creates greater, than less inequality in spending across states (Hoxby Rept. p. 24-25). All of these analyses exhibit the problems that poorly done production function analyses are susceptible to.

Test-based accountability systems, by design, shift control of schooling to the State. Although there is no evidence that plaintiffs' experts' actual recommendations have any of the harmful effects that Hoxby and the other State's experts warn of, the same can not be said for the test-based accountability system that the State's experts' find so appealing. Here, there is more than "highly suggestive" evidence. One could make the same arguments about the negative impact of test-based accountability that Hoxby makes about her selected centralizing policies. States with test-based accountability have lower achievement than others. Therefore, adopting Hoxby's approach, one could argue that test-based accountability causes low achievement. Of course, just as with Hoxby's claim, it would be irresponsible to use gross correlational evidence to support such an argument.

What we do know is that, by design, state systems of standards, tests, and accountability incentives put more control of educational practices in the hands of the State. That's what they are meant to do. Consider the very purposes of test-based

[74] http://www.census.gov/hhes/income/4person.html

accountability. State standards dictate local goals; state tests drive the content and emphasis of instruction; incentives manipulate local behavior.

In fact, incentives' analysts on whom Walberg relies, economists Betts and Costrell, argue that this centralizing feature of accountability is integral to its value. If locals are left to their own devices, some districts would be likely to set their standards low, allowing their graduates (and themselves) to "free ride" on the public perception that standards-based reform has increased educational productivity of school and the quality of their graduates.[75] In fact, one of the claims made about the success of Texas and North Carolina, for example, is that the statewide reforms have affected central city, rural and suburban areas of these states similarly.[76]

The State oversight and management strategies the State's experts prefer actually centralize and standardize far more than what the plaintiffs recommend. The current policies that the State's experts applaud have, if they have done nothing else, placed the major control over education in the hands of the State. The very fact that we now talk regularly and measure how well states compare with one another makes clear that the State, rather than local school systems, is in the education policy driver's seat. As *Quality Counts* noted in its special report on Standards and Accountability,

> Critics assert that the whole premise of standards-based school improvement is fundamentally misguided because it shifts the locus of control from individual schools, teachers, and parents to distant state bureaucrats. They also contend that the tests being used to drive higher expectations are, ironically, squeezing out high-quality instruction, and that the standards are producing mindless and undesirable standardization in schools.[77]

Plaintiffs' oversight recommendations will burden the system and weaken accountability. As noted above and in the plaintiffs' experts' initial reports, one of the plaintiffs' recommendations is that the State develop an expanded state accountability system that places valid, fair, and useful measures of students' achievement of the State's standards in the context of measures of the learning resources and conditions under which students were expected to learn. Such a system, the plaintiffs' experts argue, must take into consideration information about the schools' resources, conditions, and opportunities, in addition to measures of students' achievement and other important outcomes.

One of the examples of how that might be done is through on-site reviews conducted by education professionals with the expertise to gather information about, in plaintiffs' expert Russell's words, "the programs and practices [schools] have in place,

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[75] Betts and Costrell, 2001, p. 17.

[76] David Grissmer and Ann Flanagan, "Searching for Indirect Evidence for the Effects of Statewide Reforms," in Diane Ravitch, editor, *Brookings Papers on Educational Policy 2001*, New York: Brookings Institution, 2001.

[77] *Quality Counts* citation (5th annual report).

the appropriateness of these programs and practices given specific context and background indicators, and the effect these programs have on a variety of student outcomes."[78] Such information could be used both for State oversight and to inform local decision making. As one example of how such information could be collected, the plaintiffs' experts point to the English school inspectorate system. In my report on textbooks and instructional materials, for example, I offer the following example:

> Her Majesty's Inspectorate of Schools (HMI) is a model of oversight that is carried out by a cadre of well-educated, highly qualified individuals who evaluate schools for accountability, program quality, and effectiveness. Inspectors do not enforce regulations or compliance, but collect information. . . . Variations of HMI are common in other countries, and could be adapted to the California context.[79]

Grubb and Goe's and Mintrop's initial reports also offer the English inspectorate as an example. However, in their reports, the experts offer considerable cautions about pitfalls in the English system that California would want to avoid. Grubb and Goe note, in fact that "the elementary-secondary inspections system in England is a sorry example — the process is used as an accountability system to criticize individual teachers, to belittle individual schools, to fire administrators, to reconstitute schools, and in general to make educators feel demeaned and despised." They conclude that "[t]he obvious lesson is that inspection systems need to be carefully structured and developed in a climate of support . . ."[80] Mintrop cautions, "The work of evaluation would focus on discovery of "improvement potential" rather than judgment as in the case of the English Inspectorate."[81] Finally, I make quite clear in my deposition that I did not include the example of the English inspectorate system because I thought that California should replicate it. Rather, as I stated there, "I am not recommending that California imitate the British system anymore than I am recommending that it imitate any other system. I am simply using this as an example of another strategy for insuring accountability to illustrate the point that there are stronger mechanisms available. . . . some concrete images of what stronger policies might look like.[82]

The State's experts misconstrue the plaintiffs' use of it, and then denigrate what they caricaturize as a recommendation to copy the English system. Walberg asserts in his report, "Mintrop favors the English inspectorate system," and, "Mintrop's argument for an English-style inspectorate for accountability is flawed . . ." (p. 31). As if the plaintiffs' experts had not pointed to problems with the particulars of the English inspection system, Walberg cites Chris Woodhead as "well qualified by experience to

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[78]Michael Russell, *California's Accountability System and the API,* Plaintiffs' expert report, *Williams v. California*, 2002,, p. 55.
[79] Jeannie Oakes, *Access to Textbooks, Instructional Materials, Equipment, and Technology*, Plaintiffs' expert report, *Williams v. California*, 2002p. 107.
[80]Norton Grubb and Laura Goe, *The Unending Search for Equity: California Policy, the "New" School Finance, and the Williams Case*, Plaintiffs' expert report, *Williams v. California*, 2002, p. 58.
[81] Heinrich Mintrop, Public School Accountability, State Oversight, and Intervention in California's Distressed Schools, Plaintiffs' expert report, *Williams v. California*, 2002, p. 24
[82]Oakes, deposition, pp. 1086-1087.

judge" the inspection system. Woodhead was a political appointee to the position of Chief Inspector, and served for six years.[83] Walberg cites both Woodhead's book and his 2002 talk at the Hoover Institution's Koret Task Force (that Walberg attended) as sources for Woodhead's declaration that the English Inspectorate is "a failure" (Walberg Rept. p. 31)

However, the 2002 Newsletter of the Hoover Institution, still posted on its website, provides a somewhat different and puzzling account. It reports that, during his invited talk for the Task Force, Woodhead described how "the office of chief inspector of schools, which he headed, dispatches teams into the schools to do a full evaluation of the schools' effectiveness," and that Woodhead recommended this as "another tool to help improve education in the United States." This is puzzling, given the fact, as Walberg notes, that Woodhead has criticized the inspectorate in many of his other writings. Experts Hanushek, Hoxby, and Walberg are all members of the Koret Task Force.[84]

Woodhead is known for his controversial views, however. Since his resignation as Chief Inspector, he has advocated for the complete privatization of public schools, and for ending schooling for young people who are not "academically inclined at age fourteen" in school beyond age fourteen, so that they can begin a career "working with their hands." As recently as November 2002, he argued, "[t]here are many who think that it is best to keep people in education for as long as possible. But there is no economic argument to back that up."[85] Referring to low-skilled students in England, Woodhead concluded, "In some cases you can't just go on flogging a dead horse."[86]

Plaintiffs' experts' remedies are unproven. Finally, the State's experts hold the Plaintiffs' experts' recommendations to the same inappropriate burden of proof that they applied to the claim that teachers, books, and facilities are fundamental to education and that they should be provided equally to all students. At least two of the State's experts' claim, once again, that the plaintiffs' recommendations for remedies must meet an extraordinary standard: They must show that the remedies they suggest will be superior to state's current policies for increasing achievement, as measured by test scores. Raymond, for example, asserts, that "it rests with plaintiffs to prove that their choice of means is superior" and that the plaintiffs have the "burden to show that the State's current decisions and policies" relating to three issues are ineffective and completely unreasonable. Further plaintiffs must demonstrate that their proposals are a superior solution to providing a Constitutionally adequate education to California' student population" (Raymond Rept. p. 3). Hoxby argues similarly, "[T]he plaintiffs should be required to *demonstrate* that their preferred policies will have a positive *causal* effect on California schools" [emphasis in original] (Hoxby Rept. p. 36).

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[83] "Woodhead's resignation: the reaction," *The Guardian*, November 2, 2000, http://education.guardian.co.uk/ofsted/story/0,7348,392211,00.html. http://education.guardian.co.uk/ofsted/story/0,7348,392217,00.html; Roy Hattersly, "Thank Goodness He's Gone," The Guardian, November 3, 2000,

[84] "Koret Task Force on K–12 Education Convenes at the Hoover Institution," Hoover Institution Newsletter, September 16, 2002, www.hoover.stanford.edu/publicaffairs/newsletter/02092/koret.html.

[85] Nick Britten, "Let Pupils Quit School, at 14, Says Woodhead," *Telegraph*, November 2002.

[86] Britten, 2002.

The State's experts mistakenly argue that the plaintiffs' pursuit of these remedies counters the will of the people and violates democratic processes. The State's experts assert that the "democratic" processes of education policymaking (legislation, administrative regulation setting, local school boards, etc.) are the means by which the people of Californian should (and do) establish the educational policies they prefer. Hoxby calls the plaintiffs' "audacious" because they seek to "substitute their judgement [sic] for the judgement [sic] of Californians . . ." (Hoxby Rept. p. 1). Raymond argues

> The legislature enacted the Public Schools Accountability Act in 1999 after input from the Board of Education, legislators and their constituents and other interested parties, including the California Teachers' Association. Opportunities were available to any interested person or party to express opinion. Opportunities were available to influence the opinions of legislatures through lobbying or grass-roots efforts. But none of these avenues were utilized. Instead, plaintiffs are attempting to circumvent the normal policymaking process. Not satisfied with attempting to redefine policy through the courts, their focus on forcing upward accountability through the California Department of Education is in complete disregard for the constitutional process in California for managing policy disputes, namely the election of the legislature and the governor. (Raymond Rept. p. 5)

Rossell speculates that the plaintiffs have pursued the cases because they "do not know how to achieve the lofty goals they propose within the constraints of an open, democratic political process where many competing individuals and groups have access to government . . ." (Rosell Rept. p. 34).

With these statements, Hoxby, Raymond, and Rossell imply that any call for policies that could prevent or discover and correct fundamental inequalities are at their core anti-democratic because they would change or add provisions that have not emerged through the democratic legislative or regulatory process. By extension, one would presume, these State experts would argue that the courts have no legitimate role in deciding in favor of the plaintiffs.

The most obvious problem with their assertion is they ignore that a central role of the judicial system is to adjudicate claims that the will of the majority has violated the fundamental constitutional rights of individuals or politically powerless minorities. The plaintiffs here are seeking no more than their basic rights to equal treatment by the State.

The States experts also argue repeatedly that the plaintiffs' efforts to impose their "preferences" over the wishes of the majority as evidenced by public opinion. They assert that the public likes test-based accountability, and only education researchers like the plaintiffs' experts are opposed to it. Here, I must reiterate that the plaintiffs' experts are not opposed to good outcome measures, and they are clearly in favor of genuine accountability. In any event, the most recent Gallup poll conducted for the *Phi Delta*

Kappan about public attitudes toward education shows that the States' experts' claims about the popularity of test-based accountability are overstated. The Gallup researchers emphasized the following findings, and even they warned that presumptions that the public supports test-based accountability are likely unwarranted.

- 66% percent believe a single test *cannot* provide a fair picture of whether a school is in need of improvement.

- Only 15% believe testing on English and math alone can produce a fair picture of whether or not a school is in need of improvement.

- Only 26% believe it is possible to accurately judge a student's proficiency in English and math on the basis of a single test. 72% believe it is not possible.

- 66% believe the emphasis [of the federal "No Child Left Behind" law] on standardized testing will encourage teachers to teach to the tests, and 60% believe this would be a bad thing.

- 80% said that they were concerned a great deal or a fair amount that relying only on testing in English and math to judge a school compromise other domains of schooling, such as art, music, history, and other subjects.[87]

Based on equal opportunity principles or on public opinion, the State's experts are wrong about the illegitimacy of the plaintiffs' pursuit of remedies in this case.

C. Disingenuous praise for California

Many of the State's experts express considerable criticism for the State they have been hired to defend, either in the form of specific criticisms of state policies, and, more consistently in their other writings about education policy and education reform. It turns out that there is much about California's state policies that they do not like. Some of their criticism parallels that of the plaintiffs' experts.

Although Raymond is far from alone in critiquing California's policies, her deposition testimony provides explicit examples of the State's experts' disapproval of California's current education policies. She offered in her deposition a number of very negative judgments. Like the plaintiffs' experts, Raymond found California's School Accountability Report Cards to be problematic,

> "it turned out that the completeness of the data is sorely wanting. And even where the data exists, some schools describe the process by which they make that decision, and other schools describe what the decision was, and

[87] The 35th Annual Phi Delta Kappan/Gallup Poll of the Public's Attitudes Toward Public Schools. *Phi Delta Kappan*, September 2003.

> there doesn't appear to be any – there seems to be just sort of a blind acceptance on the part of CDE that whatever shows up in those SARC fields just gets put in the SARC data set. So we rejected SARCness" (Raymond Depo. p. 246)

Raymond also criticizes the State's current policies for abridging local control,

> Under the current way in which education policy is organized and delivered in California, I wouldn't go so far as to say that the State maximizes local control. If you're asking me a normative question, yes, I would prefer that the State maximize local control (Raymond Depo. p. 261).
> I would have to say that I think that the tendency has been towards giving localities more of the responsibility, but giving them less of the latitude (Raymond Depo. p. 262)

Finally, Raymond is also severely critical of California's II/USP intervention system. Responding in her deposition to a question about whether the state has some responsibility when schools repeatedly fail to help their students achieve,

> It's actually a huge policy question, and especially in California, knowing, as I'm sure you do, that the intervention remediation program in the state -- I think the technical term would be "ridiculous." We do have this tsunami that's waiting to hit, which is: What do you do about schools that are chronically underperforming? And as a state, we do not have a vehicle for dealing with that at this point (Raymond Depo. pp. 282-83).

Notably, the school report cards and the II/USP system underlie California's high rating for Accountability by *Quality Counts*, the source relied on so heavily by the State's experts as they praise California's current approach to management and oversight.[88]

Although Raymond may be the most open about her criticisms, particularly in the context of this case, she is far from alone in criticizing California's policies. Summers makes clear her view that high-quality accountability systems should include dropout and college going rates, in addition to achievement tests, as measures of educational outcomes.[89] Hanushek is explicit about the weaknesses in California's data system, in that it doesn't provide longitudinal data that enable a "value added" analysis of schools' performance.

Underlying these State's experts' criticism of California as it currently is, however, as well as their criticisms of what the plaintiffs' recommendations, is their fundamental dislike and mistrust of state-operated public schools. They have made their advocacy for an extremely limited government role in education, privatization, and competition absolutely clear in much of their scholarly and advocacy work.

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[88] *Quality Counts*, 2003.
[89] *Quality Counts*, 2003.

When confronted with the most basic questions: Should school children be provided with basic educational resources, many of the states experts agree. For example, Duffy agrees that some students attend schools where the facilities are in terrible conditions, even though most students' don't experience such problems. He also agrees with the plaintiffs' experts regarding the need for State standards for facilities provided that the standards local officials work with state officials to develop the standards rather than having state officials develop the standards on their own. He also agrees that policies that support the development of local capacity, oversee the implementation of facilities standards, and mechanisms that allow for intervention when needed would help make school facilities better (Duffy Depo, pp. 341-348). And recall that Berk acknowledges, "There are surely schools in California whose educational infrastructure is unsatisfactory. And just as surely, many of those schools are in low-income areas" (Berk Report, p. 21).

Others of the State experts who agree with much of the plaintiffs' claims qualify their agreement with their preference for an extremely limited State role and privatization. Raymond admits she agrees with the plaintiffs that "every student deserves qualified teachers, adequate instructional materials, and clean and decent facilities that are conducive to learning."[90] She just disagrees with the means by which this can be provided. Hanushek agrees that high quality teachers matter; he just doesn't want government to specify how those teachers should be prepared or to certify them. Hanushek wants students to have decent facilities; but, rather than spending resources wisely or efficiently, government might seek "gold-plated school facilities."[91] Walberg wants students to have high-quality instructional time in school and to be engaged in serious homework during their out-of-school time;[92] he just thinks the private sector can better provide the context in which this will occur. Hoxby asserts that "The most effective role that the state can play is to: ensure that each school has a relatively equal level of resources [funding] and that schools that use their resources *efficiently* are able to meet California's performance standards" (Hoxby Rept. p. 4). Nevertheless, she qualifies her endorsement of resources with the caveat, "there is no substitute for good management that takes account of local circumstances" (Hoxby Rept. p. 4). Hoxby's advocacy for limited state involvement and privatization, as well as her assertions about the effects of "centralization," reveals her view that state involvement is destructive to good local management.

Many of the State's experts also agree with the plaintiffs' that school, communities, and the public need good information, including information about school resources and conditions. Summers argues strongly throughout her report that accountability systems need to include measures of inputs as well as outputs. Berk argues for proximity and transparency in collecting data about schools (Berk Rept. p. 3). Hoxby wants the State to "provide schools with information that they may use to improve

[90] Raymond Report, p. 1.
[91] In a December 2000 article in *Education Week*, Hanushek commented, "I think having reasonable schools is important. What I object to is putting money into gold-plated school facilities." Mark Stricherz, "Bricks and Mortarboards," *Education Week*, December 6, 2000.
[92] Walberg, 2002.

achievement ad maximize the effectiveness of resources" (Hoxby Rept. p. 4). Hanushek agrees (Hanushek Rept. p.16). In Walberg's work with the OECD's international indicators' project, he has led the effort to develop good measures of school conditions, resources, and processes as part of OECD's international educational monitoring system. Raymond argues explicitly, "California needs to do a much better job of collecting consistent measures of students and teachers and performance than they are currently doing" (Raymond Depo. p. 118). Like Walberg, Summers, and the plaintiffs, Raymond argues in her deposition for measures that include school resources and conditions, "I'd love there to be a good measure of leadership within a school. I'd love for there to be a measurement of cohesion to the curriculum plan for the school. I'd like there to be measures of the enrichment resources that were available for students. I would like there to be a measure of professional development opportunities utilized by teachers. (Raymond Depo. p. 157).

These State's experts' agreement with the plaintiffs' on the essential educational resources and conditions that California's schoolchildren deserve and their similar conceptions of what information the State should provide is heartening in that it suggests consensus amongst the State and the plaintiffs' on essential issues in the case. How, then, might one understand the State's experts vigorous, although fundamentally flawed, rejection of the plaintiffs' concerns about California's failure to provide all of its students with these resources? How might one understand the State's experts' vehement opposition to the plaintiffs' recommendations for remedies to these inequalities?

Understanding the States' experts' arguments in this case, I submit, requires that one understands their underlying theories of educational improvement and the analytic approach that many of the State's experts use to pursue it. That is, the State's experts' logic makes sense only in the context of their strong adherence to a narrow view of effective schooling and school improvement, and their almost exclusive reliance on flawed production function analyses. Throughout this report, I have examined the State's experts' analyses both for their relevance to the case and for the methodological competence of their execution. My examination shows that the State's experts' consistently attempt to "reframe" the case; that is to exaggerate or invent claims that the plaintiffs do not make, and then marshal arguments that dispute those claims (of the State's, not the plaintiffs') design. These arguments and analyses, then, have generated two types of errors: First, they are false from their inception because they are irrelevant to the case as brought by the plaintiffs; and second, they are frequently incompetently carried out—rife with error, omissions, and in violation of standard methodological protocols.

The plaintiffs seek to provide the State, the public, and educators with the ability to monitor whether all students have access to essential educational resources and opportunities necessary for learning, as well their achievement, and to intervene to correct any deficiencies that may occur. A rich body of information about student outcomes and school conditions should also be used by local communities and educators to improve the public education they provide their children. For the State's experts, information gathering should not focus on equal opportunity and access to fundamental

resources. Data about outcomes should not be examined in the context of unequal school conditions and opportunities. Information on "inputs" are most useful for analyses that promote efficient resource use, and that enable educators to adjust their expectations for students based on their family and community characteristics that, they believe, are so determinative of educational outcomes. Information on outcomes is important primarily to generate quality rankings of schools that will be useful, primarily, as parents increasingly exercise their choices in the educational marketplace.

In the end, the State's experts' argument would undermine the state's efforts to maintain and oversee a system of equitable public schools provided for in the California's constitution and that have been the primary focus of California's State government for more than 150 years. In a 1925 article posted on the website of the Museum of the City of San Francisco, Will C. Wood, California State Superintendent of Instruction during the 1920s, provides this apt account of the centrality of public education to California's founding.

> "I regard education as a subject of particular importance here in California, from our location and the circumstances under which we are placed, the immense value of our lands and the extent and wealth of the country."
>
> So spoke Robert Semple, delegate from Solano county in the first Constitutional Convention of California, held in the quaint old city of Monterey in 1849. He was voicing the hopes and aspirations of hardy pioneers who had come "round the Horn," across the plains or over the Isthmus of Panama to lay the foundations of the first American state established on the shores of the Pacific.
>
> "I think," continued Mr. Semple, "that here, above all places in the Union, we should have, and we possess the resources to have, a well regulated system of education. Education, sir, is the foundation, sir, is the foundation of republican institutions; the school system suits the genius and the spirit of our form of government. If the people are to govern themselves, they should be qualified to do it. They must be educated; they must educate their children; they must provide means for the diffusion of knowledge and the progress of enlightened principles."

Appendix A

Discounting criticisms of California's educational system

To discredit the plaintiffs' claim that California's State education system has deprived large numbers of students of essential educational tools, the State's experts attempt to show that California has a sufficient supply of basic educational resources and, to do this, they compare California to other States. Not only are these experts highly selective as to their points of comparison (an abundance of overlooked comparisons support the plaintiffs' contentions), this approach ignores the central concern of the case—whether basics resources are available to all California students on equal terms.

The material in this appendix reviews the State's experts' use of state comparisons to defend the overall sufficiency of California's educational policies.[1] It establishes the following:

- The State's experts use highly selective and questionable state comparisons to bolster their contention that California is doing as well as can be expected. These comparisons are neither relevant nor competent.

- Despite the State's experts' claims, comparisons of California with other states highlight California's poor schooling outcomes.

- Despite the State's experts' claims, comparisons of California with other states highlight California's inadequate resource policies.

A. Comparing California with other states

Russell Gersten, John Kirlin, Michael Podgursky, and Christine Rossell all use comparisons with other states to judge the adequacy of California's provision of educational resources (Kirlin Rept., p. 3). These comparisons are neither relevant nor competent.

They offer analyses of educational spending overall, spending devoted to the particular resources the plaintiffs have named as essential, and some general comments about the comparative quality of resources across states. They conclude broadly that California compares favorably in terms of its outcomes and resources. In fact, they argue that California is relatively untroubled by the problems that the plaintiffs identify. One is hard pressed to find support anywhere for similarly generous views of California's educational system. Given the overwhelming evidence of California's problems—including abysmal student achievement—much of which is revealed in the experts' own

[1] Note that several other of the State's experts compare features of the California's accountability system with those of other states. Those comparisons will be reviewed in Section of this report.

analyses for this case, one wonders how they can find the current system in California either acceptable or equitable.

John Kirlin's report, in particular, provides illuminating examples of how the State's positive comparisons of California's system with other states are fundamentally flawed. Throughout he uses a highly selective and questionable sample of eight comparison states. He argues that these eight states are more appropriate for comparisons with California than any other set of states. He explains that three of these states are appropriate comparisons because they share borders with California (Arizona, Nevada, and Oregon). His reasoning here is faulty. Just because states are contiguous does not mean that they are similar in any particularly relevant way, and, in fact, Arizona, Nevada, and Oregon are no more similar to California than many other states Kirlin might have chosen. Kirlin cites as his rationale (Kirlin Rept., p. 4). Yet, it is unclear how migration levels to and from California are relevant for choosing a "reasonable" comparison state for purposes of analyzing the composition of students. Although Arizona, Nevada, and Oregon are sources of migration to and from California, they do not represent the states with the highest levels of migration. The contiguous states do not include the number one state of origin (Texas), instead they are numbers 2 (Arizona), 7 (Oregon) and 9 (Nevada). Nor do they include the number one destination state (Washington), instead they are numbers 2 (Nevada), 3 (Arizona), and 4 (Oregon).[2]

Kirlin's other five comparison states are those states next in size of elementary and secondary enrollments (Texas, New York, Florida, Illinois, and Pennsylvania) (Kirlin Report, p. 4). Here, the logic is equally puzzling. Kirlin argues that "the five large elementary and secondary enrollment states (Texas, New York, Florida, Illinois, and Pennsylvania) share the challenges of educating diverse populations" (p. 4). This statement is neither explained nor supported. While he refers to the numbers of limited English proficient students and those on free and reduced lunch, Kentucky and New Mexico both have higher proportions of students receiving free/reduced lunch than the state with the highest proportion of students receiving free/reduced lunch among Kirlin's high enrollment states. New Mexico has a higher proportion of students receiving LEP services. Yet Kirlin does not include them as reasonable comparison states.

Kirlin's analyses also report a highly selective set of indicators of educational outcomes and resources. As I show below, when states are compared more comprehensively on the factors that Kirlin purports to compare, California's standing among his comparison states drops considerably. In sum, Kirlin fails to answer the most basic challenge to his analysis: His analysis is neither methodologically competent nor relevant to the case.

The other State's experts' comparisons are also troubling. Rossell's analysis of educational spending compared California with all other states on per-pupil expenditures.

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[2]Hans P. Johnson and Richard Lovelady, *Between California and Other States, 1985-1994*, A Joint Research Project of the California Research Bureau of the California State Library and the Demographic Research Unit of the California Department of Finance, 1995, pp. 31-32. www.dof.ca.gov/HTML/DEMOGRAPH/Dommig.pdf

But, her analysis must be discounted because she changed the data about California's spending in the U.S. Census Bureau's data set. Podgursky's comparison of California's teachers' salaries with those in other states is unhelpful, because he does not factor in any cost of living differences. Gersten's comparison of instructional materials provided for English learners tell us nothing. He simply asserts, "[California's] newly-adopted instructional materials are dramatically better than the materials used by California in the past. They also are better than those used in many other states" (Report, p. 3). However, Gersten provides no citation to research, new analyses, or further discussion to substantiate his comparison. In sum, like Kirlin's comparison, these analyses are neither methodologically competent nor relevant to the case.

In what follows I review in further detail several (though not all) specific problems in the State's experts' comparisons offered in defense of California's current system. I begin with John Kirlin's comparative analyses of California's educational outcomes. These analyses set a peculiar standard for the comparative worth of the State's educational system. For those who place such ultimate faith in educational productivity, it's ironic that Kirlin and the other State's experts defend a state whose schooling outcomes are so low, as revealed by the latest national achievement data showing California's abysmal performance on the National Assessment of Educational Progress.

B. Justifying California's poor outcomes

Kirlin claims that his comparisons of California to other states show that California's outcomes reflect the extraordinary challenges of teaching the state's large number of low-income and migrant students. These challenges, he argues, rather than any resource problems or state oversight, explain why California does so poorly on some indicators.

Low achievement. Kerlin correctly acknowledges that California students' math, science, and reading average academic achievement as measured by NAEP lags behind the states with which he believes comparisons are appropriate (Kirlin Report, pp. 9-11). The tables below display these achievement comparisons. However, Kerlin fails to mention that California's national rankings are even more dismal. For example, in 2002, only 21 percent of California 4th graders scored above "proficient" on the NAEP reading test. The only state that did worse than California was Mississippi. Only Nevada had a smaller proportion of proficient 8th grade readers than California—by one percent. Twenty percent of California's 8th graders and 19 percent of Nevada scored proficient or better.[3]

[3] National Center for Education Statistics, The Nation's Report Card, 2002, http://nces.ed.gov/nationsreportcard/

Table 9: State Differences in NAEP Math, Science, and Reading Achievement
Grades 4 and 8
Comparing California with 8 "Kirlin States" [4]

	AZ	California	Illinois	NV	New York	Oregon	PA	Texas
STUDENT ACHIEVEMENT (Percent scoring at or above proficient)								
4th grade NAEP math (2000)	17	15	21	16	22	23	?	27
8th grade NAEP math (2000)	21	18	27	20	26	32	?	24
4th grade NAEP science (2000)	22	14	31	19	26	28	?	24
8th grade NAEP science (2000)	24	15	30	23	30	33	?	23
4th grade NAEP reading (1998)	22	20	?	21	29	28	?	29
8th grade NAEP reading (1998)	28	22	?	24	34	33	?	28

Kirlin claims that these low scores are understandable because California faces more challenges than any of these comparison states in educating children successfully, given its diverse student population. He cites, in particular, California's high percentage of students who are limited in their English proficiency. (Kirlin Rept. p. 9).

[4] National Center for Education Statistics, The Nation's Report Card, 2002, http://nces.ed.gov/nationsreportcard/

This is an odd claim, given that the NAEP assessments allow states to exclude from the test students who are not proficient in English. That means that many of the students to whom Kirlin attributes California's lower test scores are not even represented in the State's NAEP results. The claim is also incorrect because California's low scores are not simply a function of the low performance of the State's low-income minority students on NAEP.[5] Table 10 below shows low performance of California's white, African American, and Hispanic students. California's white students score lower in math than their counterparts in the other comparison states except Nevada, where white students do slightly worse. In science, California's white students rank at the bottom of the comparison states. Kirlin doesn't report these results.

Table 10: Math and Science Sub-group Achievement Grades 4 and 8 Comparing California with 8 "Kirlin States" [6]

	Arizona	California	Illinois	Nevada	New York	Oregon	PA	Texas
MATH Percent of 4th graders scoring at or above proficient on the 2000 NAEP mathematics exams								
White	26	25	32	23	34	26	?	41
Black	5	2	5	5	5	?	?	12
Hispanic	6	5	8	8	7	6	?	14
MATH Percent of 8th graders scoring at or above proficient on the 2000 NAEP mathematics exams								
White	31	27	38	26	36	34	?	37
Black	8	4	7	7	10	15	0	6
Hispanic	8	7	11	9	12	13	?	14
SCIENCE Percent of 4th graders scoring at or above proficient on the 2000 NAEP science exams								
White	34	27	46	27	40	32	?	39
Black	9	4	7	4	6	?	?	10
Hispanic	7	5	10	8	9	10	?	12
SCIENCE Percent of 8th graders scoring at or above proficient on the 2000 NAEP science exams								

[5] National Center for Education Statistics, The Nation's Report Card, 2002, http://nces.ed.gov/nationsreportcard/

[6] National Center for Education Statistics, The Nation's Report Card, 2002, http://nces.ed.gov/nationsreportcard/reading/

White	35	26	44	31	45	38	?	36
Black	8	6	5	7	8	8	?	7
Hispanic	8	5	12	9	11	10	?	12

Also of note in this table is that California is less successful with Black and Hispanic students than the eight comparison states. In both math and science and at both grades 4 and 8, California's minority students fall at the bottom of the comparison states.

Additionally, the most recent NAEP reports finds that in California's largest urban area, Los Angeles, students fall far below their similarly situated peers in urban centers around the nation.[7] To ignore this finding one would have to believe that the disadvantages accruing to these students could be made to disappear by averaging their scores with a large enough number of higher achieving students. The tables below compare the reading achievement in grades 4 and 8 in six major urban areas. In grade 4, Los Angeles had the fewest students score at or above "basic" than any of the cities except Washington D.C. Los Angeles' eighth graders were below every city but Atlanta.

These tables show that, although California's overall achievement scores may be lower as a result of the so-called "challenges" that accompany its greater diversity, there are other problems as well. It is not simply that California has more African American students (which it does not) or Latino students (which it does). It is also the case that each of California's subgroups exhibits lower achievement than similar students in other states. This suggests strongly that the State bears more responsibility for its low achievement levels than it would like to admit.[8]

[7] National Center for Education Statistics, The Nation's Report Card: 2002 Reading and Writing Trial Urban District Assessment, 2003.

[8] Recall, too, that Darling-Hammond's plaintiffs' expert report cited a recent study by the Public Policy Institute of California finding that after adjusting for the demographic characteristics of the student population, California students still perform considerably worse than those in other states on the NAEP, the tests used in the National Education Longitudinal Study (NELS), and the SAT (also adjusted for participation rates). On national tests, after adjusting for language backgrounds, ethnicity, and parental education, the performance of low-income students was "especially hard hit by the decline in school quality in California." John Sonstelie, E. Brunner & K. Ardon, For better or for worse? School Finance Reform in California. San Francisco: Public Policy Institute of California, 2000, p. 136.

Table 11: NAEP Urban District Achievement in Reading
Grades 4 and 8

Percentage of students at or above each reading achievement level, grades 4 and 8 public schools: By urban district, 2002

	Below *Basic*	At or above *Basic*	At or above *Proficient*	At *Advanced*
Grade 4				
Nation (Public)	38	62	30	6
Central city public [1]	49 **	51 **	21 **	4 **
Atlanta	65 *,**	35 *,**	12 *,**	3 *,**
Chicago	66 *,**	34 *,**	11 *,**	2 *,**
District of Columbia	69 *,**	31 *,**	10 *,**	2 *,**
Houston	52 **	48 **	18 **	3 **
Los Angeles	67 *,**	33 *,**	11 *,**	2 *,**
New York City ‡	53 **	47 **	19 **	5
Grade 8				
Nation (Public)	26	74	31	2
Central city public [2]	36 **	64 **	23 **	2 **
Atlanta	58 *,**	42 *,**	8 *,**	# *,**
Chicago	38 **	62 **	15 *,**	1
District of Columbia	52 *,**	48 *,**	10 *,**	# *,**
Houston	41 *,**	59 *,**	17 *,**	1 *,**
Los Angeles	56 *,**	44 *,**	10 *,**	# *,**

Percentage rounds to zero.
‡ Although deemed sufficient for reporting, the target response rate specified in the NAEP guidelines was not met.
* Significantly different from central city public schools.
** Significantly different from nation (public schools).
[1] For comparison, at fourth grade 65% of students in central city public schools and 40% in public schools nationally were non-White. Also, 61% of students in central city public schools and 43% in public schools nationally were eligible for free/reduced-price school lunch.
[2] For comparison, at eighth grade 61% of students in central city public schools and 36% in public schools nationally were non-White. Also, 47% of students in central city public schools and 34% in public schools nationally were eligible for free/reduced-price school lunch.
NOTE: Percentage below and at or above *Basic* may not add to 100, due to rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2002 Trial Urban District Reading Assessment.

Finally, the most recent indicator of California's low achievement was released in August 2003 from the federal government. That indicator is that 45 percent of California schools—a total of 3,219—failed to meet their targets for Adequate Yearly Progress under the federal No Child Left Behind law and face possible sanctions. Under the federal law, once a school that receives Title I aid for disadvantaged students does not make adequate progress for two straight years, its students are eligible to transfer to a higher-performing public school, with the district required to spend a portion of its

federal aid to pay transportation costs. The consequences become more severe for each year a Title I school does not make adequate progress.[9]

High school graduation rates. To counter these dismal achievement outcomes, Kirlin attempts to show that despite what he calls California's challenging student body, the state does admirably on other important outcomes. Looking at high school graduation rates as an example, Kirlin claims that California schools "graduate higher proportions of African American and Hispanic students, have a smaller proportion of 16-19 year olds not in school who have not graduated, and the performance of students from California poor urban schools is closer to other schools in California than in half of the comparison states" (Kirlin Rept. p. 10).

The data do not warrant this positive assessment of California's schooling outcomes. The percent of 16- to 19-year-olds not in school that had not graduated is taken from the "Current Population Survey" conducted each month by the U.S. Bureau of Labor Statistics. These numbers aren't very useful for the accomplishments of California high schools, since the measure includes students who have obtained a GED or equivalent. A significant number of these "graduates" are young people under the supervision of the juvenile justice system who have earned GEDs, rather than a high school diploma.

Moreover, as the figures in Table 12, below, show, California's official high school dropout rates are so much lower than reality that we can be certain that the undercounting of high school dropouts is commonplace. Each year, for every two California young people who walk across the stage to claim their high school diplomas, a third has disappeared. For the class of 2002, that meant more than 140,000 students. A shocking 30 percent of the 9th graders who enrolled four years earlier were missing. This included 41percent of the Latino 9th graders in fall 1998, over 70,000 students. While the state asks schools to report their dropouts, the reported data underestimate the problem dramatically. In 2002, for example, California's official four-year dropout rate was 11 % overall and 15 % for Latinos. Some officials justify the undercounting, using excuses like "students move" and different districts use different definitions of "dropout." California collects no other data that tell us who these "disappeared" young people are or what happened to them. Under No Child Left Behind, California will be required to report graduation and dropout rates to meet federal reporting requirements. Only a longitudinal database can really fix this problem, but it remains to be seen whether California will actually implement statewide the longitudinal California Student

[9] Erik W. Robelen, "State Reports on Progress Vary Widely," *Education Week*, September 3, 2003.

Information System that is currently being developed and used voluntarily by some school districts.

Table 12: California's Four-Year "Disappeared" and Official Dropout Rates 2001-2002[10]

Class of 2002	All Students	White	Asian	Latinos	Afr Amer
9th grade (1998-1999)	468,162	181,994	40,100	186,357	40,188
Graduates (2002)	325,895	140,121	36,624	109,038	25,451
Disappeared (dropouts? retained in grade?)	142,267	41,873	3,476	77,319	14,737
% Graduates	70%	77%	91%	59%	63%
% Disappeared (dropouts? retained in grade?)	30%	23%	9%	41%	37%
Reported 1-year dropout rate (2001-2002)	3%	2%	1%	4%	5%
Reported 4-year dropout rate (2001-2002)	11%	7%	5%	15%	20%

The problem is particularly severe at California's urban high schools that enroll large numbers of low-income students of color. As Table 13 below shows, more than two-thirds of 9th graders at LAUSD's Fremont, Jefferson, and Manual Arts left before graduation—a total of 3000 young people. In 2002, California's official four-year dropout rate was 11 % overall and 15 % for Latinos; Fremont and Jefferson reported rates of about one-third instead of the more likely two-thirds; and Manual Arts reported an unbelievable 7%.[11] The data form Richmond and Fremont High Schools in the East Bay and Hoover High in San Diego show troubling similarities. California's accountability system pays no attention whatsoever to these phony numbers.

[10] California Department of Education, Data Quest (online).
[11] California Department of Education, DataQuest (online).

Table 13: Four-Year "Disappeared" and Official Dropout Rates From Selected California Urban High Schools 2001-2002[12]

Class of 2002	LAUSD Fremont	LAUSD Jefferson	LAUSD Manual Arts	W Contra Costa Richmond	Oakland Fremont	San Diego Hoover
9th grade (1998-1999)	1573	1352	1349	501	627	621
Disappeared (dropouts? retained in grade?)	1,067	939	917	233	433	357
Graduates (2002)	506	413	432	268	194	264
% Graduates	32%	31%	32%	53%	31%	43%
% Disappeared (dropouts? retained in grade?)	68%	69%	68%	47%	69%	57%
Reported 1-year dropout rate (2001-2002)	9%	7%	2%	1%	15%	15%
Reported 4-year dropout rate (2001-2002)	32%	33%	7%	5%	49%	27%

California's dropout data are so untrustworthy that the federal government won't use them. In fact, it is impossible to make state comparisons of school dropout rates, since California's data does not meet the standards for quality and comparability that the National Center for Educational Statistics' requires to justify publishing estimates.[13] Kirlin's favorable comparisons of California's high school graduation rates for African Americans and Hispanics are not to be trusted because he does not tell us where he obtained these data, and it is therefore impossible to verify their accuracy (Kirlin Rept. p. 10).

[12] California Department of Education, Data Quest (online).

[13] California is one of only 13 states who do not report data using consistent data definitions and collection procedures. NCES, *Dropout Rates in the United States: 2000*, p. 8.

C. Partial and inadequate analyses of California's resource policies

Kirlin, Rossell, Podgursky, and Gersten argue that California's provision of teachers, textbooks, and facilities is quite good, compared with other states. However, none of these comparisons stands up to close scrutiny. (e.g. Kirlin Rept. pp. 15; Gersten Rpt. pp. 1, 18-22).

Flawed comparison of teacher policies. Kirlin concedes that California lags behind his comparison states in the proportion of districts that require that teachers have full state certification. This is precisely plaintiffs' complaint. Nevertheless, Kirlin defends California's provision of qualified teachers on other grounds. Both Kirlin and Rossell rely heavily on *Quality Counts*, published in *Education* Week, an annual "report card" that allows easy comparisons of selected features of states' education systems. Kirlin concludes that "California districts score quite well re: teachers" (Kirlin Rept. p. 15).

Kirlin points to data about his selected comparison states, and decides that California teachers are well paid in comparison. Since he offers no contextual data such as cost of living in the teachers' school communities or the distribution of pay among teachers at the plaintiffs' schools compared to better served schools, his data adds little to helping anyone decide whether California teachers' salaries can be used to determine the adequacy or the fairness of opportunities for the plaintiffs. Kirlin notes that teachers in high-poverty and high-minority secondary schools in California are slightly more likely than such teachers in his comparison states to have a major or minor in their teaching field. (Kirlin Rpt. p.15) However, he does not add that unlike most other states California does not permit an undergraduate minor in education, but requires that *all* certified teachers have a subject-area major. In the end, these comparisons are beside the point. The plaintiffs' have never contested the high standards that California sets for fully certified teachers. Their complaint is with the State's failure to enforce those standards or create other policies that ensure that all students have these highly qualified, credentialed teachers.

Moreover, although *Quality Counts* gives California a high grade for many of the teacher policies it has in place, California scores in the bottom third on the extent to which it permits teachers to teach "out of field." It ranks 33rd among all states on this indicator. And, although it falls in the middle of the eight states that Kirlin uses for comparison, its 59 percent of secondary teachers teaching in fields for which they have academic preparation is only 7 percentage points above the worst state in the group, and 15 points below the best.

Table 14: Percent of Secondary Teachers Teaching in their Field of Academic Preparation Comparing California with 8 "Kirlin States"[14]

	TEACHING IN FIELD				
	Percent of secondary teachers who majored in the subject they teach (2000)	Minimum degree/coursework required in the subject area taught (2002)		State discourages out-of-field teaching (2002)	
State		All high school teachers	All middle school teachers	Middle school teachers must have subject area endorsement	Statewide parent notification of out-of-field or uncertified teachers
New York	74	major	major	Yes	No
Pennsylvania	72			No	No
Florida	67	major	minor	Yes	Yes
Illinois	64	major	minor	Yes	No
California	59	major		No	No
Oregon	58			No	No
Nevada	57	major		No	No
Texas	53			No	No
Arizona	52			No	No

As noted above, Podgursky defends California's policies governing the supply of teachers by claiming that the State's salaries are highly competitive. However, Podgursky also eschews comparisons that adjust for cost of living differences, and simply reports that California's salaries are higher than most other states without acknowledging that California is well known to be one of the costliest states in which to live. However, one wonders why the State raises the salary issues at all, since Podgursky argues further that adjusted cross-state comparisons of teachers' salaries have little value, since prospective teachers weigh their career options against the other opportunities in their region, more than comparing salaries among states. Nevertheless, Podgursky's does attempt to prove that California's teachers' salaries are competitive in comparison with the salaries of other California workers. In this he uses an inappropriate metric—the hourly pay rate calculated by dividing salaries by the hours teachers spend at their worksite, compared to the hourly pay of other workers in their region. Given that the hours spent at school represent a relatively small portion of teachers' work, and that the length of the school year is fixed by state policy, comparisons of hourly on-site rates provides us with little useful information about the attractiveness of teaching in

[14] *Quality Counts*, 2003.

California compared to other professional work. Surely, if the State's experts were to cast a sympathetic eye on the plaintiffs' schools, or simply visit them with a neutral eye, they would find informal cultures and sometimes rules that actually discouraged teachers from remaining on campus to do their work there. Lack of well-equipped, safe, clean, and available space explains why many teachers complete their work day at home. Teachers, like other professionals, choose a career based on the attractiveness of working conditions such as these, on annual (not hourly) salaries, and intrinsic sources of job satisfaction.

Quality Counts data reveals quite a different picture of California teachers' salaries than Kirlin's finds with his preferred comparison states. (Kirlin Rept. p.15)[15] Although Podgursky eschews salaries adjusted for cost of living differences, *Quality Counts* disagrees, and does report salaries this way. Table 15 shows that California's teachers' *starting* salaries (the figure most salient to those deciding to enter the teaching profession) are lower than all of the comparison states but Oregon. The *average* of all teachers' salaries (salient for experienced teachers to remain in the profession) was lower than every comparison state but Arizona.

Table 15: Starting and Average Teachers' Salaries

Average teacher salaries, adjusted for the cost of living **(starting salary)** (2001)	$27,933	$27,177	$31,489	$31,508	$30,627	$26,933	$33,203	$32,999

Comparing California with 8 "Kirlin States"[16]

[15] *Quality Counts*, 2003. Average teacher salaries adjusted for the cost of living: American Federation of Teachers, "Survey and Analysis of Teacher Salary Trends 2001," 2002.
[16] *Quality Counts*, 2003. Average teacher salaries adjusted for the cost of living: American Federation of Teachers, "Survey and Analysis of Teacher Salary Trends 2001," 2002.

Nationally, California's average teacher salary, adjusted for cost of living ranked 16th. However, California's average starting teacher salary ranks 33rd. Presumably, the starting teacher salary would garner considerable attention from prospective teachers.

Flawed comparisons of expenditures on facilities and textbooks. Kirlin compares California's spending on facilities and textbooks with that in his eight preferred comparison states. I reproduce Table 7 from his report below, and highlight the state's per-pupil facilities spending with a dotted line. As Kirlin shows, California trails six of the comparison states in its recent per-pupil expenditures on facilities. Below, I provide a more detailed discussion of how this low level of spending per pupil is expected to address dramatically higher levels of facilities' need than in most other states.

Average teacher salaries, adjusted for cost of living **(all teachers)** (2001)	$38,044	$43,061	$48,275	$47,384	$47,681	$43,424	$52,832	$42,444

Table 7. Comparisons of Expenditures on Facilities and Instructional Materials

state	% schools reporting need to up-grade or repair on-site buildings, 1994	State tracks condition of all school facilities, 2002	Facilities acquisition and construction expenditures, 1999-2000 (thousands of $)	Facilities acquisition and construction expenditures, 999-2000 (per pupil)	Instructional materials, current expenditures, 1999-2000 (thousands of $)	Instructional materials, current expenditures, 1999-2000, per pupil
source code	9: profiles	14: school climate	13: T.7	calculated	13: T.6	calculated
US/reporting states	na	24	35,482,203	751	9,751,742	207
CA	87	no	4,625,124	753	1,199,931	195
AZ	85	X	1,098,073	1,251	325,405	371
NV	83	no	366,396	1,075	46398	136
OR	96	no	327,143	599	120,215	220
FL	85	X	2,560,277	1,052	379,922	156
IL	89	X	1,916,145	935	398,565	195
NY	90	X	1,543,391	535	551,635	191
PA	70	no	1,613,004	889	339,076	187
TX	76	no	4,061,524	1,000	1,059,003	261

9 US General Accounting Office. School Facilities: Profiles of State Condition by State. 1996. GAO/HEHS-96-148
13 National Center for Education Statistics. Revenues and Expenditures for Public Elementary and Secondary Education: School Year
14 Education Week. Quality Counts 2002. Released January 9, 2003. http://edweek.org/reports/qc03

Kirlin's analysis of textbook and materials spending (highlighted by a box in his table above) found that California fell in the middle of his comparison states in expenditures on instructional materials. Notably, Kirlin's comparison of instructional materials spending focuses on a year when a scandalous lack of textbooks forced the California's Legislature to enter the domains of the Governor and the State Department of Education and designate a one-time-only augmentation for standards-based textbooks.[17] Kirlin is wrong to claim that California's instructional materials spending increased in the years *following* the one he reports. (Kirlin Rept. p.21) In fact, California's legislated augmentation of $250 million in textbook funding is reflected in the figures that Kirlin reports for California. That special funding has since been discontinued. Notably the new Legislation measure supporting instructional materials created IMFRP which consolidated three existing categorical programs—K-8 Instructional Materials Fund, 9-12 Instructional Materials Fund, and the K-4 Classroom Library Materials Program—into a new block grant that took effect January 1, 2003.

[17] The *Schiff-Bustamante Standards-Based Instructional Materials Program* (Education Code Section 60450 *et seq.*) appropriated $250 million in each of the fiscal years 1999-2000 through 2001-2002 for allocation to districts based on prior-year enrollment.

However, this new block grant provides far less than the combined total of the three earlier programs.

Table 16: California's Instructional Materials Spending

	2001-02 Millions[18]	2002-03 Millions[19]	2003-04 Millions[20]
Major State Programs			
Instructional Materials Fund Realignment Program		**400**	**175**
Instructional Materials (standards-based)	250		
Instructional Materials K-8 ($136 million) and 9-12 ($35 million)	171		
K-4 Classroom Libraries	25		

Russell Gersten's assertion that "[t]he state's [California's] newly-adopted instructional materials [for EL students] are dramatically better than the materials used by California in the past" is both unsupported and highly questionable (Gersten Rept. p. 3). In fact, Gersten's claim is questioned by Laurie Burnham-Massey in her deposition for this case. Burnham-Massey concludes from her own review of Open Court materials that, although Open Court "is good for helping shelter or SDAIE the language arts instruction but isn't really designed to provide students with the developmental English language development program that will allow them to gain full proficiency in English" (Burnham-Massey Depo. p. 235). Notably, Burnham-Massey was the director of the State's Comite Monitoring compliance unit, charged with overseeing whether schools were providing adequately for the State's English Learners.

Flawed comparisons of the condition of school facilities. Kirlin also presents US General Accounting Office data as evidence that California's facilities problems are no worse than those in most of the 8 states that he prefers to compare California with. (Kirlin Rept. p.22) However, these comparisons are partial and out of line with the data included on the American Society of Civil Engineers' (ASCE) 2001 report card on America's Infrastructure reproduced below. What Kirlin selected to report was only one of eight indicators that the GAO and ASCE report about the condition of school facilities. As the ASCE Report Card shows, California's schools (underlined with dashes) rank consistently lower than Kirlin's comparison states (underlined in solid) on nearly all indicators of the quality of the State's school buildings.

[18]EdSource online, www.edsource.org.
[19]EdSource online, www.edsource.org.
[20] CDE website, www.cde.ca.gov/cfir/imfrp/imfrpgen.html

SCHOOL BUILDINGS

A = at least one inadequate building feature (roofs, framing, floors, foundations, exterior walls finishes, windows, doors, interior finishes and trims, plumbing, heating, ventilation, air conditioning, electrical power, electrical lighting and life-safety codes)
B = at least one building needing extensive repair or replacement
C = at least one unsatisfactory environmental condition
D = crumbling roofs
E = inadequate plumbing
F = bad plumbing
G = poor ventilation
H = lacking enough power outlets and wiring to accommodate computers and multimedia equipment in classroom

School Building Conditions

State	School Building Condition (%)[1]								Enrollment Growth[2] 1996-2000
	A	B	C	D	E	F	G	H	
Alabama	59	39	63	30	22	38	26	34	91,000
Alaska	69	45	80	33	39	33	52	45	16,000
Arizona	64	41	69	30	20	40	30	28	51,000
Arkansas	42	25	62	22	8	22	12	20	11,000
California	71	43	87	40	25	41	29	56	1,064,000
Colorado	58	32	63	26	29	28	37	33	40,000
Connecticut	58	30	68	32	24	25	35	41	8,000
Delaware	70	40	65	36	26	50	30	49	9,000
District of Columbia	91	49	73	67	31	65	34	41	15,000
Florida	[illegible]								98,000
Georgia	37	26	48	24	12	18	12	38	113,000
Hawaii	57	21	78	16	--	20	26	61	24,000
Idaho	56	32	64	31	20	32	36	37	25,000
Illinois	[illegible]								76,000
Indiana	56	29	67	15	21	29	29	32	47,000
Iowa	50	19	67	7	11	21	24	15	n/a
Kansas	55	38	74	28	22	32	35	37	4,000
Kentucky	59	31	63	34	18	24	26	25	8,000
Louisiana	50	39	66	28	18	25	7	39	9,000
Maine	60	38	71	38	20	30	29	35	11,000
Maryland	67	31	65	33	19	26	29	36	93,000

Massachusetts	75	41	80	41	33	36	42	49	195,000
State	A	B	C	D	E	F	G	H	Enrollment Growth [2]
Michigan	52	22	61	20	17	22	25	38	49,000
Minnesota	57	38	66	62	15	33	36	25	32,000
Mississippi	50	28	54	27	11	28	9	20	3,000
Missouri	48	27	58	20	10	30	13	26	61,000
Montana	45	20	69	19	9	19	21	25	2,000
Nebraska	44	35	61	20	17	24	33	21	9,000
Nevada	42	23	57	18	21	16	23	25	24,000
New Hampshire	59	38	78	20	25	28	47	35	31,000
New Jersey	53	19	69	25	10	20	22	34	109,000
New Mexico	69	30	75	29	24	43	33	42	30,000
New York	67	33	76	31	21	28	36	35	36,000
North Carolina	55	36	68	25	14	22	23	42	110,000
North Dakota	49	23	62	19	20	28	29	18	n/a
Ohio	76	38	83	33	25	39	33	51	111,000
Oklahoma	54	30	64	26	19	32	21	32	38,000
Oregon	63	39	84	36	27	41	40	34	62,000
Pennsylvania	42	21	57	19	17	20	23	17	160,000
Rhode Island	61	29	75	25	26	27	29	45	25,000
South Carolina	52	37	66	28	13	28	26	33	48,000
South Dakota	45	21	50	26	15	25	26	15	n/a
Tennessee	56	27	64	22	17	21	19	25	40,000
Texas	46	27	60	23	14	26	16	22	298,000
Utah	62	34	72	32	22	33	34	27	47,000
Vermont	53	21	58	21	23	19	32	26	5,000
Virginia	60	27	58	32	17	32	22	29	110,000
Washington	60	44	74	32	30	39	42	35	133,000
West Virginia	67	42	82	26	34	28	46	18	n/a
Wisconsin	49	33	60	18	14	24	20	33	19,000
Wyoming	49	24	68	24	11	19	24	16	6,000

Source: *School Facilities, Profiles of School Conditions by State*, U.S. General Accounting Office, 1996

Projected enrollment growth, 1996-2006. Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data Surveys

Flawed comparisons of per-pupil spending. Finally, both Kirlin and Rossell argue that California's education spending is significantly underreported, and Rossell attempts to demonstrate with "adjusted" figures that California really ranks quite high among the

states in per pupil expenditures.[21] Kirlin estimates that the figures commonly reported by the federal government and many independent agencies underestimate California's education spending by 20 percent. (Kirlin Rept. p.9) Kirlin and Rossell have no reason to assume that this underestimating takes place. They provide no evidence that it takes place. They simply claim that the comparisons are biased against California.

Rossell goes even further than Kirlin and actually changes the U.S. Census Bureau's data of California's spending. Acting on the presumption that California under reports its education spending to the federal government, and that other states do not, Rossell added $404 dollars to California's data. She said in her deposition that she felt justified in altering the figures, based on a faxed note from Lance Izumi, an analyst for a conservative California advocacy organization (and a colleague of Hanushek, Hoxby, and Walberg at the Hoover Institution) in which he told her, "Here are the budget figures. The per pupil spending figure used most often divides Prop 98 funding by average daily attendance. Prop 98 funding, as you can see, does not include State lottery funds. In 2001-2002 Prop 98 spending per pupil was 6,683 and total spending per pupil was 9,068." Notably, Rossell admits that she doesn't know what Prop 98 funding is, but that she assumed it was "simply the official funding statistics that are reported." Based on Izumi's note, the state controller's estimate of the lottery funds, and some other calculations she made—calculations that she doesn't specify in her report and can't recall in her deposition—Rossell increased California's 2000-2001 total and per-pupil expenditures from the $6965 reported by the U.S. Census Bureau to $7369. Rossell, however, neglects to mention that, as of July 2002, 20 states actually earmark lottery proceeds for education funding. In an additional 13 states and the District of Columbia, lottery proceeds go into the state General Fund, which may be used to fund education.[22] Rossell did not adjust any of these state's reported expenditures.

Moreover, Rossell's addition of $404 per pupil to the US Census figures for California education spending far exceeds the amount reported by the California Department of Education, the Lottery Commission, and the Office of the Legislative Analyst. As the chart below makes clear, the 2000-2001 contribution of the Lottery to per-pupil spending was $144. And, the Lottery contribution that year was higher than it had been in more than a decade.

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[21] In making comparisons of spending among states, Kirlin, Rossell, and other some other analysts favor ADA (average daily attendance) as the metric for calculating average spending on individual students. Others prefer to divide the total amount of state spending by the total number of students enrolled. It is not entirely clear how the choice of the numerator affects state rankings on spending. However, it certainly could inflate the per-pupil spending figure in states with higher rates of student absenteeism. If this is the case, California per pupil spending would seem higher using ADA, and the gap between California and states with fewer low-income and immigrant students (i.e., Wisconsin) would appear smaller than it would if the number of students enrolled was used as the numerator to determine per pupil spending.

[22] 2003 Education Commission of the States, http://www.ecs.org/html/issue.asp?issueid=48&subIssueID=47, last accessed August 28, 2003.

Table 17: K-12 Education Share of Lottery Funds

	Income per Student	Total Lottery Revenues (Millions)	Percent of Total K-12 Revenues
2001-02	$135	$856	1.7%
2000-01	$144	$900	1.8%
1999-00	$125	$767	1.7%
1998-99	$122	$726	1.8%
1997-98	$116	$ 674	1.9%
1996-97	108	612	1.8%
1995-96	124	684	2.1%
1994-95	116	635	2.1%
1993-94	102	551	2.0%
1992-93	93	496	1.8%
1991-92	77	401	1.5%

Data: California Department of Education, Lottery Commission, Office of the Legislative Analyst

Two new estimates and state comparisons of educational spending allow us to reexamine California's spending. I turn first to *Quality Counts*, the source that the State's experts rely on heavily. *Quality Counts* 2003 report allows us to compare California's spending with Kirlin's eight comparison states and nationally. The *Quality Counts* data are provided in the table below. The table shows clearly that California ranks below seven of the eight comparison states, and it only outspends Arizona. The table also shows that, although California's spending did increase over the past year, the size of its increase was matched by most of the other states. None of the three states whose percentage increases were lower fell below California in per pupil spending. Nationally, California ranks an abysmal 46th.

Table 18: Education Spending
Comparing California with 8 "Kirlin States"[23]

	New York	Oregon	PA	Nevada	Illinois	Texas	CA	Arizona
Overall grade for adequacy	A	B	B	C-	C+	C+	D	F
Education spending per student, adjusted for regional cost differences (2002)(State average)	$ 9,563	$ 8,570	$ 8,461	$ 6,438	$ 7,363	$ 7,248	$ 6,161	$ 5,487
Percent of U.S. average	127.1	113.9	112.5	85.6	97.9	96.3	81.9	72.9
Percent change from 2001	5.1	4.6	5.7	3.3	5.1	3.5	5.1	5.1

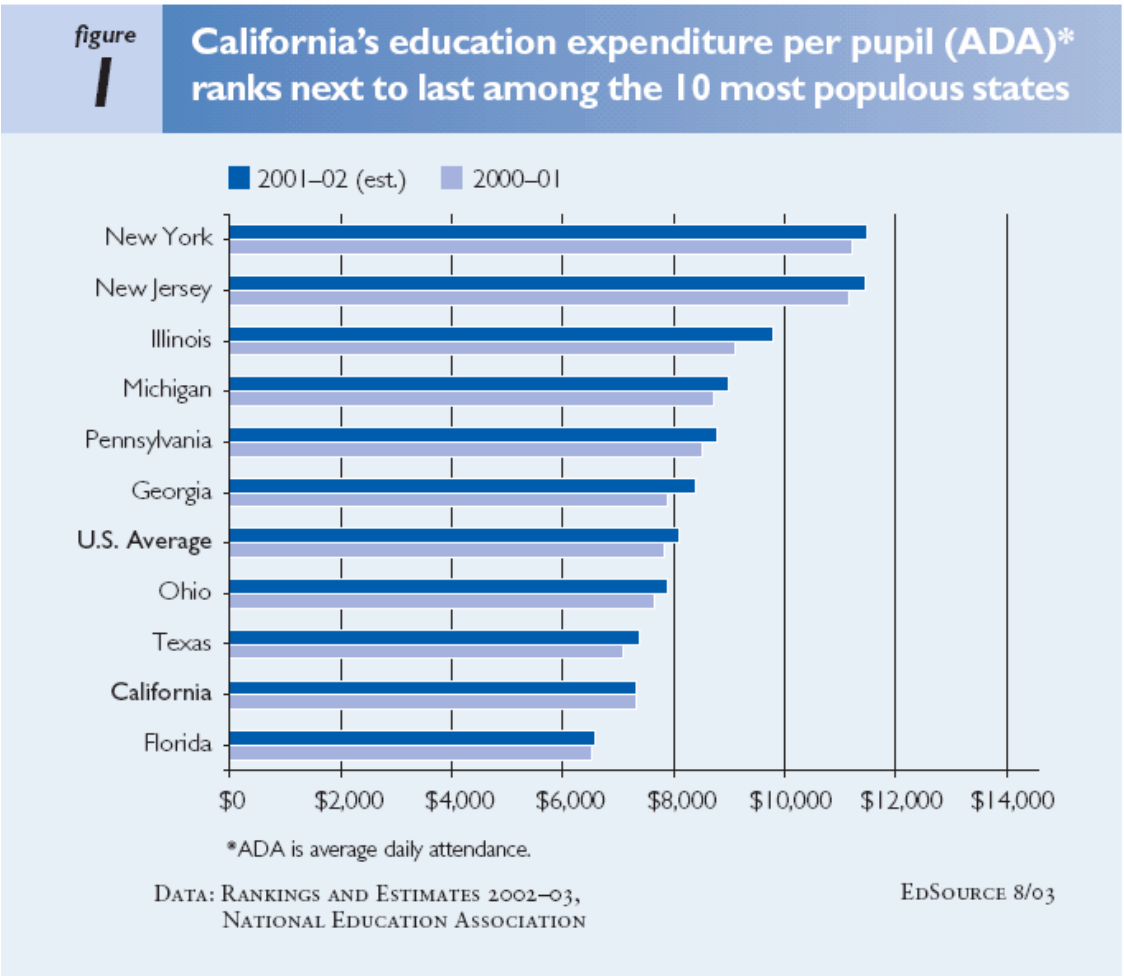
A second report was released in August 2003 by Ed Source. Ed Source's 2003 report provides the latest ranking on expenditures per public school student.[24] It shows

[23] *Quality Counts*, 2003. Education spending per student, adjusted for regional cost differences: U.S. Department of Education, National Center for Education Statistics, "Early Estimates of Public Elementary and Secondary Education Statistics: School Year 2001-02," April 2002. Figures were adjusted using the NCES Geographic Cost of Education Index. Average annual rate of change in expenditures per pupil, adjusted for inflation (1991-2001): The PPEs for 1990-91 through 1997-98 are from the National Center for Education Statistics, "Digest of Education Statistics, 2001." The 1998-99 and 2000-01 PPEs are from the National Center for Education Statistics, "Early Estimates of Public Elementary and Secondary Education Statistics: School Year 2001-02," April 2002. The 1999-2000 PPEs are from the National Center for Education Statistics, "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 1999-2000," May 2002. Expenditures were adjusted for inflation using the U.S. Department of Labor's Bureau of Labor Statistics Consumer Price Index.

that California fell from 27th to an estimated 35th in 2001-02. Table 1 from the Ed Source report (reproduced below) compares the 10 most populous states in the U.S. It shows that California ranks below all but one of the five large states to which Kirlin would have us compare California, as well as below the national average. Among the Kirlin states, California ranks just above Florida. Notably, California lags far behind the leader, New York, which spent $11,472 per student. In 2001–02 California spent $763 less than the U.S. average of $8,087, or about 91% of the national average.

Ed Source also notes that the California numbers for 2001–02 reflect estimated data from Gov. Gray Davis' proposed budget submitted in January 2003. Subsequent deferrals and additional cuts in future years are likely to slow California's progress toward the national average—unless the budget deficits in many other states also affect their education spending. These figures are not adjusted for inflation or regional cost-of-living differences.

[24]Ed Source is an independent, impartial, not-for-profit organization, whose mission is to clarify complex education issues and to promote thoughtful decisions about public school improvement. Their report is located online at http://www.edsource.org/abo.cfm



California's low level of spending is not a function of low state capacity. *Quality Counts* rated California quite low among the states in the percent of its taxable resources it spends on education. Nationally California was ranked above only six states and the District of Columbia, and it ranked above only one of the states Kirlin argues should be used to compare California's policies.

Table 19: Percent of total taxable resources spent on education –2000 Comparing California with 8 "Kirlin States"[25]

State	Percent spent
New York	3.8
Pennsylvania	3.8
Texas	3.5
Oregon	3.4
Florida	3.3
Illinois	3.3
Arizona	3.1
California	**3.1**
Nevada	2.9

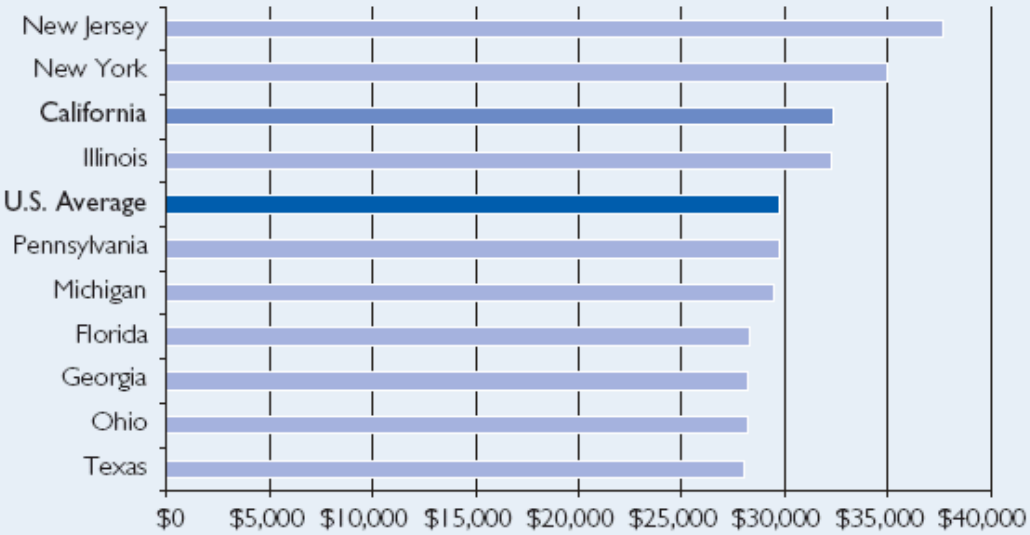
Ed Source also identifies per capita personal income as a traditional measure of a state's capacity to support programs such as K–12 public education. As illustrated in the report's Tables 5 and 6 (reproduced below), the Ed Source report ranks California's per capita personal income 9th in the nation in 2000, at $32,334.[26] Compared to the national average, the state has about $2,500 more in per capita personal income per public school student. The amount spent per $1,000 of personal income measures a state's effort to support public education. According to that statistic, California has given low priority to public schools in the past 30 years compared to other states. In 1999–2000, the latest year with available data, California ranked 40th, an increase over the ranking of 45th the previous year. The state spent $34 per $1,000 of personal income for K–12 public education, in contrast to Michigan at $45, New York at $42, and New Jersey at $41.

[25] *Quality Counts*, 2003.
[26] Ed Source, 2003 (www.edsource.org/abo.cfm)

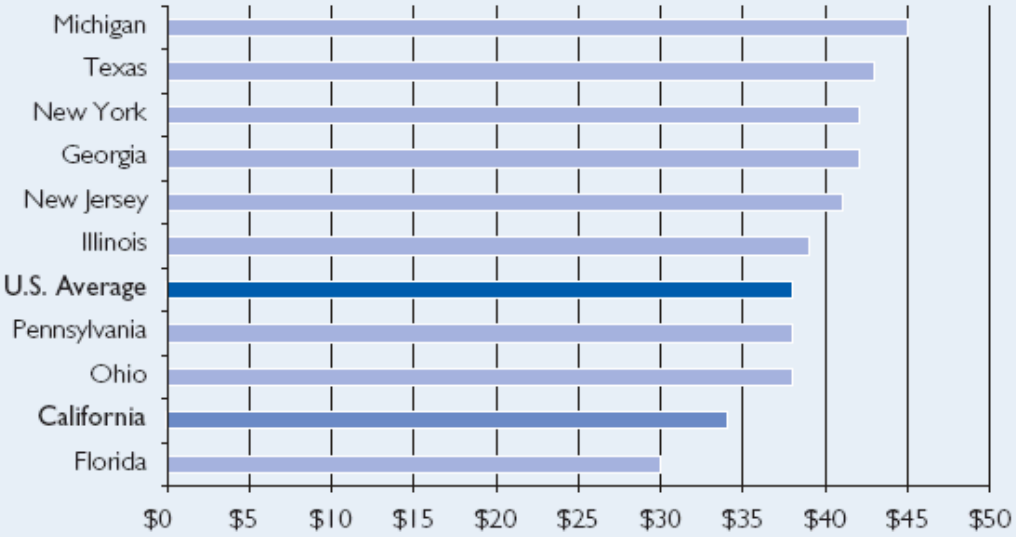
figure **5**

Among the 10 most populous states, California has a high per capita personal income but ranks low in spending on K–12 education

Per capita personal income in the 10 most populous states in 2000



Expenditures per K–12 student per $1,000 personal income in the 10 most populous states, 1999–2000



DATA: RANKINGS AND ESTIMATES 2002–03, NATIONAL EDUCATION ASSOCIATION

EDSOURCE 8/03

The analyses provided here respond to the State's experts' complaints that plaintiffs' experts failed to make systematic comparisons between California and other states. This criticism is largely without merit because the State makes no compelling argument that the comparisons are even relevant to the central issues of this case. Once entering into this argument, one finds only a smattering of selective data organized around several false constructs. One such construct is Kirlin's choice of states to compare with California (selected, in part, because they share a border and are mentioned in the same irrelevant source on migration!) (Kirlin Rept. p.4) Nevertheless, accepting Kirlin's challenge to make systematic comparisons, we find that California's policies and its outcomes fare quite poorly when measured systematically against those of other states.

The analyses of per-pupil spending offered by Christine Rossell are similarly irrelevant, and taking a close look at her data and arguments we find them inaccurate and deceptive. Finally, as I described above, Podgursky's teacher salary comparisons provide no useful information.

In sum, the State's experts set out to prove that California compares favorably with other states in its support for education, and by extension, one supposes, to prove that the State bears no responsibility for the dismal and inequitable conditions for many students in California's schools. But regardless of California's "ranking" in these matters, the plaintiffs' complaints would remain because their concerns are for the opportunities that reach their schools and desktops, not for how the state appears on one or another comparison chart. Once entering into these arguments and accepting the State's comparison states, we find that on nearly every measure of how well states provide for their students' basic education needs, California ranks near the bottom.

Appendix B

Additional detail about the flaws in the State's experts' teacher-related analyses

Rossell's considerations of whether poor students and English learners are more likely to be taught by "emergency credentialed" teachers are filled with definitional and computational errors. She notes, for example, "emergency credentials are requested by an employer (school or district) on behalf of an individual who does not qualify for a credential or internship" (p. 1). She then states, "only 24 percent of teachers are emergency credentialed," although she does not specify the year to which this percentage applies (p. 2). Setting aside Rossell's quite astonishing characterization of this large percentage as "only," both her definitions and numbers are wrong. California has four designations for teachers who are less than fully certified—waivers, emergency, pre-intern, and intern, with emergency credentialed teachers,[27] not limited to the emergency credentialed teacher that Rossell considers. I assume that Rossell is referring to the 2000-2001 school year (the date on her Table 1). As the figure below shows, in 2000-2001, 14 percent of the state's teacher held something less than a full credential. Only 10 percent held emergency credentials. It is simply impossible to determine where Rossell's 24 percent figure comes from.

Table 20. Credential Status of California's Teachers, 2001-2002

Teaching Credentials State of California, 2001-02		
	Number of Credentials[1]	**Percent of Total**
Full Credential	265,201	83.9%
University Intern	4,867	1.5%
District Intern	2,384	0.8%
Pre-Intern	8,060	2.6%
Emergency	32,523	10.3%
Waiver	3,020	1.0%
Total	**316,055**	**100%**
[1] Teachers may hold more than one credential.		
Source: Educational Demographics Office, CBEDS		

[27] Teachers on emergency permits or pre-intern credentials lack either the professional preparation and/or the content preparation expected of a fully prepared teacher. Teachers on waivers have not satisfied the requirements for emergency or pre-intern credentials. These various programs and distinctions are confusing, and the State keeps establishing new ones in its attempt to keep a teacher in every classroom. But the distinctions are not trivial, since they are based on the State's distinguishing among teachers' levels of training and competence—matters that go to the very heart of this case. Therefore it is especially important to the State and the Court that the State's own experts be able to demonstrate clarity and accuracy in their analyses.

Problems with Dr. Rossell's categories and numbers make it impossible to interpret the regression analysis she performs to assess whether poor students and English learners are more likely to be taught by "emergency credentialed" teachers. The analyses included in Darling-Hammond's and Hakuta's initial reports that Rossell attempts to discredit include as "less-than-fully certified," all those teachers who are not fully certified. It is impossible to know which or how many teachers Rossell included. Perhaps the issue is moot, however. Rossell's own analysis of whether poor students and English learners are more likely to be taught by "emergency credentialed" produces a result consistent with the Darling-Hammond and Hakuta analyses she criticizes. Poor students and English learners are, in Rossell's analysis, significantly more likely than others to be taught by emergency credentialed teachers. (Note, however, that Rossell erroneously writes on page 3 of her report that the relationships are not significant. In fact, they are. Unlike Darling-Hammond and Hakuta, however, Rossell dismisses this finding with her opinion that it is "miniscule in effect" (Rossell Rept. p.5).

In later analysis, Rossell attempts to show an unproblematic distribution of the smallest of the four categories of less-than-fully-certified teachers—those holding waivers. Here, too, her analysis must be dismissed because her numbers are wrong. Rossell reports that 2 percent of California teachers in 2000-2001 held waivers; the California Department of Education reports 1.1 percent. This translates to an error of 2739 teachers. Further, her outright error mixes seamlessly with her dismissal of likely inequality in her interpretation of her results, "Only two percent [actually, 1.1 percent] of California teachers in 2000-01 had waivered credentials and more than 75 percent of California schools had no teachers at all with waivered credentials." For even a casual reader, the import of this sentence is inescapable. Yet, although asserting that 100 percent of the sub-category of least-qualified teachers is concentrated in 25 percent of the State's schools, Rossell gives no indication that this could be a matter of concern.

A. Flaws in Raymond's Analyses

***Uses an unrepresentative, unmatched sample*.** By truncating the sample to include only high-need schools, Raymond masks the impact of teachers in all schools. Raymond does not test her hypothesis using a representative sample of California schools. She selected a set of schools that she calls "educationally challenged" schools. She characterizes this sample as the schools attended by the plaintiffs' named in the Williams complaint and other schools that "look like them" on key attributes.[28] She defined the other schools that "look like" the plaintiffs' schools as those that exceeded the average of the plaintiffs' schools in the percent of students who are minority and the percent that qualifies for free and reduced price meals, and those schools that had a lower proportion of fully certified teachers that the average at the plaintiffs' schools. Using these criteria, Raymond found 545 schools that qualified as "educationally challenged" in

[28] Importantly, Raymond's list of plaintiff schools does not match the list either in the original or in the amended complaints.

addition to the 39 schools attended by the named plaintiffs.[29] This sample is quite remarkable. It shows, first of all, that the schools attended by the named plaintiffs are far from the most disadvantaged in the state, showing that some of the students in the *Williams* class are in schools more challenged than those of some of the named plaintiffs. What Raymond offers us is the plaintiffs schools plus a set that are all "more challenged," as she puts it, than the average plaintiff school. A fairer and more accurate comparison group would be either a set of schools that has either the same range of student background characteristics and teacher qualifications as the plaintiffs' schools, or schools that were within a standard deviation of the plaintiffs' schools on these variables.

Employing analytic strategies that minimize the impact of school resources. Raymond uses a strategy that actually masks teachers' potential influence to "explain" how changes in students' background characteristics and the schools' percentage of fully certified teachers would change the schools' API scores.[30] Importantly, for the purposes of her argument, this analytic strategy can only tell us what "marginal" difference adding small increments of certified teachers might make on the average achievement of schools that are plagued with serious problems resulting from significant teacher shortages,[31] not counting any differences that might be a function of the overlapping impact of less-than-fully certified teachers and students' characteristics.

Omitting important information. Raymond fails to provide the details of her analyses that would let the reader judge the actual extent of the teacher shortages at the schools in her sample or how much variation actually existed among the schools on this dimension. She also neglects to report how much variation in API scores exists among her sample of schools. Without these important pieces of information, it is impossible to interpret her analyses meaningfully. For example, if the range of qualified teachers is very small or excludes either well staffed or very poorly staffed schools, it would be impossible to judge whether the teacher effects she reports would apply to other schools in the state. Similarly, if the range of achievement scores is small or excludes either high or low performing schools, it would also be impossible to judge whether the teacher effects she claims would apply to other schools in the state. In fact, when pressed in her deposition, Raymond did provide some of this necessary information, including the scores that she selected to define the ceiling on each of the variables that she used to select her sample. She reports that she selected schools that were at least 84.6 percent minority and at least 72.1 percent on free or reduced price meals. The schools had no more than 73.6 percent of their teachers fully certified (p. 252). We can safely assume

[29] Note that Raymond explains that she excluded 19 schools because they lacked data for one or more of the variables in her analysis, but we don't know how many of the 19 were plaintiff schools.

[30] Although Raymond's doesn't explain exactly how she defined student background characteristics, her tables suggest that she included, not only the percentage of students who were minority and poor, but also the percentage who were English learners, the district's student mobility rate, and the percentage of students' whose parents did not finish high school. She also included whether or not any of the named plaintiffs attend the school (n.p.).

[31] SRI researchers have used a benchmark of 20% or more teachers without preliminary or clear credentials to demarcate schools that have "high concentrations" of underqualified teachers, arguing that such high levels "can create problems throughout the entire school community" (Shields et al., 1999, p. 47, as cited by Darling-Hammond, p. 40).

that many of these schools have far fewer fully certified teachers, and Raymond herself estimates in her deposition that the average percentage of fully certified teachers "in this particular group of schools . . . was someplace closer to 40 or 50 [percent]" (154). Given that Raymond's sample eliminates all schools that have more that 72 percent fully qualified teachers, we know that her conclusions cannot be used to judge the impact of teachers on achievement when schools have either fewer than 20 percent less-than-fully certified teachers (the short-term minimum suggested by the plaintiffs) or when they are fully staffed with qualified teachers.

Minimizing her own positive and statistically significant findings. As noted above, Raymond's own analyses found that schools with larger proportions of fully certified teachers had significantly higher achievement test scores than schools with fewer qualified teachers. Moreover, Raymond claims that these effects are too small to be important. This is quite an extraordinary assertion by a researcher. Moreover, Raymond's estimates of how much difference it would make if these schools had more qualified teachers matter rests on a highly implausible assumption. That is, she assumes that each additional qualified teacher will have the same impact on the API, regardless of how many additional teachers might be added. For example, if adding one teacher to a staff of 100 where 50 percent of teachers are uncertified increased the API by half a point, then adding 50 certified teachers to this school—making the entire staff qualified— would increase the API by only 35 points. This assumption ignores research that suggests that adding a "critical mass" of certified teachers to a school with large shortages is likely to have an exponential, rather than an additive impact.[32] If a school transforms from being only 50 percent to 100 percent fully qualified, the sum of the benefits immediately and over time (as benefits to students accumulate over their school years) will far exceed the meager result that Raymond claims. Because Raymond only analyzes schools with fewer than 73 percent fully certified teachers, her analysis doesn't permit us to know, for example, what the impact might be of shifting from a staff that is 50 percent fully qualified to one that is 80 percent qualified, as is a suggested first order remedy in Darling-Hammond's initial report.

Claiming that she has considered all relevant resources. Raymond also resorts to out-and-out sleight of hand as she interprets her analyses to mean that resources don't matter. As one example, she argues that her analyses point to "operational differences"—which she defines as the way schools use their resources—rather than

[32] For example, plaintiffs' expert Darling-Hammond cites evidence of the cumulative, negative problems that schools with large proportions of less-than-fully qualified teachers experience. These are negative consequences beyond the lack of knowledge and skills of individual teachers who are underprepared. Students at these schools are more likely to encounter a string of underprepared teachers, thus experiencing a cumulative effect that is much more damaging to their learning than one year of poor teaching would create (see, e.g. Sanders & Rivers, 1996, for estimates of the cumulative effects of poor teaching). Moreover, when the overall expertise in the school is inadequate to support sound educational decision making or collegial learning, the "collective knowledge" of a school is weakened. It is impossible for a few teachers to carry the load for the entire faculty. Without a full complement of veteran teachers, novice teachers have few mentors from which to learn. The few relatively experienced teachers left in a school are overburdened with leadership responsibilities, thus contributing to their own "burn out" (Shields et al., 2000). Under these circumstances, we would not expect that the addition of a few qualified teachers at a school with a large proportion of less-than-fully qualified teachers would have much effect.

resource differences themselves that account for the variation among the schools in API scores. She claims, incorrectly, that once she has controlled for differences in the schools' qualified teachers, that the schools have "similar available resources" (Raymond Rept. p. 14). This is just not true. Nowhere, has Raymond accounted for resource differences that are key to this case (i.e. instructional materials, facilities, overcrowding), or a host of other resource differences outside the focus of this case. In a later analysis, Raymond provides evidence that schools differ on these other resources, and, in fact, those other resources also matter. The analyses she reports in Table 4 seek to compare the impact of fully credentialed teachers on the API with other school factors in a sub-sample of her 584 "educationally challenged" schools. One result reported in Table 4, but never mentioned in her text, is that being on a year-round calendar significantly decreases schools' API scores (Raymond Dept. n.p).

Excluding evidence. Another misleading analysis taints Raymond's conclusions about the likely impact on the API of decreasing the number of emergency credentialed teachers at the sample schools. She reports the finding that decreasing the proportion of emergency credentialed teachers wouldn't have a significant effect on the API; and this means that a teacher doesn't have to have a credential to "push positive student gains" (deposition, 154). Neither her analysis nor her conclusion is correct. By using the "percentage of emergency credentials" in her analysis, she has omitted from consideration the large number of teachers holding "pre-intern" and "intern" certification, or the smaller number on waivers. As noted earlier, these are California teachers who are neither fully certified nor teaching on "emergency credentials." In 2002-2003, for example, of the nearly 46,596 less-than-fully-qualified teachers in the state, 18,173 were interns and pre-interns, and another 2,272 were teaching on waivers.[33] These teachers represent 45 percent of the less-than-fully-qualified teachers in the state. None of them were included in Raymond's analyses.

Without these teachers included in Raymond's analysis, it is impossible for her to offer a useful conclusion about the impact of the less-than-fully certified teachers at the school. Certainly, there are further analyses that could produce more reasonable alternatives hypotheses. One is that the impact of the proportion of less-than-certified teachers is simply the inverse of the impact of the proportion of certified teachers—that is, a negative and significant effect on API scores. This would be the case if Raymond's result (decreasing the number of emergency credentialed teachers doesn't change API scores) is distorted by the absence of teachers holding "pre-intern" and "intern" credentials, and that these teachers do not have the positive impact on achievement that fully certified teachers do. Another plausible hypothesis is that, because many teachers holding emergency credentials (unlike those on intern and pre-intern credentials) are actually fully credentialed teachers teaching in areas other than the field in which they are certified, the impact of proportion of emergency credentialed teachers on API scores is attenuated. One example of this occurs when certified teachers fill shortages by teaching special education classes. Because they are not certified in

[33]California Department of Education, Education Data Partnership, July 31, 2003. http://www.Ed-Data.k12.ca.us

special education, they hold both full certification and emergency certification.[34] Of course, given that Raymond's responses in her deposition suggest that she thinks she was analyzing the effect of *all* less-than-fully certified teachers at the schools, we really don't know which teachers Raymond included. It may be simply that, like Rossell, Raymond doesn't understand the full range of credentials that California's teachers hold, and that she left substantial numbers of teachers out of her analysis from ignorance, rather than from an attempt to mask.

Misrepresenting a key variable. Raymond commits yet another serious error when she seeks to prove her claim that "with respect to the distribution of fully certified teachers, that the marginal effect of advancing Plaintiffs' case in that regard would not produce the magnitude of improvements in API scores for a school that might be achievable with focusing on other factors." (Depo, p. 30). The "other factor" she points to is "core academic classes." In her report, Raymond claims, "By increasing the number of core academic courses by one, we would expect the effect on the API scores to be about 3.5. To create the same impact, a school could increase the proportion of fully credentialed teachers by 10 percentage points or add a core course" (report, p. 18). Raymond concludes that adding courses would be a far more efficient way to increase achievement. Here, of course, is an instance of the mistake of considering these schooling factors—teachers and courses, in this case—as independent variables. Just who does Raymond think would teach these core academic courses? These are, one hopes, among the most demanding and rigorous classes in the curriculum, ones that match the California state standards and, at the high school level, satisfy the A-G university requirements. Schools currently complain that they cannot staff such courses with qualified teachers. It would make far more sense to most school personnel to add a teacher who is qualified to teach chemistry, for example, than to add a chemistry class with no one qualified to teach it.

However, Raymond has made a fundamental error in this analysis that renders it moot. The variable in the API datasets that Raymond uses for her analysis is "core academic courses" (a variable collected as part of the California Basic Education Data System). In her deposition, she explains that this variable reports "number of courses that align with the State curricular standards" (deposition, p. 166). She explains that, even in elementary schools "there is variation across elementary schools in the number of courses that they offer. I know that there are -- and I don't know what the magnitude of variation is, but I do know that there is variation" (deposition, p. 170). In fact, the "core academic courses" variable is not what Raymond represents it to be. It does not report the number of courses, and it does not report about elementary schools. The California Department of Education's API explanation sheet makes clear that the variable "core academic courses in departmentalized programs" reflects average class size in the following subject

[34]This possibility is noted on the Explanatory Notes for the 2002 Academic Performance Index Base Report, "It is possible for one teacher to be in both the fully credentialed and emergency credential categories; therefore, the total of the percentages for "Fully credentialed teachers" and "Teachers with emergency credentials" may exceed 100." www.cde.ca.gov/psaa/api/api0203/base/expn02b.htm, last visited August 19, 2003.

areas: English, Foreign Languages, Math, Science, and Social Science.[35] The variable is used in departmentalized middle and high schools as the analogue for the elementary "class size" variable, since large or small non-academic or elective classes might distort the calculation of average class size. The measure is simply telling us how many students, on average, are in the secondary schools' core academic classes, not how many such courses the school offers.

Consequently, although we don't know what Raymond's analysis actually tells us, we know for certain that it does not tell us what Raymond claims: that adding an additional academic course would be a wiser investment (in terms of raising API scores) than adding credentialed teachers to a school. Late in her deposition, Raymond acknowledges, "I'm not clear on what the mechanics are of how this particular variable is measured. So I'm not comfortable saying, well, here's how you would do that. I don't know for a fact how these particular measurements are taken across the different school types so I really can't say" (258). Her uncertainty, however, does not prevent her from using her analysis to discount the plaintiffs' concerns about inequalities in access to certified teachers in California schools.

[35] Explanatory Notes For the 2002 Academic Performance Index Base Report, www.cde.ca.gov/psaa/api/api0203/base/expn02b.htm, last visited August 19, 2003.