

RESEARCH Brief

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Class Size

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Class size reduction (CSR) has been a topic of discussion between educators and policy makers for more than 30 years. Much of the concern has been the effect class size has on student outcomes relative to the resource cost incurred from reducing class sizes. This Research Brief is organized in two main sections. The first section summarizes historical state initiatives including the Nevada Class Size Reduction program (Strum, 1997). The second section summaries key results and themes in class size reduction research, criticisms of this research, and rebuttals.

Class Size Reduction Program, Nevada

Nevada began its CSR program by partial reductions in class sizes for kindergarten and first grade classes in 1990 with class sizes capping at 16 students (Sturm, 1997). Second grade class sizes were reduced in 1991 and third grade in 1996. Class size reductions were never fully implemented, specifically for kindergarten classes (Molnar, 1998). The initial evaluation in 1993 did not show significant growth in student achievement; however, fewer students were recommended for special education, teacher absenteeism decreased, and classrooms were deemed more conducive to learning. A second evaluation in 1997 identified third grade students who attended second grade in Nevada showed higher gains in reading and mathematics than those students who did not attend second grade in Nevada. The same results occurred for second grade students who attended first grade in Nevada schools. Further evaluations showed a continued decrease in the number of special education referrals, despite large increases in the state student population. This program received large support from parents, teachers, and principals.

Project Prime Time, Indiana

The Indiana Legislature initiated a two-year study reducing class size in 1981. Twenty-four schools were randomly selected from first grade through third grade to reduce class size from an average of 26.9 to 19.1. The results were so impressive that all first grade schools in the state were reduced in 1984, and then expanded to include all kindergarten through third grade classes by 1987 (Mueller, Chase & Walden, 1988). Subsequent research identified inconsistent program implementation research practices. However, this later research still favored class sizes that were smaller (Gilman & Antes, 1985). The most recent study showed substantial gains in reading and mathematics test scores in second grade. (McGivern, Gilman, & Tillitski, 1989).

Project Star, Tennessee

Tennessee followed Kindergarten students in various class sizes for four years starting in 1985. School class sizes were categorized as standard (more than 20 students), supplemented (more than 20 students with an aide), and small class (15 students). Results were again positive with the small classes showing the greatest levels of achievement over the standard

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and supplemented classes (Nye, Hedges & Konstantopoulos, 2000) In addition, impoverished students showed the greatest gains (Nye, Hedges & Konstantopoulos, 2004). A follow-up study tracked these same students through grade twelve (Finn, Gerber & Boyd-Zaharias, 2005). Students in smaller classes showed substantial gains in test scores compared with other larger classes. Additional outcomes included fewer dropouts, greater college preparation, and more high school graduates.

SAGE, Wisconsin

Wisconsin's Student Achievement Guarantee in Education provided funding to reduce class sizes in school districts where 50% of the students lived under the poverty level for five years. Class sizes were reduced to 15 students. Kindergarten and first grade classes were reduced beginning in 1996, second grade classes were reduced in 1997 and third grade classes in 1998. By the second year of implementation, there were differences in academic achievement between reduced classes and other larger classes (Molnar, 1998). There were differences in effect on student outcomes as well, with African American males making the greatest gains. This program was later expanded statewide. Documented student outcomes included fewer discipline problems, more time dedicated to instruction, increased individualized instruction, greater variation in instructional strategies, and content was taught at greater depth (Halbach, Ehrle, Zahorik & Molnar, 2001; Zahorik, 1999).

Class Size Reduction Program, California

California initiated a statewide initiative to reduce class sizes in 1996 (Stecher, Bohrnstedt, Kirst, McRobbie & Williams, 2001). Class sizes were reduced from 40 students to 30 students, and 30 students to 20 students. Even though the initiative was poorly implemented and poorly funded, small improvements in student achievement were documented. The California initiative has been used as a case study that demonstrates how not to implement smaller class sizes (Biddle & Berliner, 2002; Sack, 2005).

Table 1

Table 1. Second Grade Test Scores by Attendance in First Grade

	1993 Mean Score	1994 Mean Score
Reading		
Attended NV 1 st Grade	643	639
Attended Other 1 st Grade	637	627
p	.04*	<.01*
Mathematics		
Attended NV 1 st Grade	623	621
Attended Other 1 st Grade	619	613
p	.09	.01*

*Denotes significant differences between groups.



Table 2

Table 2. Third Grade Test Scores by Attendance in Second Grade

	1993 Mean Score	1994 Mean Score
Reading		
Attended NV 2 nd Grade	680	682
Attended Other 2 nd Grade	674	670
Could Not Determine	652	654
p	<.01*	.02*
Mathematics		
Attended NV 2 nd Grade	674	675
Attended Other 2 nd Grade	666	666
Could Not Determine	644	658
p	<.01*	.02*

*Denotes significant differences between groups.

Research Findings

Various research methodologies have been used to explore the relationship between class size and student outcomes (Biddle & Berliner, 2002). Class size research typically compares small classes (between 13 and 20 students) to larger classes (between 25 and 30 students). Some of the primary findings from this research are summarized below.

- Students in early grades tend to make greater gains on achievement measures.
- Achievement gains tend to be greatest for students attending inner-city schools.
- These achievement gains can continue into upper grades, even when class size reduction ends at third grade.
- Student discipline problems declined when decreasing class sizes.
- Fewer students were referred for special education support after decreasing class sizes.
- Teachers are more able to individualize instruction and teach content at greater depth with smaller class sizes.
- Teacher absenteeism decreases when class sizes are smaller.
- The optimal class size appears to be less than 16 students for grades kindergarten through three, but classes as large as 20 may still have a positive impact even if at a reduced level (Achilles, 1998; Claycomb, 2008; Reichardt, 2001; McRobbie, et al., 1998).
- School districts have implemented class-size reduction in different ways. First and second grades tend to be implemented first, third grade and kindergarten later.

In-depth research summaries and reports related to class size reduction can be found at the CCSD Research Department website (http://ccsd.net/AARSI/Research/educational_research.php).



Criticisms

The primary critic of class size research is Eric Hanushek, an economist at Stanford University. Hanushek consistently attacked the quality and methodology of class size research (Hanushek, 1986; Hanushek, 1997) and claims class size reduction is an ineffective use of tax dollars. His analyses consist of literature reviews and reanalysis of data from the Tennessee Project Star (Hanushek, 1999). One key difference between Hanushek's analysis and others was his predominant use of descriptive statistics instead of the inferential statistics employed by other education researchers (Hanushek, 2002).



Reactions to Hanushek have led to more powerful statistical analyses, including meta-analysis. Contrary to Hanushek's claims, even these more advanced analyses continue to support class size reduction (Angrist & Lavy, 1999; Finn, Gerber, Achilles & Boyd-Zaharias, 2001; Hedges, Laine & Greenwald, 1994; Krueger, 2002). Hanushek's rebuttal has been that there is insufficient evidence that reduced class size is effective in middle or high school (Hanushek, 2002; 2003), claiming issues like teacher quality make a larger contribution towards student achievement than class size (Hanushek, 1999; Rivkin, Hanushek & Kain, 2005).

Conclusions

Research on the effects of class size reduction on student outcomes indicates positive results for kindergarten through third grade, with the optimal class size at approximately 15 students. Positive outcomes include increased student achievement, fewer referrals for special education support, and fewer discipline issues. Benefits for teachers have also been reported, including reduced absenteeism and teaching content in greater depth. Although the outcomes vary due to inconsistent implementation by school districts, by grade level being supported, and the number of students limited in the classroom the results have remained positive.

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