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Research Brief
Class Size & School Size

Question: How do class size and school size affect student achievement?

Summary of Findings:
Class Size Overview: Class size is one of the most researched and heavily debated topics in American public education. Currently, at least 25 states have initiated class size reduction (CSR) programs. In the past twenty years, several major studies have been conducted which indicate that smaller class sizes produce an increase in student achievement as well as greater student, teacher, and parent satisfaction. However, many of these studies have been criticized by politicians and conservative groups as containing faulty methodology and inconclusive results. In addition, class size reduction programs can be quite costly and there are many factors which contribute to the success or failure of these programs.

The Major Studies in Class Size Reduction
(AERA, 2002; Biddle & Berliner, 2002; USDE, 1999)

Indiana's Project Prime Time. This two-year study began in 1981 with a sample of 24 public schools where the class sizes of the early grades were reduced from 25 pupils to 18 pupils per class. By the 1984-1985 school year all Indiana K-3 classrooms had reduced class sizes. The results of this study indicated that students in the small classes achieved better in reading and mathematics than the students in the earlier, larger classes; however, critics argued that the Indiana study was flawed because of a lack of random assignment of pupils and other concurrent initiatives in state school policy which might have influenced the results.

The Tennessee STAR Project. Perhaps the most influential study in class size conducted in the United States both for its initial results and subsequent follow up studies, the Tennessee Student/Teacher Achievement Ratio (STAR) Project (1985-1989) involved 11,600 students and 1300 teachers in 76 schools and 42 districts. Class sizes in K-3 classrooms were reduced from an average of 22-26 to 13-17 students. The results indicated that there were statistically significant differences in student achievement in reading and math, with students in the smaller classes consistently outperforming students in the larger classes. In addition, the STAR study examined the effects of adding an additional adult, a teacher's aide, to the larger classrooms and found no effect on student achievement. The STAR study concluded that long term exposure to smaller class sizes had a greater effect and that the gains in achievement were greater for students who were traditionally disadvantaged in education. A follow up study examined the long term effects of those

early small classrooms and they indicate that those students continued to outperform other students in grades 4, 6, and 8 (McRobbie, Finn, & Harmon, 1998).

Wisconsin's SAGE Program. Wisconsin's Student Achievement Guarantee in Education (SAGE) Project focused on targeting those students who were considered disadvantaged, such as low-income and minority students, by increasing the number of small, early grade classes. Beginning in 1996 and 1997, the program reduced class sizes in grades K-3 in school districts where at least 50% of the students were living below the poverty level. Class sizes were reduced to 15 or fewer students; findings indicated greater gains in achievement scores in language arts, reading, and mathematics for those students in the smaller classes. These results support the STAR findings; specifically, relatively larger gains were found for African American students.

The California Class Size Reduction Program. In 1996 California announced a policy that provided $650 pupil for all primary schools which would reduce class sizes in the early grades from an average of more than 28 students per teacher to not more than 20 students. The results of the study have currently proven to be inconclusive (Bohrnstedt & Stecher, 1999; 2002) and critics point out several flaws in the study: California's schools were drastically overcrowded so definitions of "small" classes were problematic, per-student funding was inadequate, other programs and facilities were reduced in order to provide smaller classes, and the need for more teachers often resulted in the hiring of non-certified, under-prepared teachers.

Summary of Conclusions

Although there have been flaws and issues resulting from these studies and other studies conducted across the country, most groups examining the relationship between class size and student achievement have generated the following conclusions:

- Long term exposure to smaller class sizes in the early grades creates greater advantages for students in American schools, especially academic achievement in reading and mathematics.
- Greater gains occur for students in class sizes of less than 20 students. Many groups recommend a range of 13-17 pupils per class.
- Greater gains occur for students who have been considered educationally disadvantaged such as minority and low-income students.
- Gains from small classes in the early grades are retained when students return to larger classes and the gains remain present in later grades.
- Evidence of the advantages of small classes in upper grades and high school has so far been inconclusive.
- Class size reduction programs may shrink the achievement gap, reduce grade retention, result in fewer disciplinary actions, less dropping out, and more students taking college entrance exams (Krueger & Whitmore, 2001).

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Possible Explanations for Results

Researchers have sought to find explanations for the increase in student achievement in small classes and several theories have emerged:

- Teacher workloads are reduced.
- Smaller classes minimize discipline problems.
- Teachers are able to provide individualized attention and better match instruction with students' ability levels.
- Increase in student/teacher interaction and higher levels of student participation.
- More time spent on instruction.
- Increase in parent/teacher interaction.
- Teachers may implement a variety of instructional strategies.

Critics of Class Size Reduction

Class size reduction programs have been criticized for flawed research methodology (Hanushek, 1999), have been touted as creating teacher shortages (Laine & Ward, 2000), and have been deemed too expensive. However, supporters of class size reduction programs argue that the research of critics such as Hanushek is also flawed and that many critics of CSR support a conservative agenda which supports the privatization of public schools and opposes teacher unions and increases in public spending (Biddle & Berliner, 2002). In addition, defenders of CSR programs point out that **class size** (dividing the number of students by the number of regular classroom teachers) is often confused with **student/teacher ratio** (dividing the number of student by certified personnel) which can be misleading. Even if one chooses to ignore the statistical results of CSR research, studies have indicated that students, parents, and teachers support smaller class sizes for a variety of reasons including fostering classroom climate, an improvement in teacher morale, and more positive student and parent attitudes about education.

Suggestions for Creating Successful Class Size Reduction Programs

Several suggestions have been made for fostering successful CSR Programs (O'Connell & Smith, 2003):

- Begin early and keep the program for at least two years, if not three to four years.
- Hire qualified teachers.
- If funding is a problem, target minority and low income students first.
- Adequately fund appropriate facilities.
- Allow for flexibility in policies based on needs of each school district.
- Keep sizes below 20 pupils per class.

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School Size Overview: In 1996, Kathleen Cotton, working for the Northwest Regional Educational Laboratory, produced a review of more than 100 documents and 49 research studies examining the relationship between school size and aspects of schooling. She used the definition of "small schools" as elementary schools ranging from 300-400 students and secondary schools ranging from 400-800 students, although there is debate about the appropriate size for a school. Cotton's research review identified several key areas of research and the findings are as follows:

- **Quality of the Curriculum**: Although one argument for larger schools is that they can provide better, more varied curricula, Cotton found there was no reliable relationship between school size and curriculum quality. In addition, when many large schools add courses, they are often the introductory courses in non-core areas, not higher level courses.
- **Cost-Efffectiveness:** Perhaps the greatest argument for school consolidation is that large schools are more cost effective; however, according to Cotton, research on the cost-effectiveness of larger **schools is inconclusive, indicating that the relationship between size and cost varies from school to school.**
- **Academic Achievement:** Cotton found that about half of the student achievement research found no difference in the achievement of students in large and small schools and about half of the research indicated that students perform better in small schools. In addition, larger schools have a negative effect on student achievement for low-income and minority students.
- **Student Attitudes:** Research favors small schools over large schools with respect to student attitudes toward school in general and toward particular school subjects.
- **Social Behavior:** Research shows that small schools have lower incidences of negative social behavior such as truancy, classroom disruption, vandalism, aggressive behavior, theft, etc.
- **Extracurricular Participation:** Levels of extracurricular participation are higher in small schools and students participate in a greater variety of activities in small schools.
- **Attendance:** Small schools have higher attendance rates than those in large schools, especially for minority and low-SES students.
- **Dropouts:** Most research indicates that smaller schools have better retention rates than large schools.

Cotton's examination also found that smaller schools have students with better self-concepts and students who are more likely to exhibit a sense of belonging. In addition, positive correlations have been found between small schools and the establishment of favorable interpersonal relationships among students.

Smaller Learning Community Structures

There are many barriers to dismantling large public schools and replacing them with smaller ones such as iconic notions of high school; lack of time, resources, and technical

assistance; system impediments such as incentives for large schools; and cost concerns. Therefore, many school districts are opting for smaller learning community structures, programs currently supported by the federal government which defines them as follows:

- **Academies**: Subgroups within schools organized around particular themes.
- **House plans**: Students in a large group are divided into groups of several hundred across grade levels or by grade levels and students take all courses from their house teachers.
- **A School-Within-a-School**: Small autonomous programs housed within a larger school building, generally responsible to the district rather than the host school's principal.
- **Magnet Schools:** These programs use a specialty core focus and teachers often team, sharing responsibility for curriculum and evaluation.

There is a wide array of differences in smaller learning community structures and a myriad of programs across the nation currently conducting research on their effectiveness. See Oxley's Small Learning Communities Review of Research at http://www.temple.edu/lss/pdf/Oxley.pdf

Online Resources:

The SERVE Center for Continuous Improvement
www.serve.org
A Regional Education laboratory for the Southeast, SERVE's site contains resources and publications on class size reduction programs.

HEROS: Health and Education Research Operative Services
www.heros-inc.org/star.htm
A nonprofit organization that evaluates and assesses programs for children, families, and communities, Heros'site contains information on the data collected in the Tennessee STAR program.

Student Achievement Guarantee in Education Program (SAGE)
www.dpi.state.wi.us/dpi/oea/sage/index.html
The SAGE program's website outlining its goals and continuing research and evaluation of the class size reduction initiative.

Class Size Matters
www.classsizematters.org
An organization of parents and others concerned with class sized in New York State which advocates and promotes smaller class sizes.

Reduce Class Size Now
www.reduceclasssizenow.org
A site dedicated to providing research, how-to information, and other news on CSR.

The National Education Association's class size reduction page.
www.nea.org/classsize/
Outlines NEA's support of CSR and gives summaries of research in this area.

WestEd.
www.wested.org
The Regional Education Laboratory for Arizona, California, Nevada, and Utah which provides research and publications dealing with CSR.

Suggest websites and references for further exploration of school size

National Clearinghouse for Educational Facilities Resource List
www.edfacilities.org/rl/size.cfm
A website for people who plan, design, build, and maintain K-12 schools. This site provides an abundance of links related to school size.

Education World
http://db.education-world.com/perl/browse?cat_id=4403
Several articles dealing with school size.

School Size, School Climate, and Student Performance
www.nwrel.org/scpd/sirs/10/c020.html
A link to Cotton's seminal article about school size research.

Bill & Melinda Gates Foundation
www.gatesfoundation.org
Resources for promoting small schools.

Small Schools Alliance
www.smallschools.org
A website dedicated to reforming the Los Angeles Unified School District.

Northwest Regional Education Laboratory Small Learning Community Resources
http://www.nwrel.org/scpd/sslc/publications.shtml
Resources and publications dealing with small learning communities.

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