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What Do We Know About Class Size Reduction?

The following is a literature review regarding class size reduction (CSR). This review provides: (1) a summary of the empirical research that prompted implementation of CSR; (2) observed benefits of CSR; (3) challenges to implementing CSR; and (4) a concise description of the CSR project as implemented in California.

Research Synthesis

Class size is one of the most researched topics in education. It has been debated in the literature with researchers publishing seemingly convincing meta analysis studies (i.e., Glass and Smith, 1979) only to be disputed by other researchers (i.e., Slavin, 1984). Although the effect of class size on student achievement has been studied for decades, the debate continues today. Results span the gamut pro and con.

“A thorough review of the scientific evidence provides no support for broad programs of class size reduction.” (Hanushek 1998)

“There is no credible evidence that across-the-board reductions in class size boost pupil achievement.” (C. Finn and Petrilli 1998, p. 2)

“This research leaves no doubt that small classes have an advantage over larger classes in reading and math in the early primary grades.” (J. Finn and Achilles 1990, p. 573)

“If Americans are truly committed to providing quality public education and a level playing field for children regardless of background, once they learn about the advantages of small classes in the early grades, they will presumably find the funds needed to reduce class size.” (Biddle and Berliner 2002, p. 17).

A dilemma does exist. Proponents contend sufficient data show reducing class size improves academic achievement, however, the magnitude of that gain is still in question. Opponents contend that what actually takes place in the classroom is a bigger influence than the number of students in the classroom. They contend issues such as quality of teaching, instructional strategies used, content of the curriculum, interactions between teachers and students, as well as the number of students, are all important variables. Still other researchers emphasize student motivation, family educational background, and family economic background (CSR Consortium 2002).

Numerous class size reduction projects have been initiated in various parts of the country including Texas, Oklahoma, Utah, Michigan, Nevada, California, Georgia, Buffalo New York, Burke County North Carolina, the Sage Program in Wisconsin, and the Prime Time project in Indiana. However, the Tennessee STAR program is the single most influential field experiment, since it improved upon earlier research methods and allowed researchers to be more confident in their recommendations as they were supported by empirically-derived “hard data.”

The Tennessee Student/Teacher Achievement Ratio program, or STAR, began in the 1985 (Finn and Achilles, 1999). STAR was a large empirical study regarding the effects of reduced class size that allowed for random assignment of both students and teachers. The bulk of previous research provided little information regarding how CSR would work in the real world. Because of the scientific nature of the study, STAR has been credited with being the single best field experiment ever designed (Biddle and Berliner 2002). Results from this project prompted other states to examine the efficacy of CSR.

Although some sources contend that evaluations of full-scale programs in other states are consistent with the earlier STAR research, other evaluators contend the student sample used in STAR was not generalizable to other communities, particularly those with numerous minority and non-English speaking students. The STAR program was able to control for certain conditions in ways that other districts implementing CSR on a districtwide basis were not able to control. (California is a good example of the latter and therefore results from California are reviewed later.)

The following represent the major research findings generally mentioned in support of CSR (Thompson and Cunningham, 2001).

- As class size decreases, academic achievement increases.
- Poor and minority students gain more than their non-poor and non-minority peers.
- Positive effects are in the primary grades, particularly kindergarten through third grade. Evidence favoring smaller classes is weaker at other grade levels.

- Major benefits occur if the number of students is fewer than 20 and probably the number of students needs to be at or below 17 before significant improvement emerges.
- Academic gains continue in subsequent higher grades, even though involvement in smaller classes has not persisted.
- The longer students are in small classes, the more they benefit.
- Students need to be in smaller classes for at least two years before making enduring gains.

It should be mentioned that most of the above evidence resulted from controlled experiments and these results may not be replicated in the real life situation found in many school districts throughout the country. For example, the STAR Study was conducted in Tennessee, whose student sample was not representative of those students attending some of the nation’s large inner city school districts. The relatively small sample of STAR teachers were all experienced and fully certified, which has not been the case in other states that have initiated large-scale CSR projects. Additionally, the STAR program did not have to contend with the potentially disruptive influence of major curriculum reforms common today. Therefore, generalizability of the findings may be in question when applied to school districts that differ significantly from the conditions that existed during the Tennessee study.

In fact, under different conditions, CSR can backfire and be more difficult to implement and thereby be less of a benefit to the students it is meant to help the most. Poor and minority students attending older, smaller, and overcrowded schools do not have the available classroom space to expand into, nor can they attract the additional teachers needed. This can exacerbate an existing equity issue. These and other problem areas are addressed below.

Observed Benefits

In addition to the empirically-derived findings regarding achievement described above, additional CSR benefits documented in the educational literature are enumerated below (Thompson and Cunningham 2001). Smaller classes are said to provide for:

- More individualized instruction
- Improved identification of special needs
- Fewer classroom discipline problems
- Faster and more in-depth coverage of content
- More teacher-parent contact
- Greater parent satisfaction
- Reduced classroom stress
- Greater teacher satisfaction
- Lower dropout rates and higher graduation rates

The list of advantages resulting from CSR is impressive. Few educational reforms implemented in the recent past can claim such a list of demonstrated positive effects. Several authors were of the opinion that since teachers and parents support CSR so enthusiastically, it represents a vast improvement over more traditional reforms such as “year-round school.” Teachers and parents resist this latter reform for a number of reasons, one of which is interference with scheduling the annual family vacation.

Common Challenges to Implementing CSR

As mentioned previously, the very students standing to gain most from CSR, poor and minority students, can be the students least likely to have the opportunity to take full advantage of the reform’s benefits. The commonly older inner-city schools attended by these students lack the space required by CSR. The additional teachers required by CSR has also presented a recruitment problem because of the existing teacher shortage which is aggravated by the reluctance of some teachers to work in inner-city schools. The most frequently occurring problems associated with CSR are summarized below (Thompson and Cunningham 2001).

- Teacher Shortages
- Lack of Teacher Quality
- Inadequate Facilities
- Aggravation of Existing Equity Issues
- Diversion of Funds from Other School Activities to Pay for CSR
- Failure to Achieve the Level of Academic Gains as Demonstrated in the Research

All of these problem areas were experienced as California began to implement a statewide CSR program.

CSR in California

In July 1996, California began a \$1 billion CSR effort to improve student achievement in the primary grades (CSR Consortium 2002). Schools that reduced class size to 20 students or fewer in grades K, 1st, 2nd, and/or 3rd were given an additional \$650 to \$800 per student. To meet the CSR guidelines, a total of 18,400 new classes were added in 1996-97, which is an increase of 28 percent. Of the 895 eligible districts in the state, 873 or 98% participated and received CSR funds. In 1997-98, nearly \$1.5 billion was allocated to support CSR and to pay for facilities and to train teachers. Several states are watching CSR in California for possible implementation or for revising existing projects.

Factors that were unique to California and not experienced in the Tennessee STAR program included: (1) the larger scale of implementation in California rather than a relatively small controlled study; (2) a pre-existing teacher shortage and the large numbers of teachers hired with emergency credentials in California versus the experienced and fully certified STAR teachers; (3) the diversity of California’s racial/ethnic minority student population compared to Tennessee’s predominately Black and White population; and (4) the larger average size to which classes were reduced in California (20) compared to Tennessee (13 to 17).

As mentioned above, one of the more troubling problems reported in several states, most notably California, found the very students standing to gain most from CSR - poor and minority students - were the students least likely to take full advantage of the reform’s benefits. Such students were more likely to attend schools with inadequate facilities which did not allow for timely nor full implementation of CSR. Therefore, it is conceivable for CSR to aggravate existing equity problems.

Education in California underwent considerable change from 1996 to 2000 as CSR was phased in. As a result of implementing these simultaneous reforms, evaluators were unable to isolate CSR as the direct cause of what has been described, depending on the particular document reviewed, as “slight increases” to “significant gains” in student achievement scores.

The official evaluator of the California program was CSR Research Consortium (2002) comprising staff from the American Institutes for Research (AIR), RAND, Policy Analysis for California Education (PACE), WestEd, and EdSource. This consortium worked on the evaluation for four years at the request of the California Department of Education. The most recent analysis from this group concluded that, “There is little connection between score gains and participation in CSR.” Additional findings from this evaluation are summarized below.

- The lack of baseline data and the magnitude of simultaneous reforms presented obstacles to conducting the evaluation.
- Overcrowded schools enrolling predominantly low-income and minority students were slow to implement CSR.
- Primary impediments to CSR implementation were teacher and facility shortages and insufficient funding.
- New teachers and those lacking teaching credentials were concentrated in schools with the greatest proportions of low-income and minority students.
- The 46 percent increase in hiring K-3 teachers during the first three years, led to an increase of teachers who were not fully credentialed. Non-credentialed teachers increased from 1.8 percent before CSR to 12.5 percent during the second year of CSR.
- Teachers reported fewer discipline problems and greater ability to give individualized instruction. They did not report changing how they taught nor covering more material in a shorter span of time.
- Most districts reported expenses that exceeded State stipends. The additional funds were taken from maintenance and administration or from cuts made in professional development, computer equipment, or library funds.
- Some districts forecasted additional shortfalls in the coming year and “a few” indicated they would be cutting back on CSR.

Several authors have indicated that, the California experience is the textbook example on how not to implement CSR on a statewide basis. Inadequate funds were provided for the CSR program and the

existing teacher shortage and overcrowding problems were not addressed prior to beginning the CSR project. Therefore, implementation of CSR in school districts already experiencing these sorts of problems only serves to exacerbate an already troubled situation.

Conclusions

The literature reviewed here indicate that, instituting large scale CSR programs do not necessarily represent an educational panacea. This is not because implementation of CSR on a large scale does not have merit. On the contrary, CSR has the potential to be an effective reform if funded properly. It is the process used to implement this reform that has been less than desirable.

This review suggests that at least four conditions need to be in place for CSR to be successful. These conditions include: (1) the ability to reduce K to 3 class size to no more than 17 to 20 students; (2) adequate funding to support such a reduction in class size; (3) a sufficient supply of classroom space; and (4) a supply of experienced and fully certified teachers required by the expanded number of classes. If any one of these four program components is lacking, serious problems can develop and hamper the extent to which improvement in student achievement is realized. In a perfect world, these conditions could be met in school districts throughout the nation. Unfortunately, reality requires school districts to do with what they have. Therefore, attempts at CSR possible at the present time may only deliver minimal, if any, improvement in student achievement.

In contrast, however, if these four program requirements are in place, there appears no doubt that CSR represents an effective reform, particularly for minority students enrolled in the primary grades. Successful implementations of large-scale CSR programs require extremely high levels of commitment on the part of taxpayers and state legislatures. Unfortunately, the level of commitment required for successful CSR has been to date only marginally demonstrated by those responsible for developing economic and educational policy.

The interpretation of the research findings pertaining to CSR, appears to depend largely on one's values and what appeals to one's common sense. Common sense tells us, particularly, to teachers, that the interest of students are better served if there are fewer students in their classes. In contrast, however, politicians and policy analysts responsible for making economic and educational policy function with a different set of values. They ask the question, if CSR improves student achievement, is it practical to reduce class size to the level necessary to effect significant gains? Educational budgets after September 11th probably do

not allow for the required level of commitment. It might be more prudent to examine other factors contributing to the classroom experience including curriculum content, teacher quality, student-teacher interaction, etc.

A definitive answer to the CSR dilemma is outside the scope of this review. The issue will continue to be debated in the future. A more definitive statement regarding efficacy of CSR will no doubt be possible as more data are collected from the states that have already implemented it statewide.

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