

Bureau of Research and Evaluation Analysis of Class Size Research

Key Points

- Lack of quantifiable evidence to support widespread class size reduction policy.
- Evidence shows that class size reduction policies have a minimal effect on student performance.
- Experts agree that class size reduction policy is most advantageous when targeted toward minority and disadvantaged students.
- Research shows class size reduction policy is not a cost-effective solution to increase student performance.
- Alternatives to class size reduction, such as investments in educator professional development and quality of instructional staff, have shown similar increases in student performance.

When discussing the class size debate, it is important to recognize the two main questions behind the research. First, does class size reduction increase student performance? Second, what are the benefits and disadvantages to class size reduction policy? This brief examines the evidence on both sides of the debate. The two prominent experts on class size research are Eric Hanushek and Alan Krueger. Eric Hanushek is currently a senior fellow at the Hoover Institution of Stanford University focusing his research on the economics of education. Alan Krueger is a professor of economics and public affairs at Princeton University, and was appointed as the Assistant Secretary of the United States Treasury for Economic Policy in 2009.

Education research that focuses on class size as it relates to student outcomes relies heavily on measures that may be difficult to quantify. Since class size has not been measured on a large scale over time, the availability of data to examine the effects of class size reduction is limited. At present, student-teacher ratios are commonly used as a quantifiable proxy measure when examining class size. The student-teacher ratio is the number of students in a school or district compared to the number of teaching professionals; however, student-teacher ratios do not represent the actual number of students in a classroom and thus do not give an accurate depiction of class size.

“The Evidence on Class Size” – Eric Hanushek (1998)

In his meta-analysis, Hanushek establishes that there appears to be little systematic gain from general reductions in class size. Using 277 estimates from 59 studies that predicted the effects of student-teacher ratios on student outcomes, he found only 15% resulted in a positive and statistically significant relationship between student-teacher ratios and student performance. However, 85% of the studies show class size is not a factor. Hanushek offers additional evidence to support his meta-analysis:

- Student-teacher ratios have fallen dramatically over the past three decades, but overall student performance is approximately the same in 1970 as it is in the mid-1990s. While variations exist in trends across subject areas, the composite picture is one of flat scores over the past thirty years on the National Assessment of Educational Progress (NAEP) mathematics and reading.
- Trends in International Mathematics and Science Study (TIMSS) data show that a series of mathematics and science tests given to a group of voluntarily

participating nations in 1995 resulted in a positive relationship between student-teacher ratios and test scores; however, the overall international differences in teacher intensity provide no evidence of systematic influence on student performance.

- An education production function is an application of the economic concept of a production function to the field of education. It relates to various inputs affecting a student's learning to measured outputs including subsequent labor market success, college attendance, graduation rates, and standardized test scores. From production function estimates, Hanushek found that there is little reason to believe that overall reduction in class size will yield much in the way of positive achievement gains.
- Much of the recent debate on class size policy has focused on the results from Tennessee's Project STAR of the mid-1980s. This experiment, mandated by the Tennessee legislature, has been used to justify the class size reduction programs in California and in a variety of states emulating California since 1996. Tennessee's Project STAR study provides no support for widespread class size reductions.
- Ultimately, Hanushek found that class size reduction is ineffective when it comes to student performance. Also, class size reduction is not the most cost-effective solution for increasing student performance.

“Economic Considerations and Class Size” – Alan Krueger (2003)

Krueger analyzed Hanushek's meta-analysis by equalizing the weighting of the 277 class size estimates in the 59 studies Hanushek examined. Krueger found that the overall evidence provides little reason to believe that a wide-ranging policy of class size reduction would not improve student performance, especially for minority and disadvantaged students. Krueger argues that when the various studies in Hanushek's meta-analysis are given equal weight, class size is systematically related to student performance. Krueger's research on the Tennessee STAR experiment suggests that smaller class sizes have lasting benefits for the average student. There are several points illustrated by Krueger providing additional evidence to support his analysis:

- Krueger applied three alternative weighting schemes to the 59 studies on class size and found that each resulted in positive effects on student performance.
- In reference to the education production function, Krueger's analysis suggests that resources would be optimally allocated if they were targeted toward minority and disadvantaged students. Therefore, class size reduction policy may be effective in certain situations, but large scale class size reduction is ineffective.
- Krueger's research on Tennessee's Project STAR suggests that this study offers the most compelling evidence in support of class size reduction policies to date; however, he demonstrates that cost effectiveness is a crucial factor in the class size debate.
- Krueger makes the case that labor market outcomes, such as better job placements and higher wage earnings, are a direct result of increased educational resources. Krueger offers a conservative cost-benefit analysis, the result of which suggest that, on the margin, an extra dollar spent to reduce class size raises students' future earnings by two dollars in present value.

Other Research

“Evaluating the Impact of California’s Class Size Reduction Initiative on Student Achievement: Third Year Evaluation Report” – Douglas Mitchell and Ross Mitchell (2009)

- Mitchell and Mitchell found that class size reduction had a small positive impact on student achievement, with larger effects found in mathematics than in either reading or language achievement.
- The researchers concluded that the effects of class size reduction on student achievement were difficult to detect since many other policy initiatives caused interference.

“The Effect of Kindergarten Classroom Size Reduction on Second Grade Student Achievement: Evidence from California” – Edward Funkhouser (2009)

- Funkhouser found that class size reduction has a very small effect on student achievement in reading and math, and no effect in language and spelling.
- The effect of class size reduction on student performance in reading and math was minimal when compared to other determinants of performance, such as student demographic and economic characteristics.
- Funkhouser concluded that any increase in spending for class size reduction yields a very small improvement in student achievement.

“Do Small Classes Reduce the Achievement Gap between Low and High Achievers? Evidence from Project STAR” – Spyros Konstantopoulos (2008)

- In his research, Konstantopoulos found that class size reduction produced significantly higher variability in achievement than regular size classes in kindergarten mathematics and first grade reading.
- The effect of class size reduction on student performance distributions between low and high achievers resulted in improved performance for both groups. However, the performance gap between the two groups actually increased.
- He concluded that all types of students benefit from class size reduction; however, low performers did not benefit as much as high performers.

“Cost-Effective School Inputs: Is Class Size Reduction the Best Educational Expenditure for Florida?” – Anthony Normore and Lynn Iion (2006)

- Normore and Iion found that class size reduction is not a cost-effective means of raising student achievement as measured by Florida Comprehensive Assessment Test (FCAT) scores in Florida.
- The study found that the lower the expenditures per student, the higher the student achievement scores.
- Normore and Iion concluded that investments in school personnel and teacher quality would yield the same student performance results at a lower cost than the reduction of class size.

“An Investigation of the Effect of Class Size on Student Academic Achievement” – Melvin Borland, Roy Howsen and Michelle Trawick (2005)

- Borland, Howsen and Trawick found that class size had an effect on student achievement when class size was optimized; reducing or increasing class size improved student performance.

“Evaluating the SAGE Program: A Pilot Program in Targeted Pupil-Teacher Reduction in Wisconsin” – Alex Molnar (1999)

- Molnar found that class size reduction had a small effect on overall student achievement, but a larger effect on African-American students. African-American students closed the achievement gap between White students.
- The study identified individualized attention, classroom management, and innovative instructional strategies as significant contributing factors to the effect of class size reduction.
- Molnar concluded that class size reduction cannot influence academic achievement directly, but when combined with the other significant contributing factors noted above, minimal increases in student performance were gained.

Summary

Both Eric Hanushek and Alan Krueger present compelling evidence on both sides of the class size debate. Yet the differences in conclusions drawn from the research presented do not bring clear solutions to the table. Does class size reduction increase student performance? There is not a definitive answer. What are the benefits and disadvantages of class size reduction policy? Hanushek and Krueger agree that smaller class size can have a positive effect in some circumstances (i.e., targeted allocation of resources to disadvantaged and minority students). However, there is a lack of evidence showing a direct quantifiable benefit from class size reduction policy alone.

Other research suggests that class size reduction has a minimal effect on increasing student performance. Numerous studies show the increase in expenditures due to class size reduction is not a cost-effective means to increase student performance. Focusing resources on other factors that impact student performance, such as teacher quality and socioeconomic status, may yield increases in student achievement. It is crucial to consider these significant research findings in the formation of future class size policy.

References

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Class Size Reduction Calculations

K-12

Total Operating and Capital Costs to Implement through 2010-11

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09 ¹	2009/10 ²	2010/11 ³	8 Yr Total
2003/04	468,198,634	468,198,634	468,198,634	468,198,634	468,198,634	468,198,634	468,198,634	468,198,634	3,745,589,072
2004/05		503,992,582	503,992,582	503,992,582	503,992,582	503,992,582	503,992,582	503,992,582	3,527,948,074
2005/06			535,008,480	535,008,480	535,008,480	535,008,480	535,008,480	535,008,480	3,210,050,880
2006/07				601,329,648	601,329,648	601,329,648	601,329,648	601,329,648	3,006,648,240
2007/08					532,190,386	532,190,386	532,190,386	532,190,386	2,128,761,544
2008/09						88,771,303	88,771,303	88,771,303	266,313,909
2009/10							116,087,816	116,087,816	232,175,632
2010/11								353,741,106	353,741,106
Operating Costs	468,198,634	972,191,216	1,507,199,696	2,108,529,344	2,640,719,730	2,729,491,033	2,845,578,849	3,199,319,955	16,471,228,457
FCO Costs	600,000,000	100,000,000	83,400,000	1,100,000,000	650,000,000	0	0	0	2,533,400,000
TOTAL to Implement	1,068,198,634	1,072,191,216	1,590,599,696	3,208,529,344	3,290,719,730	2,729,491,033	2,845,578,849	3,199,319,955	19,004,628,457

Florida Department of Education
Class Size Reduction - State Averages
All Schools

	Grades PK-3	Grades 4-8	Grades 9-12
2002-2003	23.07	24.16	24.10
2003-2004	20.54	22.43	24.06
2004-2005	18.98	21.30	23.65
2005-2006	18.16	20.48	22.96
2006-2007	17.01	19.45	22.22
2007-2008	16.28	18.76	21.39
2008-2009	15.97	18.61	21.32