COUNCIL FOR EDUCATION POLICY RESEARCH AND IMPROVEMENT

PROPOSED CONSTITUTIONAL AMENDMENT: CLASS SIZE REDUCTION

Current Status

It is within the authority of the local school districts to determine class size and student-to-teacher ratios for each classroom in their respective districts.

Proposed Amendment

Ballot Summary

Proposes an amendment to the State Constitution to require that the Legislature provide funding for sufficient classrooms so that there be a maximum number of students in public school classes for various grade levels; requires compliance by the beginning of the 2010 school year; requires the Legislature, and not local school districts, to pay for the costs associated with reduced class size; prescribes a schedule for phased-in funding to achieve the required maximum class size.

Explanation of Amendment

The proposed amendment sets the maximum number of students assigned to each teacher teaching in public school classrooms to 18 students in pre-kindergarten to third grade; 22 students in grades four through eight; and 25 students in grades nine through twelve. Beginning with the 2003-2004 fiscal year, it calls for the Legislature to provide sufficient funds to reduce the average number of students in each classroom by at least two students per year until the above limits are reached. In addition, the proposed amendment exempts extracurricular classes from these class size requirements.

Summary Points

- The approval of this amendment would lead to a policy that has prohibitive costs and places unrealistic demands on finding qualified teachers to fill additional job vacancies.

- The total cumulative combined personnel and facilities cost over the implementation period of this amendment is currently estimated by the Revenue Estimating Conference to range from a low of **$20 billion**, if space needs are addressed at a rate of 75% relocatable classrooms and 25% permanent classrooms, to a high of **$27.5 billion**, if space needs are addressed at the current ratio of 88% permanent classrooms and 12% relocatable classrooms.

- An independent analysis by the Council for Education Policy, Research and Improvement (CEPRI) produced estimates that are similar to those agreed upon by the Revenue Estimating Conference **($29.1 billion)**. The estimates produced by CEPRI help validate the numbers agreed upon by the Conference, and provide an indication that cost of class size reduction may actually be higher than the official estimates.

- If this amendment passes, Floridians will be impacted by increased taxes and/or reduced governmental services. In order to provide the revenue to fund this proposed amendment, the Legislature would have to either raise taxes or reduce/eliminate current governmental services, or some combination of the two. Possible sources of revenue would include:

    - **Sales Tax Increase** – If class size reduction were solely funded through an increase in sales and use tax, the sales tax would **increase by about 20% over the current rate (it would increase from 6 cents to 7.4 cents on the dollar)**.

    - **Corporate Income Tax Increase** – If class size reduction were solely funded through an increase in corporate income and excise tax, the tax would **nearly quadruple over the current rate, increasing from 5.5% to 20.5%**.

    - **Elimination or Reduction of Other Government Services** – If taxes were not increased, the cost of class size reduction would have to be funded by reducing or eliminating current governmental services. Over the 8-year implementation period, the average annual cost of class size reduction will be $3.4 billion, which would equal:

        * **The state share of the entire Medicaid budget,** $3.5 billion (Note: eliminating the state's contribution to Medicaid would cause the loss of all federal matching Medicaid funding, which is over $7 billion); or
        * **More than the total state funding for all of the following departments**: Children and Families, $1.9 billion; Elder Affairs, $134.4 million; Health, $510.2 million; and Veterans Affairs, $7.7 million (again, eliminating state funding would jeopardize the receipt of federal matching funds in these agencies); or
        * **More than the total state operating dollars provided for both public universities ($1.9 billion) and community colleges ($902 million)**.

- Assuming additional classrooms are built at the current ratio of permanent to relocatable classrooms, the estimated cost of $27.5 billion for class size reduction is over double the amount of money that the lottery has provided to education since its inception in 1987 ($11.1 billion).

- If passed, the proposed amendment would cost an estimated **$15.6 billion to $18.1 billion**, depending on how classrooms are built, to finance the operating costs (teacher salaries and benefits, other additional personnel, and maintenance and utilities) over the phase-in period of the amendment, 2003-2010.

- An estimated **31,800 <u>additional</u> teachers** would be needed to accommodate the class size limits proposed by the amendment over the period of implementation (2003-2010).

- An estimated **30,200 <u>additional</u> classrooms** would be needed to accommodate the class size limits proposed by the amendment over the period of implementation (2003-2010).

- Approximately **$4.4 billion to $9.4 billion** would be needed for the construction and land costs of additional classroom space depending on the use of relocatables.

- Once fully implemented, each year's operating costs are estimated to be **$2.5 billion** in today's dollars.

- There has not been made a definitive connection between class size and student achievement

Class Size in Florida: The Current Picture

Florida Class-Size Indicators

Average Class Size by School Level and Subject, 2000-01

Grade Level/Subject	Average Class Size
Kindergarten through Fifth Grade	23.3
Sixth Grade Through Eighth Grade	
Language Arts	24.8
Math	25.5
Science	27.1
Social Studies	27.0
Ninth Grade Through Twelfth Grade	
Language Arts	25.4
Math	25.7
Science	26.9
Social Studies	27.8

Source: 2000-01 Florida School Indicators Report, Florida Department of Education

As of the 2000 school year, Florida ranks 43rd among the fifty states in student-to-teacher ratio in public elementary and secondary schools. (Morgan and Morgan, 2001).

Statewide, Florida's kindergarten through third grade classrooms are overwhelmingly above the proposed limit of 18 students. In some of Florida's largest counties the percentage of classrooms at or below the 18 student threshold is even smaller than the statewide average.

Classrooms At or Below the Proposed Limit of 18 Students in K - 3 Classrooms Statewide, 2001 School Year

Grade	Percentage of Classrooms with 18 Students or Fewer
Kindergarten	15.4%
First Grade	18.1%
Second Grade	10.9%
Third Grade	8.7%

Source: Data collected for *Class Size for Grades K to 3 in Florida's Public Schools*, Florida Department of Education, January 2002

The above picture demonstrates that conforming to the proposed class size limits would be a daunting task for Florida to undertake. With the majority of Florida classrooms over the class size limits proposed, a significant number of personnel and resources would be needed in order to satisfy the amendment's proposed limits.

Impact of Proposed Amendment

On June 27, 2002, the Revenue Estimating Conference met to assess the fiscal impact of five proposed constitutional amendments, including the amendment to reduce class size. This group, consisting of representatives from the Governor's office, the Senate, the House of Representatives, and the Legislature's Office of Economic and Demographic Research, reached the minimum level of consensus required by law on the fiscal impact of the class size amendment. In compliance with section Chapter 2002-390, Laws of Florida, they adopted the following statement reflecting the estimated impact of the amendment for inclusion on the ballot:

> *The state will incur costs as the amendment is phased in. Estimated cumulative costs through 2010 range from $20.0 billion to $27.5 billion, depending on how classrooms are built. Once fully implemented, each year's operating costs are estimated to be $2.5 billion in today's dollars.*

The Conference identified operating (recurring) and capital outlay (non-recurring) costs involved with the implementation of this proposed constitutional amendment. Within operating costs, costs for additional teachers, staff, and utilities and maintenance are estimated. Capital outlay costs consist of costs for construction and land. The difference between the Conference's low estimate ($20 billion) and high estimate ($27.5 billion) is the ratio of permanent to relocatable classrooms used to address the additional need. The low estimate assumes that 75% of additional classroom needs are met by relocatables. The high estimate assumes the current mix (88% permanent, 12% relocatable). This report will focus on the higher estimate since it does not assume any change in the existing ratio of permanent to relocatable classrooms.

Operating Costs (Recurring)

		Revenue Estimating Conference			CEPRI		
Year	Additional Teachers	Teacher Costs	Other Costs	Total Operating	Personnel Costs (Teachers and Other Personnel)	Maintenance and Operations Costs	Total Operating
		Annual Additional Cost			**Annual Additional Cost**		
2003-04	7,832	$407,129,634	$221,046,345	$628,175,979	$626,878,109	$75,839,958	$702,718,067
2004-05	7,754	$418,453,255	$232,735,013	$651,188,268	$640,242,641	$69,886,216	$710,128,857
2005-06	7,230	$402,220,817	$230,686,864	$632,907,681	$615,551,989	$61,573,654	$677,125,643
2006-07	4,651	$269,955,771	$157,387,411	$427,343,182	$411,191,297	$40,085,947	$451,277,244
2007-08	2,768	$167,347,826	$101,681,902	$269,029,728	$251,840,662	$25,779,322	$277,619,984
2008-09	844	$51,359,290	$32,207,309	$83,566,599	$75,993,720	$13,700,595	$89,694,315
2009-10	377	$22,619,838	$14,637,869	$37,257,707	$32,869,753	$11,316,573	$44,186,326
2010-11	353	$21,720,284	$14,402,370	$36,122,654	$30,831,853	$11,353,007	$42,184,860
Totals	**31,809**	**$1,760,806,715**	**$1,004,785,083**	**$2,765,591,798**	**$2,685,400,024**	**$309,535,272**	**$2,994,935,296**
		Cumulative Operating Costs at 2010-11:		**$18,136,802,074**		**$19,684,622,957**	

Source: Revenue Estimating Conference, June 27, 2002

Notes:
The above estimates are derived from the methodology adopted by the Revenue Estimating Conference on June 27, 2002. The projected number of teachers needed to meet the reduced class size targets through 2010 was calculated algebraically based on the 2000-01 class sizes (by district) reported in the Florida School Indicators Report, the projected capital outlay FTE (through 2010-11), and estimated number of academic courses taken by the average student and taught by the average teacher. These estimates assume a 6 period day, where each teacher has one period off. Therefore, for all grades, a teacher is estimated to teach 5 periods. The number of academic courses taken by the student differs by grade level. For K-5, the number is estimated at 5, reflecting the one period out of six where the students engage in an elective activity (e.g., PE, Music, Art). For 6-12, the number is estimated at 4.5. This estimate reflects a typical student 6 period schedule consisting of 4 academic courses (Math, Science, Language Arts, and Social Studies) and two electives. One elective (or "extracurricular class" which would not be subject to the limits of this proposed amendment) is assumed for all students. The 0.5 academic course reflects the estimate that about half of all students would use the second elective period for an academic course (e.g., an extra Math, Science, or Language Arts course).

Teachers needed due to class size reduction reflects the difference in the estimated number of classes under the target class sizes and the number of classes under the 2000-01 class sizes divided by the number of classes for the average teacher. The number of classes at the target and the 2000-01 levels were estimated by multiplying the number of academic courses taken by the average student (5 or 4.5) by the quotient of the projected capital outlay FTE and the particular average class size limit imposed. For all grades, the average target class size is two students below the maximum class size limits proposed by the amendment. For K-3, the average target class size is 16 (18 minus 2); for 4-8 it is 20 (22 minus 2); and for 9-12 it is 23 (25 minus 2). This reflects the mathematical certainty that the maximum class size cannot equal the average class size. If that were the case, every class would have 18, 22, or 25 students. Since some classes are likely to be smaller than others, it is unrealistic to assume that the average class sizes would equal the maximum class sizes proposed by the amendment. Teacher salaries are the 2001-02 district-level average teacher salary for all degree adjusted for inflation. Benefits are estimated at 26.7% of salary costs. Teacher costs equal salary plus benefits. Other costs include costs for other support staff at school and additional utilities and maintenance. Other costs average either 24% of teacher salaries and benefits for non-new sites (relocatable classrooms) or 57% for new sites (permanent classrooms). These percentages reflect a statewide average based on district level information provided by the Department of Education, Division of Support Services, Office of Funding and Financial Reporting. Please see **Appendix A** for a breakdown of the calculation of the cumulative operating costs for the estimates of the Revenue Estimating Conference. Please see **Appendix B** for a breakdown of the calculation of the cumulative operating costs for the CEPRI estimates, and a full discussion of the differences between the CEPRI analysis and the Revenue Estimating Conference analysis.

The chart above demonstrates that the adoption of this amendment would lead to a policy that has prohibitive costs and places unrealistic demands on finding qualified teachers, and other personnel, to fill additional job vacancies. Over the eight-year implementation period of this proposed policy, an estimated 31,800 additional teachers would need to be hired to meet the reduced class size targets. Given the current difficulties in filling teacher vacancies, applying this restriction on class size would exacerbate this problem.

In addition to teacher needs, the restriction on class size would also lead to an increased need for other personnel. Though the number of students enrolled would be unaffected by the class size reductions, additional non-teaching personnel would be needed. For example, additional principals would be needed to supervise the additional teachers. Additional clerical workers would be needed to assist the additional administrators. Additional custodians would be needed to handle the additional classrooms. Though at first glance it may appear that adjustments in class size would only effect the need for additional teachers, it would actually set off a chain reaction, leading to a need for additional personnel at all levels.

Another operating cost that arises from the limits on class size would be the additional maintenance and utilities costs of new facilities. Smaller class sizes result in more classes which result in more teachers, support personnel, and classrooms. Whether relocatable or permanent, these additional classrooms bear an ongoing cost for maintenance and utilities.

According to the Revenue Estimating Conference, the total cumulative cost to fund the salaries and benefits of teachers, as well as the added costs of other personnel and the utilities and maintenance of additional space, is estimated at $18.1 billion. An independent analysis by the Council for Education Policy, Research and Improvement (CEPRI) estimated this cost at $19.7 billion. This amount is relatively similar to the official estimate derived by the Conference, with the difference reflected in the methodologies used (see **Appendix B**). Though similar, the higher CEPRI analysis indicates that perhaps the cost of class size reduction will be higher than the official estimates suggest.

To provide a range of costs, the Revenue Estimating Conference calculated operating costs using a different breakdown of permanent-to-relocatable classrooms. Assuming that relocatable classrooms would meet the additional space needs to a greater degree than the current situation (relocatables making up 75% of the new space as opposed to making up 12% of the total current space), reduces the operating cost by $2.5 billion (down to $15.6 billion). This lesser cost reflects the assumption that fewer additional personnel would be needed if relocatable classrooms are added onto existing school sites at a greater rate that new schools are built. However, this assumption reflects a departure from current practice. It may be more

accurate to assess the impact of the proposed amendment by imposing the class size restriction on the current situation rather than a hypothetical situation.

In addition to the cumulative operating costs of the proposed constitutional amendment, the Revenue Estimating Conference provided an estimate of the yearly recurring operating costs after the implementation period ends in 2010-11. The Conference determined that $2.5 billion was a reasonable estimate of annual operating costs following 2010-11. This figure is unadjusted for inflation and reflects the cumulative incremental operating cost during the implementation period in today's dollars. Given that inflation is a certainty, this recurring figure will be higher.

Overall, the personnel needs that would result from the adoption of this amendment place a large financial burden on the people of Florida, as well as create a near-impossible demand on finding qualified individuals to fill the resulting job vacancies.

Capital Outlay Costs (Non-Recurring)

		Revenue Estimating Conference			CEPRI		
Year	Additional Classrooms	Building	Land	Total Capital Outlay	Building	Land	Total Capital Outlay
		Annual Additional Cost			**Annual Additional Cost**		
2003-04	7,257	$2,288,728,274	$153,330,343	$2,442,058,617	$2,317,776,826	$154,271,089	$2,472,047,915
2004-05	7,271	$2,145,616,122	$153,434,638	$2,299,050,760	$2,167,566,947	$154,087,069	$2,321,654,016
2005-06	6,944	$1,892,546,410	$145,913,740	$2,038,460,150	$1,894,002,860	$145,309,995	$2,039,312,855
2006-07	4,512	$1,194,033,225	$103,452,300	$1,297,485,525	$1,177,585,795	$101,536,426	$1,279,122,221
2007-08	2,687	$726,136,905	$71,019,958	$797,156,863	$717,957,369	$69,651,573	$787,608,942
2008-09	812	$224,399,058	$20,678,243	$245,077,301	$229,041,544	$20,600,951	$249,642,495
2009-10	364	$111,816,975	$7,344,584	$119,161,559	$120,604,004	$7,638,644	$128,242,648
2010-11	345	$110,498,006	$7,260,129	$117,758,135	$115,532,128	$7,424,164	$122,956,292
Totals	**30,192**	**$8,693,774,975**	**$662,433,935**	**$9,356,208,910**	**$8,740,067,473**	**$660,519,911**	**$9,400,587,384**

Source: Revenue Estimating Conference, June 27, 2002

Notes:
The above estimates are derived from the methodology adopted by the Revenue Estimating Conference on June 27, 2002. Projected construction costs due to class size are based on capital outlay FTE projections (through 2010) provided by the Florida Department of Education, and the estimated number of classes at the target and 2000-01 class size levels discussed in the above operating cost analysis. The projected number of classrooms needed to meet the reduced class size targets through 2010 was calculated by dividing the estimated number of classes due to class size reduction by the estimated number of classes in a classroom on a daily basis (5 for K-5 and 6 for grades 6-12). The above estimates reflect classroom needs met at the current ratio of relocatable to permanent classrooms by district. The average statewide ratio is 88% permanent, 12% relocatable classrooms. The number of permanent classrooms needed in each phase-in year is then multiplied by the target class size limit, by district, to arrive at the total number of students in new classrooms. This total is then multiplied by the student station cost factors (http://www.state.fl.us/edr/Conferences/PECO/station.htm) to arrive at an estimated cost of construction. The student station cost factors for October of each phase-in year are used (the costs are adjusted for inflation). The cost of a relocatable was estimated at $75,000 in 2001-02, as provided by the Department of Education. This cost is adjusted for inflation through 2010-11. The number of classrooms constructed is adjusted by a utilization factor provided by the Department of Education. These factors recognize that in middle and high schools, one cannot use all the classroom space all of the time. Therefore, according to the Department of Education, it is estimated that in middle school, classrooms are 90% utilized, and in high school, classrooms are 94% utilized. Land cost estimates were provided by the Office of Economic and Demographic Research. They reflect the actual land cost by school site for sites built using SIT funds on a per student station basis. Not all districts have a value for this, providing an incomplete picture. Some of the values are low, most likely reflecting donated land. A state average was computed based on the number of districts reporting a value. This average was used for districts reporting values below the state average. For districts above the state average, the value reported was used, with one exception: Broward. Since Broward is a high land value district, Miami-Dade's value was used for Broward (converted to about $185,000 an acre). Please see **Appendix B** for a full discussion of the CEPRI estimates.

The figures above represent the additional classroom space and the corresponding costs that would be generated if the proposed amendment passed mandating classroom size limits on grades K – 12. According to both the Revenue Estimating Conference and CEPRI analyses, over the eight-year phase-in implementation of this amendment, approximately $9.4 billion would be

needed to fund the construction and land costs of additional space if classrooms are built at the current ratio of permanent to relocatable classrooms (88% to 12%). If classroom needs are met to a greater degree by relocatables, this cost decreases by $5 billion (down to $4.4 billion). However, as with operating costs, the higher estimate may be more appropriate given that it does not assume a change in the current practice of building facilities.

The costs associated with additional classrooms may be understated. First, one needs to factor in the debt service costs on a 20-year bond to fund these capital costs, increasing the overall resources needed. Second, one needs to consider the time lag involved with construction. Construction of new classrooms is not likely to keep pace with the need for additional space. Therefore, during the construction phase of these new classrooms, additional portables, above the numbers displayed above, may be needed to house students temporarily while permanent space is built. Whether these relocatables are leased or bought, this would more than likely lead to higher costs. Third, the land cost factors used provide a rough estimate for this highly volatile measure. For example, the factors used do not account for land cost variation that may exist within districts. These costs may vary greatly, probably leading to higher costs.

Total Cost of Implementation

Overall, according to the Revenue Estimating Conference, the estimated combined cumulative costs to fund class size reduction proposed by this amendment would total $20 billion to $27.5 billion, depending on whether relocatables are used at the hypothetical ratio of 75% to 25% or if they are used at their current ratio. This estimate is more than double the amount the lottery has provided to education since its inception in 1987 ($11.1 billion).

An independent analysis by the Council for Education Policy, Research and Improvement (CEPRI) produced estimates that are similar to those agreed upon by the Revenue Estimating Conference. The higher CEPRI estimates reflect differences in the methodology used (see **Appendix B**). Given the projected nature of these costs, the official estimates agreed upon by the Revenue Estimating Conference are cited in this report. However, it should be acknowledged that independent analyses by different evaluating bodies reached essentially the same conclusion: class size reduction will result in prohibitive costs. The estimates produced by CEPRI help validate the numbers agreed upon by the Conference, and provide an indication that cost of class size reduction may actually be higher than the official estimates.

Total Estimated Cost of Class Size Reduction

	Revenue Estimating Conference Analysis		CEPRI Analysis
	Classroom Needs Met By		
	25% Permanent Classrooms, 75% Relocatable Classrooms	88% Permanent Classrooms, 12% Relocatable Classrooms	88% Permanent Classrooms, 12% Relocatable Classrooms
Operating Costs	**$15,556,222,618**	**$18,136,802,074**	**$19,684,622,957**
Capital Outlay Costs			
Construction	**$4,231,563,640**	**$8,693,774,975**	**$8,740,067,473**
Land	**$183,687,060**	**$662,433,935**	**$660,519,911**
Total	**$19,971,473,318**	**$27,493,010,984**	**$29,085,210,341**

The Legislature would have to determine the revenue source to fund this proposed constitutional amendment. Possible sources of revenue would include:

1. Sales tax increases
    - According to the 2002 *Florida Tax Handbook*, the value of a 1% rate change on the current sales and use tax equals about $2.8 billion dollars, of which about $2.5 billion becomes state general revenue. Using the Revenue Estimating Conference's higher estimate, the average annual cost of class size reduction over the eight year implementation period is $3.4 billion. If class size reduction were solely funded through an increase in sales and use tax revenue, the State sales and use tax would increase by 20 percent. This would raise the statewide sales tax from 6 cents to 7.4 cents on the dollar.

2. Corporate income tax increases
    - According to the 2002 *Florida Tax Handbook*, the value of a 1% rate change on the current corporate income tax rate equals about $227 million. If class size reduction were solely funded through an increase in corporate income and excise tax, the State would need to collect nearly four times more than it currently does from this source. This would lead to a near four-fold increase of the current corporate income and excise tax from 5.5% to 20.5%.

3. The elimination or reduction of other government services
    - If taxes are not increased, the cost of class size reduction would have to be funded by reducing or eliminating current governmental services. To place the average annual cost of implementation ($3.4 billion) in context, current year appropriations for the following programs are shown:

        - Agency for Health Care Administration (AHCA) – The Fiscal Year 2002-03 budget for the Agency of Health Care Administration, the state agency whose primary responsibility is Medicaid, is $12.1 billion dollars; of this amount, $3.5 billion is from general state funds. If all state funds from this program were used instead to fund class size reduction, $7.2 billion in federal matching funds would be at risk.

        - Department of Children and Families (DCF) – Included within this department are the following programs: child abuse prevention, programs for the disabled, mental health programs, and substance abuse programs. The budget for the Department of Children and Families is $3.8 billion for Fiscal Year 2002-03; of this amount, $1.9 billion is from general state funds. Federal matching funds ($1.5 billion) for these programs would be in jeopardy if all DCF state funds were used instead for class size reduction.

        - Department of Elder Affairs – Programs such as consumer advocate services for the elderly and home and community services for the elderly are funded in this department. The budget for the Department of Elder Affairs is $329 million for FY 2002-03; of this amount, $134 million is from general state funds. Federal matching funds ($137 million) would be in jeopardy if these state funds were used instead for class size reduction.

- Department of Education – Implementing class size reduction would require more than the entire state operating funds provided to universities ($1.9 billion) and community colleges ($902 million).

Although the amendment calls for the State to pay for the costs associated with reduced class size, it should be noted that education funding consists of a mix of state revenues and local property taxes. In addition to the possible funding sources mentioned above, this amendment may have an indirect impact on the need for raising local property taxes.

In order to pay for the costs associated with class size reduction, the citizens of Florida must make certain trade-offs. The examples above serve to illustrate just a few of the possible choices Floridians may face if class size reduction passes.

Research on Class Size Reduction

Research on the effects of reduced class sizes has resulted in no definitive connection between class size reduction and student achievement. This section highlights the findings of arguably the most influential work citing the merits of class size reduction—Tennessee's Project STAR and the criticisms of its findings, most notably presented by Eric Hanushek. For an overview of research on class size reduction please see the **Appendix C**.

Probably the most influential work citing the perceived merits of reduced class sizes is Tennessee's Project STAR (Student/Teacher Achievement Ratio). This experiment was conducted in Tennessee between 1985 and 1990, tracking over 7,000 K – 3 students in over 300 classrooms in 79 different schools. The main objective of the project was to determine whether class size impacted student achievement. Students and teachers were assigned to three different classrooms of varying size: (1) small classes (13-17 students); (2) regular classes (22-25 students); or (3) regular classes with a teacher aide in addition to the class teacher. The schools involved in this project represented a geographical and socio-economic cross-section of the state.

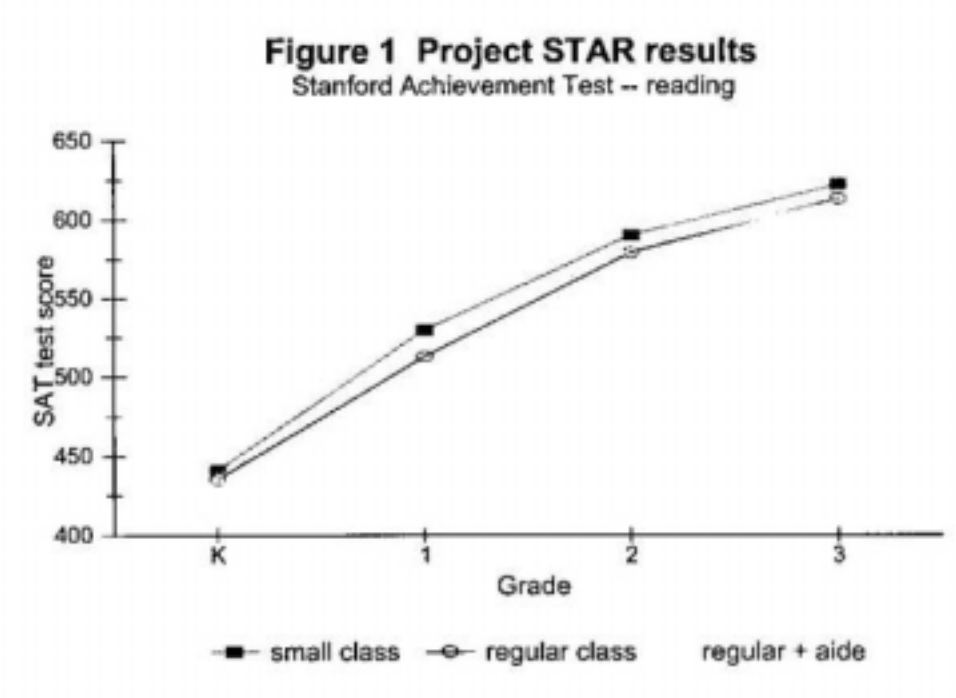
Overall, Project STAR concluded that reductions in class size led to substantial gains in student achievement levels. These effects were most pronounced for low-income and minority students. The introduction of a teacher aide in class of regular size (22-25 students) did not lead to significant differences in student achievement levels compared to regular-sized classes without a teacher aide. According to the interpretation of Project STAR researchers, the effect of these gains due to smaller class sizes appears to be persistent reporting that by the end of twelfth grade, students who were in smaller classes early in their school careers tend to drop out less frequently, to take more challenging courses, and to be more inclined toward college.

In contrast to Tennessee's Project STAR, others have argued the effect of class size on student achievement is unclear (Hanushek, 1999, 1998; Odden, 1990; and Tomlinson, 1988). The basic conclusion of these studies is that class size reduction is an educational reform that produces modest, if any, benefits at a prohibitive cost.

Research by economist Eric A. Hanushek (1999, 1998) cites numerous methodological problems with Project STAR that question the validity of the conclusions regarding the merits of reduced class size. First, there is a large attrition problem with the sample used in Project STAR. Each year between 20 and 30 percent of the students dropped out of the program and were replaced. Of the original group starting in kindergarten, only 48 percent remained at the end of the four years of the experiment. This replacement of cases introduces biases into the experiment. On the one hand, the students who dropped out of the experiment tended to be below-average students, leading to a perceived increase in student achievement levels. On the other hand, the new cases added throughout the study complicated the interpretation of the results since little is known of their prior schooling experiences. Additionally, no pretest of student achievement levels was given to these new students upon enrollment, providing no benchmark to assess any changes in achievement level due to the small class environment. Another problem with the new cases was that at the time of this study, kindergarten was not compulsory in Tennessee. Therefore, it is plausible that some of the students added during the study did not attend kindergarten. With the influx of these new students, it is not possible to discern whether any changes in achievement are due to small classes or attending kindergarten.

A second major concern with Project STAR was its lack of randomization. In any experiment, it is vital that cases are assigned randomly across treatment groups so that if any differences arise between groups one can conclude that the differences are due to the treatment. In Project STAR, neither the teachers nor the schools were selected randomly. Additionally, throughout the study period, there is a nonrandom movement of students between treatment groups. Between 9 and 12 percent of students in small classes had been in regular classes the prior year while only 1-2 percent of the students switched from small to regular-sized classes. This difference possibly reflects the pressure parents placed on the schools to have their students placed in small classes.

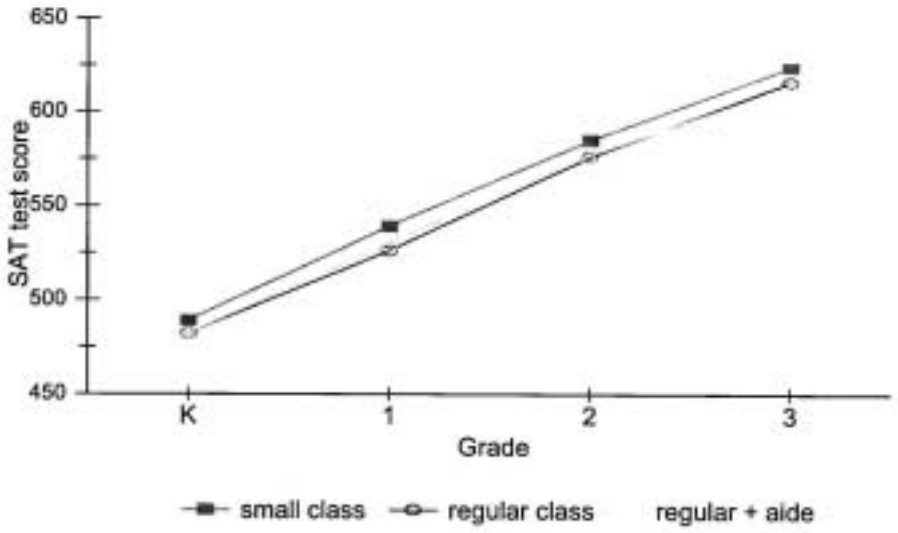
A third problem with Project STAR was that the participants (teachers, administrators, students, parents) knew the experiment was being conducted. With this knowledge it is possible that participants' expectations could have biased the results of the experiment.



Even if one ignores these methodological problems with Project STAR, a closer look at the student achievement findings shows that the effect of small class-size on student achievement is open to interpretation. Figures 1 and 2 show the student achievement results for reading and math for the Project STAR participants. The charts show that students in small classes perform better than those in regular classes beginning in kindergarten. This *kindergarten advantage* increases some in first grade, but by the third grade it remains about the same in reading and narrows in math. Though Project STAR concludes that these findings provide evidence of the positive effects of class size reduction on student achievement, critics present a different conclusion. As Hanushek notes, if small class-size is positively impacting student achievement one would expect the gap in achievement between students from small classes and those from regular classes to increase each year. The fact that the gap remains about the same or narrows by third grade, leads critics to question whether class size reduction is actually impacting student achievement.

Figure 2 Project STAR results

Stanford Achievement Test – math



Although, critics have identified problems with Project STAR's methodology and conclusions, Project STAR has influenced policy initiatives on class size throughout the nation, most notably in California. Not surprisingly, given the methodological problems of Project STAR, California's Class Size Reduction (CSR) program has failed to produce any conclusive relationship between class size reduction and student achievement in the three years since its implementation. The CSR program is a voluntary program which aims at reducing class size in K – 3 to 20 students per class by providing school districts financial incentives to participate in the program (about $850 for each K – 3 student enrolled in a class of 20 or fewer students). While no strong relationship between class size reduction and student achievement on standardized tests has been established in three years, resource reallocation away from support and educational programs, such as music and art, has occurred to support the implementation of CSR. Also, in most California school districts, the cost of the program continues to exceed the reimbursement received from the state.

Though conventional wisdom may state that smaller classes benefit students and lead to higher levels of achievement, a definitive connection between class size and student achievement has not been made.

APPENDIX A

Class Size Reduction
Total Operating and Capital Costs to Implement through 2010-11

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	8 Yr Total
2003/04	$628,175,979	$643,377,838	$658,947,581	$674,894,113	$691,226,550	$707,954,233	$725,086,725	$742,633,824	$5,472,296,844
2004/05		$651,188,268	$666,947,024	$683,087,142	$699,617,851	$716,548,603	$733,889,079	$751,649,195	$4,902,927,162
2005/06			$632,907,681	$648,224,047	$663,911,069	$679,977,717	$696,433,177	$713,286,860	$4,034,740,551
2006/07				$427,343,182	$437,684,887	$448,276,861	$459,125,161	$470,235,990	$2,242,666,082
2007/08					$269,029,728	$275,540,247	$282,208,321	$289,037,763	$1,115,816,060
2008/09						$83,566,599	$85,588,911	$87,660,162	$256,815,672
2003/10							$37,257,707	$38,159,344	$75,417,051
2010/11								$36,122,654	$36,122,654
Cumulative Operating Costs	$628,175,979	$1,294,566,106	$1,958,802,286	$2,433,548,484	$2,761,470,085	$2,911,864,260	$3,019,589,082	$3,128,785,792	**$18,136,802,074**
FCO Costs									**$9,356,208,910**
TOTAL to Implement									**$27,493,010,984**

Source: Revenue Estimating Conference, June 27, 2002

The above chart reflects the estimated cumulative operating and capital costs of the proposed constitutional amendment on class size reduction through the phase-in implementation period of 2003-04 to 2010-11. For each phase-in year, the operating costs (the figures in boxes above) are adjusted for inflation based on the CPI. Following the first year of implementation (2003-04), the additional operating costs are added to prior years' funding, adjusted for inflation, to arrive at a cumulative operating cost. The overall cumulative operating cost is reported as $18,136,802,074. This sum is added to the total capital outlay costs (nonrecurring) of $9,356,208,910 to arrive at a total cost to implement of $27,493,010,984.

APPENDIX B

Chart B-1

Class Size Reduction: CEPRI Estimates
Total Operating and Capital Costs to Implement through 2010-11

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	8 Yr Total
2003/04	626,878,109	643,322,133	660,197,511	677,515,557	695,287,883	713,526,406	732,243,355	751,451,280	5,500,422,235
2004/05		640,242,641	657,037,239	674,272,386	691,959,638	710,110,856	728,738,210	747,854,189	4,850,215,158
2005/06			615,551,989	631,698,911	648,269,393	665,274,545	682,725,770	700,634,768	3,944,155,375
2006/07				411,191,297	421,977,508	433,046,659	444,406,172	456,063,663	2,166,685,299
2007/08					251,840,662	258,446,849	265,226,327	272,183,641	1,047,697,479
2008/09						75,993,720	77,987,158	80,032,887	234,013,765
2003/10							32,869,753	33,731,980	66,601,733
2010/11								30,831,853	30,831,853
Cumulative Personnel Costs	626,878,109	1,283,564,774	1,932,786,738	2,394,678,150	2,709,335,084	2,856,399,035	2,964,196,744	3,072,784,261	17,840,622,896
Cumulative Maintenance and Operations Cost									1,844,000,061
Total Operating Costs									**19,684,622,957**
Total Capital Outlay Costs									**9,400,587,384**
TOTAL to Implement									**29,085,210,341**

Notes

The above chart reflects the estimated cumulative operating and capital costs, produced by CEPRI, of the proposed constitutional amendment on class size reduction through the phase-in implementation period of 2003-04 to 2010-11. The CEPRI analysis is a modification of the analysis used by the Revenue Estimating Conference. The following pages present an overview of the methodological differences employed by CEPRI.

Other Operating Costs

The Revenue Estimating Conference estimated the costs of other personnel and maintenance and operations ("other costs") as a percentage of teacher salaries and benefits. Other costs, under this methodology, average either 24% of teacher salaries and benefits for non-new sites (relocatable classrooms) or 57% for new sites (permanent classrooms). These percentage reflect a statewide average based on district level information provided by the Florida Department of Education. CEPRI's analysis estimated other personnel and maintenance and operations separately, using a different methodolgy.

1. Other Personnel – The CEPRI analysis estimated the cost of additional non-teaching personnel based on the percentage distribution of staff positions by category, by school level, found in the 2000-01 Florida School Indicators Report. This allows for the estimation of the number of additional staff needed in the following categories (**Chart B-2**), based on the number of teachers needed: (1) Non-classroom instruction personnel; (2) Support Staff; and (3) Administration. Non-classroom instructional personnel includes jobs such as, guidance counselors, social workers, media specialists, and school psychologists. Support staff includes teacher aides, technicians, secretaries, and service workers. Principals, assistant principals, and deans highlight some of the jobs included in the administration category. Salary costs based on average teacher salary as of 2001, by district. Average salaries for non-classroom instruction, support staff, and administration are weighted based on the percentage distribution of occupations in each category and the average salaries reported to the Department of Education for selected positions in Fall 2001 (see *Staff in Florida's Public Schools Fall 2001*, Florida Department of Education, Education Information and Accountability Services). For all categories, average salaries were adjusted for inflation. To estimate the inflationary costs, the CPI was adjusted by 2.6% each year, reflecting the average percentage change in the CPI from 1992 to 2001. As with teacher salaries, benefits are estimated at 27.5% of salary costs.

Chart B-2

Estimated Salary and Benefits Costs for Additional Personnel to Meet Classroom Size Reduction Targets, Implementation Phase of the Proposed Amendment 2003-2010

Kindergarten Through Twelfth Grade

Year		Additional Teachers Needed	Additional Non Classroom Instructional Personnel Needed	Additional Support Staff Needed	Additional Administration Needed	Total Additional Staff Needed
2003	#	7,832	931	4,457	379	13,599
	$	$412,697,621	$57,709,143	$122,602,911	$33,868,434	$626,878,109
2004	#	7,754	919	4,452	374	13,499
	$	$424,607,030	$57,685,629	$124,132,218	$33,817,764	$640,242,641
2005	#	7,230	857	4,219	345	12,651
	$	$408,987,404	$54,818,919	$119,984,636	$31,761,030	$615,551,989
2006	#	4,651	543	2,742	221	8,157
	$	$275,072,414	$35,531,146	$79,777,497	$20,810,240	$411,191,297
2007	#	2,768	316	1,619	128	4,831
	$	$170,910,886	$20,960,814	$47,789,410	$12,179,552	$251,840,662
2008	#	844	82	500	32	1,458
	$	$52,597,179	$5,485,555	$14,841,403	$3,069,583	$75,993,720
2009	#	377	26	239	10	652
	$	$23,240,928	$1,705,408	$6,999,748	$923,669	$32,869,753
2010	#	353	21	224	7	605
	$	$22,349,179	$1,350,979	$6,506,154	$625,541	$30,831,853

2. Maintenance and Operations Costs -- To estimate the maintenance and operations costs, the number of classrooms needed to meet the class size reduction targets are converted into square feet based on information provided by the Florida Department of Education. The calculation is based on the number of classrooms needed in K-3, 4-5, 6-8, and 9-12 multiplied by the square feet per student (38 sq ft/student for elementary; 30 for middle; and 27 for high) multiplied by the class size targets, by district, through the implementation period of 2003-2010. To determine the maintenance and operations cost for additional classrooms, the calculated square footage for the additional classrooms was multiplied by the average maintenance and operations cost per square foot ($4.64/sq ft in 2000-01), as provided by the Florida Department of Education. The cost per square foot was adjusted for inflation throughout the implementation period, 2003-2010. To estimate the inflationary costs, the CPI was adjusted by 2.6% each year, reflecting the average percentage change in the CPI from 1992 to 2001. The square footage of the auxiliary space (e.g., hallways, closets, teacher lounges) was estimated based on information provided by the Florida Department of Education. In planning for a new school, DOE states that typically 33% of the space in an elementary school is planned for classrooms; 38% in a middle school; and 40% in a high school. Based on these percentages, square footage for auxiliary space is estimated. As with the classroom space, the cost per square foot is applied to the auxiliary space square footage to estimate maintenance and operations costs. The calculated costs for maintenance and operations (**Chart B-3**) take into account the maintenance and operations of additional space each year plus the additional space provided in previous years during this period at the inflation-adjusted cost per square foot.

Chart B-3

Maintenance and Operations Costs for Additional Classroom and Auxiliary Space to Meet the Classroom Size Reduction Targets, Implementation Phase of the Proposed Amendment 2003-2010

Year	Maintenance and Operations Costs for Additional Classrooms	Maintenance and Operations Costs for Additional Auxiliary Space	Maintenance and Operations Costs for Total Additional Space	Cumulative Total Maintenance and Operations Costs for Additional Space
2003	$26,451,765	$49,388,192	$75,839,958	$75,839,958
2004	$24,259,087	$45,627,134	$69,886,216	$145,726,174
2005	$21,219,595	$40,354,065	$61,573,654	$207,299,828
2006	$13,774,984	$26,310,945	$40,085,947	$247,385,775
2007	$8,922,775	$16,856,555	$25,779,322	$273,165,097
2008	$4,756,259	$8,944,334	$13,700,595	$286,865,692
2009	$3,940,165	$7,376,414	$11,316,573	$298,182,265
2010	$3,954,815	$7,398,196	$11,353,007	$309,535,272

Cumulative Maintenance and Operations Costs at 2010-11: $1,844,000,061

Capital Outlay Costs

The methodology used to estimate capital outlay costs is the same as that employed by the Revenue Estimating Conference. However, slight differences in the costs involved with construction and land are present between the Conference's numbers and CEPRI's numbers. This can be explained by slightly different percentages used to calculate the number of permanent and portable classrooms. Under CEPRI's methodology, the current statewide ratios of permanent classrooms-to-relocatable classrooms, as provided by the Florida Department of Education, were applied to the total number of classrooms needed. The ratios are as follows: for K-3, 84.8% permanent, 15.2% relocatable; for Grades 4-8, 89.5% permanent, 10.5% relocatable; and for Grades 9-12, 89.1% permanent, 10.9% relocatable. The Conference used district level distributions of permanent-to-relocatable classrooms, which statewide averaged 88% permanent and 12% relocatable.

APPENDIX C
OVERVIEW OF RESEARCH ON CLASS SIZE REDUCTION

From:
"Reducing Class Size: What Do We Know?"
Ivor Pritchard, National Institute on Student Achievement, Curriculum and Assessment
Office of Educational Research and Improvement,
U.S. Department of Education
March 1999

And

"Class Size and Students At Risk: What is Known? What is Next?"
Jeremy D. Finn, National Institute on the Education of At-Risk Students,
Office of Educational Research and Improvement,
U.S. Department of Education
April 1998

Primary Conclusions:

- Research indicates that smaller classes lead to higher student achievement levels in K-3.
    - Evidence not clear in grades 4-12.

- Effect of class size reduction greater for disadvantaged and minority students
- Students, teachers, and parents report positive effects from the impact of class size on the quality of classroom activity

RESEARCH CITED THAT FOUND POSITIVE EFFECTS FOR CLASS SIZE REDUCTION:
Smith and Glass (1978)

- Meta-analysis of 77 studies found small classes associated with higher achievement at all grades, especially if students were in small classes for more than 100 hours, and if student assignment was carefully controlled.
- Class size reduction most beneficial where the number of students was fewer than 20.
- **CRITICISM of Smith and Glass:**
    - Selection of studies that were included in the meta-analysis was questionable.
        - A number of studies were short in duration
        - Many compared normal-sized classes to one-on-one tutoring
        - Others did not include "realistic" class sizes as their comparison groups
        - At least one study related to instruction in non-academic subjects (i.e., tennis)

Slavin (1989)

- Reduced class size had a small positive effect on students that **did not persist** in later years.

Robinson and Wittebols (1986)

- Clearest evidence for the benefits of class size found in K-3
- Especially beneficial for disadvantaged and minority students.
- Benefits **LESS LIKELY** if teachers did not change their instructional methods and classroom procedures in the smaller classes.
- **CRITICISM of Robinson and Wittebols:**

- Review of over 100 studies used in the analysis DID NOT distinguish the best designed studies from those using poor methodology.

RESEARCH CITED THAT DID NOT FIND POSITIVE EFFECTS FOR CLASS SIZE REDUCTION:

Tomlinson (1988)

- No consistent relationship between class size and standardized test scores
- **CRITICISM of Tomlinson** (Finn 1998, Achilles 1996)**:**
  - Analysis combined students from all grade levels
  - Reliance on student/teacher ratios for a measure of class size is arguably inaccurate.
    - Student/teacher ratio (number of students in a school divided by the number of teaching staff at a school) masks the workload faced by a teacher in one classroom, providing a misleading view of class size.
  - Ignored intervening factors and social changes

Odden (1990)

- System-wide class reduction policy would produce only modest gains in student achievement and incur an unjustifiably high cost

Florida Department of Education, Office of Policy Research (1998)

- No relationship found between smaller classes and student achievement
- Report cautions the reader that conclusion may be misleading because of the use of school-level data
  - School level data obscures within school variations
- Report found a relationship between class size reduction and student achievement only when class size is dramatically reduced in early elementary school grades.
- EVIDENCE HAS NOT BEEN COLLECTED TO SUPPORT THAT SUCH AN INVESTMENT WILL RESULT IN IMPROVED STUDENT ACHIEVEMENT.

Hanushek (1998)

- Relationships between various school expenditures—including class size reductions—and student achievement are remarkably weak.
- **CRITICISM of Hanushek** (Finn 1998 and Achilles 1996):
  - Analysis relies on student/teacher ratios (arguably not an accurate measure of class size)
  - Analysis groups all grade levels together
  - Data represent student achievement at the school or district level average scores rather than individual-level test scores.

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