

CLASS SIZE



Comprehensive class size reduction has captured the attention of parents, policymakers and educators. In 1999, President Clinton succeeded in getting Congress to agree on a “down payment” toward a \$12 billion initiative to hire 100,000 new teachers to reduce the nation’s average pupil-teacher ratio to 18 students per teacher. In the 2000 elections in Washington, more than 60 percent of voters passed an initiative advertised to reduce class sizes. Nearly every state in the union is grappling with this issue.

According to the National Education Association (NEA), the nation’s largest teacher union, “excellence in the classroom can best be attained by small class size.”¹ These sentiments are echoed by numerous parents, legislators and community leaders who have been involved in class size reduction efforts.

Why is class size reduction such a popular education reform issue? Parents like it because they believe it will allow more one-on-one instruction for their children. Teachers like it because their workload is decreased and it has the potential to reduce discipline problems. Politicians like it because it offers a simple, popular, easily measurable (and observed) education reform initiative. Unions like it because they get more members (smaller class sizes mean more teachers). In short, class size reduction appears to have something for everyone—except students.

For students, class size reduction fails to live up to its promise to increase academic achievement. In fact, it is among the most expensive and least effective education reform options and, as with any investment, resources need to be put where a good return is most likely.

Many education groups, including the Department of Education, claim that research on class size reduction “points more and more clearly toward the beneficial effects of reducing class size” to improve student achievement.² Other sources suggest an entirely different pattern of evidence. According to the National Conference of State Legislators, more than 1,100 studies examine the relationship between class size and student achievement, yet no definitive conclusions have been reached.³ *Education Week* regularly reports the deep divisions among scholars concerning class size reduction results.⁴

Other research suggests that studies linking increased student achievement and class size reduction efforts have been unsound.⁵ Critics maintain that after isolating and evaluating co-existing influences, evidence suggests that most class size reduction efforts offer no significant increases in student learning unless the pupil-teacher ratio reaches tutorial levels.⁶

The data on class size reduction

National trend data

As unbelievable as it seems, national trend data supports the argument that class size reduction, *by itself*, will not improve student achievement. Class size trends from the ‘50s to the ‘80s provide no evidence of a significant relationship between student achievement and class size.⁷ Compare the 1950s national average teacher-pupil ratio of 30 to 1 with today’s average of about 19 to 1 (actual class size averages 23 students per class.^{8,9} From the 1970s to 1996 class sizes have fallen nearly 25 percent.¹⁰

Meanwhile, over the last three decades, public education spending has increased by at least 61 percent above inflation with much of those funds going toward the hiring of new teachers.¹¹ Yet few would argue that there has been a corresponding increase in student learning.

Advocates of class size reductions maintain that these trend data ignore negative social factors, such as increased numbers of single parents and the corresponding levels of poverty, which have changed the face of education over the years. Yet these critics fail to point out the many positive social factors gained during the past few decades, such as increased K-12 funding and higher parental education levels, which we are told are precursors to improved student test scores. (Data also indicate that no more than one-third of the drop in the pupil-teacher ratio can be attributed to the increase in special education populations who tend to require smaller classes and greater individualized attention).¹²

International trend data

Like the national data, international trend data suggest a further look is warranted before class size reduction measures are adopted. Nations with far larger class sizes than those found in the U.S. are experiencing significantly higher student achievement. For example, the average academic scores of eighth graders in Korea and Japan are noticeably higher than those of U.S. students. Yet thirteen-year old students in Korea and Japan learn in average class sizes of 49 and 36 respectively.¹³

Actual class size averages in the U.S. and Japan are quite different due to the way schools in the two nations prioritize and organize academic disciplines and instructional practices.¹⁴ We are not suggesting that American schools ought to adopt a Japanese or Korean instructional model. Teachers must instruct large classes (often exceeding forty) to ensure that schools can still provide students with art, music and computer instruction.¹⁵ But the academic success enjoyed in countries where classrooms are brimming over with students suggests that the *key* factor for student achievement is something other than smaller classes.

Despite the evidence forwarded from national trend data and international comparisons, class size reduction advocates are not cautious or dissuaded. Many states have already invested heavily in reducing class size, with more states promising to follow. Examining the results of a few of the more prominent of these experiments helps provide perspective as to the wisdom of class size reduction policies.

Tennessee's STAR experiment

In 1985, Tennessee began a four-year study of the effects of class size reduction on kindergarten, first, second and third grades. In relative terms, Project STAR (Student-Teacher Achievement Ratio) was to be a controlled experiment designed to provide reliable, scientific evidence on the effects of class size reduction. The project was inspired by earlier research indicating student achievement was roughly constant until class size was reduced to 15 or fewer pupils per teacher.¹⁶

More than 300 classrooms in 79 schools totaling 7000 students participated in the program. Assignment of students and teachers to classrooms was random. STAR compared smaller classes (13-17 students) with normal-sized, larger classes (22 to 26 students) both with and without an instructional aide in the larger classes. To control for possible differences in school quality, every participating school had at least one of each type of class (a class of 13 to 17 students, a class of 22 to 26 students without an instructional aide, and a class of 22 to 26 students with an instructional aide).¹⁷

The results of the STAR experiment led many class size reduction advocates to conclude that STAR had “definitively” proved that “bringing class size down in the primary grades in and of itself has positive effects on student achievement in all subject areas.”¹⁸ Initial results revealed that students from smaller classes outperformed students from larger classes and that smaller classes had significantly less student retention and improved assessment of special education needs.¹⁹

Performance of students participating in STAR was followed for several years after the program. Test scores indicated that students from smaller classes significantly outperformed students from the larger classes in all academic subjects. These results led Tennessee to implement class size reduction in 16 of the state's poorest schools in a program called “Project Challenge.” These schools experienced an increase in their ranking compared to other school districts on statewide student achievement tests.²⁰ Unlike Project STAR, however, Project Challenge was not a controlled experiment.

Despite these seemingly clear cut results, researchers remain divided on the effectiveness of comprehensive class size reduction, especially since a closer examination of the STAR experiment suggests that its results are not as conclusive as is commonly believed.²¹

A review of the available STAR data, which has generally not been available to researchers,²² was conducted by Eric Hanushek, Professor of Economics, University of

Rochester. Professor Hanushek observed that many advocates of class size reduction report the STAR project showed that small classes led to improved student achievement in each grade. *The data, however, showed no significant cumulative achievement in students who remained in small classes*, leaving researchers to wonder why learning gains did not accumulate from year to year.²³

Gains were made by students who began their initial grade (kindergarten or first grade) in a small class. Evidence obtained from the STAR experiment and its follow up studies suggests that, although these first-year, one-time gains remained with these students, no increase in subsequent years occurred. This was true even when students remained in small classes.²⁴ If class size reduction changed the aggregate rate of student learning, students remaining in small classes would advance above their counterparts each year.²⁵ This first-year gain in student achievement may reflect a one-time acquisition of social and learning behaviors useful to students in subsequent years.²⁶

Professor Hanushek cited numerous potential problems with the experiment (such as the reassignment of some students due to parental pressures²⁷) and warned against concluding too much based on the STAR experience. He further observed that the STAR study has never been replicated and remarked that, although such experiments [class size reduction] are expensive, they are far less expensive as a demonstration project than the potential costs of an across-the-board policy of class size reduction, especially if the sweeping policy change is based on faulty or incomplete data.²⁸

Contrary to those who believe that the STAR project conclusively proved that comprehensive class size reduction efforts will improve academic achievement, Professor Hanushek concludes that evidence obtained from the STAR project supports only targeted class size reduction, and that comprehensive class size reform would likely be an inefficient use of scarce resources.

Professor Hanushek's interpretation of the STAR data can be summarized as follows:

Evidence obtained from the STAR project supports only targeted class size reduction . . . comprehensive class size reform would likely be an inefficient use of scarce resources.

The most expansive conclusion that can be reached from Project STAR and the Lasting Benefits Study is that they might support an expectation of positive achievement effects from moving toward small kindergartens, and maybe small first grades. None of the STAR data support a wholesale reduction of class sizes across grades in schools. The achievement results also come from large reductions (one-third of the existing regular class sizes) that take the small classes to quite low levels compared to most existing situations (15 students per class). It does not provide evidence about what might happen with smaller changes that take class sizes down from the current levels to levels above the Tennessee experiment, say, 18-20 students. (Remember that the original motivation for Project STAR involved research results suggesting no effects for class sizes above 15 to 1).²⁹

Other state experiments in class size reduction

Tennessee's STAR experiment is the most significant in terms of class size reduction, particularly since it was designed with some controls to measure the effects of class size reduction as an independent variable. But the experiences of other states are also instructive. Wisconsin and California are currently experimenting with reduced class size.

The effect of the class size reform has not been measured as an isolated variable.

Wisconsin's class size reduction program, called the Student Achievement Guarantee in Education (SAGE), was enacted and financed as part of Wisconsin's 1995-97 state budget.³⁰ The objective for Wisconsin's program was

to target class size reduction in kindergarten through third grade in schools serving low-income populations. The program was intended to reduce class sizes in targeted schools to a student/teacher ratio of 15 to 1 or less. Unlike STAR, however, SAGE was not designed to directly compare classes targeted by the program with control classes not involved in the reforms. In fact, SAGE reforms went beyond class size reduction.

Under the SAGE program, reductions in class size were accompanied by additional changes including a revised, rigorous academic curriculum, professional development, and accountability initiatives.³¹ Schools participating in the SAGE program are also "required to embrace the "lighted schoolhouse" concept" which requires that schools provide family, student, and community events from very early in the morning until late in the evening.³²

Preliminary reports in the December 9, 1997 *Milwaukee State Journal* suggest that this approach was successful in raising test scores, particularly for minority students. But the degree to which class size reduction alone is to be credited with these improvements remains unknown,³³ and because SAGE reforms targeted specific populations, results of the reform may not be generally applicable. Thus, when SAGE is used as an example of the positive effects of class size, it is important to remember that the reduction of class size under the program was only one of several significant alterations. The effect of the class size reform (or any of the other reforms) has not been measured as an isolated variable. As a result, one cannot assume that any increases in student learning are due to class size reduction alone—or that these increases would not have been achieved without reducing class size.

California is also experimenting with state-wide class size reduction efforts. In 1996, inspired by the reported success of Tennessee's STAR report, California lawmakers set up a program to implement class size reduction in grades K-3 throughout the state. They are aiming for a ratio of twenty students to one teacher. California's Class Size Reduction Program mandates that top priority be given to first grade, followed by second grade and then third grade or kindergarten.³⁴

The California experiment extends well beyond any state's previous experimentation with class size reduction. The scale of the experiment dwarfs the STAR program and is based on assumptions that lay outside the realm of the available STAR data.

For example, STAR data suggested increases in student learning occurred at the *earliest* grade, but California's program prioritizes kindergarten *after* first, second and third grades. Also, Tennessee's STAR program, largely carried out by experienced teachers, did not create teacher shortages. On the other hand, California's plan (requiring extra classrooms with a teacher in each room) has created a severe teacher shortage resulting in the hiring of many inexperienced teach-

ers. This practice is likely to negatively impact the possibilities for increased student achievement.

Another significant difference: Small classes for the STAR experiment were approximately 15 students per teacher. California's "small" classes of twenty pupils per teacher better resemble the large classes of the STAR experiment. So, though STAR provided no evidence that a reduction to twenty students per teacher would improve student learning, California has set twenty students per class as its target size.

California appears to be gambling its educational resources on unfounded extrapolations of already optimistic conclusions on class size reduction. Since California began making massive expenditures on class size, it has been reported that test scores have improved slightly, but whether or not reduced class size is the cause of these modest gains remains unknown.³⁵ Furthermore, allegations of test fraud and teacher incompetence have made headlines in California newspapers for the past several years, with the blame placed on the push to decrease class sizes before enough qualified teachers were in place. Some researchers contend that California could have improved student achievement using other methods for a fraction of the cost.³⁶

Class size reduction experiments in other states have yielded inconclusive and/or unsupportive evidence as well. For example, the Nevada Department of Education's "1993 Class Size Evaluation Study" determined that "achievement levels remained about the same when small classes were compared with larger classes."³⁷ During the 1980s, in Austin, Texas, sixteen schools were given \$300,000 a year for five years which was used to reduce class sizes. After five years, fourteen of the schools had failed to improve student test scores or attendance, while two schools posted significant improvements in student test scores. The two schools that improved student achievement implemented a number of reforms in addition to a reduction in class size, including intensive teacher training and rigorous academic standards. Whether or not reduced class size was a significant factor in the improved student performance in the two successful schools is uncertain.³⁸

The uncertainty of class size reduction results coupled with the modest gains attributed (justly or unjustly) to these efforts leave many questions unanswered. For example, even if one assumes that reducing class size improves student achievement, do the benefits justify the costs? Also consider that the STAR experiment reduced classes to an average of fifteen pupils per class,

a rate lower than many policymakers are proposing. Still, many researchers considered the actual improvements in test scores to be questionable or modest.³⁹

The Costs of Class Size Reduction

Class size reduction faces numerous obstacles to its implementation. Although the concept (having fewer students per teacher) is simple to understand relative to other education reform possibilities, implementation of class size reduction is far more complex than a mere allocation of dollars.

After evaluating effectiveness, the first factor to consider regarding class size reduction efforts is cost. But monetary costs cannot be considered in a vacuum. The costs of class size reduction must be compared to its benefits. The opportunity costs of choosing class size reduction over other education reforms must also be examined. For example, one must consider if the resources spent on class size reduction would be better spent on another type of reform. Comparing the costs and benefits of different types of reform will require reliable research on education reform options. Investments of resources must be made carefully, not only for the sake of the taxpayers who foot the bill, but for the students whose educational opportunities are at stake. Additional investment alone does not always improve student learning or achievement.

Class size reduction is among the most expensive education reform options, and costs must be calculated using a number of factors, including:

- *Initial average class size.* The larger the drop to "small" the greater the cost.
- *Imposition of a rigid cap, or flexibility in the number of students per teacher.* A rigid cap will increase the cost by decreasing the final average class size. Schools will keep numbers lower than necessary to ensure staying below the cap. (For example, if schools only receive class size reduction funding for staying below 17 students per class, it is likely that schools will remain at 15 or 16 per class in case of a student transfer. Therefore, rigid caps are likely to increase the costs of class size reduction by creating a need for classes to be even smaller than mandated.)
- *The cost of teachers hired for class size reduction.* Costs vary depending on the experience level of the teachers hired. Teacher costs increase as teachers move up the salary ladder, but experienced

teachers are valuable. (The costs of teacher support may also need to be factored in.)

- *The cost of providing new classrooms.*
- *Added operational costs, such as costs for utilities, custodial and clerical services.*
- *Potential cost offsets, e.g., due to less grade retention.*⁴⁰ (If fewer students are held back or sent to special education services, taxpayers would save on the extra costs of those students.)
- *Method by which class size is implemented (year-round schooling, block scheduling, etc.).*

The enormous financial commitment inherent in class size reduction can be readily observed through the California example where legislation mandates twenty or fewer pupils per teacher. The actual per-pupil costs vary by district from \$0 to \$1000 excluding facilities and staff development costs.⁴¹ Continuing costs for the program start at \$1-1.5 billion every year with costs steadily rising as teachers' salaries climb due to experience.⁴² Yet the monetary price tag of class size reduction is not the only cost to consider.

The opportunity costs of class size reduction versus its benefits are immense. Before committing to reductions, policymakers should consider if the required money spent might have greater effect if it were invested in better curricula; rigorous academic standards; teacher training; or technology. Money spent on class size reduction cannot be recovered for other areas of educational reform that may be better suited toward improving student learning. This is particularly disturbing when considering that *teacher quality is a more important factor in increasing student learning than is class size.*⁴³

Teacher quality is a more important factor in increasing student learning than is class size.

Related implementation obstacles to class size reduction

As already noted, cost alone is not the only problem facing class size reduction policies. Other implementation obstacles loom large. Class size reduction leads to the need for more facilities, which in turn increases the need to hire more teachers. However, as one superintendent of a school district near Houston remarked, "The fact that there's more money [for class size reduction] doesn't mean there are more teachers."⁴⁴

Already some states are finding it difficult to obtain qualified, knowledgeable teachers. Policymakers, already struggling to find ways to ensure that teachers are qualified, will face shortages as classroom sizes are reduced. Unless ways are found to find and hire qualified individuals, these shortages can lead to the increased hiring of unqualified teachers.⁴⁵

Portable classrooms, new schools, and/or adding rooms to existing facilities require additional resources. These facilities also increase utility and maintenance costs. Furthermore, these additional costs do not affect all schools equally. Some schools may have additional facilities readily available. Some may already have small classes. On the other hand, some schools may experience extreme difficulty obtaining additional facilities (particularly in urban areas).⁴⁶

A number of other questions arise. Will reduction policies target certain types of classes first? Will team teaching count as a reduced class? If experienced teachers have better capabilities to handle large classes, will they be last to experience smaller classes? Class size reduction is a much more complex issue than it appears at first glance. Comparing the costs and complexities with the uncertain return indicates that comprehensive class size reduction is a weak strategy for meaningful education reform. Nevertheless, class size reduction remains politically popular.

Would class size reduction help anybody?

Evidence that reductions in class size may have a positive effect is strongest in the primary grades.⁴⁷ Data collected from the Tennessee STAR experiment suggest that this benefit is achieved in the initial small kindergarten or first grade class a child attends.⁴⁸ The evidence also indicates that, because benefits to reduced class size have not proven to be cumulative, providing additional grades (above the first grade) with reduced class size may have no significant positive affect on student learning.⁴⁹

Effectiveness may also depend on the extent of the drop in class size. STAR classes dropped by about a third to an average size of 15 students per pupil and registered modest gains, while some proposals offer class size reductions of only a student or two, with average class sizes remaining significantly larger than 15. Minor reductions in class size are likely to be an ineffective and expensive means of improving student achievement.⁵⁰

Aside from the first couple of grades, certain student populations seem to be more affected by reduced class size than others. Disadvantaged students and minorities seem to be more sensitive to class size variation than other students.⁵¹ (This does not necessarily mean that these students would not be better served by another reform.⁵²)

Washington state gets smaller classes . . . maybe.

Currently, Washington state law provides schools with funds to provide, at a minimum, one teacher for every 20.4 students and, at a maximum, one teacher for every 18.42 students. Washington's *actual* pupil per teacher ratio is among the highest in the nation at 20.32 pupils-per-teacher.⁵³ But it should also be noted that our state's pupil-per-teacher ratio has been steadily falling. In 1976 Washington's average was 23.21 pupils per teacher.

Of further interest is the fact that the pupils per total instructional staff ratio is dramatically different from the pupil-per-teacher ratio. Washington's official pupil-per-teacher ratio is about 20.32 pupils per certified teacher; 16 students per certified staff member. Yet, according to the National Education Association, the *actual* average class size in Washington state is more than 28 pupils per teacher.⁵⁴ This is because pupil-teacher ratio is not necessarily the same as actual class size. The truth of the matter is, *data for actual class size is not kept in our state, so the actual average class size is unknown.*

That pupil-to-teacher ratios do not always accurately reflect class size is due to the accounting formula used for non-teaching certified staff (such as librarians and counselors). Another reason may be found in class scheduling. For example, if a school has a 22-to-1 pupil-to-teacher ratio, the school may be able to hold class size down to 15 students in reading classes by scheduling larger classes in a less intensive discipline. Further illustration of the point may help clarify the issue.

Under current state law, an elementary school of 300 students would be provided a minimum of 15 certified instructional staff. If every teacher were an in-class instructor, the school's actual class size would be twenty students per class. But if the school used the funds to provide two out-of-class instructors, say a librarian and

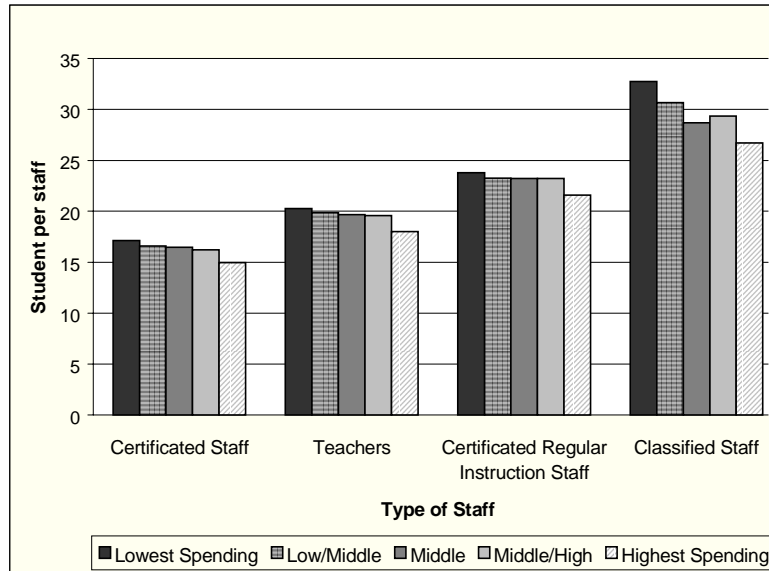


Chart CS-1: Student-staff ratios decrease with increased per-pupil spending level, regardless of how ratio is measured. Source: Joint Legislative Audit and Review Committee, K-12 Finance and Student Performance Study, Appendix 7.

Definitions

Certificated Staff: All teachers, administrators, and other staff with a certificate.

Teachers: Certificated teachers, regardless of type of school or subject.

Certificated Regular Instruction Staff: Certificated staff providing instruction in the basic education program

Classified Staff: Any staff without a certificate, regardless of function.

a counselor, the teacher-to-student ratio would technically remain 1:20 but the actual class size would be 23 students per in-class instructor (assuming all classes are of equal size). Regardless, **no significant improvement in student learning occurs until class sizes are reduced far below this level**—which could require nearly *doubling* the resources currently allotted to K-12 public education.

Although pupil-to-teacher ratios and actual class size rankings receive a great deal of political attention, the real value of these measures should be weighed against their effect on student achievement. This effect, according to the evidence explored here, is, in most circumstances, likely quite minimal.

In fall of 2000, more than 70 percent of Washington state voters said “yes” to I-728 touted as a class size reduction initiative. The official ballot title, however,

Effect of Initiative 728

- During the 2001 fiscal year, half the lottery revenue is forwarded to the new Student Achievement Fund and half to the Education Construction Fund. During the following two fiscal years, 75% of lottery proceeds will go to the Student Achievement Fund and 25% to the Education Construction Fund. Beginning July 1, 2004, all lottery revenue will go to the Education Construction Fund.
- 75% of revenues in excess of the Emergency Reserve Fund limit (the limit is an estimated 5% of annual General Fund revenue) will go to the Student Achievement Fund until Washington per-student education funding reaches 90% of the national average. After reaching 90% funding, these transfers will only be made as necessary to maintain that level of funding.

was “Shall school districts reduce class sizes, extend learning programs, expand teacher training, and construct facilities, funded by lottery proceeds, existing property taxes, and budget reserves?”

According to the initiative, money from the “lottery proceeds, existing property taxes, and budget reserves” would be placed in smaller funds outside the general fund, thus exempting them from the state spending limit (I-601).

With passage of I-728, lottery revenue that has for years been deposited into the state general fund for education now goes directly to smaller education-related accounts: the Student Achievement Fund and the Education Construction Fund. A portion of proceeds from the state property tax equal to \$140 per full-time equivalent student in 2001 and increasing to \$450 per FTE student in 2004 (at the rate of inflation thereafter) is also forwarded to the Student Achievement Fund.

Money in the Student Achievement Fund is distributed directly to school districts where officials may decide how best to use the funds within certain limitations, but not necessarily to reduce class sizes. While the district could use its Student Achievement Fund allocation to reduce K-4 class sizes or reduce the size of select 5-12 classes, it can also spend that money to provide extended learning opportunities, compensation for teachers’ professional development and extended contracts, pre-kindergarten, and school building improvement.

Conclusion

Concern about the condition of our public school system has not dissipated over the last decade and a half.

Parents, policymakers and educators remain desperate to improve public education, and despite the expense and limited success of class size reduction, it remains a popular solution.

The primary harm inherent in comprehensive class size reduction efforts is in the opportunity cost of the expended taxpayer funds and the energy of the individuals involved. For some students, class size reduction may offer increased potential of achievement. It may also offer teachers more time and less stress. But as a comprehensive attempt at increasing student achievement, it has little, if any, demonstrable positive effect. Because the results of class size reduction efforts are negligible, the considerable resources

(human and financial) are mostly wasted. More worthy, but more controversial efforts, such as improving teacher quality, are not pursued.

Policymakers need to ask themselves how they can make the best, most effective, use of limited resources. Numerous reform options are available. It is important to remember that schools will vary in strengths and weaknesses, so a one-size-fits-all strategy is likely to be inefficient. Decisions are best made locally, school by school, class by class, teacher by teacher. If children are to be well-educated, we must be willing to focus on practices and models that are successful for students.

Recommendations

- *Decisions regarding how many students should be in each classroom ought to be made by local schools.* The appropriate number of students will vary depending on the age and preparedness of the students, the subject matter, the experience level of each teacher, and the instructional delivery model of each school.
- *Class size reductions must be part of a larger plan* that also identifies or provides for increased teachers, facilities and related costs such as costs for utilities, custodial and clerical services.
- *Demonstration models, with objective evaluation criteria, should be completed first,* before making expensive system-wide class size reductions.
- *The legislature should commission a review of a representative sample of school districts to determine how the I-728 funds are actually spent.* A public report should result.

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