

A TAXWATCH SERIES:
TAKING A FRESH LOOK AT FLORIDA'S CLASS SIZE LIMITS
SMALLER SCHOOLS,
NOT SMALLER CLASSES

DECEMBER 2014



Florida
TaxWatch

center for
Educational
Performance
& Accountability



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John B. Zumwalt, III
Chairman

Dominic M. Calabro
President & Chief Executive Officer

Dear Fellow Taxpayer,

Twelve years after Florida voters approved a constitutional amendment limiting the number of students in public school classrooms, Florida TaxWatch is assessing what the \$30 billion taxpayer investment has done to raise achievement in the Sunshine State, and identifying how that investment could be better utilized in the Florida school system.

The first report in our series, *Taking a Fresh Look at Florida's Class Size Limits*, addressed the failure of class size reform to improve standardized test scores and student achievement in Florida, despite significant investment in additional teachers and school facilities to enable more individual classroom instruction. This report identifies opportunities to improve Florida's class reform efforts to produce tangible results in public schools.

Our independent research shows that above all, quality teaching has the largest impact on students' ability to learn. However, if Florida policymakers are intent on regulating the physical characteristics of the learning environment, smaller schools are better able to facilitate student achievement than smaller class sizes.

The analysis shows that students in smaller schools have higher mathematics and reading assessment scores, are less likely to drop out or be absent, and have higher teacher and student satisfaction, among other characteristics.

Sincerely,

A handwritten signature in black ink, appearing to read "John B. Zumwalt, III".

John B. Zumwalt, III
Chairman

A handwritten signature in black ink, appearing to read "Dominic M. Calabro".

Dominic M. Calabro
President & CEO

Introduction

With an increased emphasis on accountability, educators nationwide continue to look for ways to improve scores on state-mandated assessments. In trying to establish optimal conditions for learning and improved student achievement, many states are looking to define the most advantageous class and school sizes.

With the expectation that smaller class sizes would result in improved student achievement, voters in 2002 amended the Florida Constitution to establish limits on the number of students in elementary, middle and high school classes. Research shows that, despite an investment by Florida taxpayers of more than \$27 billion, smaller class sizes have had no discernible impact on student achievement.¹ With an additional appropriation of \$3.01 billion² for fiscal year 2014-15, this investment has now reached \$30 billion.

What has been proven to be the most significant factor in student achievement is the quality of teaching. Smaller classes coupled with ineffective teaching does not increase student achievement. The reforms of higher standards, accountability, and teacher quality have had the greatest impact in Florida. Investment in high quality instruction far outweighs the investment made to reduce class size.

This is the second in a series of research papers intended to renew the discussion of Florida's class size limits in public schools and to make a case for class size reform. The first paper in the series shows that the anticipated improvements in student achievement do not support the costs associated with class size reduction, and suggests that investments in proven educational practices may produce greater improvements in student achievement. The focus of this paper is on small schools and how school size impacts student achievement and behavior. Given the number of research studies on this relationship, the research summarized in this paper includes only research of high quality.

1 Matthew M. Chingos, "The Impact of a Universal Class-Size Reduction Policy: Evidence from Florida's Statewide Mandate", Program on Education Policy and Governance, John F. Kennedy School of Government, Harvard University, Last revised: August 2010.

2 Florida Department of Education, 2014-15 Funding for Florida School Districts.

School Size and Student Achievement

The majority of research on the relationship between elementary school size and student achievement shows an inverse relationship: students in smaller elementary schools tend to achieve at a higher level than students in larger elementary schools.

A 1981 study of the impact of elementary school size on student achievement (Wendling and Cohen, 1981) found that third graders from small schools (average enrollment of 447 students) demonstrated higher achievement in math and reading than third graders in larger schools (average enrollment of 776 students). This was confirmed in a 1984 study (Eberts, Kehoe, and Stone, 1984) which also found that the greatest negative impact on student math scores occurred when students moved from medium sized (400-600 students) elementary schools to larger sized (800 or more students) elementary schools.

Greenwald, et al., (1996) conducted a meta-analysis of 60 studies and found that student achievement was greater in small schools. A second meta-analysis of the 26 studies that had been done since 1970 also showed greater achievement in smaller schools.

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Howley and Bickel (1999) used data from Ohio, Georgia, Texas, and Montana in regression equations to predict which communities (based on socio-economic status) would benefit or lose from increases in school size. Their research showed that students from low-income families in small schools performed better on state-mandated tests than low-income students in large schools; however, wealthier students in large schools performed better than wealthier students in small schools. Studies by Franklin and Crone (1992) and Kearney (1994) also found that small schools benefit economically deprived students and large schools benefit affluent students.

Kuziemko (2006) tracked a sample of third and sixth grade math and language arts outcomes for students in 96 elementary schools in Indiana for a three-year period. Using a two-stage least squares approach, Kuziemko's findings corroborated the inverse relationship between school size and student achievement, and found that students in smaller schools had higher math scores and attendance rates.

Fowler and Walberg (1991) looked at achievement test data from 293 public high schools in New Jersey and found that students in small high schools had higher passing rates on the reading portion of the state's Minimum Basic Skills Test, and higher passing rates on the writing and math portions of the state's High School Proficiency Test, than students in large high schools. Enrollment ranged from 147 students to 4,018, with an average enrollment of 1,070 students.

Walberg and Walberg (1994) looked at data from the 1990 National Assessment of Educational Progress (NAEP) mathematics assessment and found that states with larger schools tended to score lower on the NAEP mathematics assessment, even after controlling for per-student expenditures and the percentage of non-white students.

Using longitudinal data from a nationwide sample of over 9,000 students, Lee and Smith (1997) looked at the relationship between school size and achievement gains from the eighth to twelfth grades and found a curvilinear, or U-shaped, relationship between size and student achievement. Students in moderate-sized high schools showed higher gains in both reading and math, and the highest achievement gains occurred in high schools with enrollments between 600 and 900 students. Students in high schools with enrollments below 300 students performed significantly worse, suggesting that high schools can be "too small." The achievement gains in math for students in larger high schools were lower for minority students and students from lower socio-economic backgrounds.

A 2013 study (Egalite and Kisida) looked at math and reading achievement for more than 1,000,000 students in grades 2 through 10 in 2,852 schools in four states from 2007 through 2011. The researchers found consistent negative effects of large school size on student math and reading achievement, especially in secondary schools that enroll more than 540 students.

A study by the Texas Education Agency (1999) showed that the effects of school size are greater for students in the elementary and middle school grades than students at the high school level. The study showed that elementary and middle school students are more likely to benefit academically from smaller schools, high school students are more likely to benefit academically from large schools.

School Size and Student Behavior

Pittman and Haughwout (1987) studied the relationship between school size and dropout rate in 744 public high schools. In schools with graduating class sizes of more than 2,091 students, the average dropout rate (12.1%) was nearly twice the average dropout rate for schools with graduating class sizes of fewer than 667 students (6.4%). In those high schools with graduating classes between 667 and 2,091 students, the dropout rates increased as school size increased.

Haller (1992) looked at a nationwide sample of more than 500 public high schools and found that larger high schools were associated with greater problems with truancy and disorderliness in the school. Rural schools with average enrollments of 443 students experienced fewer disciplinary problems when compared to urban/suburban schools with average enrollments of 1,200 students. As the size of the rural schools increased through consolidation, the number of disciplinary problems increased accordingly.

In a study using a nationally representative sample of almost 15,000 students, Lindsay (1982) found that smaller schools were more likely to have higher attendance rates.

School Size and Extracurricular Activities

Schoggen and Schoggen (1988) reviewed yearbooks from 27 New York high schools to document participation in extracurricular activities for more than 10,000 high school seniors. Their findings suggest that a greater percentage of students in small schools participate in extracurricular activities, and that students in small schools participate in more types of activity than students in large schools.

Holland and Andre (1987) reviewed available literature on the relationship between school size and extracurricular activity participation and concluded that smaller schools are associated with greater activity participation, and that greater participation is associated with a variety of positive outcomes including higher self-esteem, higher educational aspirations, less delinquency, and greater involvement in community activities as an adult. Low income and low achieving students in small schools are more likely to participate in extracurricular activities than low income and low achieving students in larger schools.

Black (2002) found that, on a per capita basis, small schools create more opportunities for extracurricular participation, and that a larger percentage of students in small schools participate and participate in a greater variety of activities.

School Size and Learning Climate

Students in small schools are more visible and less anonymous than students in large schools. This permits teachers to more easily identify the needs of each student and to provide more personal attention and individual instruction.

Studies also show that teachers in small schools enjoy improved student-teacher relationships and greater job satisfaction. Major reviews of the school size literature have found that both teacher satisfaction and student satisfaction tend to be lower in large schools (Cotton, 1996; Goodlad 1984; Swanson, 1988).

Research suggests that smaller schools create a sense of camaraderie and collective responsibility, where teachers plan together and share what they have done (Darling-Hammond, Aness, and Ort, 2002), and that this sense of collective responsibility in small schools influences student achievement and learning. Smaller school size promotes the kinds of interactions between teachers and students that are conducive to learning (Lee and Loeb, 2000).

School Size and Economies of Scale

Early research generally supported the assumption that large schools operated more cost effectively than small schools and benefited from the cost savings that result from economies of scale. The cost per student is generally lower in a large school; however, when the cost per graduate is considered, small schools may be as cost effective, if not more so, than large schools (Raywid 1999). Raywid also suggested that, because of the higher retention rate in large schools, the cost per student to graduate is lower in smaller schools.

Morris (1964) found that the costs per student in high schools with fewer than 500 students were higher than the costs per student in larger schools. McGuffey and Brown (1978) looked at the relationship between school size and the costs to operate facilities and found that larger schools made greater use of facilities and had lower operational costs per student than smaller schools.

Fox (1981) found that the cost curves are U-shaped. Once the size of a school exceeds some optimal level, the cost per student begins to increase, not decrease. Fox noted that as long as increasing school size results in larger pupil/teacher ratios, per pupil expenditures will drop; however, once the maximum class size is reached, no additional savings are possible because the need for administrative staff continues to grow. This suggests that the most expensive schools to operate are schools that are very small and schools that are very large.

A 1998 study (Stiefel, Iatarola, Fruchtnier, and Berne) of small New York City schools found that, although small schools cost more per student, the higher graduation and lower dropout rates of these schools resulted in a lower cost per graduate than in large schools. This study also found a U-shaped cost curve, and concluded that schools with enrollments of more than 2,000 students begin to operate at a "diseconomy of scale."

School Size and Curriculum

Although large schools generally offer a wider range of courses (both basic and advanced) than small schools, the research suggests that there is no reliable relationship between school size and the quality of curriculum. Walberg and Walberg (1994) looked at NAEP data from 38 states and found that smaller school districts were less likely to offer a wide range of specialized courses. In contrast, Barker and Gump (1964) found that increases in school size did not necessarily result in large increases in curriculum programming. Monk (1987) found that increases in school size were associated with more varied course offerings, but increasing enrollment beyond 400 students did not greatly enrich the curriculum.

School Size and Teacher Qualifications

The literature generally suggests that large schools have an advantage over small schools in terms of teacher qualifications. Jackson (1966) found that larger schools had more highly qualified teachers than did smaller schools. Pethel (1978) found that large schools in Georgia had more teachers with advanced degrees, more special education teachers, and fewer teachers teaching outside their area of certification than small schools.

Conclusions

Based on a literature review, the findings of studies analyzing the effects of school size on student achievement, student behavior, curriculum, economies of scale, and teacher quality suggest the following recurring themes:

- Student academic achievement is higher in small schools, and this is especially true for minority and low-income students.
- A greater percentage of students in small schools participate in extracurricular activities, and greater participation is associated with a variety of positive outcomes, including: higher self-esteem, higher educational aspirations, less delinquency, and greater involvement in community activities as an adult.
- Small schools offer a climate that is more conducive to learning.
- The cost per student is generally higher in a small school; however, once the size of a school exceeds some optimal level, the cost per student begins to increase, not decrease.
- Although large schools generally offer a wider range of courses than small schools, there is no reliable relationship between school size and the quality of curriculum.
- Large schools have an advantage over small schools in terms of teacher qualifications.
- There is no clear agreement among researchers and educators about what constitutes a “small” school or a “large” school. What is considered to be a large school to one researcher may be considered a small school to another.

Policy Implications

The research suggests that two U-shaped relationships exist with respect to school size, one for student achievement and one for cost efficiency. In both relationships, there is a point at which the positive benefits associated with school size begin to diminish.

This suggests that there is an optimal size for public schools in Florida, above or below which produces diminishing returns in terms of student achievement and cost efficiency. An optimal school size could be calculated that represents the range in the number of students in which school size continues to show a positive

relationship between student achievement and cost efficiency. Andrews, et al. (2002), reviewed a number of production function studies and found some evidence that moderately sized elementary schools (300-500 students) and high schools (600-900 students) may optimally balance economies of size with the negative effects of large schools.

The Florida Legislature recognized the benefits associated with small school size and, in 2000, enacted legislation that required all plans for new educational facilities to be constructed to plans for small schools.³

Small schools were defined as follows:

- Elementary schools—student population of not more than 500 students;
- Middle schools—student population of not more than 700 students;
- High schools—student population of not more than 900 students;
- Combination (K-8) schools—student population of not more than 700 students; and
- Combination (K-12) schools—student population of not more than 900 students.

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The establishment of enrollment limits for new school construction by the Legislature was a responsible action supported by a substantial body of research demonstrating the positive benefits of small school size. The voters, however, put the Legislature in a difficult position in 2002 with the passage of the constitutional amendment establishing class size limits. This forced the Legislature to fund both small schools and small class sizes. Public Education Capital Outlay (PECO) funds, the primary source of funding for new educational facility construction, decreased from \$807.0 million in fiscal year 2002-03 to \$752.4 million in fiscal year 2003-04 and no significant increase in PECO revenues was projected over the short term.⁴ With insufficient revenues to fund both small schools and small classes, the Legislature acted responsibly when it repealed the requirements for small school construction in 2003. This is a good example of a popular initiative trumping a sound public policy that is based upon a competent and substantial body of empirical research.

³ Subsection 235.2157, Florida Statutes.

⁴ Florida Office of Economic and Demographic Research, Historical PECO Appropriation, retrieved from <http://www.edr.state.fl.us/Content/conferences/peco/pecohists.pdf>.

By any researcher's definition, public school size in Florida would be considered large. Florida public elementary schools have the highest average enrollment in the nation. For the 2010-11 school year, Florida averaged 622.5 students per elementary school, which is 37% above the national average of 453.1.⁵ Average enrollment for Florida's middle schools is also the highest in the nation at 871.4 students, which is 51% greater than the national average of 575.7.⁶ At 1,533.8 students per school, average enrollment for Florida's public high schools was nearly twice the national average of 846.6.⁷

Despite the repeal of the small school requirements, the State of Florida continues to take steps to reduce school size. Between 2006-07 and 2011-12, the percentage of elementary schools with 500 students or fewer has increased from 26.7 percent to 31.0 percent; the percentage of middle schools with fewer than 500 students increased from 13.9 percent to 17.2 percent; and the percentage of high schools with fewer than 500 students increased from 21.3 percent to 51.9 percent.⁸

Conversely, the percentage of public schools with more than 1,000 students has decreased over the same period. The percentage of elementary schools with more than 1,000 students decreased from 9.0 percent to 4.6 percent; the percentage of middle schools with more than 1,000 students decreased from 48.3 percent to 37.2 percent; and the percentage of high schools with more than 1,000 students decreased from 71.1 percent to 40.0 percent.⁹

Despite these efforts, Florida still has more than 700 public schools with enrollments in excess of 1,000 students.¹⁰ Students in these schools are likely to experience the negative academic and behavioral outcomes associated with large schools. Because of this, we need to continue to provide the Florida Department of Education additional tools to use to reduce school size.

5-10 Florida Department of Education., Enrollment Size of Florida's Public Schools, Series 2014-01D, August 2013.

Recommendations

In consideration of the competent and substantial body of research that demonstrates the positive benefits of small school size, and the failure of the constitutional amendment establishing class size limits to improve student achievement:

- Florida TaxWatch supports Florida’s continued efforts to reduce class sizes to 18 students or fewer in pre-kindergarten through grade 3. This is where Florida’s investment in class size reduction will have the greatest influence on student achievement.
- Florida TaxWatch supports a constitutional amendment that would permit local school districts to achieve the class size reduction mandate on a “school level class size average” basis for grades 4-12. This will give school districts additional flexibility while only modestly affecting the way the class size limits are applied, and will generate substantial savings.
- Florida TaxWatch supports the reconsideration of efforts by the 2014 Legislature to calculate maximum class size and any categorical allocation reductions when maximum class size requirements are not met on the “school level class size average” basis.¹¹
- Florida TaxWatch supports the reinvestment of the savings realized by permitting local school districts to achieve the class size reduction mandate on a “school level class size average” basis into measures to improve teacher quality and to improve student achievement.
- Florida TaxWatch supports additional research to identify optimal school sizes for Florida elementary, middle, high and combination schools. As a state, Florida needs to better understand the ranges in the number of students for which school size continues to show a positive relationship between student achievement and cost efficiency.

¹¹ HB 5101.

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Nave spent 27 years as a public servant with the State of Florida as an executive level policy advisor, developing and executing state policy in the fields of criminal justice, emergency management, growth management, gaming, K-12, and higher education. As Chief of Staff of the Florida Lottery, Nave implemented strategies that dramatically increased annual Lottery sales, while reducing the size of the Lottery's workforce by almost 40% and reducing operating costs to the lowest level in more than a decade. Following his public service career, Nave served as Vice President of Convergys HR Management, where he secured a 5-year renewal of the \$350 million People First contract with the State of Florida.

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As an independent, nonpartisan, nonprofit taxpayer research institute and government watchdog, it is the mission of Florida TaxWatch to provide the citizens of Florida and public officials with high quality, independent research and analysis of issues related to state and local government taxation, expenditures, policies, and programs. Florida TaxWatch works to improve the productivity and accountability of Florida government. Its research recommends productivity enhancements and explains the statewide impact of fiscal and economic policies and practices on citizens and businesses.

Florida TaxWatch is supported by voluntary, tax-deductible memberships and private grants, and does not accept government funding. Memberships provide a solid, lasting foundation that has enabled Florida TaxWatch to bring about a more effective, responsive government that is accountable to the citizens it serves for the last 34 years.

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The Florida TaxWatch Center for Educational Performance and Accountability (CEPA) was established to address the profound fiscal and economic impact that PreK-20 education has on Florida's competitiveness. CEPA works directly with Florida's business community and educational research organizations to advocate sound education policy to promote high academic achievement, develop and deploy reliable assessment tools, maximize the return on taxpayer investment, and help foster a more competitive Florida.

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