

Is Less More?

Exploring California's New Class Size Reduction Initiative



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Introduction

The Mixed History of Class Size Reduction

Reducing class size has, at times, come to be regarded as almost the Holy Grail of public education. As a school improvement measure, it enjoys almost universal popularity among both parents and teachers. However, substantial class size reduction rarely occurs on any significant scale because it is so expensive to accomplish.

There is no better example of the trade-off between desire and fiscal reality than here in California, where class size reduction has been discussed and desired for years, but class size inexorably increased beginning in the 1970s, and until recently we were generally ranked either 49th or 50th in the country in this category. When school districts faced funding reductions, many found that incremental increases in class size were more politically palatable than other possible cost-cutting measures.

Contributing to this dynamic was a dispute which has existed within the education research community for many years over the relative gains in student achievement possible or probable as a result of a reduction in class sizes. While some recent studies and a considerable degree of common sense point to smaller classes as an inherent educational advantage, research until 1978 showed little indication that class size reduction would generate improved student achievement. Thus, little empirical evidence existed at the time to back up the claims of advocates for smaller class size.

The first widely regarded positive evidence became public in 1978, with release of the results of a meta-analysis conducted by Dr. G.V. Glass and his associates of numerous studies on class size and other factors affecting student achievement. Glass' conclusions were many and multifaceted, but the key one with regard to class size was this: small, incremental reductions in class size were not generally effective in improving student performance; however, after a certain threshold student-teacher ratio — estimated to be in the range of 15:1 to 20:1 — measurable benefits to student achievement were seen (see Appendix A for a description of the Glass research and related studies).

The lone class size reduction measure passed in California during the 1980s reflected this prescription of 20:1 or less. Senate Bill 666 (Morgan/Hart) of 1989 provided additional funding to high schools that voluntarily reduced class size in one subject area in one grade to the desired 20:1 ratio. With that single exception, however, no state legislation to reduce class size received serious consideration in California until earlier this year.

New Initiative Aimed at Early Grades

This year, an upturn in the state's economy, coupled with the education funding guarantees contained in Proposition 98, made an ambitious new initiative possible. As a result, the Governor and Legislature together drafted and approved SB 1777 (O'Connell), which appropriated \$771 million to be transferred to districts that reduce class size to specified levels. The requirements of the bill are that schools reduce enrollments in grades one and two and either kindergarten or third grade to no more than 20:1 (the 20:1 ratio was once again adopted in accordance with the conclusions reached by Glass and other researchers). California's new class size reduction program is, like the Morgan/Hart legislation before it, entirely voluntary for districts. However, over 90% of districts with high schools took advantage of the 1989 measure, and most observers predict the present sense of urgency among parents and teachers for class size reduction makes an extremely high district participation rate in the current program likely.

The 1996 legislation despite being the largest and most ambitious program of class size reduction ever attempted, is being implemented in a remarkably short period of time. Obvious benefits are already apparent, including: more manageable workloads, greater opportunities for teacher attention to individual student learning needs, and improved morale and enthusiasm of both parents and students.

However, this enormous, swift change has generated numerous side effects of varying severity and significance. Many new teachers — some with limited qualifications, many still in the process of getting credentialed — have had to be hired with very short notice. Some teachers have also been reassigned from grades four, five and six to the lower grades with little opportunity for training. Unused buildings and portables have had to be readied, and other buildings reconfigured into classrooms, sometimes displacing libraries, computer labs, auditoriums or other standard school facilities. And in some instances, the other important educational responsibilities of teachers and administrators have had to be put on hold as a concerted effort has been made to begin the school year with the appropriate 20:1 ratio in place.

September 18, 1998 Seminar

On September 18, 1996 a group of 50 state officials, local education leaders and academics gathered in Sacramento to discuss both the immediate questions raised by the rapid implementation of this massive program, and the larger analytical questions raised by the legislation. These questions include:

- Is class size reduction in and of itself likely to affect the improvements in student achievement sought through the implementation of this program?
- What kinds of professional development measures are necessary to insure that class size reduction has its intended effects?
- What type of evaluation can help state officials, local educators and the general public determine the effectiveness of the program?
- What has been the experience of other states and their local schools that have attempted class size reduction?
- Are there changes in the legislation that need to be considered when the Legislature reconvenes?

In addition to a general discussion of these issues and concerns, the seminar featured two guest presenters who offered their own research findings and insights to the participants: Dr. Jeremy Finn of the State University of New York, Buffalo, and Dr. Robert Slavin of Johns Hopkins University in Baltimore. Brief biographies of each of these distinguished researchers follow.

Dr. Jeremy Finn is a professor in the Department of Community and Educational Psychology at the State University of New York, Buffalo, currently on leave and serving as a visiting NAEP Scholar at the Education Testing Service in Princeton, New Jersey. Dr. Finn previously served as a lead researcher on Tennessee's Project STAR, one of the most systematic research studies of the effects of class size reduction on pupil achievement ever conducted.

Dr. Robert Slavin is Co-Director of the Center for Research on Education of Students Placed at Risk at Johns Hopkins University and has conducted extensive research in many subjects, including literacy programs, cooperative learning and the effects of class size reduction. He is also the originator of Success For All, a nationally-recognized, site-based school reform program emphasizing an essential commitment to attaining reading proficiency at grade level for early elementary age students.

Presentation of Dr. Jeremy Finn

(NOTE: Throughout this report, comments made by individuals participating in the September 18 seminar are summarized without quotation; all text contained herein should be regarded as paraphrasing and/or synthesizing what was actually said, and not as quotes attributable either to Drs. Finn and Slavin or to any other participant.)

Introduction

The results of the State of Tennessee's Project STAR, an intensive longitudinal study of the effects of class size reduction, were one of many factors influencing the thinking behind California's new program of class size reduction. Three central questions for California policy-makers arise from the Project STAR study:

- Is there evidence that small class size at the kindergarten through third grade level helps improve student achievement?
- What kind of expectations are fair and reasonable for the present California class size reduction initiative?
- How might we evaluate this program in order to observe and record its results?

Project STAR: A Careful Study of the Effects of Class Size

Project STAR stands as a very important research project due to several unique design features:

- It used large and diverse samples — over 6,000 pupils from over 300 classrooms in 78 inner-city, suburban and rural schools participated.
- It implemented a longitudinal design, with the small-class intervention continued for four years (K-3) and the students tracked continuously through the present (grade 10).
- Both norm-referenced and curriculum-based tests were administered at the end of each school year.
- Students and teachers were assigned to small (13-17) or regular (22-26) *classes at random within each school*. The effects that were discovered were thus attributable directly to class size.
- No other special teacher preparation or materials were provided.

Each of the above features contributed to the validity and value of the study's ultimate results and conclusions.

Project STAR Findings

The major findings of Project STAR include:

- Smaller classes generated statistically significant benefits across the board, for every subject, every age group and every achievement measure in every year of the project.
- The small-class advantage was found for boys and girls alike, for inner-city, urban, suburban and rural schools, and for white and minority students alike.
- Longitudinal analyses showed that the small-class advantage was established in kindergarten, increased in grade 1, and remained stable in grades 2 and 3.
- The small class advantage translated to academic improvement equivalent to one month in kindergarten, two months by the end of grade 1, and somewhat more by the end of both grades 2 and 3.
- Achievement gains were greater for minority than for white students; therefore, the achievement gap between white and minority students was reduced in small classes.

Follow-up analyses showed:

- The small-class advantage was maintained in grade 4 and in subsequent grades even after all students were returned to regular-sized classes (although the advantages did diminish, not unlike most early-grade interventions).
- Teacher ratings in grades 4 and 8 indicated that students who had been in small classes were more actively engaged in learning, took greater initiative in the classroom, and displayed less disruptive behavior than peers who had been in regular classes.

- The benefit of small classes can be realized even without preservice or inservice teacher preparation (although these may increase the benefit).
- The effects of small class size may actually be substantially larger than those reported when out-of-range classes (i.e. those showing statistically huge gains in achievement) are removed from the analysis.
- There may be other as-yet-undocumented benefits: for example, reduced disciplinary measures, reduced need for special education and/or reduced dropout rates.
- 15:1 is not the same as 30:2; that is, smaller classes only work when the total number of students in the classroom drops, not simply when an aide or a second teacher is added to an already-crowded room.

How Will California's Class Size Reduction Initiative Measure Up?

Class size reduction is an expensive and ambitious program to undertake, especially in a state with the size and diversity of California. Given the expenditure of close to \$1 billion for this new program — the most extensive class size reduction program undertaken anywhere — it is remarkable that no funds have been allocated at this point to evaluate the effectiveness of the program and whether it ought to be continued or modified.

Evaluating a Small-Class Initiative: Lessons Learned

The Project STAR evaluation may be a useful source for any future evaluation of California's current class size reduction initiative. A few suggestions on study design and evaluation measures follow:

Design

- Monitor class enrollments regularly to watch for class size drifting as students enter or leave.
- Design a simple but reliable data collection system. A few tips:
 - to the extent feasible, make sure that students can be tracked even if they change schools or are grade-retained;
 - make certain that students can be matched with their teacher in the data system;
 - make certain that different sources of data can be merged;
 - don't depend on school or teacher records to be collected after the fact; and
 - collect each indicator in a given prespecified time frame each year (let the teachers know this is coming).
- Give something back to the teachers and schools you study.

Measures

- Choose achievement indicators by consensus and collect the same measures from all participating schools/classes/pupils.
- Because the program is not a randomized experiment, a pretest of academic readiness or performance is very useful (it does not have to be an entire battery).
- Keep the number of additional indicators small; focus on the essential elements, for example:
 - *Teacher behavior*: Measure time spent on classroom management time versus instructional time in reading and mathematics.
 - *Teacher morale and satisfaction*: Provide a quick checklist plus an opportunity to request assistance, resources, etc.
 - *Reports of student behavior*.

Class Size in Tennessee and California: Apples & Oranges?

Tennessee	vs.	California
6,000 students		1.3 million students
2 year of planning time		no planning time
sufficient licensed teachers		shortage of qualified teachers
adequate school facilities		inadequate school facilities (limited money for portables and, in some instances, conversion of libraries, computer labs, etc. into classroom space)

- Teacher reports and/or observations of student engagement, and the extent to which everybody is involved in learning activities.
- Discipline problems/contacts with parents.
- Referrals for special education.
- In-grade retentions.

Conclusion

Smaller classes can be a major step toward ensuring every student is engaged in the learning process because students are left with no place to hide and essentially required by circumstance to become more active learners in the classroom. As to whether the significant gains which are achievable are worth the also very significant price — this is an issue for policy-makers, not researchers.

Presentation of Dr. Robert Slavin

This is an extraordinary time for education, both nationally and in California. After years of being a second-priority issue, always on the agenda but consistently outranked by others, education has finally risen to the top among issues of concern in both arenas. Today even the President has lent his visible support to the need to focus on basic early education skills such as reading.

In the past, major education initiatives have more often than not resulted in disappointments, followed by a subsequent reluctance to spend new dollars on education. Two keys to implementing effective programs are providing schools and teachers with the professional flexibility needed to adapt to reform programs, and providing professional development to all teachers to expand their knowledge and abilities.

Problems & Possible Solutions in California Initiative

There are three particularly important problems with the class size reduction initiative currently being implemented in California, which require policy-makers attention on an urgent basis:

- The funding provided for reduction of class sizes in grades K-3 may be insufficient, given the large class sizes now present in California and the imperative to reduce to a 20:1 student to teacher ratio.
- The immediate need for new teachers generated by this quick action may require districts to hire uncredentialed, underqualified and in some cases incompetent teachers.
- The plan doesn't provide any real solution to the serious encroachment problem created by adding thousands of new classes to an already under-built school system. Many schools are being forced, for example, to make very difficult choices between reduced class sizes and important facilities such as libraries.

It is likely that these problems will be exacerbated in districts serving predominantly disadvantaged students.

In addition, other existing interventions aimed at improving student achievement — such as one-to-one tutoring programs — may face adverse pressures based on these sweeping changes. And finally, the question remains, is 20:1 a low enough ratio to make a real difference?

As some potential solutions to these problems policy-makers should consider:

- Exploring whether class size reduction can be funded in such a way as to reduce encroachment on existing school resources and programs. The key is providing flexibility for decision-makers at the individual school site to make adjustments in how they approach these issues.
- Bringing in additional part-time teachers to reduce class size further for reading time (many credentialed but non-working teachers who are retired or have young children would gladly come back part-time).
- Providing extra tutoring for struggling students, particularly in the key first grade year (some tutoring programs have a very strong basis in research).
- Providing facilitators/mentors for new faculty members.

Issues to Consider in Professional Development

Three principal elements should go into any professional development program that is adopted in connection with class size reduction:

- The school or district should focus on finding a program with clear evidence of effectiveness elsewhere, rather than trying to invent its own program; many programs with proven track records of effectiveness are out there available to be replicated.
- The school's faculty and staff should be given all the relevant information and allowed to select their own professional development program from the available options, so that they are making a choice for a given program by consensus.
- Follow-up is essential — the training must be comprehensive and ongoing, active supervision and classroom observation is essential.

Comments from the Governor's Office

During the seminar, a representative of the Governor's office took issue with the implication that the class size reduction legislation was underfunded, thereby leading to educationally unwise trade-offs. The Governor's representative made the following points:

- Class size reduction has never been seen as an end in and of itself. It's intended to be well-coordinated with an explicit focus on strengthening reading. There is an additional \$200 million in AB 3482 (Davis) for a reading initiative that will fund a complete set of reading materials for every child in grades K-3, as well as provide \$39 million for staff development.
- In addition to the targeted funds available, there is a \$1.1 billion increase in unrestricted monies for the growth of general purpose education spending, including cost-of-living adjustments. There are two sets of block grants, totaling \$587 million, available to school sites and school districts with virtually no strings attached. Plus districts with lower than average per-pupil expenditures receive three shots of equalization aid -- an additional \$500 million -- in this budget. In total, there is \$2.2 billion in virtually unrestricted funding available to school districts that can be used as part of a comprehensive approach to reducing class size.
- Finally, language in the categorical mega-item allows districts to redirect up to 50% of any (or all) categorical funds for one-time costs associated with class size reduction. Because total funding in the mega-item is over \$2 billion, this language provides up to an additional \$1 billion that could be redirected to class size reduction.

Questions and Answers

This section is divided into four parts, reflecting the focus of discussion on four major areas of concern: Funding and Evaluation; Dangerous Trade-Offs; The Tennessee-vs.-California Comparison; and Teachers and Professional Development.

Funding and Evaluation

QUESTION: Is an evaluation of this program necessary? Aren't there enough data reports already?

SLAVIN: You need to find out what the real impact of this program is. You can't just rely on the Project STAR data; that study involved 6,000 students in Tennessee, whereas you are dealing with millions of kids here in California. I would also note that education seems to enjoy a unique status with regard to the need for evaluation. We are talking about a two billion dollar initiative here, and yet there is hesitation to spend two million to study whether the program is actually working. How much sense does that make?

FINN: We need to know what actually happens: what are the costs of implementation, whether there was a real benefit to student achievement, and which kinds of situations and variables offered the highest payoff for the dollars invested. An evaluation of some sort is important, but it should be one in which every district measures the same elements; this is the only way to generate meaningful data that is useful for policy decision-making.

QUESTION: With regard to the concern about evaluation: I saw a cartoon recently that shows a class which has had its size reduced to 20 just the day before, with the principal walking in already asking, "Are test scores up yet?" Very soon, the focus will be on that. We're already exploring how to assess student progress. What might be some appropriate types of evidence of gains resulting from class size reduction?

SLAVIN: You don't want to use any kind of assessment a teacher applies to their own class, and you do want to have data that's comparable from place to place. Have teachers test each others kids in different schools, or have professional researchers do it. Some sample of schools that are comparable in socio-economic status and prior achievements should be assessed using a standard reading inventory program.

QUESTION: Some studies suggest that lower class size helps more in the early grades, when the focus is on basic skills like reading. Is what we really need more formal reading instruction? Do we need explicit reading instruction in late primary grades and in middle schools?

SLAVIN: What we need is to change people's thinking about how to teach reading. We need to focus on building skills incrementally and continuously, rather than throwing it all out there at once and hoping most of it sticks. Reading should be a focus of elementary school faculty all the way up through the sixth grade. Teachers should move forward from the foundation of basic reading skills into teaching effective reading strategies (and eventually, study strategies) such as how to organize and analyze information.

To Evaluate or Not to Evaluate— The Department of Education's Response:

"We'll request funding for an evaluation if the demand is there, and it seems to be among this group. The question is how big people want it to be, because the larger and more comprehensive the evaluation, the greater the budget issue."

Dangerous Trade-Offs

QUESTION: The class size reduction effort we're going through today in California is forcing schools and districts to shuffle priorities and address multiple variables in ways that are harming the learning environment even as they're reducing class size. Many schools are sacrificing library space in order to convert it into new classrooms; others are losing computer labs or science labs or music and art facilities. Are these kinds of trade-offs worth it?

FINN: There's no way to know the impact of these kinds of trade-offs. California seems to have defined class size reduction as the intervention of choice without considering side effects such as these. There should always be a variety of means used, never just a reduction in class size. Class size reduction is simply one tool of many available to aid in the learning process.

SLAVIN: The legislation is much too restrictive. If participating in this program is causing people to shut down other good programs that are working, the legislation is actually acting in a manner counter-productive to its own stated goals. A variety of factors should be brought into the mix, and people should always be looking at the trade-offs. If the trade-offs required to achieve lower class size are too damaging, don't do it.

The Tennessee vs. California Comparison

QUESTION: Project STAR's class size reductions took student-teacher ratios from 25:1 to 15:1. Other research seems to indicate there is a threshold of effectiveness for class size reductions of around 15 to 18 students. If California's current initiative can only get class size down to 20:1 — above the supposed threshold — are we wasting money on this effort?

FINN: Well, California's approach does beg the question, why 20? Why not 17 or 18, given what some of the research shows? But there actually isn't a huge difference between 18 and 20 students in a class. The negative correlation between class size and student achievement is fairly steady overall. Twenty is still considerably better than 30, even if it isn't as good as 18. And consider that most days, there will be approximately one to three students absent, bringing the total number down in the 17-18 range on a frequent basis.

QUESTION: Most of the Tennessee data is based on a reduction in class size from about 24 students to about 15. In California, we're looking at going from 34 to 20 — a much larger change. How do the study findings translate between these different environments? Are there additional changes teachers will need to make to adapt?

SLAVIN: Other studies have been done charting class size reductions from 29 to 21 and other combinations. There still isn't enough data overall to pinpoint the precise impacts of class size reductions on student achievement. But evidence does exist that smaller is better. It's important to emphasize additionally the need to choose effective professional development strategies for teachers who take on these new assignments.

QUESTION: Were there space problems associated with Tennessee's class size reduction program?

FINN: There weren't any real space problems in Tennessee.

SLAVIN: There are significant problems with generalizing Tennessee's experience to California. Schools volunteered, so that schools that had space problems probably didn't participate. Because the Project STAR study involved a relatively small proportion of even Tennessee's schools, the impact on the availability of teachers was probably very small. It's really quite a different thing to implement this sort of program on a massive scale; these kinds of issues about the availability of teachers and space are going to have a much greater impact.

Is Class Size Reduction the Means, or the End?

During the seminar, discussion took place surrounding the tension between class size reduction as a means to improve student achievement, and as an end in itself. This key point of discussion, as articulated by a school superintendent, is summarized below.

Let me try to describe a real dilemma I'm having listening to these presentations. On the one hand, the objective here for some people is to reduce class size in the belief that good things will then happen, such as increases in student achievement. There is evidence that reducing class size can by itself make a difference. But, on the other hand, if we start with the objective of improving student achievement in basic skills such as reading and math, then reducing class size becomes just one of many things we can be doing to accomplish this objective. When I hear about trade-offs involving things like losing the school library to reduce class size, it makes me concerned that class size reduction is becoming the end rather than the means. I think it forces the question of what our real objective is. Is it to reduce class size no matter what, or is it to improve student achievement through a variety of means?

Teachers and Professional Development

QUESTION: With regard to creating greater flexibility in the law, most of the examples given in the discussion were for teachers who have some degree of special training, as opposed to teacher aides or other people who do not meet special certification requirements. Is that an accurate characterization of how you see the needs presently?

SLAVIN: In my view, there has been an over-investment in instructional aides. Research indicates that the correlation of aides to improved achievement is profoundly zero. Studies have been done comparing large classes with and without teacher aides; virtually no differences were found, with the exception of a situation where the aide is focused on tutoring students one-to-one on reading skills.

QUESTION: Class size reduction generates a huge amount of enthusiasm from teachers who are excited about the prospect of being able to do and teach more every day in the classroom. This enthusiasm may in fact be one of the key factors that makes class size reduction effective in increasing student achievement. Might there be some link between this enthusiasm and the successful results of other class size reduction efforts?

SLAVIN: There might be, and it should be studied. However, in every study of class size reduction, the teachers invariably feel a great surge of enthusiasm and freedom. But it's like someone who's been in a cast and then they get the cast off and suddenly feel like they can fly. They can't; they can run faster, but they can't fly. I think while people are still enthusiastic about the possibilities before them is precisely the time to start getting them to think about new, effective strategies they can use to take advantage of this, rather than hoping the enthusiasm itself will carry the day.

QUESTION: Many teachers feel with dramatically reduced class size they can now do things they always wanted to do, like have regular oral presentations by students. Class size does make a big difference in the things you can do in a classroom. And a great deal of professional development happens informally among teachers on the job, rather than in formal professional development programs.

SLAVIN: As a teacher and a parent, it seems obvious to me that 20 is better than 30. There are so many more things you can do with the students in the classroom. But every research study of reduced class size shows that size alone doesn't make a huge difference in and of itself. It *can*, but professional development is an essential component of ensuring that the advantage offered by smaller class size translates into results.

Class Size Reduction Isn't Truly Optional

One seminar participant, a local school board member, offered some frank comments on the mislabeling of class size reduction as a voluntary program, and the consequences of the strong public demand for it. Her comments are summarized below:

"Dr. Slavin commented that everyone is watching California and it's true. Educators and policy-makers all over the country are paying close attention to what we're trying here and we could set the cause of education back ten years if we mess this up. I'm very concerned that we're setting ourselves up for failure because of the very serious and detrimental trade-offs we're having to make at the school site level to implement these class size reductions. We're looking at losing computer labs and science labs and doubling up classes in rooms designed for single classes. And it's really misleading to characterize this as a voluntary program — the public's expectation everywhere in the state is that it will be done in their school."

Final Thoughts

Several points raised in the September 18 seminar discussion bear close scrutiny and consideration by both state and local education policy-makers:

- State policy-makers should consider granting greater local flexibility in the program, i.e. permitting funding to be used for research-based, cost-effective tutoring programs, or for the formation of smaller classes focusing specifically on reading and math. This is especially necessary in view of some of the potentially damaging trade-offs being implemented at individual schools due to the overwhelming demand for class size reduction.
- Local education officials must be prepared to resist calls for immediate implementation of class size reduction if the trade-offs are too great for students (for example, requiring the elimination of libraries or the hiring of unqualified teachers).
- Schools and districts must recognize the need for professional development focusing on ways teachers can take advantage of smaller class size.
- Professional development programs should be chosen by local school staffs, based on research of the program's proven effectiveness, and should be sustained over an extended period of time.
- A searching evaluation of this unprecedented \$1 billion program's effectiveness in improving student achievement should be authorized and funded.

Appendix A

The following passage was excerpted from *"Reducing Class Size: A Review of the Literature and Options for Consideration,"* David C. Illig, California Research Bureau, California State Library (June 11, 1996).

Literature Review

A perception exists among parents and teachers that smaller classes are better than larger classes. Researchers and policy analysts, however, are more wary. Some researchers have technical concerns about the research designs of studies that report a relationship between reduced class size and improved achievement — including the Project STAR study. Other studies address concerns that are based on the cost effectiveness or program design of smaller classes.

Analysts have raised several fiscal and implementation issues, including questions about whether the benefits of reduced class sizes are sufficient to offset the costs incurred to create them. These studies suggest that other strategies can be implemented to improve student performance at a lower cost. In addition, there are concerns about whether classes with as few as 15 children are small enough to achieve marked improvements in performance, and whether those improvements persist in subsequent years. Finally, there are concerns about whether other reforms, such as curriculum and teaching style changes and quality improvement mechanisms, should accompany smaller classes in order to assure consistent achievement gains.

Following is a discussion of the literature that drove the Project STAR demonstration project, as well as other literature that addresses other comprehensive reforms that can complement small classes.¹

Researchers Had Different Thoughts About the Appropriate Size of Classes. The small class size of 15 students was chosen for Project STAR based on the work of a group of researchers headed by Gene Glass and Mary Lee Smith. These researchers used a statistical technique known as meta-analysis to determine an estimate of the relationship between class size and student achievement. The primary finding of the Glass-Smith analysis was that class size reduction improved student achievement, but that those improvements were relatively small for class sizes of 20 or more students. Student achievement was more significantly improved for classes that had fewer than 15 students.²

Another research entity, the Educational Research Service³ (ERS), challenged the Glass-Smith analysis on several grounds, including the reliability of the meta-analysis technique to predict appropriate class size, and the studies used by Glass-Smith to support its research.⁴ By the early 1980's, however, the basic Glass-Smith results were widely cited in the literature. While these results are the basis for many policy initiatives, the debate has not been settled, and many researchers remain unconvinced about the Glass-Smith results.

A 1986 ERS report, using a different analytical technique, suggested that achievement gains are found in classes that enroll fewer than 22 students. Further, the report suggests that these results are most pronounced in early elementary classes (kindergarten through grade 3) and in classes containing mainly disadvantaged children. The ERS results have been challenged for many of the same reasons as those attributed to Glass-Smith.

Field Projects Complemented the Research Literature. In the early 1980's, as Project STAR was under development, researchers were reporting encouraging early results from a class-size demonstration project at one Nashville elementary school. In addition, another class-size experiment, Indiana's Project Prime Time⁵, was showing promising results. University researchers that were evaluating the Nashville demonstration project also were advocating Project Prime Time as one possible model for reducing class sizes in Tennessee. Follow-up studies of the Nashville experiment, along with later studies of Project Prime Time, reported that achievement gains made by children in smaller classes in the first year were not sustained in subsequent years of instruction. These studies, however, were published after Project STAR began.

¹ This section relies on several recent reviews of the literature, including: Project STAR 1989, Odden 1989, Mitchell, et. al. 1989, Slavin 1990, Robinson 1990, Hanushek 1994, and Sadowski 1995.

² Glass, et. al. 1978.

³ Educational Research Service 1980.

⁴ Summarized in Glass, et. al. 1982. See also Educational Research Service 1980, and Robinson and Wittebols 1986.

⁵ Project Prime Time was approved by the Indiana legislature in 1981 and begun in the 1983-84 school year in 24 kindergarten through second grade classes. The demonstration tested class sizes at 14 students per teacher in a variety of schools.

A recent analysis of the Glass-Smith data by Robert Slavin⁶ challenges whether reducing classes to 15 students or less would actually improve performance.⁷ As it turns out, when removing one study from the group used by Glass-Smith, the average effect for classes of about 15 students declined significantly.⁸ Further, most of the large gains in achievement in the Glass-Smith analysis can be attributed to tutoring situations that had only 1 to 5 children.

Studies Also Identify Other Outcomes from Smaller Classes. In addition to achievement gains, researchers have reported other benefits that are attributed to smaller class size. For example, some of the Project STAR team reported that children in small classes were less likely to be retained than children in regular classes. They also found that fourth grade teachers reported more active participation from students who had previously been enrolled in smaller classes.

A different small class size evaluation conducted in Nevada⁹ suggests that children in small classes are less likely to be referred to special education. Researchers also have reported higher morale and less teacher stress for teachers who instruct classes with a smaller number of students. Another byproduct of smaller class size is that teachers report that they can move through their curriculum at a faster pace. In most of these instances the changes are small and are not always statistically significant. Nevertheless, such factors can be considered as benefits to class size reduction. In addition, to the extent that these nonachievement outcomes of smaller classes reduce costs over time, they could be considered in policy discussions.

Does Money Matter? Many policy analysts have used the research noted above to debate whether the benefits derived from reducing class size are greater than their cost. Much of the literature on this topic, however, does not provide enough information to determine whether money does or does not matter, or under what conditions money does matter. Studies typically focus on broad averages, across many types of school sites, and often lead to very different conclusions. For example, a recent article in the *Harvard Education Letter*¹⁰ used a demonstration project in Austin, Texas to show how different analytical techniques could yield contradictory conclusions. In the Austin demonstration, 15 poorly performing elementary schools were given \$500,000 each per year for five years, and were directed to improve student performance. Each school used some of its funds to reduce class size; yet, only two schools showed improvements. One analysis (counting successes and failures) would suggest that money didn't matter, in that 13 schools did not improve student performance. Conversely, another analysis, one that focuses on average gain in student achievement across sites, might show that the two exemplary schools compensated for those schools that did not succeed; thus, money did matter.

The real significance of the Austin demonstration to policy makers is that it suggests the need to compare improved schools to those that did not improve. What the authors found is that the improved schools markedly changed the way teachers taught in the smaller class settings. This example emphasizes the need to examine what is occurring at each test site rather than merely relying on averages to drive policy formation.

The class size debate is both more subtle and more complex than just reducing class size. Recently, one researcher from Harvard, Richard Murnane, stated that asking whether money matters is the wrong question. Instead, he suggests that policy makers should identify student performance goals, along with a set of strategies for achieving those goals. He suggests that policy makers should then determine how funds can be used to support the achievement of their goals¹¹.

⁶ Slavin 1989.

⁷ The Glass-Smith finding is derived from the use of statistical techniques to estimate a curve that is based on extrapolation from the results of 14 "well controlled" studies reviewed by the authors. Slavin's analysis examined the actual data underlying the Glass-Smith curve, and found that these data suggest much smaller gains than the gains based on the Glass-Smith estimates. Slavin also suggested that other studies could be excluded either because the study examined only short duration small classes (30 minutes), or the study examined post-secondary classes. Leaving these studies in the analysis, however, would not materially affect the results.

⁸ The study Slavin excluded was an experiment that tested whether class size affects motor skill training. The achievement test used in the experiment consisted of rallying a tennis ball off a wall for a specified period of time.

⁹ Snow 1993.

¹⁰ Sadowski 1995.

¹¹ The Project STAR team and other researchers also suggest that class size reductions should be accompanied with other changes including changes in teaching style. Some of these changes may evolve naturally when classes are smaller; but these changes cannot be assumed. A recent book published by the Brookings Institute draws similar conclusions (Hanushek 1994). This book summarizes the work of a prominent group of education economists with diverse backgrounds. It supports the notion that smaller classes must be imbedded in more comprehensive reforms.

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