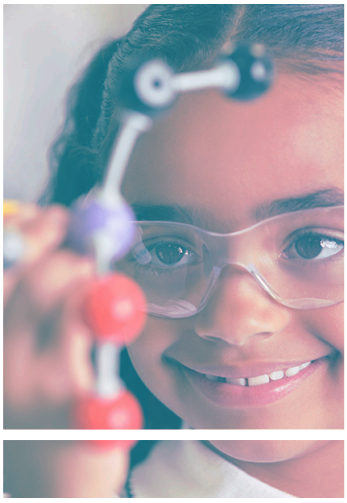
Senate Document 11 (2015)
Commonwealth of Virginia
September 2015

Report to the Governor and the General Assembly of Virginia

Efficiency and Effectiveness of K-12 Spending

2015






JLARC
JOINT LEGISLATIVE AUDIT
AND REVIEW COMMISSION

JLARC Staff for This Report
Justin Brown, Associate Director
Jamie Bitz, Project Leader
Bridget Marcek
Joe McMahon
Nichelle Williams

Report No. 472

http://jlarc.virginia.gov

COMMONWEALTH of VIRGINIA

Joint Legislative Audit and Review Commission
201 North 9th Street, General Assembly Building, Suite 1100
Richmond, Virginia 23219

Hal E. Greer
Director

(804) 786-1258

March 24, 2016

The Honorable John C. Watkins, Chair
Joint Legislative Audit and Review Commission
General Assembly Building
Richmond, Virginia 23219

Dear Senator Watkins:

In 2013, the General Assembly directed the Joint Legislative Audit and Review Commission (JLARC) to study K-12 spending in Virginia, and to identify opportunities for improving the quality of education in consideration of the funds spent (HJR 328). In 2014, the General Assembly further directed JLARC to examine virtual instruction as part of its study of K-12 spending (Item 30, Appropriation Act). This report was briefed to the Commission and authorized for printing on September 14, 2015.

On behalf of Commission staff, I would like to express appreciation for the cooperation and assistance of the staff of the Virginia Department of Education and the Virginia Department of Planning and Budget. I would also like to thank the staff of local school divisions who provided information and assistance.

Sincerely,

Hal E. Greer

Hal E. Greer
Director

Contents

Report summary
Efficiency and Effectiveness of K-12 Spending

WHAT WE FOUND

Virginia spends about the national average on K-12; is above average in local funding and student achievement

Virginia is close to the national average in total spending per student on K-12 education. Virginia relies more on localities to fund K-12 than other states. Virginia's localities pay the highest share of total K-12 spending in the Southeast region.

Virginia's students score above the national and Southeast average in reading and mathematics on the National Assessment for Education Progress.

Divisions spend less to educate each student than a decade ago

In FY 2014, the average Virginia school division spent seven percent less to educate each student than it did in FY 2005. Nearly 95 percent of the state's K-12 population is educated in divisions that now spend less per student.

This spending decline is not unique to Virginia or K-12 education. Twenty-nine states, including other states in the Southeast region, also spend less now per student than a decade ago. The K-12 spending per student decline is also consistent with Virginia's spending in other functional areas that rely heavily on general funds.

WHY WE DID THIS STUDY

This study is directed by two mandates. The first, passed by the 2013 General Assembly, directs JLARC to "study the efficiency and effectiveness of elementary and secondary school spending in Virginia" (SJR 328). The second mandate, which was included in the 2014 Appropriation Act (Item 30), directs JLARC to examine virtual instruction.

ABOUT K-12 SPENDING IN VIRGINIA

Virginia school divisions collectively spent $15.6 billion on K-12 education for 1.27 million elementary and secondary students in FY 2014. About two-thirds of total spending was on instruction. Salaries and benefits for staff account for approximately three-fourths of total K-12 spending and are the primary expense in most spending areas. School divisions rely primarily on local and state funding, and a majority of total funding comes from localities. Divisions are subject to state and federal laws and regulations but have significant flexibility over how they spend their funds.

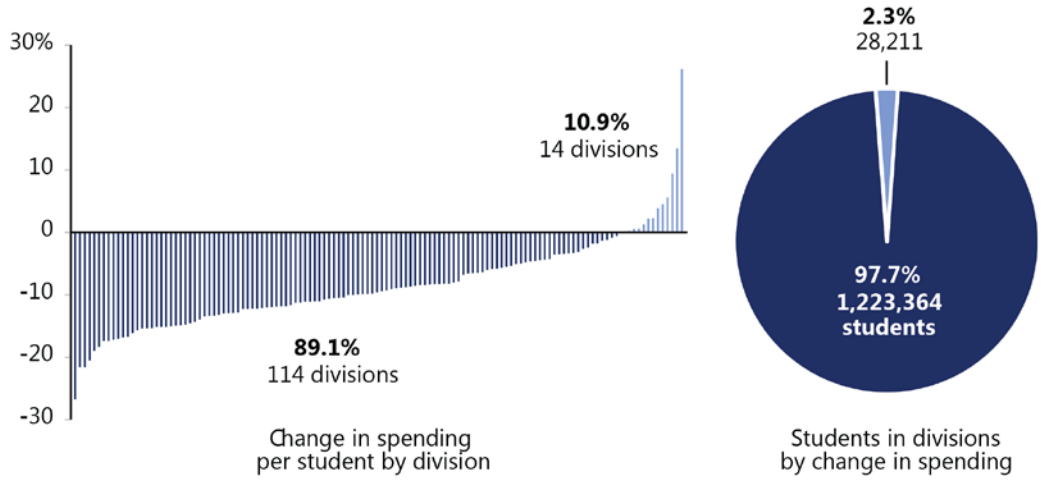
Virginia divisions reduced non-instructional spending, particularly related to facilities, by more than instructional spending. Divisions also reduced spending on division-level administration, which accounted for 2.1 percent of total spending. As divisions reduced spending, the proportion of total spending devoted to classroom instruction increased from 63.1 to 65.1 percent.

School divisions can have their non-instructional operations reviewed through the Virginia School Efficiency Review Program. To date, school efficiency reviews have been conducted for 43 school divisions (33 percent). Divisions have implemented, or are in the process of implementing, 91 percent of the more than 3,300 recommendations made during the reviews. The Department of Planning and Budget estimates that school divisions collectively will realize an average of $37.5 million in annual savings for recommendations that have been, or are being, implemented.

Nearly all divisions reduced instructional spending but also report being less effective

The average Virginia school division spent nine percent less per student to provide instruction than it did in FY 2005. The 114 divisions that spent less in FY 2014 than in FY 2005 educate 98 percent of the state's students (see figure below). The magnitude of the decline in per-student spending over this period ranged widely across divisions. Spending declined by more than 10 percent for 59 divisions, including four divisions that now spend at least 20 percent less. Instructional spending per student declined while many divisions are educating a higher proportion of students with more resource-intensive needs.

Nearly 90 percent of school divisions with 98 percent of statewide enrollment decreased instructional spending (FY 2005 to FY 2014)



Source: JLARC staff analysis of data from Virginia Department of Education.
Note: Each bar represents one division. Inflation and enrollment adjusted. Figures exclude capital expenditures. Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded due to changes in how data was reported.

Divisions reduced per-student spending on instruction through a combination of employing fewer teachers per student, limiting teacher salary growth, and requiring teachers to pay a higher percentage of health insurance and retirement benefit costs. Divisions report that these spending reductions are hindering instructional effectiveness. These conclusions could not be independently validated, but there is support in the research literature that such reductions can negatively impact instructional effectiveness. For example, research literature concludes that student learning can suffer when class sizes become too large. Divisions also reported that reduced spending per student on instructional support services is creating challenges, such as teachers being less prepared and curriculum not being fully aligned with state standards.

Some divisions can improve facilities and transportation efficiency

In FY 2014, the average Virginia school division spent eight percent less per student to operate and maintain its facilities than in FY 2005. Divisions also now spend far less on facility renovation and construction. Divisions report that some of the approaches used to reduce spending, such as deferring new projects and maintenance, are hindering long-term efficiency and effectiveness.

The average division spent about the same per student on transportation as it did in FY 2005. Divisions report that some of the approaches used to reduce spending, such as deferring new bus purchases, have reduced long-term efficiency and effectiveness. Because of deferring new bus purchases, at least 1,900 buses statewide are near or past the recommended 12- to 15-year replacement cycle.

There are opportunities to gain relatively small non-instructional spending efficiencies in some divisions. For example, some divisions have yet to fully implement energy efficient practices at their facilities. Other divisions have not fully capitalized on technology to improve the efficiency of bus operations and routing.

Virtual learning is a small but growing aspect of K-12 education

Virginia has thus far provided online learning that supplements physical classroom learning, mostly for high school students. Online learning increases access to educational opportunities for students and can be effective for students with strong motivation and time-management skills. It generally costs less than educating a student in a physical school. School divisions reported that the greatest challenge with supplemental online learning programs was students not completing the courses. Research comparing the effectiveness of online and in-person instruction is limited and inconclusive, in Virginia and nationwide.

The state's current approach to fully online virtual learning will provide a useful test case for whether and to what extent fully online virtual learning is sound education policy. There is currently no reliable statewide information comparing the performance of similar students at virtual and physical schools. There is also no accurate statewide method to estimate how much funding the state should provide for virtual learning.

WHAT WE RECOMMEND

Legislative action

- Provide funding for VDOE to hire several staff to provide school divisions with guidance and facilitate information sharing on facilities and transportation management best practices.
- Option: Provide funding for VDOE to employ additional staff to support school divisions with teacher training and curriculum development.

Executive action

- VDOE should provide guidance and facilitate information sharing among divisions regarding facilities and transportation management best practices.
- As the number of students participating in virtual learning increases, VDOE should analyze and report student effectiveness data and develop a cost methodology.

The complete list of recommendations is available on page v.

Recommendations and Options: Efficiency and Effectiveness of K-12 Spending

RECOMMENDATION 1

The General Assembly may wish to consider amending § 22.1-23 of the Code of Virginia to require the Superintendent of Public Instruction to track teacher turnover and report annually to the General Assembly and governor the numbers of and most common reasons for teacher turnover (Chapter 3, page 25).

RECOMMENDATION 2

The Virginia Department of Education should provide facilities management expertise to school divisions. The expertise should include guidance and information sharing about facilities management best practices, such as performance measurement, energy efficiency, outsourcing, collaboration, and closing schools (Chapter 4, page 39).

RECOMMENDATION 3

The General Assembly may wish to consider appropriating funds for the Virginia Department of Education to employ up to three additional staff to provide guidance and assist school divisions in sharing information about facilities management best practices (Chapter 4, page 39).

RECOMMENDATION 4

The Virginia Information Technologies Agency, in cooperation with the Department of Education, should assess the feasibility and potential savings of a statewide contract for school bus routing and monitoring software, and if feasible and likely to produce savings, develop such a contract (Chapter 5, page 47).

RECOMMENDATION 5

The Virginia Department of Education should provide transportation management expertise to school divisions. The expertise should include guidance and information sharing about transportation management best practices, such as performance measurement, improving bus routing, and bus maintenance and replacement (Chapter 5, page 48).

RECOMMENDATION 6

The General Assembly may wish to consider appropriating funds for the Virginia Department of Education to employ up to three additional staff to provide guidance and assist school divisions in sharing information about transportation management best practices (Chapter 5, page 48).

RECOMMENDATION 7

The Virginia Department of Education should collaborate with the board and/or staff for any statewide fully online school created in Virginia to develop (or obtain) and distribute informational materials that help families and guidance counselors to make informed decisions about enrolling children in fully online schools (Chapter 6, page 57).

RECOMMENDATION 8

The Virginia Department of Education should develop a methodology for estimating the cost of fully online learning programs (Chapter 6, page 58).

RECOMMENDATION 9

The Virginia Department of Education should annually compare the achievement of students enrolled in Virtual Virginia courses to students of the same characteristics in physical schools, and report these findings to the Board of Education annually (Chapter 6, page 59).

OPTION 1

The General Assembly could amend § 2.2-1204 of the Code of Virginia to allow school division employees to participate in the state employee health plan (Chapter 2, page 11).

OPTION 2

The General Assembly could appropriate funds for the Virginia Department of Education to employ additional staff to provide teacher training and curriculum development support to the school divisions that would most benefit from state assistance (Chapter 3, page 28).

1 K-12 Education in Virginia and Compared to Other States

SUMMARY Virginia school divisions collectively spent $16 billion on K-12 education for 1.27 million elementary and secondary students in FY 2014. Nearly two-thirds of total spending was on instruction. Salaries and benefits for staff account for approximately three-fourths of total K-12 spending. Total spending on K-12 education varies widely across school divisions, primarily due to the diverse size of Virginia's 132 divisions. School divisions rely primarily on local and state funding, and a majority of total funding comes from localities. Divisions are subject to state and federal laws and regulations for K-12 education but have significant flexibility over how they spend their funds. Virginia spends close to the national average per student and more than most states in the Mid-Atlantic and Southeast regions. Virginia's localities provide a higher than average share of total K-12 funding. Virginia consistently ranks above other states nationally and regionally in standardized test scores.

This study is directed by two mandates. The first, passed by the 2013 General Assembly, directs JLARC to "study the efficiency and effectiveness of elementary and secondary school spending in Virginia" (SJR 328). Specific items in the mandate require JLARC staff to evaluate the findings and recommendations from school efficiency reviews, compare Virginia to other states in funding for K-12 education, and identify opportunities to improve the quality of education in consideration of the funds spent. The second mandate, which was included in the 2014 Appropriation Act (Item 30), directs JLARC to examine virtual learning options used in Virginia, the cost of virtual learning programs, and their effectiveness in terms of student academic achievement. (See Appendix A.)

To address the study mandates, JLARC staff analyzed Virginia's division-level financial data; interviewed staff with school divisions, the Virginia Department of Education, and private online providers; surveyed staff with school divisions; and reviewed the research literature on a variety of topics related to K-12 education, including online learning programs. (See Appendix B for research methods used for this study.)

Divisions spend funds on instructional and non-instructional operations

School divisions spend funds on a wide range of instructional and non-instructional operations. The instructional spending category includes instructional staff compensation, classroom materials, and curriculum design. The non-instructional spending category includes facilities operation and maintenance, student transportation, division-level administration, and food services.

Virginia school divisions collectively spent nearly $16 billion on K-12 education in FY 2014

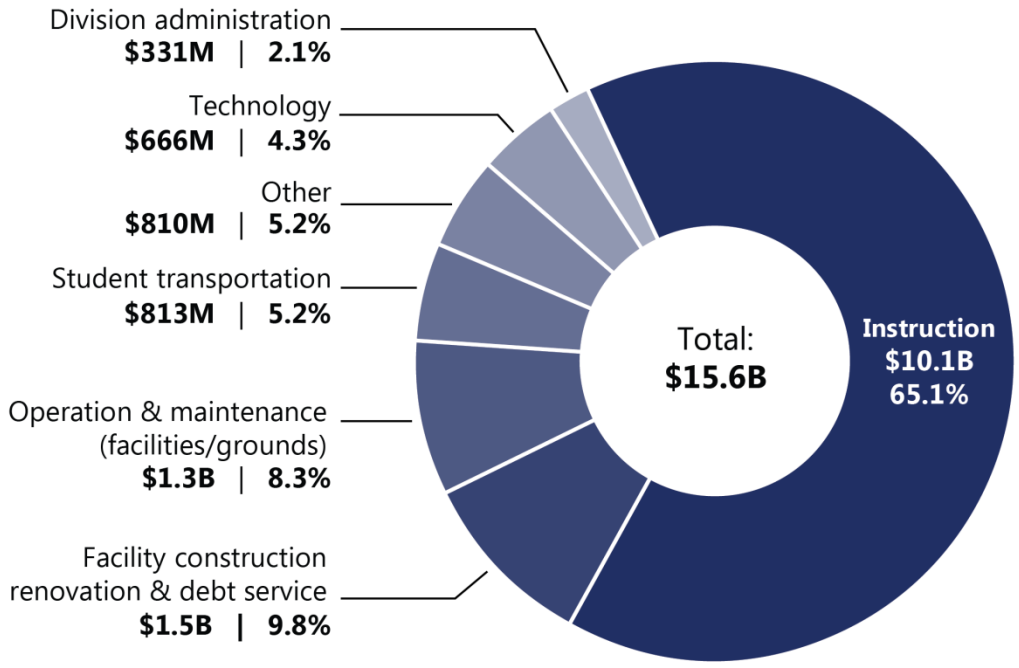
During FY 2014, Virginia's 132 school divisions spent $15.6 billion to educate approximately 1.27 million elementary and secondary students (Figure 1-1), an average of $12,344 per student. Nearly two-thirds of this spending—or $10.1 billion—was on instructional operations, including classroom teachers, principals, teacher aides, guidance counselors, social workers, and librarians.

Nearly one-fifth was spent on facilities, including $1.5 billion for construction and renovation projects and $1.3 billion to operate and maintain facilities. Smaller amounts were spent on student transportation, technology, and other non-instructional operations such as food services. Division-level administrative services accounted for approximately two percent of total spending.

Approximately three-fourths of total K-12 spending was for salaries and benefits for more than 200,000 school division staff. Compensation for staff is the primary expense in most spending areas (Figure 1-2). Salaries and benefits accounted for more than 80 percent of total spending for instruction, student attendance and health, and division administration.

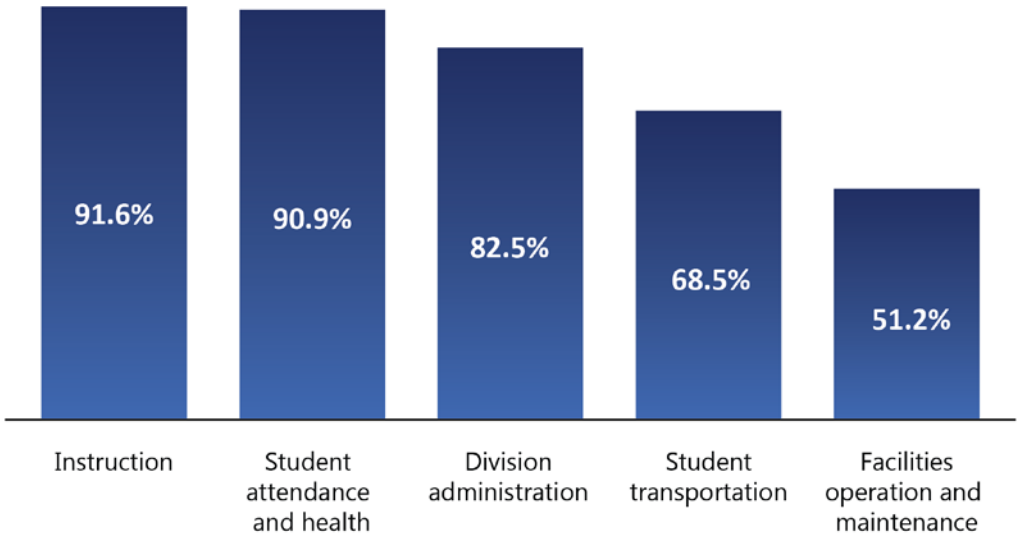
FIGURE 1-1
Two-thirds of K-12 spending was on instruction (FY 2014)

Source: JLARC staff analysis of data from the Virginia Department of Education.



Note: Includes operating and capital expenditures.

FIGURE 1-2
Staff salaries and benefits were the primary expense in most spending areas (FY 2014)



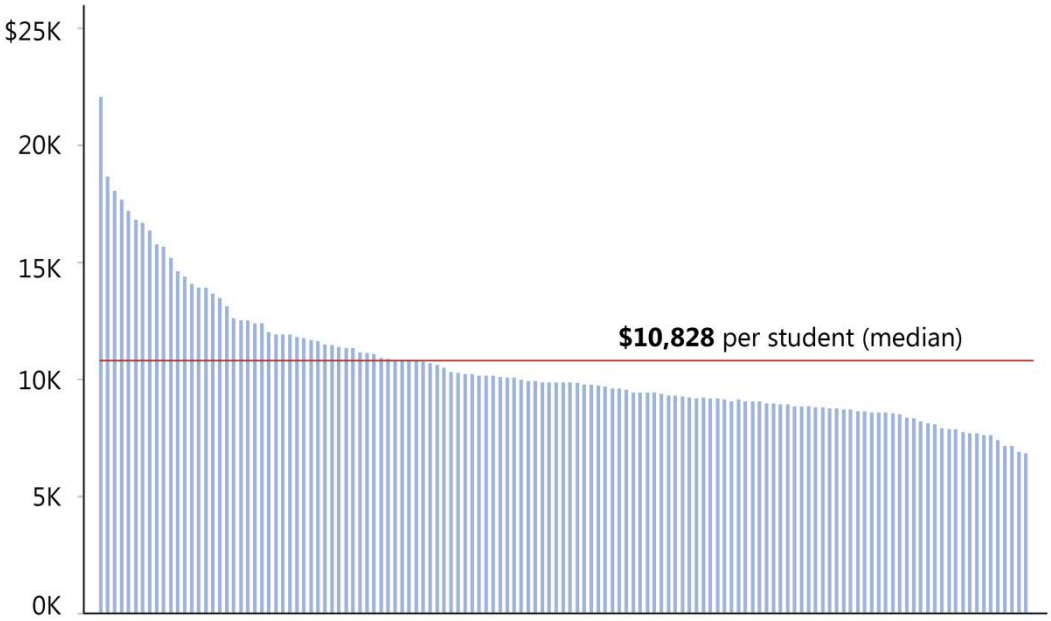
Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Includes operating and capital expenditures.

K-12 spending levels vary across Virginia's school divisions

Total spending varies widely, primarily because of the variation in size of Virginia's 132 school divisions. In FY 2014 Fairfax County and City, with 180,000 students, spent the most, approximately $2.8 billion. Highland County, with 200 students, spent the least, $3.9 million. Median spending across divisions was approximately $41 million.

Across divisions, K-12 spending per student varies much less than total spending. In FY 2014 Arlington County spent the most per student, at $22,100. King George County spent the least per student, at $8,550. The middle 80 percent (105 out of 132) of divisions spent between $9,500 and $14,000 per student, with median spending of approximately $10,800 (Figure 1-3).

FIGURE 1-3
School divisions spent between$8,550 and $22,100 per student (FY 2014)



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Excludes capital expenditures.

Standards of Quality

The Constitution of Virginia requires the General Assembly to determine the cost of meeting the SOQs and apportion these costs between the state and localities. SOQ funds are appropriated annually by the General Assembly in a variety of categories.

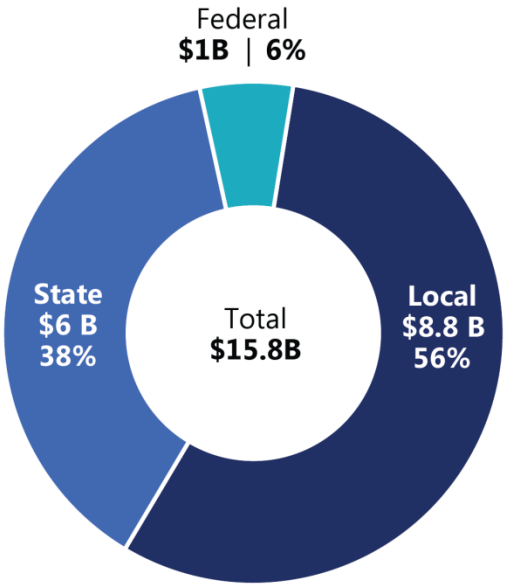
Since FY 1993, the state has paid 55 percent of statewide SOQ funding. Localities are required to provide the remaining 45 percent, though each locality's share of SOQ funding is adjusted to reflect their ability to pay.

School divisions rely primarily on local and state funding for K-12 education

School divisions in Virginia rely primarily on local and state funds for instructional and non-instructional operations, with a much smaller amount of funding from the federal government (Figure 1-4). Localities provided a majority of total funding in FY 2014, while the state provided 38 percent. Under the Constitution of Virginia, the state and localities share primary responsibility for funding K-12 education. The largest source of state funding for K-12 education is provided under the standards of quality (SOQ), which set forth the minimum educational program school divisions must provide.

In FY 2014, the state provided $5.3 billion to meet SOQ costs, and localities provided the remaining $3.3 billion to meet the minimum required local effort for SOQ costs. Localities contributed an additional $3.6 billion in funding beyond the minimum SOQ funding required. Funding for state SOQ costs is benchmarked every two years using the SOQ formula, which is often modified through the Appropriation Act. In addition to SOQ funds, the state annually provides grant funds to support specific educational programs and student populations.

FIGURE 1-4
Majority of funding for K-12 was provided by localities (FY 2014)



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Local includes funding to meet and exceed the required local match for standards of quality and capital expenditures.

The federal government provides funding for K-12 education through a variety of grant programs designed to help school divisions educate students living in poverty or with disabilities. The largest source of federal funding is Title I of the Elementary and Secondary Education Act, which provides grants to help school divisions with high percentages of students in poverty meet state academic standards. The federal government also provides grants to states for special education and related services for students with disabilities. Additional federal grant programs fund teacher quality and improvement efforts in low performing schools.

School divisions have flexibility over spending, subject to state and federal requirements

School divisions must comply with a broad range of state and federal laws on K-12 education, and these requirements often mean divisions must allocate funds for certain services and activities. Beyond these requirements, school divisions have significant flexibility over how they spend K-12 funds from the state, localities, and the federal government. This flexibility can include collaborating with another division or even fully contracting out their K-12 services to another division (sidebar).

School division collaboration or consolidation

JLARC has previously identified improvements in efficiency and effectiveness that school divisions can gain by working with other divisions.

Local Government and School Division Consolidation (2014)

Encouraging Local Collaboration Through State Incentives (2012).

School divisions must meet and may exceed state and federal minimum spending requirements

State and federal laws on K-12 education primarily require school divisions to allocate resources for certain educational services, but divisions can exceed minimum requirements if additional funds are available. Virginia's SOQs include minimum requirements for instructional services that school divisions must provide. The SOQs generally specify minimum class sizes and instructional staffing ratios at the elementary, middle, and high school levels, but school divisions have the discretion to exceed these minimum requirements. For example, the Code of Virginia requires a kindergarten classroom with more than 24 students to assign a full-time teacher's aide. Divisions can allocate funds—if available—to maintain substantially smaller kindergarten classes while still providing teacher's aides.

The SOQs also require school divisions to implement programs for instruction, prevention, intervention, and remediation, but divisions have flexibility over how these programs are designed and implemented. School divisions can expand their instructional programs beyond courses required under the Standards of Learning to include additional courses such as foreign language immersion and vocational or technical studies. Local school divisions are required to provide reading intervention services for students until third grade, and algebra intervention services for students from grades six through nine. If they have sufficient resources, divisions can provide student support in additional grades.

The **Individuals with Disabilities Education Act** (federal) provides funding for K-12 educational services for children with disabilities.

Federal requirements for K-12 education primarily affect instructional services for students with disabilities or living in poverty. For example, in order to receive federal funding for students with disabilities through the Individuals with Disabilities Education Act, school divisions must comply with a range of federal requirements, such as evaluating students for disability under certain circumstances, developing individualized education plans to provide educational services for students with disabilities, and providing these services in the least restrictive environment. School divisions also must comply with federal requirements to receive funds for additional educational services, such as additional instruction in reading and math, for students living in poverty.

Local school divisions also have broad flexibility over spending on non-instructional functions such as facilities, transportation, and administration. Depending on available funding, divisions can design and build facilities that support their instructional program. Divisions have broad discretion to determine how facilities are operated and maintained and how transportation is provided for students, including the level of staffing needed to perform these functions.

One-third of school divisions have undergone state efficiency reviews

School divisions can have their non-instructional operations reviewed for efficiency by a private consultant, through the Virginia School Efficiency Review Program, which is overseen by the Department of Planning and Budget (DPB). The areas addressed by the school efficiency reviews are division administration, facilities, educational service delivery, human resources, financial management, technology, food service, and transportation. Pursuant to the 2015 Appropriation Act, school divisions pay 100 percent of the cost of an efficiency review. The General Assembly appropriates $300,000 in nongeneral funds annually to allow the DPB to collect payments from school divisions to fund the reviews.

To date, school efficiency reviews have been conducted for 43 school divisions (33 percent), and more than 3,300 recommendations have been presented for improving efficiency through greater use of best practices. A majority of recommendations address financial management, division administration, human resources, and educational service delivery.

According to DPB staff, school divisions have implemented—or are in the process of implementing—91 percent of these recommendations. DPB estimates that school divisions collectively will realize an average of $37.5 million in annual savings for recommendations that have been or are being implemented. Around nine percent of recommendations have been rejected by divisions, and rejected recommendations are relatively evenly spread across each category of recommendations. (See Appendix C for information on recommendations implemented and savings achieved.)

States with higher per capita personal income and gross state product tend to have higher total spending per student on K-12 education. Virginia, though, differs from other states in spending relatively less on K-12 education compared to its higher-than-average personal income and economic output.

Virginia is close to the national average in K-12 spending and above average in student achievement

Virginia is close to the national average in spending on K-12 education (Table 1-1). In FY 2013, Virginia ranked 23rd nationwide in total per-student spending. Virginia relies more on localities to fund K-12 spending. It ranks 11th nationally in how much localities provide of total spending. Virginia's localities provide the largest share of total spending of any state in the Southeast region.

Fairly consistently, Virginia's students perform above the national and regional averages in reading and mathematics on the National Assessment of Educational Progress. Virginia ranked at or near the top compared to other states in the Mid-Atlantic and Southeast regions. (See Appendix D for comparison to other states in K-12 spending, funding, and student outcomes.)

National Assessment of Educational Progress is a testing program for student knowledge of subjects such as reading and math.

Mid-Atlantic and Southeast regions

For the regional comparison, JLARC staff used the 16 Southern Regional Education Board member states:

Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia

TABLE 1-1
Virginia compared to other states on education measures (FY 2013)

Measure	National rank	Regional rank (of 16 states)
Total spending per student	23	4
Local share of K-12 funds	11	1
National Assessment of Educational Progress		
Reading scores – Grade 8	20	3
Mathematics scores – Grade 8	15	1

Source: JLARC staff analysis of U.S. Census and National Center for Education Statistics data.
Note: Regional rank based on states in the Southern Regional Education Board.

2 Total K-12 Spending

SUMMARY The average Virginia school division spends seven percent less to educate each student than it did in FY 2005. Approximately 85 percent of school divisions—or 112 divisions—now spend less per student in inflation-adjusted terms compared to 10 years ago. Nearly 95 percent of the state's K-12 population is educated in these divisions that now spend less per student. The decline in total K-12 spending is not unique to Virginia. Twenty-nine states, including many other southern states, also spend less now per student than a decade ago. Virginia divisions reduced non-instructional spending, particularly related to facilities, by far more than instructional spending. As divisions reduced spending per student, the proportion of total spending devoted to classroom instruction increased from 63.1 to 65.1 percent.

Virginia's 132 school divisions spent a total of $15.6 billion in FY 2014. Over time, this total spending has shifted in two key ways. Divisions spend, on average, less per student than they did 10 years earlier in FY 2005. Spending on instruction now also comprises a higher percentage of total K-12 spending compared to 10 years ago.

Divisions collectively spend less to educate each student than a decade ago

Adjusted for inflation and student enrollment, Virginia's 132 school divisions collectively spend less now than they did in FY 2005 (Figure 2-1). Per-student spending on operations declined 7.1 percent (adjusted for inflation) between FY 2005 and FY 2014, from $10,927 to $10,148. During this time period, there have been changes in spending levels, inflation, and student enrollment that have combined each year to various effect. Generally, though, spending rose steadily until the 2008-2009 recession, dropped considerably as available state and local revenue declined, then increased more modestly as revenue began to recover.

Adjusting for inflation

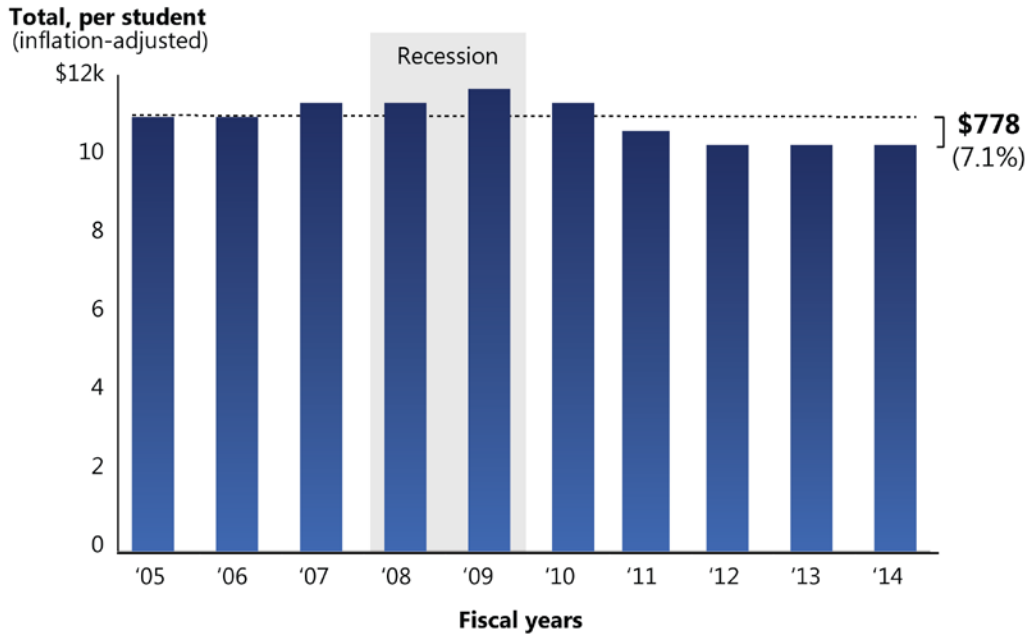
To measure the value of school division spending over time, JLARC staff adjusted spending data to account for inflation.

(See Appendix B.)

The decrease in per-student spending appears more dramatic when it includes capital expenditures. The average division reduced combined operational and capital expenditures by 9.9 percent. In nominal terms (not adjusting for inflation or changes to enrollment) the average division increased spending by 13.1 percent over the decade.

On an inflation-adjusted basis, approximately 85 percent of school divisions (112 divisions) now spend less per student on K-12 operations than 10 years ago. Nearly

FIGURE 2-1
Statewide, total spending per student is seven percent less than a decade ago



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars; excludes capital expenditures; per-student spending is calculated as median spending per student among school divisions in Virginia.

one-third of divisions (37 divisions) are spending at least 10 percent less per student. Per-student spending is at least 20 percent lower than in FY 2005 in three divisions: Richmond City, Charles City County, and Covington City. Compared to FY 2009 when per-student spending peaked, all but four school divisions in Virginia now spend less per student in real terms.

Nearly 95 percent of the state's K-12 population is educated in divisions that spend less per student now than a decade ago. Fairfax County, which educates 15 percent of the state's total K-12 population, spends about four percent less per student than it did in FY 2005. (See Appendix E for changes in per-student, inflation-adjusted spending.)

Health insurance spending increased as divisions spent less overall

Despite spending less in total, many divisions spend more on health insurance than 10 years ago. Health insurance spending accounted for about 7.8 percent of total operational spending in FY 2014, up from 6.1 percent in FY 2005. At the statewide level, health insurance spending increased 66 percent in nominal terms between FY 2005 and FY 2014, from $665 million to $1.1 billion. This increase is more than twice the rate of inflation. Health insurance expenditures increased all but one year

over the last decade—including after the recession of 2008-2009—with an annual average increase of 5.9 percent. Spending declined, though, by two percent between FY 2013 and FY 2014.

Changes to health insurance spending have varied widely across divisions. For example, between FY 2005 and FY 2014, 29 divisions experienced a decrease in health insurance spending, and five divisions had their health insurance spending approximately double (adjusted for inflation and enrollment).

Allowing school divisions to further cooperate on health insurance plans may help certain divisions better manage health insurance spending. One option would be to expand the state employee health plan to allow school division employees to participate. Later this year, the General Assembly will receive the results of an actuarial study (sidebar) of the potential for savings from this option.

***Use of Cooperative Procurement by Virginia School Divisions* (JLARC, 2010)**

In a 2010 report, JLARC staff recommended an actuarial analysis to determine the potential savings of expanding the state employee health plan to include school division employees.

The 2015 General Assembly directed and funded this analysis, to be completed by the Department of Human Resource Management by October 31, 2015.

OPTION 1

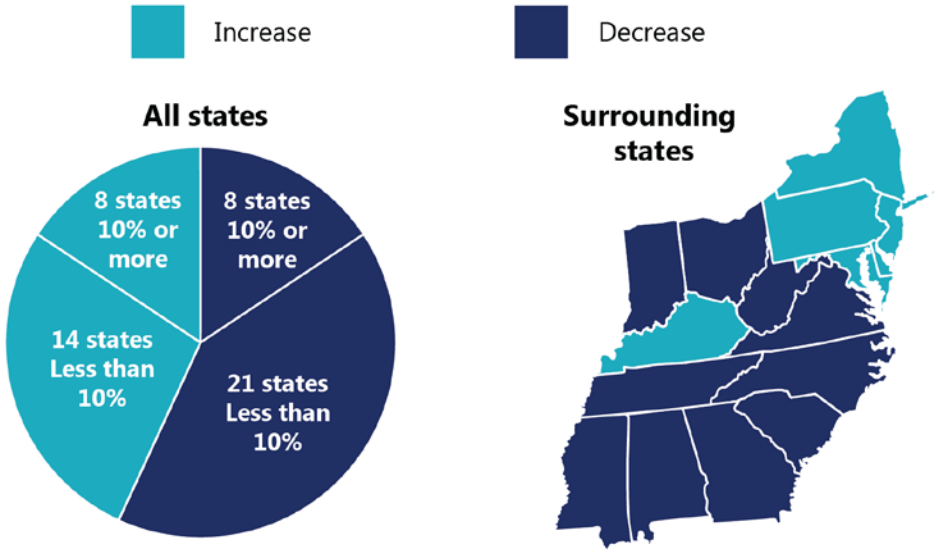
The General Assembly could amend § 2.2-1204 of the Code of Virginia to allow school division employees to participate in the state employee health plan.

Spending decline not unique to Virginia or to K-12 education

Virginia's decline in per-student spending is consistent with a national trend, particularly as compared to other states in the Southeast region. Twenty-nine states spent less per student in FY 2013 than FY 2004. Many of these surround Virginia, including North Carolina, West Virginia, and Tennessee (Figure 2-2).

The decline in K-12 spending per student is also consistent with state spending in other functional areas, particularly those that rely heavily on general funds. In 2014, JLARC's annual review of state spending found that the state's general fund declined four percent on a per capita inflation-adjusted basis between FY 2005 and FY 2014.

FIGURE 2-2
Twenty-nine states spend less per student now than a decade ago



Source: JLARC staff analysis of data from National Center for Education Statistics.
Note: FY 2004 to FY 2013.

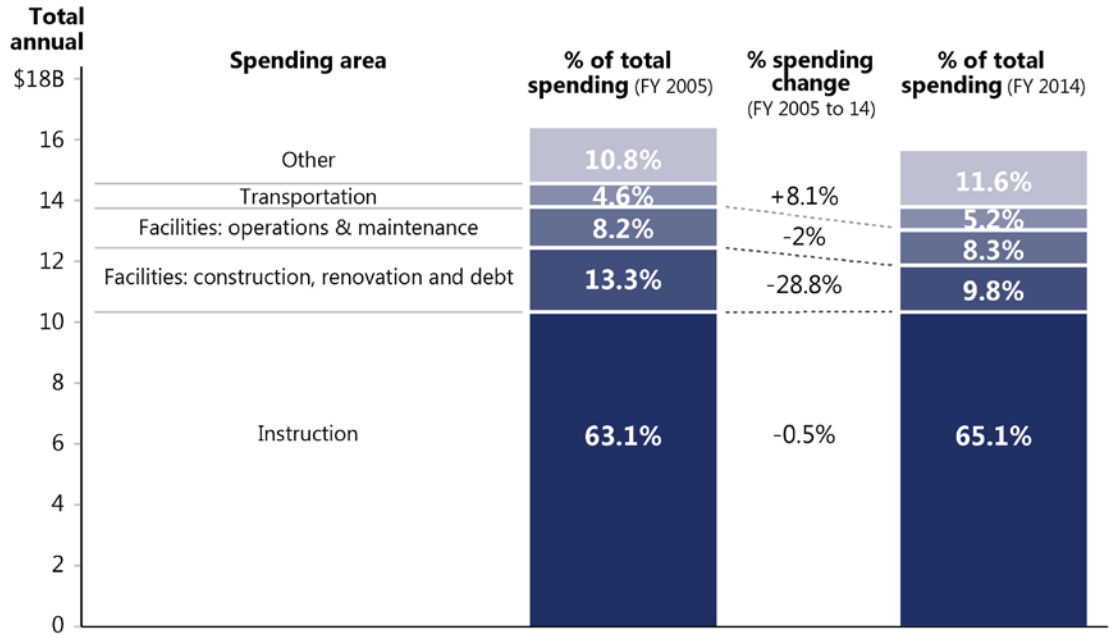
Non-instructional spending was reduced by more than instructional spending

The spending figures in this section are based on operating and capital expenditures at the statewide level. The figures are adjusted for inflation but do not reflect changes in enrollment. This is to show how the proportion of total spending allocated to instruction and non-instruction has changed over time.

School divisions reduced instructional spending by less than one percent, and non-instructional spending by 10 percent, at the statewide level between FY 2005 and FY 2014 (sidebar). Including both instructional and non-instructional spending, divisions collectively spent about 3.5 percent less ($562 million, adjusting for inflation only) during the time period. The bulk of this reduction was in non-instructional spending areas, namely spending on facility construction, renovation, and debt service (−28.8 percent). Divisions also reduced, to far lesser degrees, division administration (−1.8 percent), and facility operations and maintenance (−2.0 percent). Because instruction is the largest single spending area, it was difficult for divisions to completely shelter instructional spending as they reduced their total spending.

With instructional spending reduced by less than the key components of non-instructional spending, instruction now comprises a higher proportion of total spending (Figure 2-3). Instructional spending rose from 63.1 to 65.1 percent of total spending between FY 2005 and FY 2014. Chapters 3, 4, and 5 include more detail about the changes in instructional, facilities, and transportation spending.

FIGURE 2-3
Instruction now accounts for a higher proportion of total spending



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Includes operating and capital expenditures. Percent change in spending is measured as statewide total and does not account for changes in enrollment. Adjusted for inflation to 2014 dollars. "Other" spending area includes health and attendance, debt service, and contingency reserve.

3 Instructional Spending

SUMMARY The average Virginia school division spends nine percent less per student to provide instruction than it did in FY 2005. The 114 divisions that spent less in FY 2014 than in FY 2005 educate 98 percent of the state's students. Instructional support services, which include helping teachers provide better instruction, declined by more than direct classroom instruction. Divisions reduced per-student spending on instruction through a combination of employing fewer teachers per student, limiting salary growth, and requiring teachers to pay a higher percentage of health insurance and retirement benefit costs. Divisions report that these spending reductions have hindered instructional effectiveness. This conclusion could not be independently validated, but there is support in the research literature that such reductions can negatively impact instructional effectiveness. Divisions also report that reduced spending per student on instructional support services is creating challenges, such as teachers being less prepared and curriculum not being fully aligned with state standards. The state could facilitate instructional support in a more efficient manner by rebuilding the Virginia Department of Education's regional capability to help divisions provide teacher support.

Under Virginia's Standards of Quality, the mission of K-12 education is to enable each student to develop the skills needed for success in school, preparation for life, and reaching their full potential. The core of this mission is instruction, which comprises the daily instructional activities provided by teachers, teacher aides, and other instructional staff.

At 65.1 percent of total spending, or $10.1 billion in FY 2014, instruction is the largest spending area for school divisions. This instructional spending is almost entirely for staff salaries and benefits, which account for nearly 92 percent of total instructional spending. Classroom instruction accounted for over 80 percent of total instructional spending across Virginia school divisions in FY 2014. This spending is for teachers, teacher's aides, substitute teachers, and classroom supplies. Instructional support for staff and students, and school-level administration made up the remaining portion of instructional spending (sidebar).

Instructional support categories

School administration Office of the principal and the management operations for a particular school (8 percent of instructional spending)

Support for teachers Improvement of instruction such as curriculum development, planning, training, and evaluation (6.5 percent)

Support for students Counseling, social workers, and homebound services (4.3 percent)

Instructional efficiency cannot be reliably assessed

Whether divisions use instructional funding efficiently to achieve instructional goals cannot be reliably assessed. There are no well-established benchmarks either for what constitutes an efficient level of instructional spending or for the resources students need to achieve instructional goals, such as the optimal ratio of teachers to

students in each class. Further, multiple factors shape the spending level per student and teacher to student ratio desired or necessary in each community, including the socioeconomic characteristics of students and their families; local expectations and resources; and teacher experience.

Most school divisions in Virginia have faced reduced funding and increasing enrollment over the past 10 years. The primary means to spend less has been through reductions in classroom instructional staff and instructional support, because the vast majority of instructional spending is on staff salaries and benefits. In some instances, spending reductions may have enhanced efficiency if they did not undermine instructional effectiveness. However, most school divisions assert that instructional spending has been reduced to a level that has hindered effectiveness and does not offer opportunities for further efficiency.

Divisions now spend less per student on instruction

In FY 2014, Virginia's school divisions spent a median of $7,116 per student on instruction, with 80 percent of spending between $6,400 and $9,000 per student. This spending per student calculation for a single year, though, provides little insight into a division's efficiency or effectiveness.

How much a division spends per student is primarily driven by three factors outside the control of the school division. The first of these is how much more in additional local funding (beyond the minimum required by the Standards of Quality) the local government allocates to the division. Divisions that spend more on instruction tend to derive a higher percentage of their total funding from local government than divisions that spend less.

High / low instructional spending divisions

JLARC staff created peer groups of similar divisions based on two factors that were most closely statistically associated with instructional spending (Appendix B). Divisions that were high or low instructional spenders relative to their peer group were compared to other divisions in the group in terms of instructional spending, staffing, and service levels to better understand which practices contribute to spending variation.

The second factor that determines how much a division spends per student on instruction is cost of living. School divisions in the state's higher-cost Northern Virginia region generally pay higher teacher salaries. The third factor is the characteristics of the students the division educates. Students who live in poverty, have limited English proficiency, or have disabilities generally require more resource-intensive instructional services.

A division's spending level is also driven by factors within its control. For example, compared to similar divisions, higher spending divisions employ an average of 15 percent more teachers, substitute teachers, and teacher aides. These higher spending divisions also employ 42 percent more staff for instructional support of teachers, such as curriculum developers and teacher coaches. Higher spending divisions tend to offer a broader array of courses, including more advanced courses, foreign language and fine arts courses, and more specialized programs in the sciences, arts, and technology.

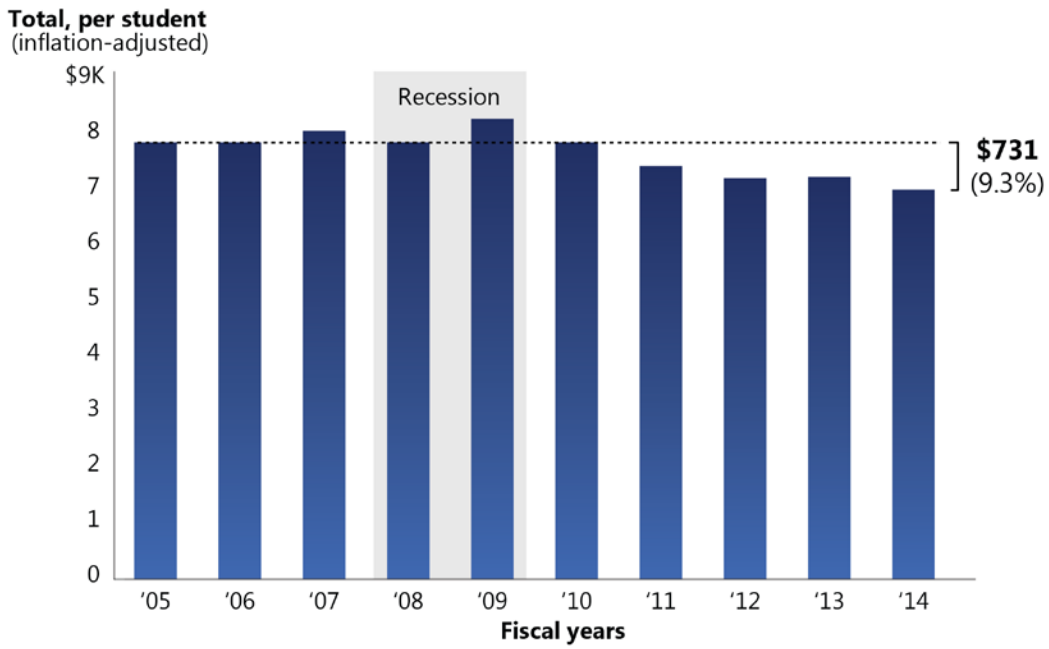
The research literature suggests a complex and often difficult to measure relationship between these higher levels of instructional spending and better education outcomes. In interviews with JLARC staff, however, nearly all school divisions that spent more

on instruction cited the local community's expectation for well-funded K-12 schools. These divisions asserted that students are better prepared for college and the workplace because small class sizes permit a more individualized educational experience, and more educational opportunities allow students to explore more academic interests.

Divisions spend nine percent less on instruction than a decade ago

Adjusted for inflation and student enrollment, Virginia's 132 school divisions spend 9.3 percent less on average, on instruction, than they did in FY 2005 (Figure 3-1). This represents a decrease from $7,847 per student in FY 2005 to $7,116 per student in FY 2014. Instructional spending has declined 13 percent since the 2008-2009 recession, though it increased 1.4 percent in FY 2013 and decreased by just 0.8 percent in FY 2014. The decrease in instructional spending over the past decade occurred despite increased spending on health insurance for instructional staff. When adjusted for enrollment and inflation, health insurance increased by 16 percent between FY 2005 and FY 2014, despite a decrease in instructional staff by an average of 3.6 percent across divisions.

FIGURE 3-1
Per-student spending on instruction declined more than nine percent



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars; excludes capital expenditures; per-student spending is calculated as median spending per student among school divisions in Virginia; Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded in FY 2005 due to changes in how data was reported.

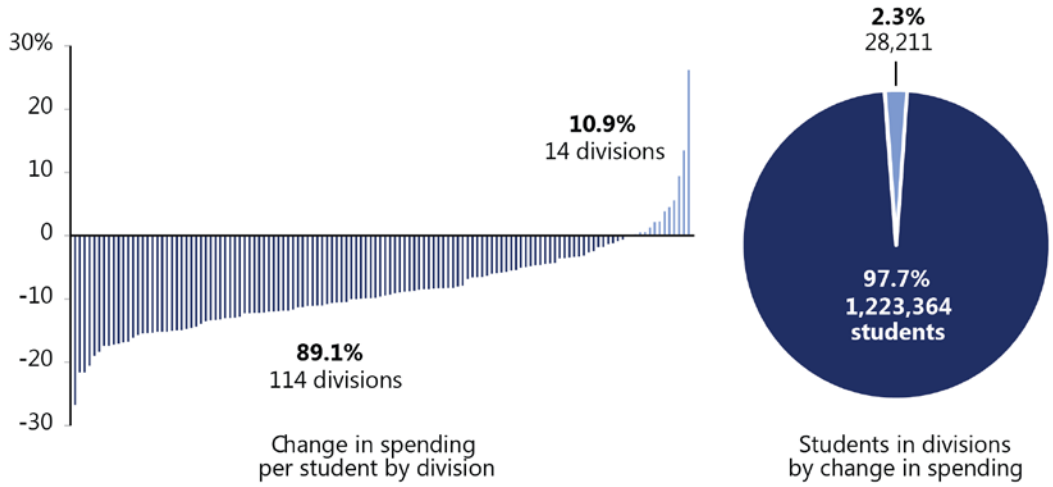
In nominal terms, total and per-student spending on instruction is higher now than a decade ago. Total spending on instruction grew by more than $2.2 billion between FY 2005 and FY 2014, an increase of 28 percent. Spending increased consistently until FY 2009, then declined 4.7 percent over the two years after the 2008-2009 recession. Total instructional spending increased at a more modest 2.6 percent per year between FY 2011 and FY 2014.

The General Assembly appropriated $204 million in additional state funding for K-12 in FY 2015. School divisions are scheduled to receive an additional $293 million during FY 2016. Depending on their local funding, this additional state funding means divisions are likely increasing their instructional spending currently or will be in the near future.

Vast majority of school divisions spend less on instruction than a decade ago

Most school divisions decreased instructional spending on a per-student basis over the past decade. In real terms, nearly 90 percent of school divisions in Virginia now spend less per student on instruction compared to spending in FY 2005 (Figure 3-2). The 114 school divisions that reduced instructional spending educate 98 percent of K-12 students in Virginia. The magnitude of the decline in per-student spending over this period ranged widely across divisions. Spending declined by more than 10 percent for 59 divisions, including four divisions that now spend at least 20 percent

FIGURE 3-2
Nearly 90 percent of school divisions with 98 percent of statewide enrollment decreased instructional spending over the past decade



Source: JLARC staff analysis of data from Virginia Department of Education.
Note: Each bar represents one division. Inflation and enrollment adjusted. Figures exclude capital expenditures. Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded due to changes in how data was reported.

less. Per-student spending on instruction did increase, though, for 14 divisions, most of which have fewer than 3,000 students and experienced declining enrollment over the past decade.

Instructional support was reduced more than classroom instruction

Divisions reduced spending on classroom instruction by 8.7 percent per student and instructional support by 8.9 percent between FY 2005 and FY 2014. However, because classroom instruction accounts for the vast majority of instructional spending, the bulk of the total decline in instructional spending was in classroom instruction. Divisions now spend $560 per student less on classroom instruction and $125 per student less on instructional support.

The result of reducing classroom instructional spending by less, in percentage terms, than instructional support is that classroom instruction now comprises a slightly higher proportion of total instructional spending. Classroom instruction spending rose from 80.9 to 81.2 percent of total instructional spending between FY 2005 and FY 2014.

Many divisions spend less on instruction but educate more resource-intensive students

School divisions reduced spending on instruction at a time when the composition of Virginia's K-12 population was changing to include a higher percentage of resource-intensive students. Because certain students have needs that require more instructional and instructional support resources, reductions to instructional spending posed additional challenges for divisions with a growing proportion of these students.

More of Virginia's K-12 students live in poverty and have limited English proficiency than a decade ago. The number of Virginia students living in poverty increased 33 percent over the past decade, and students in poverty now account for more than 40 percent of all K-12 students. The number of students with limited proficiency in English increased 69 percent over this period, accounting for 10 percent of all K-12 students in Virginia. (See Appendix F for change in percentages of students in these categories.)

Of the 114 divisions that spent less on instruction in FY 2014 than in FY 2005, 89 also educated a higher proportion of students living in poverty and with limited English proficiency (Figure 3-3). These students generally require more educational services to support their learning. The academic progress of some students may be disrupted by the effects of poverty, which are associated with lower attendance levels, more frequent moves from one school to another, and difficulties in the home. In addition to learning the core curriculum, students with limited English proficiency have the added challenge of learning English, which can make it difficult to learn at the same pace as English-speaking students.

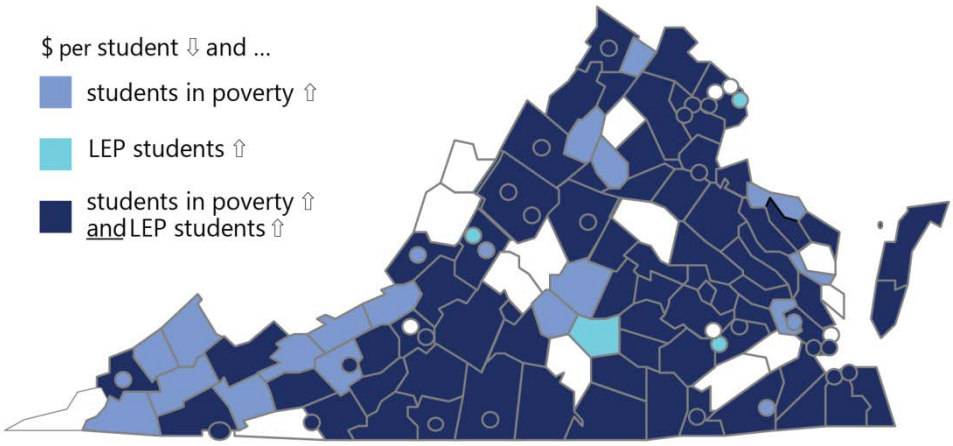
Measuring Poverty in Public Schools

The poverty rate in public K-12 schools is most commonly measured as the percentage of students qualifying for free or reduced price lunch through the National School Lunch Program. This measure is used in this report.

***Low Performing Schools in Urban High Poverty Communities* (JLARC, 2014)**

JLARC staff reported on factors that contribute to low K-12 school performance in urban high poverty communities and evaluated strategies for improving student achievement.

FIGURE 3-3
Eighty-nine divisions spent less per student on instruction while educating a higher percentage of students in poverty and with limited English proficiency



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Poverty is measured as the percentage of students qualifying for free or reduced price lunch through the National School Lunch Program. Per-student spending is calculated as median spending per student among school divisions in Virginia; excludes capital expenditures.

Reduced teacher staffing and increased class sizes may have hindered instructional effectiveness

Staffing costs are the vast majority of instructional spending. The primary way divisions reduced spending on instruction was by employing fewer staff. Nearly two-thirds of instructional staff are teachers, and another 20 percent are teacher aides and substitute teachers. Instructional support positions such as principals, guidance counselors, and clerical staff make up the remaining 15 percent of instructional staff.

Divisions now employ fewer teachers per student

On a per-student basis, school divisions employ fewer teachers than 10 years ago. Divisions reduced teacher staffing levels per student by three percent between FY 2005 and FY 2014. While the number of teachers statewide increased 3 percent over past decade, student enrollment grew at a faster rate of 7.5 percent. If school divisions had maintained teacher staffing at their 2005 levels, there would be approximately 4,080 more K-12 teachers in Virginia. If divisions had maintained teacher staffing at their 2009 levels, when instructional spending and staffing levels peaked, there would be approximately 5,990 more teachers. At the average division, this represents declines to teacher staffing levels of 3.8 and 5.3 percent since FY 2005 and FY 2009, respectively.

School divisions also changed staffing per student for other instructional positions. There are 112 fewer principals, 187 fewer counselors, and 664 fewer substitute teachers. In contrast, there are 1,574 more teacher aides than a decade ago, adjusted for

changes in enrollment. The hiring of additional teacher aides may mitigate the reduction in teachers to some degree.

Most school divisions used attrition to reduce teacher staffing levels across a broad range of grade levels and subjects. Of the divisions that responded to the JLARC survey, more than 80 percent (83 divisions) reported that they reduced teacher staffing by leaving positions vacant or not hiring additional staff as enrollment increased. Only 19 percent (20 divisions) of divisions relied solely or in part on lay-offs. Half reported that they reduced teacher staffing levels at the elementary, middle, and high school levels (52 divisions). (See Appendix B for more about the JLARC survey.)

More than two-thirds of school divisions reduced the number of teachers on a per-student basis over the past decade. These divisions, which include nine of the 10 largest divisions in the state, educate 86 percent of K-12 students in Virginia. Among divisions that reduced their numbers of teachers compared to enrollment, 22 did so by 10 percent or more.

On a per-student basis, Virginia tends to have more K-12 teachers than other states. In FY 2013, Virginia had the 16th highest number of total K-12 teachers per student in the nation. The state has fewer teachers per student at the kindergarten and elementary levels, but has the 5th highest number of teachers per student at the secondary level. (See Appendix D for instructional staffing levels compared to other states.)

Divisions report that larger class sizes have made it more difficult for teachers to provide quality instruction

Most school divisions reported that they increased class sizes to reduce instructional spending per student. Among surveyed school divisions, about two-thirds increased class sizes at each of the elementary, middle, and high school levels. Nearly 90 percent of divisions responding to the survey reported increasing class sizes for at least one grade level (86 of 100 divisions).

The magnitude of the increase in class sizes varied considerably. While statewide data on K-12 class sizes is not available, changes in student-teacher ratios at the elementary school level provide insight into how class sizes likely changed. In FY 2014, 107 divisions (81 percent) had more students per teacher at the elementary school level when compared to FY 2009. Student-teacher ratios increased by 10 percent or more for 50 divisions, including 19 divisions where ratios increased by 20 percent or more. Increases in class sizes were likely relatively large for these divisions.

Hampton City, for example, increased the size of its 4th and 5th grade classes from 24 to 30 students. This was a 25 percent increase in the class sizes of these elementary students. This meant each 4th and 5th grade teacher had six additional students, on average, in the classroom (Figure 3-4). The division has used federal Title I funding for additional 4th and 5th grade teachers to limit class size increases at high poverty schools.

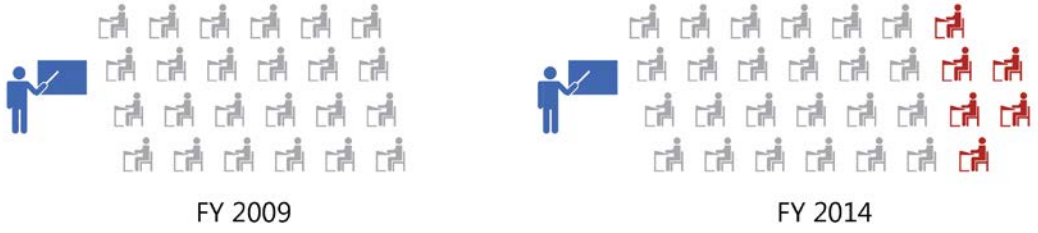
By contrast, student-teacher ratios increased less than five percent in 47 divisions. These divisions likely experienced minimal increases in class sizes. Loudoun County, for example, increased class sizes by one student on two occasions between FY 2009 and FY 2014. Loudoun then was able to decrease elementary class sizes by one student for FY 2015, for a net gain of one student per class.

Many of the divisions with a reduction in teachers relative to students now teach a higher percentage of resource-intensive students. Sixty-nine divisions reduced teacher staffing levels and experienced proportional increases in resource-intensive student populations (Figure 3-5). For instance, Manassas Park decreased teachers by approximately 16 percent, while students with limited English proficiency increased from 29 to 39 percent of total enrollment and the percentage of students living in poverty nearly doubled as a portion of total enrollment. Divisions experiencing this trend include the nine largest school divisions: Fairfax, Prince William, Chesterfield, Loudon, and Henrico Counties and the Cities of Virginia Beach, Chesapeake, Norfolk, and Newport News.

The impact of reducing instructional spending through increased class sizes depends on the size of the increase and the specific student population. According to the research literature, smaller class sizes can improve student achievement, especially for disadvantaged students, though the estimated effects are often small. (See Appendix H for more information on cost and impact of changes to class sizes and other aspects of instruction.)

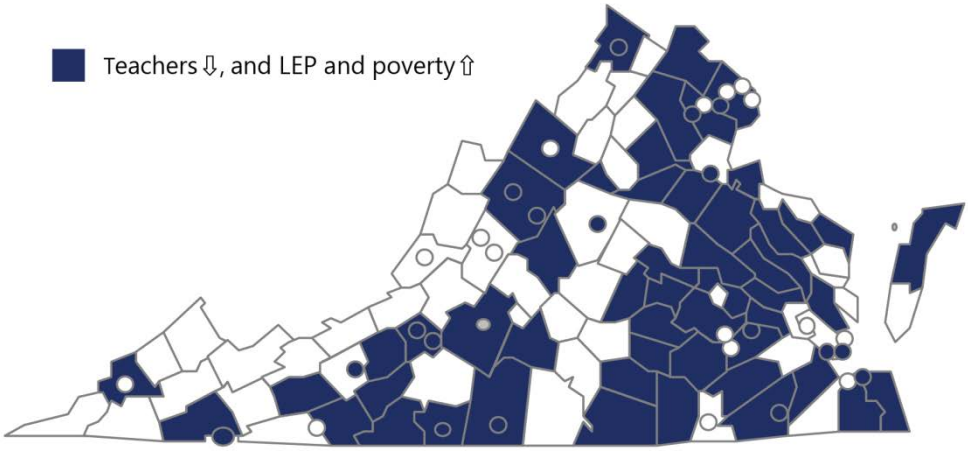
All school divisions interviewed, though, indicated that increased class size has reduced instructional effectiveness. This conclusion by divisions cannot be independently validated, but the research literature concludes that student learning can suffer when class sizes become too large. Smaller classes enable higher-quality student-teacher interactions.

FIGURE 3-4
Hampton's 4th and 5th grade class sizes increased by six students



Source: JLARC staff interview with Hampton City Public School division.

FIGURE 3-5
Many divisions now educate a higher percentage of resource-intensive students with fewer teachers



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Poverty is measured as the percentage of students qualifying for free or reduced price lunch through the National School Lunch Program. Teachers are measured as the number of teachers per 1,000 students. Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded due to changes in how data was reported.

School divisions reported that larger class sizes made it harder for teachers to provide differentiated instruction, which is tailored to the needs of individual students (sidebar). Increases in the number of students living in poverty and with limited English proficiency have created a greater need for differentiated instruction, even as the ability to provide it has declined. About 90 percent of divisions (75 of the 84 divisions that responded to the survey) indicated that increased class sizes decreased their teachers' ability to differentiate instruction. The research literature points to a relationship between class size and a teacher's ability to use certain aspects of differentiated instruction. For example, larger class sizes make it harder for a teacher to accurately determine which aspects of class material the students understand.

Differentiated instruction is the tailoring of educational content, process, products, or learning environment, to meet the needs of individual students.

Teachers differentiate instruction through individual attention or student grouping.

Additionally, larger class sizes require teachers to focus more time on classroom management rather than instruction. In interviews, nearly all school divisions indicated that more students in a class can result in more disruptions because teachers are less able to monitor student behavior. Disruptions take time away from classroom lessons and distract other students from learning. Larger class sizes make classroom management more challenging, particularly at the elementary level.

Most research studies find that smaller class sizes increase test scores, but by a small amount for the typical student. In interviews, though, division staff emphasized that because Virginia's new SOLs require a stronger understanding of the material, more individual instruction may be required to meet SOL requirements.

Limited salary increases and reduced benefits may have hindered teacher recruitment and retention

Salaries and benefits for instructional staff comprise more than 90 percent of instructional spending. In addition to employing fewer staff per student, instructional spending can be reduced by limiting salary growth. Division spending can also be reduced by having instructional staff pay a higher portion of retirement and health insurance costs.

Divisions now pay teachers slightly more but provide less in benefits

Teacher salaries are now slightly higher for the average teacher in Virginia, but starting salaries for new teachers are now slightly lower. Adjusted for inflation, Virginia's teacher salaries are about what they were in FY 2005. The median statewide salary of K-12 teachers increased slightly less than one percent over the past decade, from about $47,000 in FY 2005 to just under $47,500 in FY 2014. For new teachers, the median salary fell slightly, from about $43,800 in FY 2008 to $42,800 in FY 2014 (adjusted for inflation). (Note: Before 2008, VDOE did not report starting salaries.)

While median teacher salaries in Virginia increased slightly over the past decade, they declined relative to teacher salaries in other states during this period. Virginia had the 21st highest salaries in the U.S. in FY 2005. In FY 2014, Virginia had the 29th highest salaries. (See Appendix G for teacher salaries compared to other states and other professions.)

Nearly all divisions reported limiting salaries and benefits to decrease instructional spending. All but five of the 104 divisions responding to the survey reported that they had reduced salaries and benefits for teachers and other instructional staff after the 2008-2009 recession. Most school divisions offered smaller and less frequent salary increases for teachers and other instructional staff after the recession. About 75 percent (80 divisions) reported eliminating or reducing salary increases for instructional staff, including teachers. Smaller percentages of divisions actually reduced salaries for existing staff (16 divisions) or new instructional staff (29 divisions).

Take-home pay likely decreased for many teachers in Virginia as they paid a larger portion of their benefits. More than 60 percent (67 divisions) of divisions reported that instructional staff now pay a larger share of their health benefit costs, and 45 percent (48 divisions) reduced health insurance coverage through measures such as restricting the provider network or covering fewer procedures. More than 60 percent (66 divisions) reported that they required instructional staff to pay a larger share of retirement contributions.

Divisions report limited compensation growth hinders recruitment and retention and may reduce effectiveness

Divisions report that limited compensation growth has made it more difficult to recruit and retain teachers. More than 80 percent of divisions responding to the survey reported that reductions in teacher compensation levels after the recession reduced their ability to recruit and retain instructional staff (83 and 84 divisions respectively). In interviews, division staff explained that turnover among teachers often means replacing experienced teachers with less experienced teachers. Less experienced teachers tend to be less effective than teachers with more experience. Divisions that rely increasingly on new or less experienced teachers may face a decline in instructional effectiveness.

It is not clear whether job turnover among teachers is increasing statewide, because it is not consistently tracked by school divisions or the state. Since 2013, the annual Appropriation Act has required the Virginia Department of Education (VDOE) to report annually to the General Assembly on teacher shortages, and the department was reporting this information voluntarily before 2013. Legislation approved by the General Assembly in 2015 requests that VDOE examine the feasibility of tracking teacher turnover through exit questionnaires and other means.

The 2015 Appropriation Act provided $23,000 for VDOE to conduct this study, which is currently underway. Given the negative impact teacher turnover can have on instructional effectiveness, VDOE should collaborate with divisions to develop a system for tracking teacher turnover that poses the least administrative burden on divisions while providing the state information on the extent of teacher turnover and factors that contribute to it. The General Assembly may wish to consider requiring the Superintendent of Public Instruction to direct VDOE to implement such a system and report this information annually to the General Assembly and the governor.

RECOMMENDATION 1

The General Assembly may wish to consider amending § 22.1-23 of the Code of Virginia to require the Superintendent of Public Instruction to track teacher turnover and report annually to the General Assembly and governor the numbers of and most common reasons for teacher turnover.

Reduced instructional support may be hindering instructional effectiveness

Spending on instructional support is for school administration (eight percent of total instructional spending), support for teachers (6.5 percent), and support for students (4.3 percent). In addition to having fewer teachers and spending less on their compensation, another way to reduce instructional spending is to spend less on help for teachers. Support for teachers includes staff who advise teachers on how to better

educate certain student groups, help teachers develop curriculum and lesson plans, and evaluate teacher performance. Support for teachers also includes a variety of types of professional development.

Divisions now spend less on teacher support and professional development

While school divisions reduced spending in a range of instructional areas following the 2008-2009 recession, support for teachers experienced the steepest decline in spending. Adjusted for inflation, per-student spending on support for instructional staff declined nearly 13 percent statewide over the past decade, from $502 in FY 2005 to $437 in FY 2014. Over the same period, the median number of staff providing instructional support services declined 7.5 percent on a per-student basis at the average division.

Fifty-one divisions responding to the survey reported that they had reduced instructional support positions at the central district office. Twenty divisions reported that they had reduced teacher training positions. Forty-four divisions reported reducing curriculum development positions (sidebar)—staff who ensure that teaching materials are aligned with the SOLs, content is delivered uniformly across teachers and schools, and teachers have guidance on effectively teaching the curriculum to students.

Curriculum development is the process of identifying the type of learning that is necessary, supporting teachers and other instructional staff with materials and training necessary to meet these learning needs, and monitoring to make sure that learning is taking place.

In interviews, most divisions reported that they had reduced or eliminated spending on professional development for teachers. Sixty-seven divisions reduced or eliminated teacher training programs, and nearly all divisions reduced or eliminated professional development staff. These divisions also reported being less likely to spend money on conferences, certifications, and tuition reimbursement for teachers.

Reductions in teacher support can lead to curriculum misalignment and instructional inconsistency

Most school divisions reported that reductions in instructional support for teachers, such as in curriculum development staff, resulted in inconsistent instructional content delivery and made it difficult for divisions to adapt to recent changes in the SOL. The impact of reductions in central curriculum development staff positions has likely depended in part on the capabilities that remain at each school. The lack of central curriculum support requires principals and teachers at each school to design and implement course curriculum content. Several divisions reported that if the principal and teachers can fill the gap, then the negative effects, other than the increased workload, can be avoided. However, at schools without the capability to do this on their own, it is likely that students in some classes will not be taught curriculum that is optimally aligned with the SOLs.

Some divisions also reported that reducing or eliminating professional development programs made it more difficult for teachers to adapt to changes in SOL content or changes in the student population. Furthermore, divisions reported that it is more

difficult for teachers to adapt their instructional practices as they teach more students in poverty and those with limited English proficiency. More broadly, constraining professional development programs makes it less likely that new teachers will develop the skills needed to effectively support student learning.

VDOE could provide additional teacher support for divisions

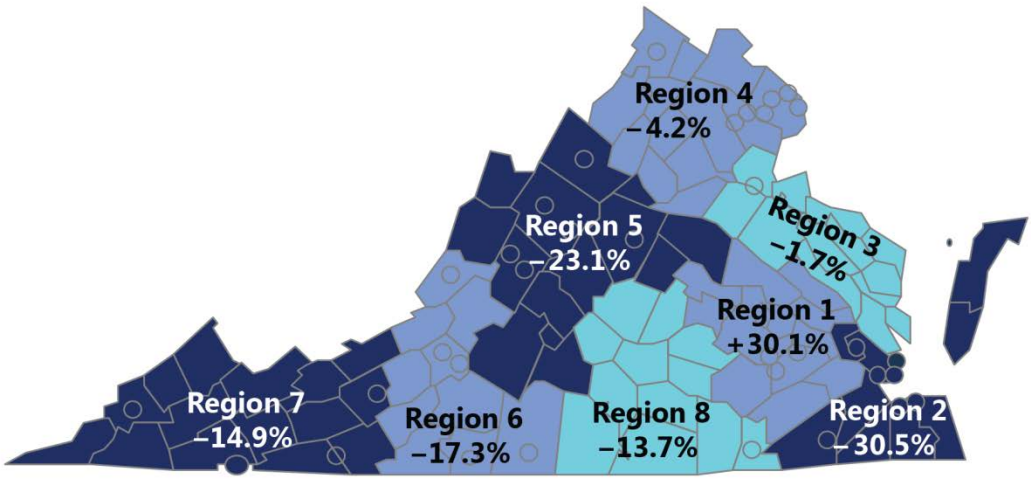
VDOE could help school divisions that have substantially reduced or eliminated teacher support. Central office VDOE staff could help divisions that request assistance with adapting curriculum as the SOLs change, develop and offer professional development, and share information about effective teaching practices. These staff could develop expertise in particular grade levels or subjects and stay informed and current on evolving trends and best practices.

Teacher support would still remain a function of school divisions, but VDOE could provide supplemental assistance for the divisions that have the least capability to provide teacher support services. Divisions did not uniformly reduce staffing in this area—many decreased teacher support staff substantially, while others increased staffing (Figure 3-6). It is likely that the need for support within each region would vary considerably based on the current instructional support capacity and student population of divisions, among other factors.

The General Assembly could appropriate additional funding for VDOE to hire sufficient staff to provide supplemental teacher support. Centralizing teacher support expertise at VDOE, rather than at each school division, is likely more efficient for divisions with limited resources. More centralized staffing would reduce division staff needs and the total number of instructional support staff needed to be hired. Divisions now have 304 fewer instructional improvement staff (support positions that help teachers) as compared to FY 2009 staffing levels. The cost of additional VDOE staff needed to develop a strong centralized structure is likely substantially lower than the cost of restoring these 304 positions at school divisions. These additional VDOE staff could reduce the need for individual divisions to hire additional support staff so that available funding could be allocated to other division needs.

The exact number of additional VDOE staff necessary to provide this supplemental teacher support is not known. To determine this, VDOE could conduct a needs assessment to identify divisions that need state assistance with curriculum and professional development. Based on this assessment, VDOE could then develop a plan detailing the number and type of staffing required. The plan would also need to include an estimate of the annual cost of these staff.

FIGURE 3-6
Change in staffing levels for instructional improvement staff, by VDOE region (FY 2005–FY 2014)



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Percentages represent the median change among divisions in a region of the number of improvement of instruction staff per 1,000 students between FY 2005 and FY 2014. Excludes clerical staff.

OPTION 2

The General Assembly could appropriate funds for the Virginia Department of Education to employ additional staff to provide teacher training and curriculum development support to the school divisions that would most benefit from state assistance.

4 Facilities Spending

SUMMARY Statewide, the average Virginia school division spent eight percent less per student, in inflation-adjusted terms, to operate and maintain facilities than it did in FY 2005. Divisions also spend far less on facility renovation and construction. Divisions used several approaches to reduce facilities spending. Some of these approaches, such as deferring projects and reducing staffing levels and compensation, may hinder long-term efficiency and effectiveness. Other approaches, such as more efficient energy management practices, can result in sustainable, long-term efficiencies. These have been implemented by some, but not all, divisions. These approaches may result in efficiencies, if implemented by divisions that have yet to do so. The Virginia Department of Education (VDOE) should serve as a resource, especially for smaller divisions, on how to fully implement facilities management best practices.

Facilities are an important part of a school division's instructional program, providing the space where teaching and learning occurs. Effective spending on facilities ensures that the design and quality of facilities support the instructional program of the school division, and efficient spending minimizes the short- and long-term costs of building and maintaining facilities.

The state has a minimal role in local decisions regarding school buildings and other division facilities. Each school division has broad discretion regarding building design, standards, maintenance, and renovation and replacement. Localities provide the vast majority of funds used to renovate or build new schools. The state provides funding to operate and maintain facilities through the Standards of Quality funding formula.

After instruction, facilities are the second largest spending category in K-12 education, accounting for 20 percent of all K-12 expenditures. Virginia school divisions operate and maintain approximately 2,000 facilities. Divisions spent nearly $2 billion on facilities in FY 2014, two-thirds to operate and maintain existing facilities and one-third to renovate, construct, or acquire facilities. The largest expenditures were building services, such as the heating, ventilation, and air conditioning (HVAC) systems; heat, electricity, water, and sewer utilities; and custodial services (Table 4-1).

TABLE 4-1
Two-thirds of spending on facilities is for operations, maintenance, and other facility services (FY 2014)

Spending area	Spending ($M)	Percent of total facilities spending
Operating expenditures		
Building services (operations and maintenance, custodial services)	$1,067.0	54.3%
Equipment and vehicle services	92.0	4.7
Management and administration	53.7	2.7
Security services	52.3	2.7
Groundskeeping	26.7	1.4
Subtotal operating expenditures	**$1,291.0**	**65.8%**
Capital expenditures		
Facility renovations and additions	323.8	16.5
Facility construction and acquisition	321.5	16.4
Site acquisition and improvement	18.7	1.0
Architectural and engineering services	8.4	0.4
Subtotal capital expenditures	**$672.0**	**34.2%**
Grand total	**$1,964.0**	**100%**

Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Facilities operations and maintenance includes warehousing and distributing services.

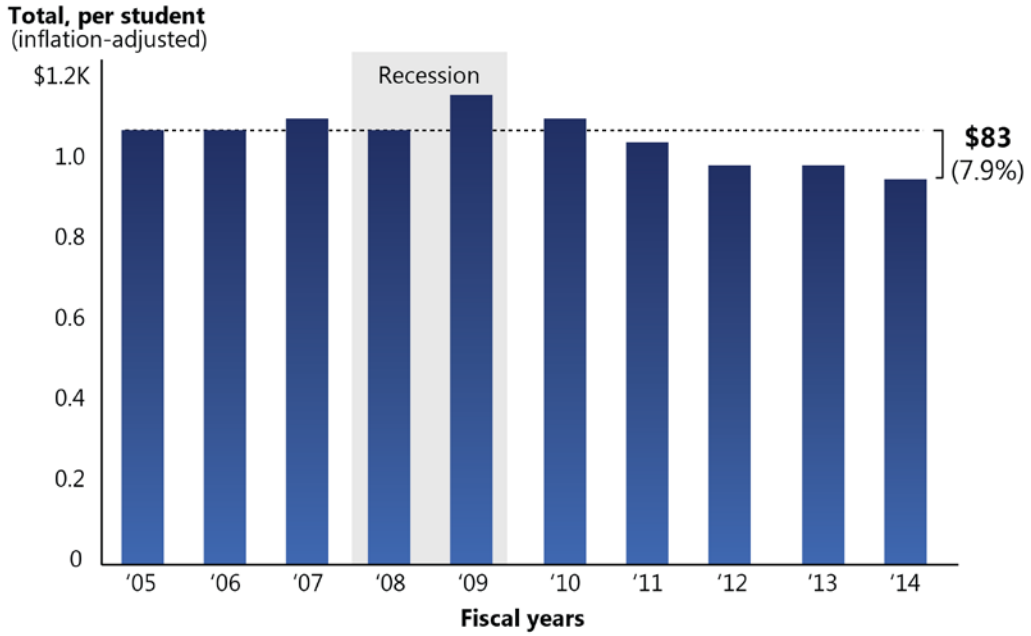
Divisions now spend less per student on facilities

In FY 2014, Virginia's school divisions spent a median of $971 per student to operate and maintain facilities, with 80 percent of divisions spending between $810 and $1,260 per student. This spending calculation for a single year provides little insight into the efficiency or effectiveness of facilities spending. There is no data available on facility age, square footage, energy usage, or maintenance costs, factors that would explain the variation in spending on facilities. Some insight into efficiency can be attained by measuring how facilities spending changes over time. In simple terms, school divisions that spend less per student over time could be characterized as becoming more efficient. This may not always be the case, though, as maintenance that is deferred or projects not undertaken tend to be more costly—in other words, less efficient—over the long term.

Divisions spent eight percent less to operate and maintain facilities

Adjusted for inflation and student enrollment, Virginia's 132 school divisions collectively spent eight percent less to operate and maintain facilities than they did in FY 2005 (Figure 4-1). Median per-student spending decreased from $1,054 to $971 between FY 2005 and FY 2014. As a result, statewide annual spending to operate facilities in FY 2014 was approximately $101 million lower than if it had kept pace

FIGURE 4-1
Spending on facilities operations and maintenance is eight percent lower than a decade ago on a per-student inflation-adjusted basis (FY 2005–FY 2014)



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars; excludes capital expenditures; per-student spending is calculated as median spending per student among school divisions in Virginia.

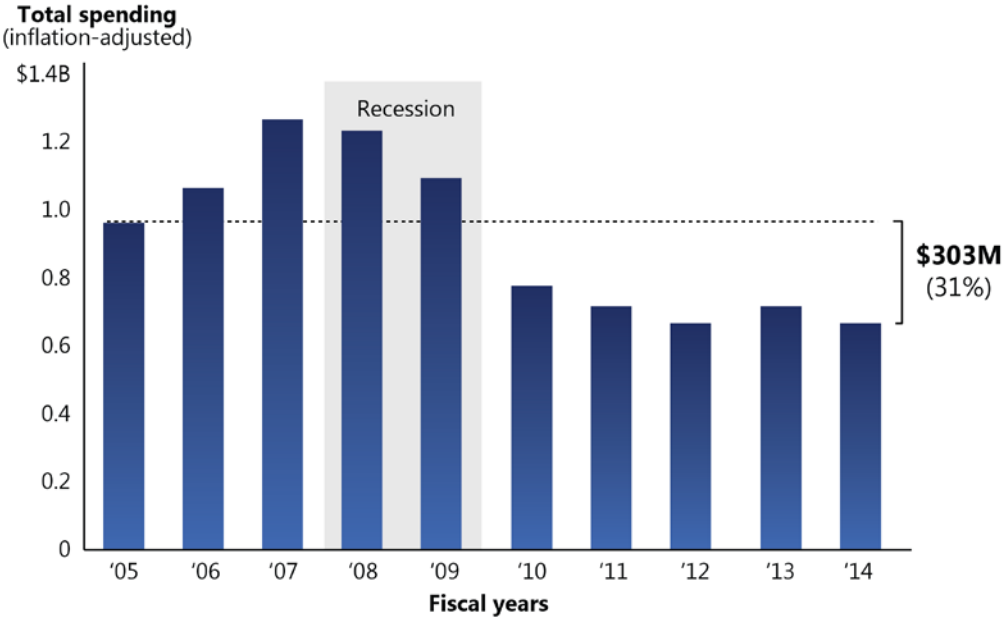
with enrollment growth and inflation. Between FY 2005 and FY 2009, per-student spending on facilities grew 11 percent faster than the inflation rate, peaking at $1,165 in FY 2009. After the recession, spending declined in real terms by 17 percent to $971 per student in FY 2014. Per-student spending levels remain relatively unchanged since FY 2012.

In nominal terms, total and per-student spending by school divisions to operate K-12 facilities is higher now than a decade ago. Total statewide spending to operate facilities grew more than $250 million between FY 2005 and FY 2014, an increase of 26 percent.

Divisions spent 30 percent less on facility renovation and construction

Statewide spending to build or renovate K-12 facilities declined substantially after the recession of 2008-2009 and in real terms is now about 30 percent lower than 10 years ago (Figure 4-2). From FY 2005 through FY 2009, total annual spending on construction and renovation averaged $1.13 billion statewide. Capital spending on facilities declined more than 31 percent between FY 2009 and FY 2010 and has averaged $705 million annually since FY 2009.

FIGURE 4-2
Spending on facility construction and renovation is 30 percent lower than a decade ago on a per-student inflation-adjusted basis (FY 2005–FY 2014)



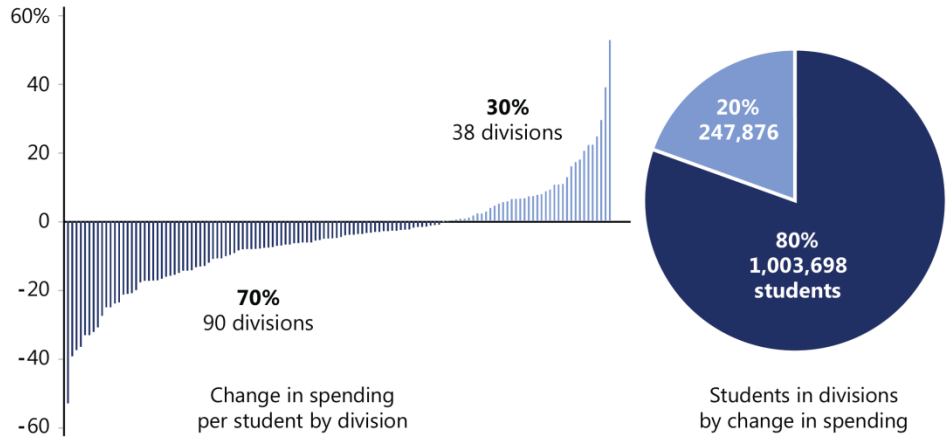
Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars; capital expenditures only; per-student spending is calculated as median spending per student among school divisions in Virginia.

Approaches used to reduce facilities spending will likely hinder long-term effectiveness and efficiency

Ninety school divisions, or a little more than 70 percent of divisions in Virginia, now spend less per student to operate K-12 facilities than 10 years ago (Figure 4-3). Twenty divisions spend at least 20 percent less, and several divisions spend at least 40 percent less. The divisions that now spend less per student educate the vast majority of the state's students.

Divisions that are spending less on facilities may have achieved temporary efficiencies by lowering facilities costs without a significant decline in facility quality. Measures to reduce costs included deferring non-emergency maintenance projects and delaying new projects. However, many divisions have reported that over the longer term this reduced spending has not been efficient and has negatively impacted the quality of the instructional environment.

FIGURE 4-3
Seventy percent of divisions that educate 80 percent of Virginia's students now spend less per student on facilities (FY 2005–FY 2014)



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Each bar represents one division. Inflation and enrollment adjusted. Figures exclude capital expenditures. Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded due to changes in how data was reported.

Deferring projects increases facility costs and reduces facility quality

For most school divisions, deferring facilities projects increased some facilities costs. The link between higher long-term facilities costs and the deferring of construction, renovation, and non-emergency maintenance projects is well established in facilities management research. More than 60 percent of divisions (55 divisions) responding to the JLARC survey reported that deferring facility projects collectively increased their projected long-term facility costs. Forty percent of divisions (37 divisions) reported that deferred projects were missed opportunities to increase energy efficiency. (See Appendix B for more information about the JLARC survey.)

More than 75 percent of divisions (78 divisions) reported deferring non-emergency maintenance projects, including upgrade and replacement of roofing, flooring, and HVAC equipment such as boilers and chillers since the recession of 2008-2009.

School divisions cited two primary reasons that deferring facilities maintenance, construction, and renovation projects resulted in higher short- and long-term costs. First, older equipment generally had higher maintenance and replacement costs, often because it was more likely to require major maintenance or full replacement. Second, the cost of maintenance, construction, and renovation may be higher after delaying projects if prices increased faster than the rate of inflation. One school division interviewed by JLARC staff described higher facilities costs after deferring two projects.

CASE STUDY

School division experienced higher costs after deferring facilities projects

A school division delayed building a new middle school and high school when funding declined after the recession. Before it could begin construction of the new schools, the division spent $450,000 replacing part of the middle school roof and $1 million for extensive repairs to the high school roof. According to division staff, the roofing projects were needed to prevent roof and wall leaks. The middle school was torn down and replaced two years after the roof repairs, and a new high school is currently under construction.

The same school division delayed repairs to its HVAC system. The repairs had been scheduled for the 2008-09 school year, but were not made until the summer of 2014 due to budget reductions. The final cost of the repairs was $12,000 higher than originally estimated, because costs increased and the equipment was older and required more extensive repairs.

Deferring facilities projects also reduced the quality of the state's K-12 facilities. Over 50 percent of divisions (48 divisions) reported that deferring construction, renovation, or maintenance has substantially or moderately decreased the quality of facilities. Some divisions attributed an increase in failures of building systems, such as temporary loss of heating or cooling, to the deferring of non-emergency maintenance. These incidents can disrupt classroom routines and interfere with learning activities. Several divisions reported that their facilities lack sufficient technology infrastructure and learning space because construction and renovation projects have been deferred. In some cases, deferring facilities projects made school facilities potentially less safe for students. Twenty-six percent of divisions (24 divisions) reported that deferring projects reduced facility safety, while a little more than half of divisions said there was no impact.

Divisions report that staff and compensation reductions negatively affected recruitment and retention

A little more than half of operational spending on K-12 facilities was on salaries and benefits for facilities staff. In FY 2014, school divisions collectively spent approximately $700 million to employ nearly 14,000 full-time equivalent staff. Nearly 90 percent of these positions were in the services and trades sectors, including building maintenance, repair, and custodial staff. Statewide, less than five percent of total facilities staff were classified as security guards, and three percent were classified as management and clerical staff.

Many school divisions reported that they decreased facilities spending through staffing and spending reductions, both by employing fewer people and by reducing compensation. Every division reported reducing facilities staffing levels, reducing salary and benefit levels, or both, in response to funding declines after the recession. Two-thirds of divisions responding to the survey (68 divisions) reduced the number of

full-time equivalent custodians, and nearly 60 percent of divisions (60 divisions) reduced maintenance or repair staff. Adjusted for enrollment growth, the number of facilities staff statewide was cut by 11 percent from FY 2005 to FY 2014. More than 80 percent of school divisions reduced the number of facilities staff per student.

Nearly 70 percent of school divisions (70 divisions) reported that they had eliminated or reduced salary *increases* for staff. More than 50 percent of divisions (60 divisions) reported reducing health insurance benefits, either by requiring staff to pay more for insurance or reducing coverage levels. Nearly 10 percent of divisions (nine divisions) reduced actual salary levels for existing or new staff.

Reductions to facilities staffing and compensation have likely hindered, or at some point may hinder, recruiting and retention. More than 70 percent of school divisions (71 divisions) reported that these approaches substantially or moderately diminished staff morale and increased staff workload. Approximately 50 percent (47 divisions) reported a negative impact on staff recruitment and retention, most often to a moderate degree.

Some divisions could gain efficiency through facilities management best practices

Best practices are available to achieve increased short- and long-term efficiencies without hindering effectiveness. Some divisions are not using these best practices for facilities management and could achieve modest but measurable improvements to efficiency by their use.

At least 32 divisions do not collect or use data to manage facility efficiency and effectiveness

Despite the value that performance measurement can provide, many divisions do not routinely collect data on facilities and use it to inform their decisions. In fact, 32 percent of divisions (32 divisions) responding to the survey reported not using any performance measures for facilities management in the last three years. The majority of these divisions are comparatively small—collectively, they account for 14 percent of K-12 students statewide—and most have reduced the number of staff who would have been responsible for tracking facility data. However, three divisions are in urban or suburban localities and have more than 15,000 students. Larger divisions should have the staff capacity to track facility data.

According to facilities management experts, performance measures should be used regularly by school divisions to compare their performance to industry or national standards, or to set strategic goals for the cost of facility services. Measures such as total spending and staffing for operations and maintenance per square foot, and spending on utilities per square foot, can help divisions monitor facilities costs and identify opportunities to reduce them.

There is currently no requirement for divisions to collect performance data about facility efficiency or to use such data to inform decisions. There is also no standard statewide definition of how to measure many aspects of facilities. Because the state has a minimal role in facilities and their funding, it may not be appropriate for the state to mandate collection and use of this performance data. Still, such data would be valuable for informing the decisions of school division staff, school board members, and local government staff and officials.

At least 17 divisions have not implemented new utility efficiency practices

Energy management practices and equipment upgrades can reduce spending on heat, electricity, and water. Despite this potential, 16 percent of divisions responding to the survey (17 divisions) reported they have not implemented new energy efficiency practices in the last six years. Some of these divisions may have developed energy efficiency programs before the recession. These divisions represent 14 percent of K-12 students statewide and include three divisions with more than 25,000 students each.

About 83 percent of school divisions (84 divisions) reported implementing energy efficiency measures after the recession of 2008-2009. A majority of divisions reported that these changes resulted in moderate or substantial decreases in short-term spending and long-term projected costs. School divisions used a range of measures to improve their energy efficiency, including

- conducting energy audits to identify opportunities to reduce usage and costs;
- changing staff behavior to ensure that lights, computers, and temperature settings were adjusted for non-working hours;
- replacing older or malfunctioning equipment with more energy efficient equipment; and
- implementing automated control systems for HVAC equipment.

An **energy performance contract** with a private vendor may enable school divisions to finance energy efficiency programs.

A division using an energy performance contract may pay the contractor a certain percentage of savings from reduced energy consumption for a specified period of time.

At least eight divisions used an energy performance contract with a private contractor (sidebar) to conduct energy audits and develop strategies for reducing energy consumption. One division estimated their energy savings at just over $2 million, through both reducing actual utility expenditures and avoiding cost increases.

School divisions that have not considered energy efficiency measures should consider whether upgrading equipment and promoting more energy efficient behavior by staff would reduce their energy usage and spending. The Department of Mines, Minerals, and Energy maintains a state contract with a vendor to develop energy efficiency programs. The energy performance contract can be used by state and local public bodies, including school divisions.

At least 60 divisions did not outsource or collaborate with local government on facilities, and those that did had mixed results

The use of outsourcing, collaboration, or consolidation for operating facilities may not always improve efficiency or effectiveness, because these practices require complex analysis and additional staff time to evaluate. Divisions have undertaken these practices, but with mixed results in terms of feasibility and improving efficiency and effectiveness.

More than one quarter of divisions (27 divisions) reported contracting with a private vendor or collaborating with their locality to perform custodial, building maintenance, or groundskeeping operations. Approximately half of these divisions indicated these approaches reduced short-term spending on facilities, most often to a moderate degree. About 20 percent reported that outsourcing these functions decreased the safety or adequacy of their facilities. Two divisions reported major challenges contracting with a private vendor for facilities services, and emphasized that other divisions should carefully evaluate the advantages and disadvantages of these approaches before proceeding.

Nearly 60 percent of divisions (61 divisions) reported that they did not contract with a private vendor or collaborate with their locality to perform custodial, building maintenance, or groundskeeping operations after the 2008-2009 recession. To the extent that these divisions have not already done so, they should carefully examine the costs and feasibility of privatization or collaboration with their locality in these areas.

At least 21 divisions have schools below capacity but have not closed facilities to increase efficiency

While K-12 enrollment statewide increased by seven percent over the past 10 years, enrollment *decreased* for 70 school divisions over that period. The largest declines occurred in Southside and Southwest Virginia as well as the Northern Neck. According to demographic data from the Weldon Cooper Center, total population is expected to decline for many localities in these parts of the state over the next decade, suggesting that student enrollment in these divisions will decline.

Closing a school is one of the most contentious, difficult decisions that confronts local officials. Many communities, especially those that are smaller, draw much of their local identity from their schools and high school athletics. Despite the challenges of closing schools, one third of divisions responding to the survey (34 divisions) reported closing or consolidating at least one school since the recession, likely allowing them to save on some facility costs through a reduction in electricity and other utilities, instructional personnel, and transportation. These divisions cited long-term enrollment declines as the primary reason. Operating schools under capacity for long periods of time is inefficient because the fixed costs of operating and maintaining

Local Government and School Division Consolidation **(JLARC, 2014)**

This report, which reviewed state options for encouraging local government and school consolidations, quoted a school division official from another state, on the difficulty of closing a school: "The most difficult animal to kill is a school mascot."

the school are spread over a declining number of students, driving the spending per student up.

Twenty-one divisions reported having schools below 80 percent capacity, and did not close or consolidate any schools after the recession. To the extent that enrollment continues to decline in certain divisions, these divisions should periodically evaluate the potential savings and costs of closing or consolidating underutilized facilities.

While closing an underutilized school would likely reduce operating costs for a division, it may not be feasible if the division does not have excess capacity in another facility. Closing a facility may not be feasible or cost-effective if some students have longer bus rides and student transportation costs increase.

VDOE should help divisions improve facilities management

Several divisions reported relying primarily on their own experience to identify best practices for non-instructional functions such as facility operations. The General Assembly has made efforts to facilitate sharing of best practices, most recently in the 2015 Appropriation Act, which requires the Department of Planning and Budget (DPB) to develop a list of best practices and common recommendations identified through school efficiency reviews. DPB is well positioned to develop such a list because it oversees the state's school efficiency review program.

The efficiency review program examines a school division's facility operations, maintenance, and capacity, to find ways to reduce spending. To date, only about one-third of divisions have been reviewed. More than 350 recommendations—nearly 11 percent of all recommendations—from the efficiency reviews conducted thus far involve facilities. The most common types of facilities recommendations address planning, organizational structure, and data collection and reporting. According to DPB staff, facilities recommendations that have been or are being implemented represent an annual average savings of $12.6 million. (See Appendix C for information on recommendations implemented and savings achieved from school efficiency reviews.)

Building a relatively small capability at VDOE would be an efficient way to help divisions more effectively manage their facilities. Depending on how division needs evolve, VDOE's capability could be expanded over time. Divisions had 14 fewer facilities management and analyst positions in FY 2014 than FY 2009. Smaller divisions likely lacked sufficient facilities management and analyst staffing prior to FY 2009. Rather than rebuilding this division capacity, it would be more efficient for VDOE to hire up to three staff and leverage their expertise across divisions. Such an approach would also be more effective because these staff could specialize in helping divisions measure facilities performance, implement energy efficiency practices, and explore outsourcing, collaboration, or consolidation.

RECOMMENDATION 2

The Virginia Department of Education should provide facilities management expertise to school divisions. The expertise should include guidance and information sharing about facilities management best practices, such as performance measurement, energy efficiency, outsourcing, collaboration, and closing schools.

RECOMMENDATION 3

The General Assembly may wish to consider appropriating funds for the Virginia Department of Education to employ up to three additional staff to provide guidance and assist school divisions in sharing information about facilities management best practices.

5 Transportation Spending

SUMMARY The average Virginia school division spent about the same per student for transportation in FY 2014 as it did in FY 2005. About half of the state's divisions actually reduced their spending per student despite an increase in fuel prices. Divisions used a variety of approaches to reduce or maintain transportation spending. Some of these approaches, such as reducing staffing and deferring the purchase of new buses, may actually hinder the long-term efficiency and effectiveness of school transportation. The deferral of new bus purchases is pushing the age of at least 1,900 school buses to the high end of the recommended 12- to 15-year replacement cycle range. Other approaches, such as using technology to improve bus routes, can result in sustainable, long-term efficiencies. These have been implemented by many, but not all, divisions. These approaches may result in efficiencies, if implemented by the divisions that have not already done so. The Virginia Department of Education (VDOE) should serve as a resource on how to fully implement transportation management best practices.

The majority of Virginia's K-12 students (68 percent) rely on buses to transport them safely to and from school. Effective transportation spending helps ensure safe, reliable student transportation. Efficient spending minimizes unnecessary short- and long-term costs, which then allows divisions to allocate a greater percentage of available funds to instruction.

Transportation is the third largest spending area in K-12 education behind instruction and facilities, accounting for about five percent of all K-12 expenditures. School divisions spent about $813 million on transportation in FY 2014. Nearly two-thirds of total student transportation spending in FY 2014—or $521 million—was spent on vehicle operations, which includes compensation for drivers and motor fuels for school buses. Another 17 percent was spent on vehicle maintenance, including the cost of vehicle parts and compensation for maintenance technicians (Table 5-1).

TABLE 5-1
Nearly two-thirds of transportation spending is for operating school buses

Spending area	Spending ($M)	Percent of total transportation spending
Operating expenditures		
Vehicle operations	$520.5	64.0%
Vehicle maintenance	139.7	17.2
Management and direction	51.2	6.3
Student monitoring	50.6	6.2
Purchase and lease of vehicles	35.8	4.4
Other vehicle equipment purchases	0.9	0.1
Subtotal operating expenditures	**$798.8**	**98.2%**
Capital expenditures		
Purchase and lease of vehicles	12.8	1.6
All other capital	2.2	0.3
Subtotal capital expenditures	**$14.9**	**1.8%**
Total	**$813.8**	**100%**

Source: JLARC staff analysis of data from the Virginia Department of Education.

Divisions spent about the same per student on transportation despite rise in fuel costs

In FY 2014, Virginia's school divisions spent $644 per student (median) on transportation, with 80 percent of divisions spending between $400 and $900 per student. Data on per-student spending is of limited value in assessing the efficiency and effectiveness of school transportation spending, because this type of spending depends on the geography and population density of the locality (sidebar). For example, rural divisions generally spend more per student, because they have more annual miles per bus, more bus riders, and more buses (Table 5-2).

Urban, suburban, and rural divisions

JLARC staff used locality land area and population density to categorize divisions as rural, suburban, or urban to better explain how geography influences student transportation.

TABLE 5-2
Rural divisions spend more on transportation than urban and suburban divisions (FY 2014)

Type of division	Transportation $ per student	Average annual miles per bus	Riders as a % of total enrollment	Buses per 100 students
Rural	$775	10,728	71%	3.0
Suburban	662	8,587	69	2.1
Urban	446	7,231	59	1.7
Statewide	**$644**	**9,404**	**67%**	**2.5**

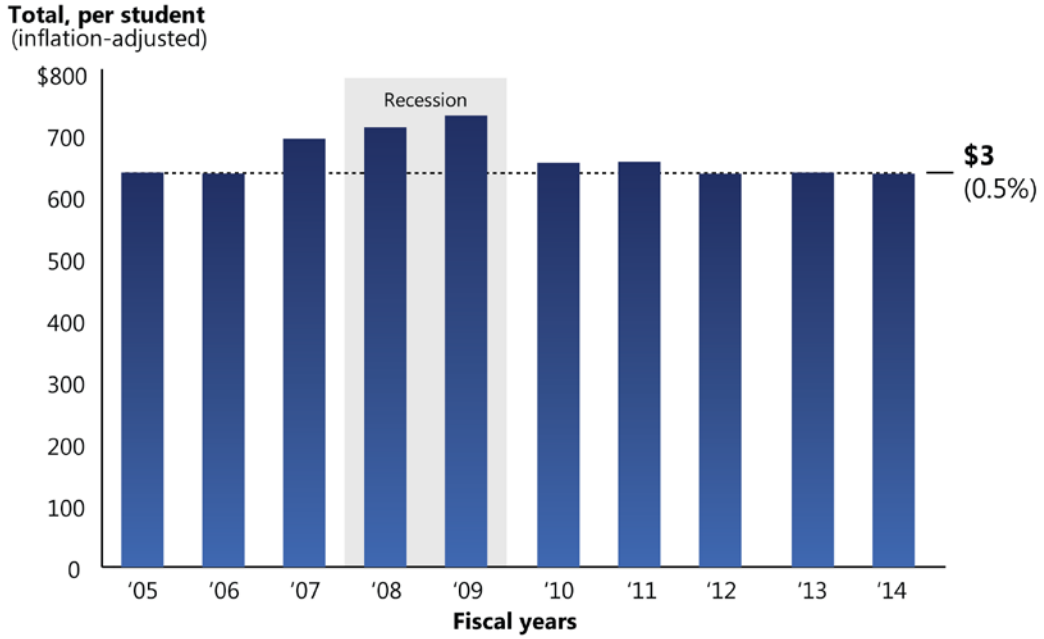
Source: JLARC staff analysis data from the Virginia Department of Education.

Further insight into efficiency can be gained by measuring how transportation spending changes over time. In simple terms, divisions that spend less per student over time could be characterized as becoming more efficient over time. This may not always be the case, though, as deferring maintenance and using older buses tend to be more costly—in other words less efficient—over the long term.

Divisions spent about the same as they did a decade ago on transportation

Adjusted for inflation and student enrollment, Virginia's 132 school divisions collectively spent 0.5 percent less than they did in FY 2005 (Figure 5-1). In nominal terms, total and per-student spending by school divisions to transport K-12 students is higher now than a decade ago. Total spending on student transportation by school divisions increased from $559 million to $799 million, or 43 percent, between FY 2005 and FY 2014.

FIGURE 5-1
Per-student transportation spending kept pace with inflation and enrollment growth



Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars; excludes capital expenditures; per-student spending is calculated as median per-student spending among school divisions in Virginia.

As fuel prices have increased, fuel has become a greater proportion of transportation spending

Increased spending on fuel is the main reason why transportation spending stayed nearly the same in real terms over the course of a decade. The median school division now spends 50 percent more on fuel than it did in FY 2005, adjusted for enrollment and inflation, largely because the cost of diesel fuel increased 92 percent in nominal terms. Statewide, fuel spending has nearly doubled as a proportion of K-12 transportation spending. In FY 2005 fuel spending accounted for 8.8 percent of transportation spending; by FY 2014 it had increased to 14.6 percent.

Reducing transportation spending may have provided temporary savings but hindered long-term efficiency and effectiveness

The relative stability of transportation spending statewide masks the considerable variation in how each division's spending changed. About half of Virginia divisions (63 divisions) now spend less per student on transportation compared to 10 years ago. Divisions that are spending less on transportation may have achieved temporary efficiencies by lowering transportation costs without a significant decline in service. Measures to reduce spending generally involved reducing the number of bus drivers, reducing bus driver salaries, and keeping buses longer. However, many divisions have reported that over the longer term this reduced spending has not been efficient and reduced the quality of the transportation services.

Divisions report that staffing and compensation reductions may hinder recruitment and retention of bus drivers

Nearly 70 percent of the $799 million spent on student transportation in FY 2014—or $557 million—was for salaries and benefits for transportation staff. School divisions employed 17,476 FTE transportation staff statewide in FY 2014. Approximately 85 percent (15,000) are bus drivers.

To manage spending, divisions reduced transportation staffing levels, and salaries and benefits. The average division reduced spending on salaries and benefits by 10 percent between FY 2009 and FY 2014 when accounting for changes to enrollment and inflation. Nearly two-thirds of divisions reduced their numbers of bus drivers per student. Divisions employed two percent fewer bus drivers, eight percent fewer administrative staff, and 22 percent fewer managers and analysts. Sixty-two percent of divisions (65 divisions) responding to the JLARC survey reported eliminating or reducing salary increases, while half reported reducing health insurance or retirement benefits. (See Appendix B for information about the JLARC survey.)

These decreases, according to divisions, have made it more difficult to recruit and retain staff, particularly bus drivers. For half of the divisions interviewed, recruiting

and retaining bus drivers was cited by staff as particularly difficult because of reductions to compensation. Staff of one division remarked, "We have to beg people to drive a bus."

Continued use of older buses may have negative long-term effect on cost and reliability

Deferring the replacement of school buses was widely used to reduce student transportation spending after the recession of 2008-2009. Nearly 80 percent of divisions responding to the survey (82 divisions) reported deferring the scheduled replacement of buses between FY 2009 and FY 2014. Statewide spending on the purchase and lease of new school buses declined substantially following the recession, though spending has increased more recently. Between FY 2009 and FY 2012, spending on new buses declined 29 percent, from $49.2 million to $34.9 million. Spending has increased in more recent years, and at $48.5 million in FY 2014 was near the spending level a decade before.

Although keeping older buses on the road has helped divisions control spending in the short term, it is likely increasing costs over the long term. Maintenance costs rise because older buses are more likely to need repair, and replacement parts often cost more and take more time to acquire. More than half of divisions reported that deferring bus replacements moderately or substantially increased projected long-term transportation costs because they will need to buy more new buses in the future.

Using older buses also increases the likelihood that students are late for school. More than 70 percent of divisions reported that deferring bus replacements had a moderate to substantial negative impact on their ability to provide prompt, reliable student transportation. Division staff reported that older buses require more maintenance and break down with greater frequency.

Deferring bus purchases has yet to measurably reduce student safety, though some divisions are now driving buses older than what industry standards recommend. Three-quarters of divisions reported deferring bus replacements has not yet reduced transportation safety. Industry research states that school buses should be replaced at least every 12 to 15 years. Among the 104 divisions responding to the survey, 16 percent of buses used for daily transportation are more than 15 years old. This equates to at least 1,900 buses at these divisions that are older than 15 years and are at the end of, or beyond, their recommended useful life.

Certain divisions could still achieve relatively moderate improvements in transportation efficiency

Best practices are available to achieve increased short- and long-term efficiencies without hindering effectiveness. Some divisions have not undertaken best practices that have been proven to improve efficiency without increasing long-term costs, or

hindering safety and dependability. Those divisions could achieve relatively modest, but still measurable, improvements in transportation efficiency.

At least 20 divisions do not collect or use data to manage transportation efficiency and effectiveness

Despite the value that performance measurement can provide, some divisions do not routinely collect transportation data and use it to inform their decisions. In fact, 20 divisions responding to the survey reported not using any performance measures for transportation management in the last three years. Within the K-12 transportation sector, performance measures are widely recommended to help school divisions minimize transportation spending by setting goals, tracking progress, and comparing their performance to similar divisions. Measures such as total transportation spending per rider and mile operated, the number of students per bus, and the number of runs per bus per day can help divisions monitor transportation costs and identify opportunities to reduce them.

There is currently no requirement for divisions to collect data about transportation efficiency or use such data to inform decisions. Because K-12 transportation is a locally performed function, it may not be appropriate for the state to mandate collection and use of this performance data. Such data, though, can help school division staff, school board members, and local government staff and officials make more informed decisions. Some smaller divisions may have limited staff capacity to substantially increase the amount of transportation data they collect and analyze.

Most divisions have not maximized transportation technology

Making bus routes more efficient can reduce transportation spending by between two and five percent, according to the results of school efficiency reviews. Despite this potential savings, 40 divisions responding to the survey reported they did not use bus routing software to review their routes in the last three years. Twenty-four divisions reported they did not change bus routes. Seventy-five reported that they did not use GPS bus tracking to monitor driver performance. Just 15 divisions used all three practices of routing software, changing routes, and GPS bus tracking since the 2008-2009 recession. Seventeen divisions did not use any of these practices during that time period; however, some of these divisions may have used these practices before the recession.

Over half of divisions indicated that using these practices lowered their student transportation spending. Sixty-two divisions reported using routing software in the past three years. Divisions also noted the trade-offs that can be associated with changing bus routes. For example, although many divisions had success changing bus routes, some changes required students to walk farther to a bus stop and spend more time on the bus, both of which generated concern among parents.

There is a relatively small potential for further reducing transportation spending by using these efficiency practices. This is primarily because the 62 divisions that already use bus routing software educate about 90 percent of the students among the divisions responding to the survey. Furthermore, some divisions that have not used routing software, changed their routes, or used GPS devices to track buses, may still have routes that are already efficient.

The most commonly cited reason for not using bus routing software was the cost of purchasing it and the annual subscription fees. Currently, school divisions must individually, or cooperatively with other divisions, negotiate with routing software vendors. The state may be able to secure a lower software purchase price by negotiating a statewide contract with one or more vendors. The Virginia Department of Education (VDOE) should collaborate with the Virginia Information Technologies Agency to assess the feasibility of developing a statewide contract for bus routing software.

RECOMMENDATION 4

The Virginia Information Technologies Agency, in cooperation with the Department of Education, should assess the feasibility and potential savings of a statewide contract for school bus routing and monitoring software, and if feasible and likely to produce savings, develop such a contract.

VDOE should help divisions improve transportation management

During interviews, several division staff reported relying primarily on trial and error, "common sense," or past experience in another division to decide whether and how to improve transportation efficiency. Larger divisions and those with more resources typically employ a transportation analyst or have more experienced staff than small divisions and those with fewer resources. During interviews, division staff cited certain strategies, such as un-mirrored bus routing, that could benefit similar divisions in some instances (sidebar).

As with facilities, there are opportunities for additional information sharing across divisions. The General Assembly recently required the Department of Planning and Budget to develop a list of best practices and common recommendations identified in school efficiency reviews. To date, only about one-third of divisions have been reviewed by the program. Nearly 400 recommendations—more than 11 percent of all recommendations—made in efficiency reviews involve transportation. Common types of transportation recommendations include using bus routing software to review and update routes, establishing a bus replacement plan, and developing policies and procedures for bus maintenance. (See Appendix C for more information on the extent to which divisions have implemented recommendations and achieved savings from school efficiency reviews.)

Building a relatively small capability at the Virginia Department of Education would be an efficient way to help divisions more effectively manage their transportation

Un-mirrored bus routing

A driver and their bus have different morning and afternoon routes, allowing them to end their afternoon route and begin their morning route at similar locations. Un-mirrored routes reduce miles traveled by empty buses.

spending. Depending on how division needs evolve, VDOE's capability could be further expanded as necessary over time. Divisions had 38 fewer transportation management and analyst positions in FY 2014 than in FY 2009. Smaller divisions likely lacked sufficient facilities management and analyst staffing prior to FY 2009. Rather than rebuilding this division capacity, it would be more efficient for VDOE to hire up to three staff and leverage their expertise across divisions. Such an approach would also be more effective because these staff could specialize in helping divisions better measure transportation performance and improve bus routing, maintenance, and replacement.

RECOMMENDATION 5

The Virginia Department of Education should provide transportation management expertise to school divisions. The expertise should include guidance and information sharing about transportation management best practices, such as performance measurement, improving bus routing, and bus maintenance and replacement.

RECOMMENDATION 6

The General Assembly may wish to consider appropriating funds for the Virginia Department of Education to employ up to three additional staff to provide guidance and assist school divisions in sharing information about transportation management best practices.

6 Role of Online Learning Programs in Virginia

SUMMARY Online learning is a small but growing part of public K-12 education in Virginia. Online learning programs are provided by the state and most school divisions, primarily as supplemental courses for high school students. Online learning increases access to educational opportunities for students and can be effective for students with strong motivation and time-management skills. The cost of online learning programs is less than physical schools, and cost varies widely depending on the type of program and several other factors. Because there is limited research on the effectiveness and cost of online learning programs in Virginia, the state should use a data-driven, incremental approach to expanding access to fully online programs.

Online learning has some potential to improve the efficiency and effectiveness of K-12 education by reducing costs and providing access to a broader array of educational opportunities, including higher quality teachers and richer course content.

Online courses rely on Internet-related technology and digital course content to allow teachers to educate students who are separated by location and, often, time. A wide variety of courses are provided online for K-12 students including English, foreign languages, health and physical education, mathematics, and Advanced Placement courses. Courses are either synchronous, with a live video lesson with an instructor at a specific time, or asynchronous, using recorded lectures, videos, or other online content. (See Appendix I for examples of K-12 online course content.) A student in an online program may communicate with his or her teacher by email, phone, online instant messaging, or in person. Online courses are commonly conducted through an Internet-based program called a learning management system (LMS). In the LMS, the student can read documents posted by the teacher, listen to lectures, interact with other students on a discussion board, submit written work, take quizzes, and receive tutoring from the instructor.

The amount of time online and the role of the parent or learning coach (see sidebar) varies by grade level. Online learning programs for elementary school students, for example, involve primarily offline learning supervised by a learning coach. In this case, it is the learning coach who interacts with the LMS, following instructions from the online teacher to guide the student through offline activities. In middle school, the student may spend more time in the LMS and less time in offline activities, and the learning coach takes a less active role. By high school, most of the student's learning happens through the LMS, and the learning coach is responsible for recording attendance and troubleshooting technology.

A **learning coach** is an adult, such as a parent, school counselor, or other school personnel, responsible for monitoring online students. A learning coach is responsible for attendance, facilitating contact with the online teacher, and monitoring the student.

Online learning is a small but growing part of K-12 education in Virginia

The online learning programs provided by states, school divisions, and private providers may be offered as supplemental or fully online programs. In supplemental programs, a student is enrolled in one or more online courses but remains a student in a physical school. Supplemental programs typically provide the LMS, course content, and teacher while the student's physical school remains responsible for special education services and student support services such as guidance counseling. In fully online programs, the online school typically is the student's school of record, responsible for all aspects of the student's education, including special education, counseling, and other student support services.

Most online students in Virginia are enrolled in supplemental online programs

In Virginia, both the state and most school divisions offer opportunities for online learning. Some divisions offer online learning through multidivision online providers (see sidebar) and others provide their own programs. The state's supplemental online program, Virtual Virginia, is available to all public high school students and some middle school students. Virtual Virginia is provided through the Virginia Department of Education (VDOE), and funded with general funds. In the 2013-14 school year, Virtual Virginia offered more than 20 Advanced Placement courses, as well as foreign language, economics and personal finance, history, and mathematics courses. WHRO, a public broadcasting station that benefits from a collaboration of 19 public school divisions, supports the online infrastructure by providing the course content. Virtual Virginia teachers are certified to teach in Virginia, though they may live in other states.

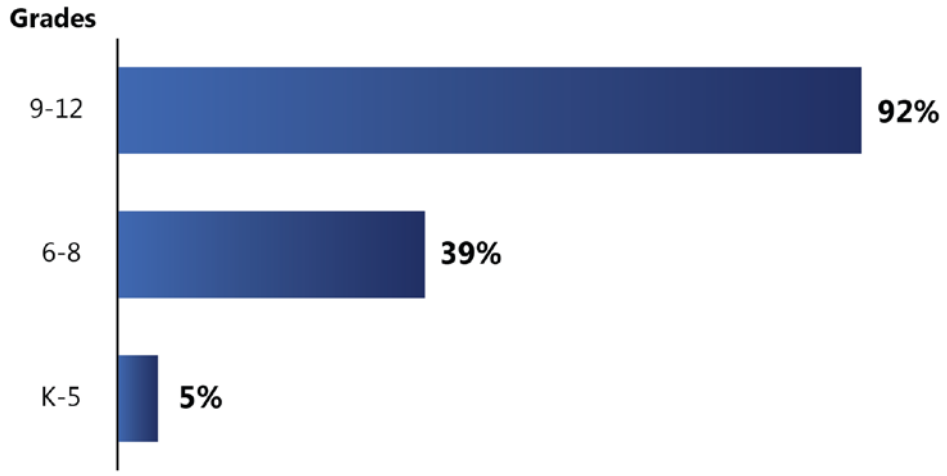
Multidivision online providers

To be approved as a multidivision online provider by VDOE, an online provider must be accredited by one of six approved agencies, submit curriculum for approval before offering a course to students in Virginia, and must use teachers licensed to teach in Virginia. Multidivision online providers may enroll students from multiple divisions in their online learning programs.

In the 2013-14 school year, at least 93 divisions offered supplemental online learning programs. More than 75 percent of divisions responding to the JLARC survey (see Appendix B for more information about the survey) reported offering core courses such as English, mathematics, science, and social studies, while less than half of divisions offer fine arts, foreign language, or health.

More than 90 school divisions reported offering supplemental online learning courses to high school students. Substantially fewer divisions offer online learning at the elementary and middle school levels (Figure 6-1). School divisions and private online learning providers offer a substantially smaller number of online learning courses for K-5 because there is much less demand at these grade levels.

FIGURE 6-1
Most divisions offer supplemental online learning to high school students



Source: JLARC survey of school divisions.
Note: A total of 98 divisions responded to the JLARC survey on online learning, of which 93 offer online learning programs.

The number of online students in Virginia remains very small relative to the total K-12 population. Among school divisions reporting their online enrollment, an average of three percent of a school division's student population enrolled in at least one online class provided through their division in the 2013-14 school year. Similarly, no more than three percent of high school students statewide enrolled in at least one class from Virtual Virginia that same year. This enrollment is comparable to other states with state-supported online learning programs. Virginia is among the top 10 states for online enrollment among high school students in state-operated online learning programs.

Course enrollment vs. number of students enrolled

The number of course enrollments is likely higher than the number of total students.

Students are counted for each course in which they enroll meaning one student enrolled in three courses would count for three course enrollments.

Enrollment in online learning programs in Virginia has increased in recent years. Enrollments in programs operated by private online providers have more than doubled since the 2011-12 school year. The number of course enrollments in Virtual Virginia increased by 27 percent between the 2012-13 and 2013-14 school years, from about 8,000 to about 11,000. Enrollments in Virtual Virginia are likely to continue to increase as all high school students (starting with incoming ninth graders in 2013-14) are now required to complete one online course for graduation, and as Virtual Virginia expands to offer a full-time online virtual high school program.

Few students are enrolled in fully online programs in Virginia

Virginia currently does not have a publicly funded fully online school available statewide to all students in grades K-12. Private providers can receive approval from VDOE to operate as multidivision online learning providers, allowing them to enroll students from multiple school divisions. However, providers must partner with a school division to offer courses, and divisions can limit the number of students re-

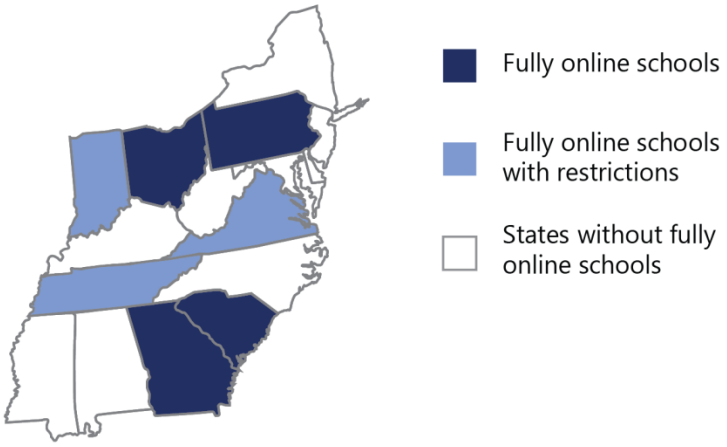
siding outside the division who can enroll in the online program. Through these programs, students in certain grades may complete an entire year or more of school online. However, no program provides a fully online option for grades K-12.

Nationwide, 31 states provide publicly funded fully online schools for K-12 students, though some states have restrictions that limit enrollment under certain circumstances. (See Appendix J for more information about enrollment in other states.) The majority of states neighboring Virginia either do not offer publicly funded fully online schools for K-12 students, or offer them with restrictions (Figure 6-2).

A small number of students in Virginia are enrolled solely in online courses. Statewide, about four percent of online students were enrolled in fully online programs in the 2013-14 school year, which is less than one percent of the total state K-12 population. Nationwide, no state has more than three percent of its K-12 population enrolled in a fully online school. (See Appendix J.)

Two recent initiatives seek to expand access to fully online learning programs in Virginia. The 2015 General Assembly passed HB 324 to create a statewide, fully online school for students in grades K-12. Students enrolling in the online school would no longer be enrolled in a physical school, and would receive all educational services through the online school. A policy board would oversee the school, and private providers approved by VDOE as multidivision online providers would provide all educational services. An enactment clause requires the 2016 General Assembly to reenact HB 324 (2015) before the school is created.

FIGURE 6-2
Few neighboring states offer publicly funded fully online schools for grades K-12



Source: *Keeping Pace with K-12 Digital Learning*, 2014.

In June 2015, VDOE announced plans to begin a fully online high school program as a 100-student pilot project for the 2015-16 school year. This program is part of the Virtual Virginia program, and open only to high school students who enroll with the approval of their high school's guidance department. Students remain enrolled in their physical school and receive their high school diploma from the physical school, but take all their courses through the Virtual Virginia program. The students remain part of the average daily membership count at their school of record; the physical schools are still responsible for providing any student services such as counseling, guidance, and special education, and no funding transfers from the physical school to Virtual Virginia. For the 2015-16 school year, the fully online program will be funded with existing VDOE funding.

Online learning programs increase educational opportunities, but effectiveness varies

The state has a constitutional obligation to ensure that a high quality K-12 education is provided to all students in Virginia. This requirement covers all public schools, including public online learning programs. Online learning programs through Virtual Virginia and private online providers use public funds to offer online learning to Virginia students enrolled in public school.

Online learning programs increase the educational options available to students

Online learning programs provide three primary benefits that, together, make a broader array of educational options available to students. First, online learning better enables students to take the courses they need and want. Sixty-four percent (63 divisions) of divisions responding to the survey noted that online learning programs reduced scheduling conflicts for students by allowing them to take courses at their preferred times. For example, Virtual Virginia offers Advanced Placement courses online, which can be especially helpful to students whose division offers these courses only once a day in their physical schools. A majority of divisions indicated that online courses also increase student access to electives, such as Advanced Placement and foreign languages courses, and very focused or advanced courses that attract small numbers of students. Online learning programs are particularly beneficial for students in divisions that lack the resources to provide a broad range of courses. Students in these divisions have access to courses otherwise not available, and the division avoids the cost of a teacher and physical classroom space.

Second, online learning programs may be beneficial for students who struggle academically in physical schools. About one quarter of divisions reported the potential to improve graduation rates or credit recovery as a benefit of online learning programs. Divisions commented that online learning helped more students graduate, even those who had failed classes or been suspended or expelled from their physical

school. The literature similarly states that online learning can expand access to learning for students who need remedial help or additional time to complete a course.

Third, online coursework may be the only feasible educational setting for students who are unable to attend physical school. Students who are homebound due to illness, are involved in intensive athletic or professional pursuits, are bullied, or have behavioral or other issues, may not be able to attend physical schools. In the JLARC survey, seven divisions noted that online learning allowed them to provide services to students who have been suspended or expelled or are otherwise unable to attend physical school. One private provider said online programs can be helpful for military families, allowing their children stay in one school program while families move around.

Insufficient research to determine if online learning is more or less effective than physical schools

Research comparing the effectiveness of online and in-person instruction is limited and inconclusive, both nationally and in Virginia. The U.S. Department of Education found "few rigorous research studies on the effectiveness of online learning for K-12 students." Research on the effectiveness of online learning has primarily focused on its use in higher education (see sidebar). Most research does not control for student characteristics, such as family income, race, disability status, or past academic performance, when comparing online and in-person instruction. This makes it difficult to determine if the differences between online and in-person performance are related to student characteristics or program characteristics.

***Review of Academic Spending and Workload at Virginia's Public Higher Education Institutions* (JLARC, 2013)**

JLARC staff reported that the literature on the effectiveness of online programs in higher education has many limitations, and that research into online learning is an emerging field.

Two recent studies, one of Florida Virtual School (FLVS) and one of online learning in Kansas, suggest that online instruction might be as effective as in-person instruction. However, the studies could not determine whether differences in student achievement between online and in-person instruction are related to characteristics of the online student population, such as socioeconomic status, or the learning program itself. Additional research on the effectiveness of online learning programs with a variety of student populations may help guide statewide fully online schools.

In Virginia, there has been little analysis of student achievement in online learning programs, or how outcomes in online courses compare to physical, in-person courses. Both Virtual Virginia and private provider-run online learning programs report the number of students enrolled and the number of students who completed or passed their courses. However, demographic and other information on students is maintained by the student's local school division and neither Virtual Virginia nor the private providers analyze this data.

Success of online learning depends on student and program characteristics

Although the research literature on online learning is still developing, school divisions cited two primary factors influencing a student's success in online courses: motivation to learn and time management skills. In interviews with JLARC staff, private online providers noted that students who lack motivation, discipline, or the ability to self-pace tend to have difficulty with the online environment. The research literature similarly highlights the importance of student motivation, time management, and ability to set goals. Compared to students in physical schools, students in online courses have more independence and less oversight when completing their coursework.

In Virginia, 64 percent of divisions responding to the survey said the greatest challenge with online learning programs was students not completing the course. Completion rates vary in online courses. In the 2013-14 school year, Virtual Virginia had completion rates of 100 percent in some courses, and a low rate of 62 percent in another. A learning coach or virtual teacher can answer questions and help students with time management but cannot necessarily provide a sense of connection. Students who feel disconnected may stop coursework without dropping the course.

To help students be successful in online courses, educational experts and practitioners recommend providing all online students a learning coach to monitor the student's progress, provide technical assistance, and act as an intermediary between the student and teacher. Students with poor motivation or time management skills, or students who struggle academically, may need more attention from the instructor or other instructional staff. Additionally, students who have poor time management skills or insufficient motivation may find it difficult to progress through the course. These students may benefit from a physical "drop-in" center where they can work with a tutor, or from taking online courses at computer labs where teachers are available.

Cost of online learning programs is less than cost of physical schools

Because online learning programs remain relatively new to K-12 education, information on the cost of these programs is scarce. Fully online schools are generally operated by private vendors, and the cost to vendors of operating such schools has not been widely examined by states or researchers. Some insight into the cost of fully online schools can be gained from a review of the funding that states and school divisions provide for these programs.

The cost of online learning programs is less than physical schools. An industry research group representing online providers argues that funding for fully online schools should be slightly less than funding for physical schools. In addition, the actual level of funding provided by other states for fully online schools suggests that

the cost of fully online schools is less than physical schools. A majority of other states with fully online schools fund these schools at approximately two-thirds of funding provided for physical schools. States generally fund online learning programs based on the cost of physical schools, rather than the cost to online learning providers of operating programs.

The cost to the state of online learning programs varies, depending primarily on the overall level of service provided. Compared to supplemental online programs, the cost of fully online schools is generally higher because these schools must provide the full slate of educational services for students, including support services such as guidance counselors, school psychologists, and services for special education students. (The 2014 General Assembly passed HB 1086, which required local school boards to provide special education services for each student with a disability who attends a fully online school in the school division but resides in another division in Virginia.) Supplemental online programs generally provide the teacher, course content, and learning management system, but the student's physical school continues to provide support services. The cost of online learning programs varies depending on a wide range of other factors, including the number of students enrolled with the program, the student-teacher ratio, and teacher compensation levels.

State should continue cautious progress toward fully online learning

Virtual Virginia's inclusion of a fully online high school program and HB 324 (2015)—if reapproved by the 2016 General Assembly—will provide useful test cases for whether and to what extent fully online virtual learning is sound education policy. Given the minimal information about online learning's cost and effectiveness, the state can use the growth in fully online programs to better understand the students who are likely to benefit from such programs and how they should be funded.

State should develop resources to assist with individual decisions about fully online learning

Resources that allow students, parents, and guidance counselors to discuss the online learning environment and set realistic expectations will help students determine if a fully online school is a good fit. Many online higher education programs provide a list of expectations for the online environment and encourage students to complete a self-assessment about time management, problem solving, and technical capabilities, to help them decide whether to enroll in an online course.

Guidance counselors and parents of K-12 students can use these same tools when considering the potential benefits and challenges of a fully online school. In Virginia, three divisions active in online learning, and WHRO, which provides course content for divisions and Virtual Virginia, provide an orientation for students enrolled in online learning. The orientation is an opportunity for students and parents and guid-

ance counselors to meet with program administrators to discuss online learning. In one division, students can read a fact sheet titled, "What's it like to be in an online class" and complete a demonstration course before enrolling. Similarly, WHRO offers a short online qualifier course for students to try before enrolling in full-length courses. These resources allow students to make informed decisions before enrolling in a fully online school, and may reduce the number of students who drop out of or fail to complete online learning programs.

As the state expands access to fully online learning programs, particularly if HB 324 (2015) is re-enacted by the 2016 General Assembly, VDOE should ensure that parents of students who are interested in any state-administered fully online learning program have access to the same, or similar, resources to help decide whether their child is a good candidate for a fully online school.

RECOMMENDATION 7

The Virginia Department of Education should collaborate with the board and/or staff for any statewide fully online school created in Virginia to develop (or obtain) and distribute informational materials that help families and guidance counselors to make informed decisions about enrolling children in fully online schools.

State should develop a methodology to better estimate the cost of fully online learning

As the state expands access to fully online learning programs, it should develop a methodology for estimating the per-student cost of operating these programs. Without such a methodology, there is substantial risk that funding for a statewide fully online school would be too high, costing the state more than necessary, or too low, limiting the ability of private providers to offer the educational services students need to succeed in an online setting. Physical schools receive state funding through the Standards of Quality (SOQ) formula, which is based on the cost of meeting the SOQs. Under HB 324, the funding method for a fully online school is based on the costs of physical schools rather than the actual costs to private providers. However, the services and costs of online learning programs differ from those of physical schools. For example, online learning programs do not require large facilities or robust transportation programs.

In developing a methodology for estimating the cost of fully online learning programs, VDOE staff should

- develop cost estimates for different tiers of service levels for different student populations, including students with disabilities or living in poverty;
- collaborate with the board and staff of all publicly funded statewide fully online schools that are created in Virginia;

- work with private online providers to estimate their costs of operating fully online programs; and
- include a process for periodically re-benchmarking the methodology to reflect changes in the cost of programs due to inflation.

VDOE would likely need one-time, additional funding for a single fiscal year to develop a methodology for estimating the cost of fully online programs.

RECOMMENDATION 8

The Virginia Department of Education should develop a methodology for estimating the cost of fully online learning programs.

State should conduct ongoing analysis of student outcomes in online programs compared to physical schools

As the state expands into fully online virtual schools, the state should routinely evaluate the student achievement of online students compared to students in physical schools, controlling for student characteristics that can influence achievement outcomes. Because so little analysis has been done, it is not clear which types of students in fully online programs perform as well as or better than in physical schools, which types of students perform worse than in physical schools, and how additional support services could improve the performance of these students. To minimize the risk of funding programs that do not support learning as well as physical schools, the state should use the information gained by expanding into fully online learning to better understand which types of students can perform equally well or better in a fully online school.

To facilitate a meaningful comparison of student outcomes in online and physical schools over time, VDOE should use its data on the past academic performance of students and their characteristics, such as disability and limited English proficiency status, eligibility for free or reduced price lunch programs, race, and gender.

In using this information to compare the achievement of online students with students in physical schools, VDOE should conduct at least three types of analysis of students enrolling in fully online Virtual Virginia courses. The department should examine

- whether certain types of students perform better or worse in an online setting,
- whether online students perform better or worse in certain types of courses, and
- whether additional support services for lower performing online students improves their performance.

VDOE could measure student achievement using a wide range of measures, including scores on SOL and college aptitude tests as well as high school graduation rates. In conducting this analysis, VDOE should control for student characteristics such as disability, LEP status, race, and gender, so that useful comparisons can be developed over time.

RECOMMENDATION 9

The Virginia Department of Education should annually compare the achievement of students enrolled in Virtual Virginia courses to students of the same characteristics in physical schools, and report these findings to the Board of Education annually.

VDOE should ensure that enrollment in the fully online program of Virtual Virginia is available to students at higher and lower levels of academic achievement. By limiting enrollment to higher performing students, the state would lose the opportunity to better understand how fully online programs can be designed to support learning for students who lack motivation, time-management skills, or experience with academic success. As noted above, these students may benefit from a physical "drop-in" center where they can receive in-person tutoring or take an online course with a physical teacher present. Limiting enrollment to higher performing students would also make it more difficult to compare the achievement of online students with students in physical schools. VDOE should make it clear to guidance counselors in school divisions that students should not be screened out of the fully online program solely due to poor academic performance. If there are more interested students than available spaces in the fully online program, VDOE should use a lottery to randomly select students for the program.

Appendix A: Study Mandates

2013 Study Mandate

SENATE JOINT RESOLUTION NO. 328

Directing the Joint Legislative Audit and Review Commission to study the efficiency and effectiveness of elementary and secondary school spending in Virginia.

Agreed to by the Senate, February 19, 2013
Agreed to by the House of Delegates, February 15, 2013

WHEREAS, the Commonwealth should express a strong commitment to all students who attend public schools in our Commonwealth in order to ensure that they receive an educational opportunity of high quality and a program that is continually maintained; and

WHEREAS, if Virginia is to continue offering a promising future, students must have a meaningful opportunity to learn the knowledge and skills necessary to meet the Standards of Learning objectives, to attend a fully accredited school, to graduate with at least a standard diploma, and to be ready for college and careers in this knowledge-based global economy; and

WHEREAS, the Constitution of Virginia states: "The General Assembly shall provide for a system of free public elementary and secondary schools for all children of school age throughout the Commonwealth, and shall seek to ensure that an educational program of high quality is established and continually maintained"; and

WHEREAS, the Constitution of Virginia also states: "The General Assembly shall determine the manner in which funds are to be provided for the cost of maintaining an educational program meeting the prescribed standards of quality, and shall provide for the apportionment of the cost of such program between the Commonwealth and the local units of government comprising such school divisions"; and

WHEREAS, our schools are meeting the challenges of revised graduation requirements, more rigorous Standards of Learning tests, and increased accreditation requirements; and

WHEREAS, many revisions to the Standards of Quality funding formula have been made by the General Assembly since the 2001 Joint Legislative Audit and Review Commission study; and

WHEREAS, since 2005, Virginia has conducted School Efficiency Reviews to identify savings through best practices and operational improvements that could be used in the classroom to more directly benefit Virginia's children; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Joint Legislative Audit and Review Commission be directed to study the efficiency and effectiveness of elementary and secondary school spending in Virginia. The Joint Legislative Audit and Review Commission shall (i) study the efficiency and effectiveness of elementary and secondary school spending in Virginia, including evaluating the findings from School Efficiency Reviews and assessing the extent to which recommendations have been implemented; (ii) compare to other states how and to what extent Vir-

ginia funds elementary and secondary education; and (iii) identify opportunities to improve the quality of education students receive in consideration of the funds spent.

Technical assistance shall be provided to the Joint Legislative Audit and Review Commission by the Department of Education. All agencies of the Commonwealth shall provide assistance to the Joint Legislative Audit and Review Commission for this study, upon request.

The Joint Legislative Audit and Review Commission shall complete its meetings for the first year by November 30, 2014, and for the second year by November 30, 2015, and the Chairman shall submit to the Division of Legislative Automated Systems an executive summary of its findings and recommendations no later than the first day of the next Regular Session of the General Assembly for each year. Each executive summary shall state whether the Joint Legislative Audit and Review Commission intends to submit to the General Assembly and the Governor a report of its findings and recommendations for publication as a House or Senate document. The executive summaries and reports shall be submitted as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents and reports and shall be posted on the General Assembly's website.

2014 Study Mandate

2014 Special Session I
Virginia Acts of Assembly
Chapter 3

Approved November 14, 2014

Item #30 G. 1. As a component of the review for efficiency and effectiveness of public education spending in Virginia, pursuant to Senate Joint Resolution 328 from the 2013 Session of the General Assembly, JLARC shall examine and include virtual instruction. The review of virtual instruction and spending may include, but not be limited to, (i) virtual options used in Virginia and other states and the rate of growth of the virtual school populations; (ii) the cost of virtual K-12 schooling for part-time and full-time enrollments, particularly in relation to the cost of conventional 'brick-and-mortar' education; and, (iii) the effectiveness of virtual schooling in terms of student academic achievement outcomes on assessment tests and course completion or graduation rates.

2. The Department of Education and local school divisions shall cooperate as requested by JLARC. All agencies of the Commonwealth shall provide assistance for this study, upon request.

Appendix B: Research Activities and Methods

JLARC staff conducted the following primary research activities:

- quantitative analysis of school division spending, staffing, and enrollment changes from FY 2005 to FY 2014;
- survey of school division staff regarding spending and operations for instruction, facilities, transportation, and online learning programs;
- structured phone interviews with staff at school divisions, state agencies, and online learning providers, education experts, and K-12 education stakeholders in Virginia; and
- review of research literature and documents.

Quantitative analysis

JLARC staff analyzed data from a variety of sources to assess changes in K-12 division spending over time. To compare Virginia to other states, JLARC staff accessed staffing data from the National Center for Education Statistics (NCES). Other states spending data came from the US Census bureau, specifically from Public Elementary–Secondary Education Finance Database. Student performance data is based on graduation rates, Advanced Placement (AP) test performance, and scores on the National Assessment of Education Progress. In addition, JLARC staff collected data on Virginia spending and achievement from VDOE and the Annual School Report Financial Section (ASRFIN). Furthermore, VDOE provided information on online learning programs, including data from the parent satisfaction survey, enrollment and student performance in Virtual Virginia, and enrollment in multidivision online providers as reported in the Board of Education annual report.

K-12 spending, staffing, funding, and student achievement in Virginia compared to other states (Chapter 1)

JLARC staff used two national data sources to compare K-12 spending, staffing, and funding in Virginia to other states nationally and regionally. First, staff used data from the U.S. Census Bureau's Public Elementary–Secondary Education Finance Database to compare spending and funding levels in Virginia with other states. Second, staff used data from the Elementary/Secondary Information System managed by NCES to compare K-12 staffing levels in Virginia and other states.

JLARC staff used three data sources to compare student achievement in Virginia and other states:

- the National Assessment for Educational Progress from NCES,
- the U.S. Department of Education's Public High School 4-year adjusted cohort graduation rate, and
- the College Board's Advanced Placement data.

All national and regional comparisons were based on data from FY 2013, the most recent year for which data was available.

To compare Virginia to other states in the region, JLARC staff used the Southern Regional Education Board, which consists of 16 states in the mid-Atlantic and southeastern regions: Alabama, Ar-

kansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

Virginia school division revenue analysis (Chapter 1)

JLARC staff used ASRFIN data from FY 2005 to FY 2014 to examine revenue sources for Virginia school divisions. Revenue is reported for Federal, state, and local sources. Total revenue from each source and the percentage of revenue from each source was calculated for each year. The percentage of revenue from each source was compared across years to examine how the mix of revenue streams have changed over time.

Virginia K-12 spending, staffing, and student demographic analysis (Chapters 1-5)

To analyze changes in school division spending and staffing over the last decade, JLARC staff used ASRFIN data from VDOE. Staff analyzed total spending and staffing levels statewide and by division from FY 2005 through FY 2014, the most recent year for which data was available. Staff also conducted a more in-depth analysis of spending and staffing in three spending categories: (i) instruction, (ii) student transportation, and (iii) facilities operations, maintenance, construction, and renovation. Together, these three spending categories comprise nearly 90 percent of total spending by school divisions. Within these categories, JLARC staff analyzed spending data for salaries and benefits, purchased services, and materials and supplies such as computers, textbooks, and parts for facilities and school buses.

To determine statewide spending and staffing levels, JLARC staff calculated the median across the 132 school divisions. Using the median gave equal weight to each division, providing a more accurate measure of statewide spending and staffing levels across divisions of widely varying size. This method was preferred to calculating a weighted average, which would have weighted divisions based on their enrollment and given larger divisions such as Fairfax County more influence over the calculation.

JLARC staff analyzed spending and staffing levels on an inflation-adjusted, per-student basis. Staff adjusted spending data for inflation to control for changes in the purchasing power of expenditures over time. Staff used a price deflator from the U.S. Bureau of Economic Analysis developed specifically for expenditures and investments by government. The January 1 implicit price deflator was used for each fiscal year. JLARC staff analyzed spending and staffing levels on a per-student basis to control for differences in enrollment over time and across divisions. In analyzing staffing data, JLARC staff used the descriptions of staffing categories in the ASRFIN data and feedback from VDOE staff to accurately identify staffing categories. For example, using this approach, "vehicle operators" in the student transportation functional area were identified as "bus drivers".

To assess changes in Virginia's K-12 student population over the last decade, JLARC staff analyzed school division enrollment data from VDOE for school years 2004-05 through 2014-15. For each year, staff calculated the percentage of enrolled students living in poverty and the percentage with limited English proficiency in each school division. (VDOE data did not indicate the number of students in more than one of these categories.) The number of students living in poverty is reported by divisions based on the number of students qualifying for free or reduced price lunch through the National School Lunch Program.

Teacher salary and instructional spending analysis (Chapter 3 and Appendix G)

JLARC staff used salary data from the Virginia Retirement System (VRS) and teacher licensure data from VDOE to examine annual salaries for classroom teachers and changes in salary levels over time. VRS data included salary data and years of experience for all teachers who were active members of VRS in 2014. VDOE licensure data provided licensure and education level of all teachers licensed with the state. The two datasets were combined to examine the salaries of classroom teachers, focusing on classroom "teachers of record"; that is, teachers responsible for instructional content and grading.

JLARC staff analyzed factors that correlate with instructional spending levels. Based on this analysis, staff created peer groups of similar divisions based on the two factors that most highly correlate with divisions' instructional spending: a locality's average income, from the Bureau of Labor Statistic's National Occupational Employment and Wage Estimates database; and a locality's population density, from the Weldon Cooper Center for Public Service. These peer groups were then used to better understand how divisions differed in their instructional spending and staffing levels.

Other transportation and facilities data (Chapters 4-5)

To supplement analysis of ASRFIN spending and staffing data, JLARC staff analyzed VDOE data on K-12 facilities and student transportation operations. Staff used the School Building Inventory to determine the number of school facilities by division and the age of those facilities. Staff used the Transportation Finance Summary from VDOE to analyze bus ridership rates, number of buses, total bus mileage, and number of special needs students receiving transportation for each division.

Online learning (Chapter 6)

JLARC staff analyzed data from VDOE, including student enrollment and performance in Virtual Virginia, VDOE's parent satisfaction survey for parents of online learning students, and Virginia Board of Education annual reports containing enrollment information from multidivision online providers. With the Virtual Virginia data, JLARC staff determined the pass rates for students enrolled in Virtual Virginia programs since 2011. JLARC staff also determined the change in enrollment in Virtual Virginia and private provider programs since 2011 and 2012, respectively.

Survey of school divisions

JLARC staff surveyed division-level staff in Virginia's 132 school divisions to gain further insight into the efficiency and effectiveness of K-12 spending. The survey addressed four areas of school division spending: instruction, facilities, student transportation, and online learning. The instruction, facilities, and transportation sections of the survey asked divisions about approaches used to reduce spending in response to a decline in total funding after the 2008-2009 recession, and the impact of spending reductions on instructional and non-instructional services. Divisions were also asked about their use of recommended practices for minimizing the cost of services without adversely affecting quality.

The online learning section of the survey asked school divisions to provide information about any online learning programs they offer, including the grades and subjects in which online courses are available, and the number of students enrolled in online learning programs during the 2013-14 school year. Finally, the survey asked divisions about the benefits and challenges of online learning

programs, including the factors that most influence student achievement in online courses, and the potential for online programs to support learning and reduce the cost of K-12 education.

A total of 90 school divisions completed all four sections of the survey for a 68 percent response rate (Table B-1). An additional 19 divisions completed at least one section of the survey, which means that 82 percent of divisions completed at least one survey section. Response rates for individual sections ranged from 75 to 80 percent.

TABLE B-1
Response rates for JLARC staff survey sections

Survey section	# of divisions responding	% of divisions responding
Student transportation	105	79.5
Instruction	104	78.8
Facilities	100	75.8
Online learning	99	75.0
All sections	**90**	**68.0**

Structured interviews

Structured interviews were a key research method used by JLARC staff in conducting research for this report. Staff conducted structured interviews with school divisions, state agency staff, K-12 education stakeholders and experts, and online learning providers in Virginia, and other states with online learning programs. In total, JLARC staff conducted more than 50 structured interviews throughout the project.

Structured interviews of staff in Virginia's public school divisions

JLARC staff conducted structured phone interviews with division-level staff in 27 Virginia school divisions (Exhibit B-1). Interviews with school divisions were used for four primary purposes:

- gather background information on K-12 spending and operations, including to help guide survey questions
- examine the factors influencing spending on instruction, facilities, and transportation, including why some divisions spend more or less than others
- better understand how changes in spending since the 2008-09 recession have impacted the efficiency and effectiveness of K-12 spending
- identify practices school divisions are using to improve the efficiency of their expenditures

More broadly, these interviews allowed JLARC staff to collect qualitative information and opinions from school divisions to supplement quantitative analysis and survey results.

To ensure a range of perspectives from school divisions, JLARC staff selected divisions with varying spending and enrollment levels and from differing geographic regions.

Exhibit B-1
School divisions interviewed by JLARC staff

Albemarle	Charlottesville	Henrico	Orange
Appomattox	Chesapeake	Loudoun	Poquoson
Arlington	Chesterfield	Lynchburg	Prince William
Bristol	Culpepper	Mecklenburg	Richmond City
Brunswick	Fairfax	Newport News	Russell
Campbell	Goochland	Norfolk	Virginia Beach
Caroline	Hampton	Montgomery	Westmoreland

Structured interviews of state agency staff

JLARC staff conducted structured interviews with four state agencies. VDOE staff were interviewed on a range of topics, including trends in K-12 spending over the last decade, online learning programs in Virginia, and the availability of various types of data. JLARC staff interviewed staff with the Virginia Department of Planning and Budget (DPB) to better understand the school efficiency review program and identify opportunities for improving the efficiency of divisions. Finally, JLARC staff interviewed staff with the Virginia Department of Human Resource Management regarding the option of allowing school division employees to participate in the state employee health plan.

Structured interviews of K-12 education stakeholders and experts

To better understand the perspectives of school divisions, JLARC staff interviewed the following K-12 education stakeholders:

- Virginia Municipal League,
- Virginia Association of Counties,
- Virginia Association of School Superintendents,
- Virginia Education Association,
- Virginia School Board Association, and
- Virginia Public Education Coalition.

JLARC staff interviewed staff from the Commonwealth Educational Policy Institute through Virginia Commonwealth University to explore alternative methods of evaluating the efficiency and effectiveness of K-12 spending. In addition, JLARC staff interviewed an academic researcher in K-12 online learning to better understand trends in K-12 online learning and the state of the research literature on online learning programs.

Structured interviews of online learning providers and other state staff

JLARC staff also conducted phone interviews with six online learning providers in Virginia. Staff used these interviews to better understand

- the educational services provided through online learning programs,
- the cost of operating these programs,
- the factors influencing student achievement in online courses, and
- the benefits and challenges of online learning for K-12 students.

JLARC staff also conducted interviews with staff at Florida Virtual School (FLVS) and the State Charter School Commission of Georgia. FLVS was selected because it is one of the largest and oldest state-run online learning programs in the U.S. These interviews were conducted to obtain information on state funding methods for online learning programs, support systems in place for students, the effectiveness of online learning programs compared to in-person schools, and the use of orientation and evaluation programs for students. Georgia was selected to better understand its funding model, and to gain further insight into the state costs of online learning programs.

Review of research literature and documents

Throughout the study, JLARC staff conducted extensive reviews of the research literature. Staff reviewed the literature to identify cost-effective instructional strategies. Topics addressed in this review included the effects of teacher experience and teacher certification level, the impact of class size on student achievement, the use of pay and bonuses to improve teacher recruitment and retention, and strategies for improving teacher quality. JLARC staff also reviewed the research literature to identify recommended practices for efficient facilities and transportation operations.

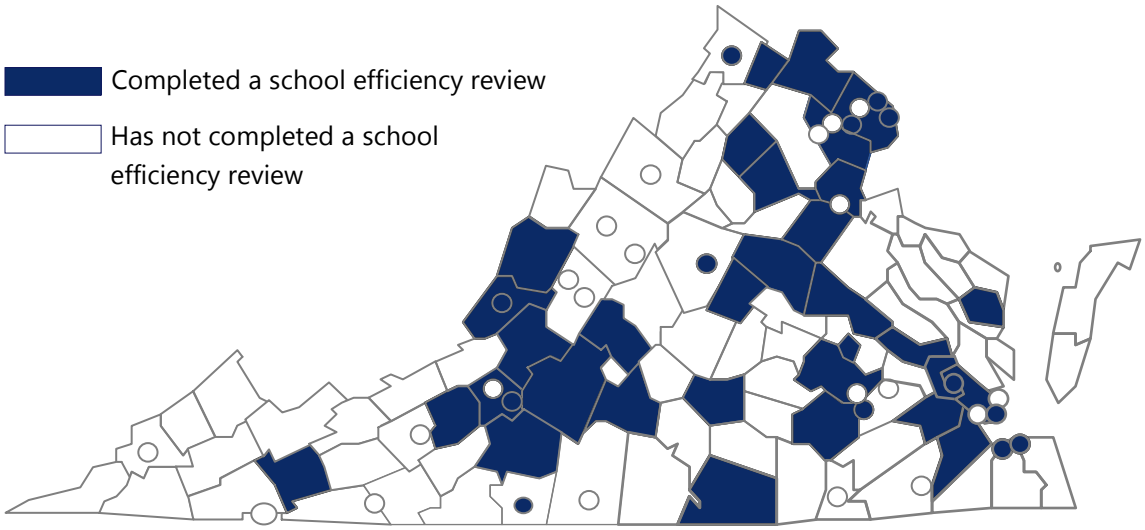
JLARC staff reviewed the research literature on various aspects of online learning programs. Because peer-reviewed literature on online learning for K-12 students is relatively limited, staff included state-based reviews and industry-supported research in its review. The literature review covered a variety of K-12 online learning topics, including the effectiveness of online programs, the benefits and challenges of online learning, trends in the field, and the cost of online learning programs compared to physical schools.

JLARC staff reviewed findings and recommendations from the 41 school efficiency reviews provided by DPB staff. JLARC staff looked at the guidance and oversight DPB provided to the consultants, and compared the results of the SERs across all 41 divisions to determine any trends. In addition, JLARC staff conducted a savings analysis based on annual savings and five year savings data provided by DPB.

Appendix C: Virginia School Efficiency Reviews

Forty-three school divisions, or slightly less than one-third of divisions, have completed school efficiency reviews since the School Efficiency Review Program was created in 2004 (Figure C-1). Most of these divisions are in Northern Virginia, Central Virginia, and Hampton Roads. The 43 divisions represent almost 60 percent of Virginia's K-12 students, and include six of the 10 largest divisions in the state. A more limited number of divisions in Southwest Virginia, Southside Virginia, and the Shenandoah area have completed reviews.

FIGURE C-1
School divisions completing school efficiency reviews



Source: JLARC staff analysis of information from the Virginia Department of Planning and Budget.

A total of 3,377 recommendations have been made to improve the efficiency of school divisions through school efficiency reviews. More than half of the recommendations have been in the areas of financial management, division administration, education service delivery, and human resources (Table C-1). Slightly smaller numbers of recommendations have been in technology management and food services.

TABLE C-1
Recommendations made through school efficiency reviews

Category	Description of category	Number of recommendations	Percent of total recommendations
Financial management	Planning and budgeting, financial performance, contracting process	619	18.3%
Educational service delivery	School administration, curriculum management, special programming	494	14.6
Division administration	Division management, planning, evaluation	435	12.9
Human resources	Recruitment, hiring, retention, staff development, compensation system	426	12.6
Transportation	Routing, scheduling, training safety, vehicle maintenance and replacement	386	11.4
Facilities	Maintenance and custodial operations, energy management	367	10.9
Technology management	Technology infrastructure, inventory, support, policies and procedures	326	9.7
Food services	Management and operations, purchasing, warehousing, contracting	281	8.3
Shared Services	Service delivery shared with local government or other school divisions	43	1.3
Total		**3,377**	**100%**

Source: JLARC staff analysis of information collected from Department of Planning and Budget.
Note: Most categories also include a review of organization and staffing. Purchasing, and special education services were separate categories but are now a part of the other categories listed.

According to staff with the Virginia Department of Planning and Budget (DPB), recommendations in educational service delivery, facilities, and food service account for nearly all of the average annual savings school divisions will realize from school efficiency reviews (Table C-2). DPB staff report that, with the exception of shared services, more than 85 percent of recommendations in each category have been or are being implemented.

While recommendations from school efficiency reviews are designed to improve the long-term efficiency of school divisions, many recommendations require additional spending in the short term. Recommendations implemented or being implemented in the areas of human resources, transportation, and technology management carry one-time or annual costs that exceed estimated annual savings (Table C-2). These recommendations represent an annual average cost of $2.6 million. A common example of a recommendation that improves long-term efficiency but increases short-term spending is establishing a bus replacement plan. There will likely be staffing costs to developing the plan, but the plan can improve long-term efficiency by ensuring that buses are replaced at the end of their useful life.

TABLE C-2
Estimated savings and implementation rate for recommendations made through school efficiency reviews

Category	Estimated savings from implemented recommendations ($ millions)	Percent of recommendations implemented
Educational service delivery	$17.8	96%
Facilities	12.7	91
Food service	8.8	92
Financial management	3.9	92
Special education	0.670	9
Shared services	0.539	50
Divisional administration	0.203	90
Purchasing	0.124	94
Human resources	−1.7	93
Transportation	−2.6	86
Technology management	−2.9	94
Total	**$37.6**	--

Source: JLARC staff analysis of information collected from Department of Planning and Budget.
Note: Implemented recommendations are complete, or in the process of being completed. Estimated savings may not add due to rounding.

Appendix D: Virginia K-12 Education Compared to Other States

This appendix provides information on how Virginia compares to other states in spending, staffing, and student achievement in K-12 education. Virginia's total K-12 spending per student is near the middle of other states nationally (Table D-1). Many of the states that spend more than Virginia are located in the Northeast region of the U.S. Virginia ranks fourth regionally for total K-12 spending per student. Only Delaware, Maryland, and West Virginia spend more than Virginia in the Mid-Atlantic and Southeast region.

TABLE D-1
Total K-12 spending per student in Virginia compared to other states (FY 2013)

State	Total spending per student	National rank
New York	$19,818	1
Alaska	18,175	2
District of Columbia	17,953	3
New Jersey	17,572	4
Connecticut	16,631	5
Vermont	16,377	6
Wyoming	15,700	7
Massachusetts	14,515	8
Rhode Island	14,415	9
Pennsylvania	13,864	10
Delaware	13,833	11
Maryland	13,829	12
New Hampshire	13,721	13
Illinois	12,288	14
Maine	12,147	15
North Dakota	11,980	16
Hawaii	11,823	17
Nebraska	11,579	18
Ohio	11,197	19
West Virginia	11,132	20
Minnesota	11,089	21
Wisconsin	11,071	22
Virginia	**10,960**	**23**
Michigan	10,948	24
Montana	10,625	25
Louisiana	10,490	26
Iowa	10,313	27
Kansas	9,828	28
Washington	9,672	29

State	Total spending per student	National rank
Missouri	9,597	30
Indiana	9,566	31
Oregon	9,543	32
South Carolina	9,514	33
Arkansas	9,394	34
Kentucky	9,316	35
California	9,220	36
Georgia	9,099	37
New Mexico	9,012	38
Alabama	8,755	39
Colorado	8,647	40
South Dakota	8,470	41
Florida	8,433	42
North Carolina	8,390	43
Nevada	8,339	44
Texas	8,299	45
Tennessee	8,208	46
Mississippi	8,130	47
Oklahoma	7,672	48
Arizona	7,208	49
Idaho	6,791	50
Utah	6,555	51

Source: JLARC staff analysis of U.S. Census data.
Note: Operational spending only.

In FY 2013, Virginia ranked near the middle of other states nationally in per-student spending for instructional and student support services (Table D-2). Regionally, Virginia's per-student spending on instructional and student support services ranked near the top. Virginia ranked near the top, nationally and regionally, in per-student spending on staff support services.

TABLE D-2
Instructional and support services spending in Virginia compared to other states (FY 2013)

Spending category	National rank	Regional rank (of 16 states)
Instructional spending per student	20	3
Student support services spending per student	27	6
Staff support services spending per student	9	3

Source: JLARC staff analysis of U.S. Census data.
Note: Higher ranking for spending indicates higher dollar amount per student. National rankings include Washington D.C. Regional rankings based on states in the Southern Regional Education Board.

TABLE D-3
Instructional staffing in Virginia compared to other states (FY 2013)

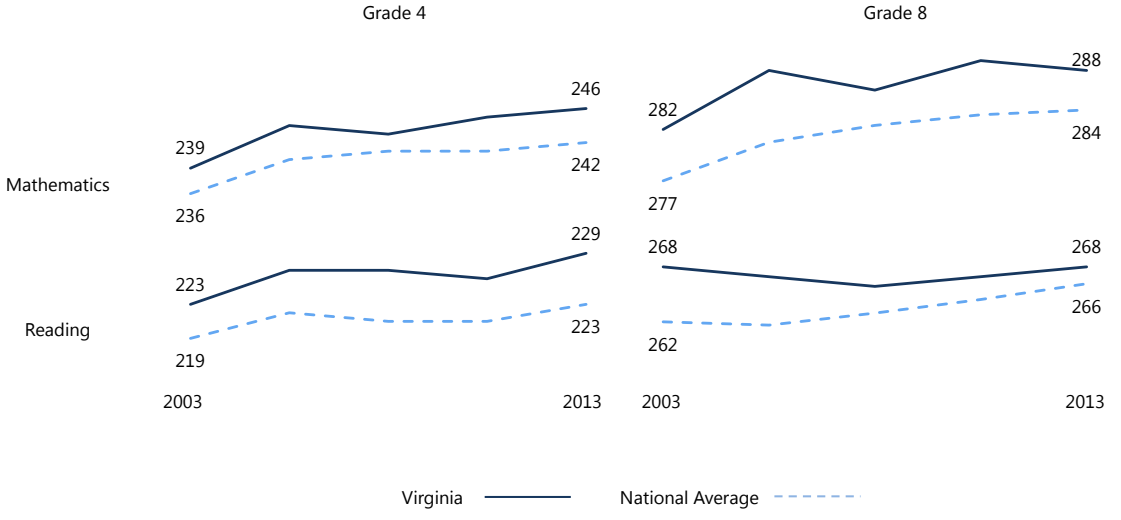
Staffing category	National rank	Regional rank (of 16 states)
Students per teacher (all grades)	16	3
Students per teacher (kindergarten)	29	10
Students per teacher (grades 1-7)	31	10
Students per teacher (grades 8-12)	5	2
Students per instructional aide	30	6
Students per student support services staff	40	14
Teachers per administrator	43	16
Teachers per instructional coordinator	30	10

Source: JLARC staff analysis of National Center for Education Statistics data.
Note: Higher ranking indicates fewer students or teachers for the given staffing category. For example, the state ranked first for students per teacher (all grades) has 11.6 students per teacher, and the state ranked 50th has 25.4 students per teacher. National rankings include Washington D.C. Regional rankings based on states in the Southern Regional Education Board.

Virginia has more K-12 teachers on a per-student basis compared to most other states nationally and regionally. Virginia has the 30th highest number of instructional aides on a per-student basis. For student support services staff, Virginia ranks lower than most other states nationally and regionally (Table D-3).

Virginia's students consistently score above the nationwide average in math and reading on the National Assessment of Educational Progress (NAEP). Since 2003, Virginia's 4th grade students have averaged three points higher than students in other states in math, and five points higher in reading (Figure D-1). Virginia's 8th grade students outscore counterparts in other states by five points in mathematics and three points in reading. Virginia's students also consistently outscore students in other states in the Mid-Atlantic and Southeast region.

FIGURE D-1
Math and reading NAEP scores in Virginia compared to the national average (2003-2013)



Source: JLARC staff analysis of National Assessment of Educational Progress data.

Appendix E: Change in Spending by School Divisions

This appendix provides the percentage change in total per-student operational spending by school divisions since FY 2005 and FY 2009. All spending figures are adjusted for inflation. Of the 128 divisions for which useful data is available, 108 spent less on K-12 operations in FY 2014 compared to FY 2005. These 108 divisions tended to be larger, accounting for 94 percent of students statewide and including 19 of the 20 largest divisions.

All but four divisions spent less in FY 2014 compared to FY 2009, when K-12 spending peaked before the recession of 2008-2009. Over 99 percent of students are in divisions that decreased spending per student over this time period. Overall, the median reduction in per-student operational spending by divisions was 7.1 percent between FY 2005 and FY 2014, and 12.5 percent between FY 2009 and FY 2014.

TABLE E-1
Change in per-student operational spending by school divisions

Division	FY 2005	FY 2009	FY 2014	% change (FY 05-14)	% change (FY 09-14)
Accomack	$11,900	$11,382	$9,873	−17.0%	−13.3%
Albemarle	$13,462	$13,848	$12,767	−5.2%	−7.8%
Alexandria	$20,356	$20,323	$17,622	−13.4%	−13.3%
Alleghany	$11,283	$11,793	$10,896	−3.4%	−7.6%
Amelia	$9,887	$10,584	$9,730	−1.6%	−8.1%
Amherst	$10,062	$11,165	$10,292	2.3%	−7.8%
Appomattox	$9,763	$10,764	$8,635	−11.6%	−19.8%
Arlington	$21,191	$22,214	$18,736	−11.6%	−15.7%
Augusta	$9,855	$10,727	$9,034	−8.3%	−15.8%
Bath	$15,407	$15,050	$16,411	6.5%	9.0%
Bedford	$9,996	$9,890	$9,137	−8.6%	−7.6%
Bland	$10,860	$10,508	$10,454	−3.7%	−0.5%
Botetourt	$10,525	$11,281	$10,446	−0.8%	−7.4%
Bristol	$11,404	$11,173	$10,139	−11.1%	−9.3%
Brunswick	$12,730	$12,854	$10,793	−15.2%	−16.0%
Buchanan	$11,809	$12,655	$10,910	−7.6%	−13.8%
Buckingham	$11,433	$12,567	$10,140	−11.3%	−19.3%
Buena Vista	$10,659	$11,211	$9,624	−9.7%	−14.2%
Campbell	$9,661	$10,276	$8,733	−9.6%	−15.0%
Caroline	$10,192	$10,573	$9,000	−11.7%	−14.9%
Carroll	$10,581	$11,239	$10,159	−4.0%	−9.6%
Charles City	$16,519	$14,919	$12,919	−21.8%	−13.4%
Charlotte	$10,422	$11,691	$10,975	5.3%	−6.1%
Charlottesville	$15,655	$17,568	$14,407	−8.0%	−18.0%
Chesapeake	$10,815	$12,206	$10,618	−1.8%	−13.0%

Division	FY 2005	FY 2009	FY 2014	% change (FY 05-14)	% change (FY 09-14)
Chesterfield	$9,571	$10,603	$8,958	−6.4%	−15.5%
Clarke	$10,754	$10,615	$10,456	−2.8%	−1.5%
Colonial Beach	--	$13,060	$11,585	--	−11.3%
Colonial Heights	$12,081	$13,217	$12,617	4.4%	−4.5%
Covington	$14,092	$13,821	$11,045	−21.6%	−20.1%
Craig	$10,927	$11,047	$10,306	−5.7%	−6.7%
Culpeper	$10,062	$10,800	$9,199	−8.6%	−14.8%
Cumberland	$12,026	$12,190	$10,263	−14.7%	−15.8%
Danville	$10,698	$12,022	$10,238	−4.3%	−14.8%
Dickenson	$10,997	$12,138	$10,484	−4.7%	−13.6%
Dinwiddie	$10,607	$10,835	$9,518	−10.3%	−12.2%
Essex	$11,033	$11,700	$10,157	−7.9%	−13.2%
Fairfax	$14,557	$14,901	$13,931	−4.3%	−6.5%
Falls Church	$19,696	$20,879	$17,016	−13.6%	−18.5%
Fauquier	$11,841	$12,540	$11,898	0.5%	−5.1%
Floyd	$10,186	$10,550	$9,670	−5.1%	−8.3%
Fluvanna	$9,785	$11,345	$9,229	−5.7%	−18.7%
Franklin City	$10,477	$11,309	$10,158	−3.0%	−10.2%
Franklin County	$12,975	$14,190	$12,599	−2.9%	−11.2%
Frederick	$11,037	$11,341	$10,487	−5.0%	−7.5%
Fredericksburg	$12,957	$14,418	$12,593	−2.8%	−12.7%
Galax	$9,896	$10,591	$9,943	0.5%	−6.1%
Giles	$9,910	$10,442	$9,523	−3.9%	−8.8%
Gloucester	$10,660	$11,198	$9,712	−8.9%	−13.3%
Goochland	$11,306	$12,463	$11,022	−2.5%	−11.6%
Grayson	$10,939	$12,458	$11,997	9.7%	−3.7%
Greene	$11,077	$11,317	$9,514	−14.1%	−15.9%
Greensville	--	$11,849	$9,755	--	−17.7%
Halifax	$11,666	$12,007	$9,817	−15.9%	−18.2%
Hampton	$10,926	$12,006	$10,193	−6.7%	−15.1%
Hanover	$9,600	$10,758	$8,981	−6.4%	−16.5%
Harrisonburg	$12,513	$14,684	$11,459	−8.4%	−22.0%
Henrico	$9,754	$10,336	$8,879	−9.0%	−14.1%
Henry	$10,223	$11,014	$9,335	−8.7%	−15.2%
Highland	$14,224	$18,167	$17,864	25.6%	−1.7%
Hopewell	$11,453	$12,056	$9,769	−14.7%	−19.0%
Isle of Wight	$10,359	$11,852	$9,551	−7.8%	−19.4%
King and Queen	$14,127	$15,440	$12,257	−13.2%	−20.6%
King George	$9,092	$9,510	$8,550	−6.0%	−10.1%
King William	$10,431	$11,346	$9,926	−4.8%	−12.5%
Lancaster	$11,720	$12,283	$11,575	−1.2%	−5.8%

Division	FY 2005	FY 2009	FY 2014	% change (FY 05-14)	% change (FY 09-14)
Lee	$11,690	$13,041	$9,664	−17.3%	−25.9%
Lexington	$10,233	$10,900	$9,073	−11.3%	−16.8%
Loudoun	$14,424	$14,891	$12,556	−13.0%	−15.7%
Louisa	$10,726	$11,653	$11,571	7.9%	−0.7%
Lunenburg	$11,327	$11,759	$9,666	−14.7%	−17.8%
Lynchburg	$10,990	$12,458	$10,618	−3.4%	−14.8%
Madison	$10,667	$10,667	$11,945	12.0%	12.0%
Manassas	$13,185	$14,474	$12,624	−4.3%	−12.8%
Manassas Park	$12,626	$12,999	$10,432	−17.4%	−19.7%
Martinsville	$11,221	$12,309	$10,502	−6.4%	−14.7%
Mathews	$10,224	$10,805	$10,824	5.9%	0.2%
Mecklenburg	$9,981	$10,801	$9,156	−8.3%	−15.2%
Middlesex	$10,817	$11,146	$10,056	−7.0%	−9.8%
Montgomery	$10,780	$11,625	$9,985	−7.4%	−14.1%
Nelson	$11,922	$13,102	$12,590	5.6%	−3.9%
New Kent	$9,962	$10,656	$9,195	−7.7%	−13.7%
Newport News	$10,933	$12,173	$10,157	−7.1%	−16.6%
Norfolk	$11,555	$12,175	$10,125	−12.4%	−16.8%
Northampton	$12,415	$13,152	$12,109	−2.5%	−7.9%
Northumberland	$11,163	$11,910	$10,853	−2.8%	−8.9%
Norton	$10,320	$10,771	$9,231	−10.6%	−14.3%
Nottoway	$11,092	$11,031	$9,106	−17.9%	−17.5%
Orange	$9,896	$9,958	$8,878	−10.3%	−10.8%
Page	$10,063	$11,338	$9,500	−5.6%	−16.2%
Patrick	$9,960	$10,828	$8,999	−9.6%	−16.9%
Petersburg	$11,431	$12,383	$10,365	−9.3%	−16.3%
Pittsylvania	$9,544	$10,311	$8,715	−8.7%	−15.5%
Poquoson	$9,270	$10,191	$9,492	2.4%	−6.9%
Portsmouth	$11,145	$12,031	$9,837	−11.7%	−18.2%
Powhatan	$10,626	$11,277	$10,106	−4.9%	−10.4%
Prince Edward	$11,044	$12,264	$10,822	−2.0%	−11.8%
Prince George	$9,818	$10,806	$9,244	−5.8%	−14.5%
Prince William	$11,522	$11,826	$10,393	−9.8%	−12.1%
Pulaski	$10,390	$10,809	$9,948	−4.3%	−8.0%
Radford	$10,361	$10,931	$9,370	−9.6%	−14.3%
Rappahannock	$12,360	$13,344	$13,704	10.9%	2.7%
Richmond City	$10,408	$11,634	$10,973	5.4%	−5.7%
Richmond County	$15,569	$15,004	$12,036	−22.7%	−19.8%
Roanoke City	$10,569	$10,937	$9,661	−8.6%	−11.7%
Roanoke County	$12,534	$13,004	$11,593	−7.5%	−10.9%
Rockbridge	$12,073	$12,041	$10,910	−9.6%	−9.4%

Division	FY 2005	FY 2009	FY 2014	% change (FY 05-14)	% change (FY 09-14)
Rockingham	$10,826	$11,096	$10,007	−7.6%	−9.8%
Russell	$10,608	$11,282	$8,796	−17.1%	−22.0%
Salem	$10,764	$11,390	$10,820	0.5%	−5.0%
Scott	$10,403	$11,415	$8,808	−15.3%	−22.8%
Shenandoah	$10,978	$11,414	$9,703	−11.6%	−15.0%
Smyth	$9,882	$10,803	$9,462	−4.3%	−12.4%
Southampton	$11,092	$11,828	$9,858	−11.1%	−16.7%
Spotsylvania	$10,280	$10,844	$9,922	−3.5%	−8.5%
Stafford	$9,705	$10,568	$9,854	1.5%	−6.8%
Staunton	$11,707	$12,595	$10,092	−13.8%	−19.9%
Suffolk	$10,273	$11,392	$9,257	−9.9%	−18.7%
Surry	$15,329	$17,876	$16,020	4.5%	−10.4%
Sussex	$15,594	$17,801	$16,856	8.1%	−5.3%
Tazewell	$9,881	$9,904	$8,787	−11.1%	−11.3%
Virginia Beach	$11,047	$12,177	$10,729	−2.9%	−11.9%
Warren	$9,443	$9,995	$9,590	1.6%	−4.1%
Washington	$10,064	$10,546	$9,878	−1.8%	−6.3%
Waynesboro	$11,304	$11,152	$9,806	−13.3%	−12.1%
West Point	--	$13,270	$11,049	--	−16.7%
Westmoreland	$10,909	$11,566	$10,467	−4.1%	−9.5%
Williamsburg-James City	--	$12,748	$10,722	--	−15.9%
Winchester	$13,456	$13,733	$12,067	−10.3%	−12.1%
Wise	$10,441	$11,297	$9,315	−10.8%	−17.5%
Wythe	$10,150	$10,496	$9,341	−8.0%	−11.0%
York	$10,234	$10,765	$9,876	−3.5%	−8.3%

Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Inflation-adjusted to 2014 dollars. Uses operations spending as defined by VDOE for the Superintendents Annual Report for Virginia. Does not include non-regular day school programs, debt service, or capital outlay additions. In some cases, data for Colonial Beach, Greensville, West Point, and Williamsburg-James City were excluded due to changes in how data was reported.

Appendix F: Change in Student Demographics

This appendix provides data on the change in certain student populations in school divisions between FY 2005 and FY 2014. The total number of students living in poverty statewide, as measured by the number of students eligible to receive free or reduced price lunches, increased from 384,684 in FY 2005 to 512,752 in FY 2014 (Table F-1). This represents an increase from 33.3 to 41.2 percent of total enrollment statewide. The number of students living in poverty as a percentage of total enrollment increased for 126 of Virginia's 132 school divisions, including 19 of the 20 largest divisions in the state. Manassas City experienced the largest increase in students living in poverty, growing from 23.4 percent of total enrollment in FY 2005 to 58.9 percent of enrollment in FY 2014. Arlington County experienced the largest decrease, as students living in poverty accounted for 41.7 percent of students in FY 2005 and 32.4 percent in FY 2014.

The number of students of limited English proficiency (LEP) statewide increased from 74,594 in FY 2005 to 125,786 in FY 2014 (Table F-2). This represents an increase from 6.9 percent of total statewide enrollment to 10.2 percent. The number of LEP students as a percentage of total enrollment increased for 82 of the 95 divisions for which data is reported for both FY 2005 and FY 2014, including 19 of the largest 20 divisions in the state. Manassas City experienced the largest increase in LEP population, increasing from 25.2 percent of total enrollment in FY 2005 to 43 percent in FY 2014. Arlington County experienced the largest decrease, with LEP students accounting for 35.5 percent of students in FY 2005 and 28 percent in FY 2014.

TABLE F-1
Change in students living in poverty, FY 2005-2014

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Accomack	3,240	61.0%	3,707	70.7%
Albemarle	2,499	20.1	3,786	28.2
Alexandria	5,542	52.2	8,099	59.6
Alleghany	1,088	37.2	1,091	44.7
Amelia	712	40.5	874	48.7
Amherst	1,798	38.9	2,196	51.2
Appomattox	867	37.5	1,075	46.9
Arlington	7,365	41.7	7,502	32.4
Augusta	3,146	28.9	4,285	40.1
Bath	264	33.0	281	44.2
Bedford	3,247	30.0	3,823	36.9
Bland	315	34.8	345	39.8
Botetourt	697	14.4	1,079	22.2
Bristol	1,218	52.1	1,518	64.6
Brunswick	1,661	70.7	1,558	80.5
Buchanan	2,660	74.4	2,180	67.8
Buckingham	1,256	56.1	1,450	69.0

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Buena Vista	340	30.1	529	51.0
Campbell	2,945	33.0	3,645	44.4
Caroline	1,566	40.7	2,301	52.6
Carroll	2,066	50.2	2,323	58.2
Charles City	344	40.1	435	58.1
Charlotte	1,187	52.1	1,144	57.1
Charlottesville	2,277	51.8	2,293	52.9
Chesapeake	10,182	25.1	13,126	34.6
Chesterfield	8,729	22.4	13,468	32.9
Clarke	303	14.2	400	20.1
Colonial Beach	273	46.7	360	66.3
Colonial Heights	482	24.1	1,209	43.4
Covington	332	39.7	517	54.5
Craig	190	28.2	349	50.7
Culpeper	1,458	32.4	3,607	44.7
Cumberland	878	58.4	971	66.5
Danville	4,500	61.9	4,854	77.3
Dickenson	1,518	57.9	1,324	56.4
Dinwiddie	1,763	38.1	2,287	50.9
Essex	793	50.0	1,106	70.5
Fairfax	32,997	20.6	50,629	27.8
Falls Church	153	8.2	114	10.5
Fauquier	1,646	15.2	2,744	24.5
Floyd	719	33.8	974	47.1
Fluvanna	650	19.1	1,145	31.1
Franklin City	1,115	80.2	970	76.4
Franklin County	2,960	39.8	3,742	50.1
Frederick	2,213	18.9	4,602	35.1
Fredericksburg	1,348	51.6	1,876	54.1
Galax	658	48.7	875	64.9
Giles	858	34.0	1,105	45.1
Gloucester	1,110	26.6	2,020	36.7
Goochland	468	21.7	684	27.9
Grayson	1,202	54.1	1,117	61.9
Greene	727	26.3	1,171	37.7
Greensville	1,629	62.4	1,849	70.9
Halifax	3,670	59.3	3,390	58.9
Hampton	10,992	44.8	12,168	58.1
Hanover	1,597	12.4	2,567	20.9
Harrisonburg	2,162	50.7	3,813	71.1
Henrico	9,108	27.5	20,456	40.0
Henry	3,682	46.2	4,906	66.3

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Highland	144	45.7	126	61.2
Hopewell	2,566	62.6	3,362	77.5
Isle of Wight	1,718	33.6	2,063	37.3
King and Queen	573	68.9	559	69.0
King George	730	21.7	1,420	32.8
King William	615	30.3	795	35.1
Lancaster	744	51.2	917	71.7
Lee	2,367	64.7	2,165	66.9
Lexington	87	18.4	96	17.8
Loudoun	5,263	12.8	12,541	17.5
Louisa	1,755	40.6	2,246	47.0
Lunenburg	1,103	62.1	1,086	68.9
Lynchburg	4,608	52.1	5,441	62.6
Madison	404	22.0	749	41.3
Manassas	1,559	23.4	4,253	58.9
Manassas Park	776	33.2	1,910	58.0
Martinsville	1,443	53.9	1,714	75.5
Mathews	290	22.9	456	39.8
Mecklenburg	2,873	58.7	2,868	62.0
Middlesex	461	35.4	593	51.2
Montgomery	3,222	34.4	3,663	37.5
Nelson	814	40.1	994	51.3
New Kent	370	14.4	636	21.7
Newport News	16,258	50.6	17,977	60.7
Norfolk	22,404	60.0	22,233	67.0
Northampton	1,369	65.9	1,253	74.8
Northumberland	730	49.6	786	56.1
Norton	357	48.0	501	59.5
Nottoway	1,320	53.5	1,458	64.3
Orange	1,284	28.9	2,194	43.2
Page	1,420	39.1	1,806	51.7
Patrick	1,184	45.4	1,412	56.4
Petersburg	3,731	69.1	3,668	82.7
Pittsylvania	3,671	39.9	5,033	54.4
Poquoson	178	6.9	316	14.9
Portsmouth	9,091	55.9	9,529	63.1
Powhatan	528	12.9	784	18.2
Prince Edward	2,089	74.9	1,590	69.3
Prince George	1,508	30.6	2,564	40.2
Prince William	17,321	25.8	33,355	39.0
Pulaski	1,990	40.0	2,256	50.5
Radford	439	28.4	682	42.2

	FY 2005		FY 2014	
	Number of students	**% of enrollment**	**Number of students**	**% of enrollment**
Rappahannock	145	14.3	314	34.6
Richmond City	17,646	68.8	17,351	74.3
Richmond County	465	38.6	677	54.6
Roanoke City	8,450	61.5	9,955	73.4
Roanoke County	2,317	15.8	3,808	26.5
Rockbridge	939	32.1	1,203	43.8
Rockingham	3,336	29.9	4,705	40.2
Russell	2,046	49.9	2,338	56.8
Salem	862	22.0	1,226	32.0
Scott	1,896	51.5	2,176	58.7
Shenandoah	1,601	26.9	2,751	43.8
Smyth	2,351	46.2	2,762	57.6
Southampton	1,134	39.5	1,382	48.9
Spotsylvania	4,626	20.4	8,808	36.5
Stafford	3,500	13.6	7,396	26.7
Staunton	1,150	40.4	1,527	55.5
Suffolk	5,388	39.3	6,738	46.5
Surry	553	52.0	586	64.1
Sussex	998	73.9	915	82.4
Tazewell	3,497	49.3	3,270	52.0
Virginia Beach	21,965	29.0	25,500	36.2
Warren	1,239	24.0	2,247	41.2
Washington	2,922	40.4	3,407	46.1
Waynesboro	1,489	47.8	1,806	57.5
West Point	120	15.3	230	29.6
Westmoreland	1,003	52.4	1,268	73.9
Williamsburg-James City	1,707	25.5	3,501	31.0
Winchester	1,622	41.5	2,458	58.4
Wise	3,468	50.3	3,662	59.7
Wythe	1,696	39.6	2,106	49.2
York	1,831	14.5	2,615	21.0
Statewide	**384,684**	**33.3%**	**512,752**	**41.2%**

Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Poverty is measured as the percentage of students qualifying for free or reduced price lunch through the National School Lunch Program.

TABLE F-2
Change in students of limited English proficiency, FY 2005–FY 2014

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Accomack	326	6.3	932	18.0
Albemarle	775	6.3	1116	8.3
Alexandria	2,382	22.7	4,510	33.3
Alleghany	--	0.0	22	0.9
Amelia	14	0.8	43	2.4
Amherst	--	0.0	--	0.0
Appomattox	--	0.0	--	0.0
Arlington	6,323	35.5	6,591	28.0
Augusta	176	1.6	215	2.0
Bath	-	0.0	11	1.8
Bedford	39	0.4	167	1.6
Bland	--	0.0	--	0.0
Botetourt	15	0.3	40	0.8
Bristol	16	0.7	34	1.5
Brunswick	--	0.0	45	2.4
Buchanan	--	0.0	--	0.0
Buckingham	--	0.0	--	0.0
Buena Vista	--	0.0	--	0.0
Campbell	40	0.5	151	1.8
Caroline	53	1.4	66	1.5
Carroll	83	2.1	135	3.4
Charles City	--	0.0	18	2.4
Charlotte	--	0.0	10	0.5
Charlottesville	231	5.5	547	12.7
Chesapeake	302	0.8	991	2.5
Chesterfield	1,579	2.8	4,087	6.9
Clarke	54	2.5	35	1.7
Colonial Beach	17	3.0	10	1.7
Colonial Heights	150	5.2	101	3.6
Covington	--	0.0	--	0.0
Craig	--	0.0	--	0.0
Culpeper	189	2.9	592	7.4
Cumberland	--	0.0	32	2.2
Danville	172	2.5	259	4.1
Dickenson	--	0.0	--	0.0
Dinwiddie	35	0.8	72	1.6
Essex	21	1.4	35	2.3
Fairfax	35,091	22.1	49,443	27.0
Falls Church	197	10.5	160	6.6
Fauquier	250	2.3	643	5.8

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Floyd	42	2.0	55	2.7
Fluvanna	--	0.0	53	1.5
Franklin City	--	0.0	--	0.0
Franklin County	57	0.8	142	1.9
Frederick	341	2.9	754	5.8
Fredericksburg	159	6.5	466	13.7
Galax	171	13.1	221	16.6
Giles	--	0.0	--	0.0
Gloucester	--	0.0	38	0.7
Goochland	14	0.6	52	2.1
Grayson	12	0.6	37	2.1
Greene	56	2.1	131	4.2
Greensville	19	1.2	75	2.9
Halifax	19	0.3	60	1.1
Hampton	360	1.6	474	2.3
Hanover	164	0.9	205	1.1
Harrisonburg	1,473	35.7	2,201	40.9
Henrico	1,980	4.3	3,562	7.1
Henry	243	3.1	513	7.0
Highland	--	0.0	--	0.0
Hopewell	55	1.4	126	3.0
Isle of Wight	29	0.6	34	0.6
King and Queen		0.0	17	2.0
King George	16	0.5	27	0.6
King William	--	0.0	18	0.8
Lancaster	--	0.0	--	0.0
Lee	--	0.0	--	0.0
Lexington	11	1.7	18	2.7
Loudoun	2,759	6.3	7,734	10.9
Louisa	33	0.8	59	1.3
Lunenburg	25	1.5	75	4.8
Lynchburg	110	1.3	214	2.5
Madison	13	0.7		0.0
Manassas	1,667	25.2	3,119	43.0
Manassas Park	667	28.6	1,259	39.2
Martinsville	97	3.8	130	5.7
Mathews	--	0.0	11	1.0
Mecklenburg	45	0.9	78	1.7
Middlesex	18	1.4	--	0.0
Montgomery	250	2.7	277	2.9
Nelson	43	2.1	53	2.7
New Kent	--	0.0	22	0.7

	FY 2005		FY 2014	
	Number of students	% of enrollment	Number of students	% of enrollment
Newport News	467	1.5	1,272	4.3
Norfolk	264	0.8	805	2.5
Northampton	109	5.6	196	11.9
Northumberland	22	1.5	33	2.3
Norton	--	0.0	--	0.0
Nottoway	19	0.8	101	4.4
Orange	52	1.2	133	2.6
Page	37	1.0	25	0.7
Patrick	67	2.6	89	3.2
Petersburg	37	0.7	135	3.1
Pittsylvania	125	1.4	189	2.1
Poquoson	15	0.6	11	0.5
Portsmouth	32	0.2	65	0.4
Powhatan	17	0.4	20	0.5
Prince Edward	--	0.0	12	0.5
Prince George	34	0.6	81	1.3
Prince William	8,317	12.7	18,554	21.8
Pulaski	29	0.6	22	0.5
Radford	10	0.7	24	1.5
Rappahannock	--	0.0	11	1.2
Richmond City	547	2.3	1,258	5.3
Richmond County	48	4.0	92	7.6
Roanoke City	550	4.3	1,264	9.4
Roanoke County	194	1.3	332	2.3
Rockbridge	10	0.4	30	1.2
Rockingham	689	6.3	809	6.8
Russell	--	0.0	--	0.0
Salem	47	1.2	87	2.3
Scott	20	0.5	19	0.5
Shenandoah	131	2.2	378	6.1
Smyth	42	0.8	23	0.5
Southampton	--	0.0	--	0.0
Spotsylvania	410	1.8	1,094	4.6
Stafford	462	1.8	1,511	5.5
Staunton	20	0.8	48	1.8
Suffolk	18	0.1	42	0.3
Surry	--	0.0	--	0.0
Sussex	17	1.2	13	1.2
Tazewell	--	0.0	52	0.8
Virginia Beach	1,129	1.5	1,277	1.8
Warren	112	2.2	157	2.9
Washington	21	0.3	63	0.9

	FY 2005		FY 2014	
	Number of students	**% of enrollment**	**Number of students**	**% of enrollment**
Waynesboro	99	3.4	170	5.4
West Point	--	0.0	13	1.6
Westmoreland	110	6.1	100	6.0
Williamsburg-James City	208	0.5	485	0.1
Winchester	396	10.9	921	21.9
Wise	23	0.3	31	0.5
Wythe	--	0.0	10	0.2
York	160	1.3	306	2.4
Statewide	**74,594**	**6.9%**	**125,786**	**10.2%**

Source: JLARC staff analysis of data from the Virginia Department of Education.
Note: Statewide percentage of enrollment is calculated as number of LEP students as a percentage of total students for only the divisions that LEP students are reported. VDOE data does not report Bland, Dickenson, and Southampton for either FY 2005 or FY 2014.

Appendix G: Salaries of Classroom Teachers in Virginia

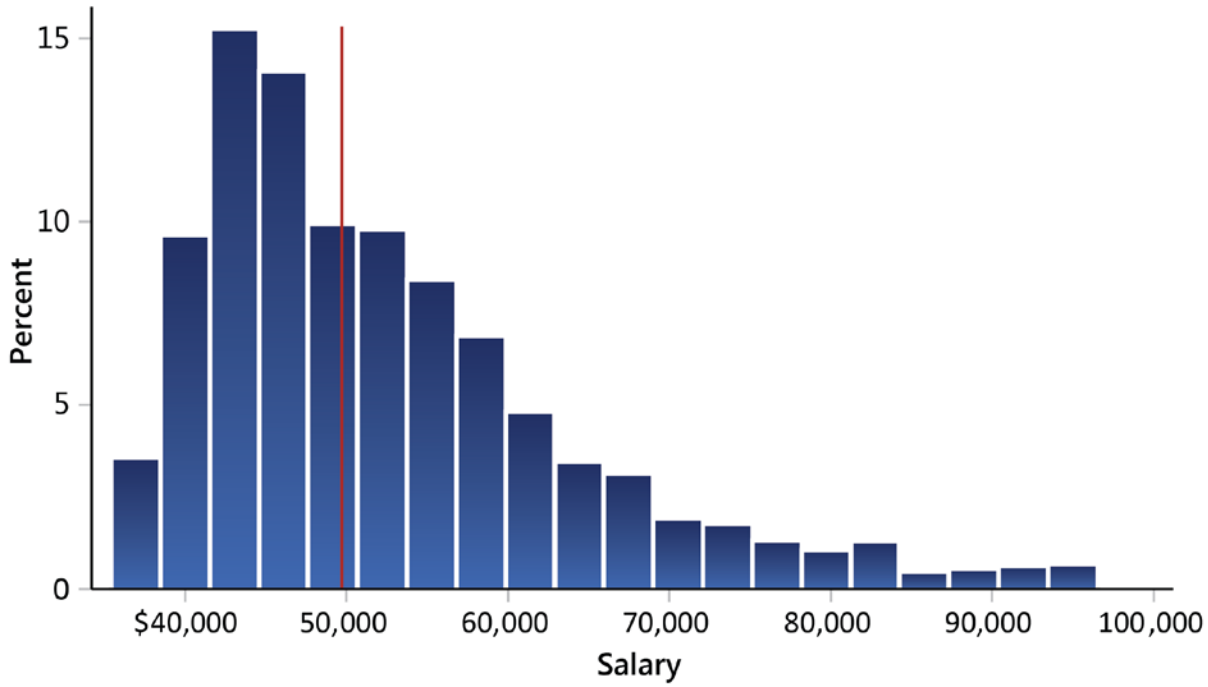
Teacher salaries are the single largest expenditure for school divisions. Understanding how much Virginia's teachers earn, how salaries have changed over time, and how they compare to other states, is useful context for understanding K-12 spending generally. Teacher salaries can also influence the quality of the teacher workforce, and teacher turnover.

Teacher salaries vary due to experience, education, and the cost of living

The median salary for full-time classroom teachers in Virginia in 2014 was $49,700. This median is for the 75,000 "teachers of record" statewide; that is, teachers responsible for instructional content and grading, excluding other teachers such as art, remedial, and gifted teachers. Approximately ten percent of regular classroom teachers in the state earn $40,000 or less, and ten percent earn $70,000 or more (Figure G-1).

Most of the variation in salaries is due to differences in teachers' years of experience, teachers' education (specifically, whether a teacher has a master's degree), and divisions' cost of living. Teachers' earnings increase by close to $1,000 for each year of experience, on average. Teachers with a post-graduate license earned about $4,000 more than teachers with a collegiate license, other things equal.

FIGURE G-1
Distribution of classroom teacher salaries in Virginia 2014



Source: JLARC staff analysis of VRS salary data; licensure data from the Virginia Department of Education.
Note: Vertical line at median. Smallest one percent and largest one percent are omitted for clarity.

School divisions in northern Virginia pay substantially higher teacher salaries than divisions in the western and southern areas of the state, in part to offset the higher cost of living.

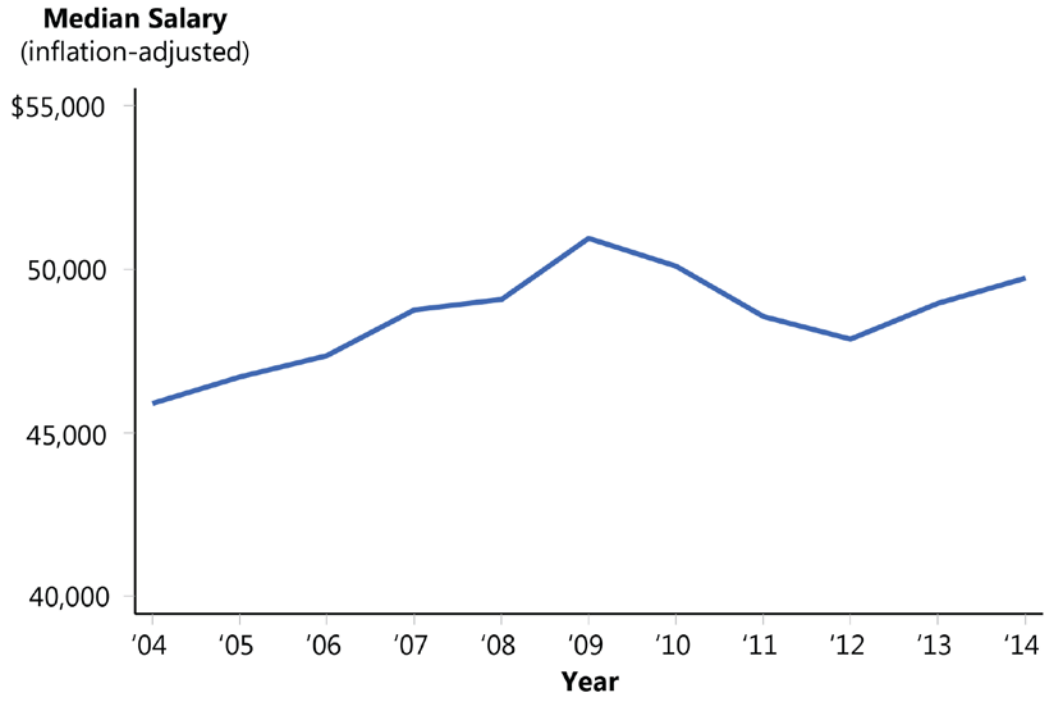
The median starting salary for teachers in Virginia in 2014 was $42,800. Starting salary was about $7,000 lower than the salary for all teachers, because the salary for all regular teachers reflects a median experience level of ten years. New teachers with a bachelor's degree earned $41,300, and new teachers with a master's degree earned $44,400.

(The statewide average salary for full-time classroom teachers in 2014 was about $53,000. The average salary is about $3,000 higher than the median because the average is influenced more by the small percentage of teachers with relatively high salaries. The median is a better indicator of the typical salary for a teacher.)

Teacher salaries increased about one percent per year over the past decade

The median salary of regular classroom teachers has kept pace with inflation over the past decade, growing by eight percent or slightly less than one percent per year after inflation. For regular teachers active in 2014, median salary increased from $45,900 in 2004 to $49,700 in 2014 (Figure G-2). Over the most recent five years, however, teacher salaries have lost ground. The median salary fell for three consecutive years, from 2010 through 2012, and salaries in 2014 were still below their peak in 2009, five years earlier.

FIGURE G-2
Median salary of full-time classroom teachers employed in 2014



Source: JLARC staff analysis of VRS salary data; licensure data from the Virginia Department of Education.
Note:. Inflation-adjusted to 2014 dollars. Statewide median salary. Includes only teachers that were employed as of 2014.

The small growth in salary over the past decade means a small return to experience. Because the salaries shown above are for the same group of teachers—those active in 2014—rather than for all teachers active in each year, experience increased each year. Research shows that teachers' effectiveness increases with experience, so on average this group of teachers was more productive in 2014 than they were in prior years.

Teachers earn less in Virginia than in most other states

Virginia ranked 29th out of 51 states (including Washington D.C.) in average teacher salaries for the 2013-14 school year. The average salary reported for Virginia, $49,800, was below the U.S. average of $56,600, and below most mid-Atlantic states (Figure G-3). The state's average teaching salary has consistently been below the national average. Average teacher salaries, however, have declined in most states over the past decade, after adjusting for inflation.

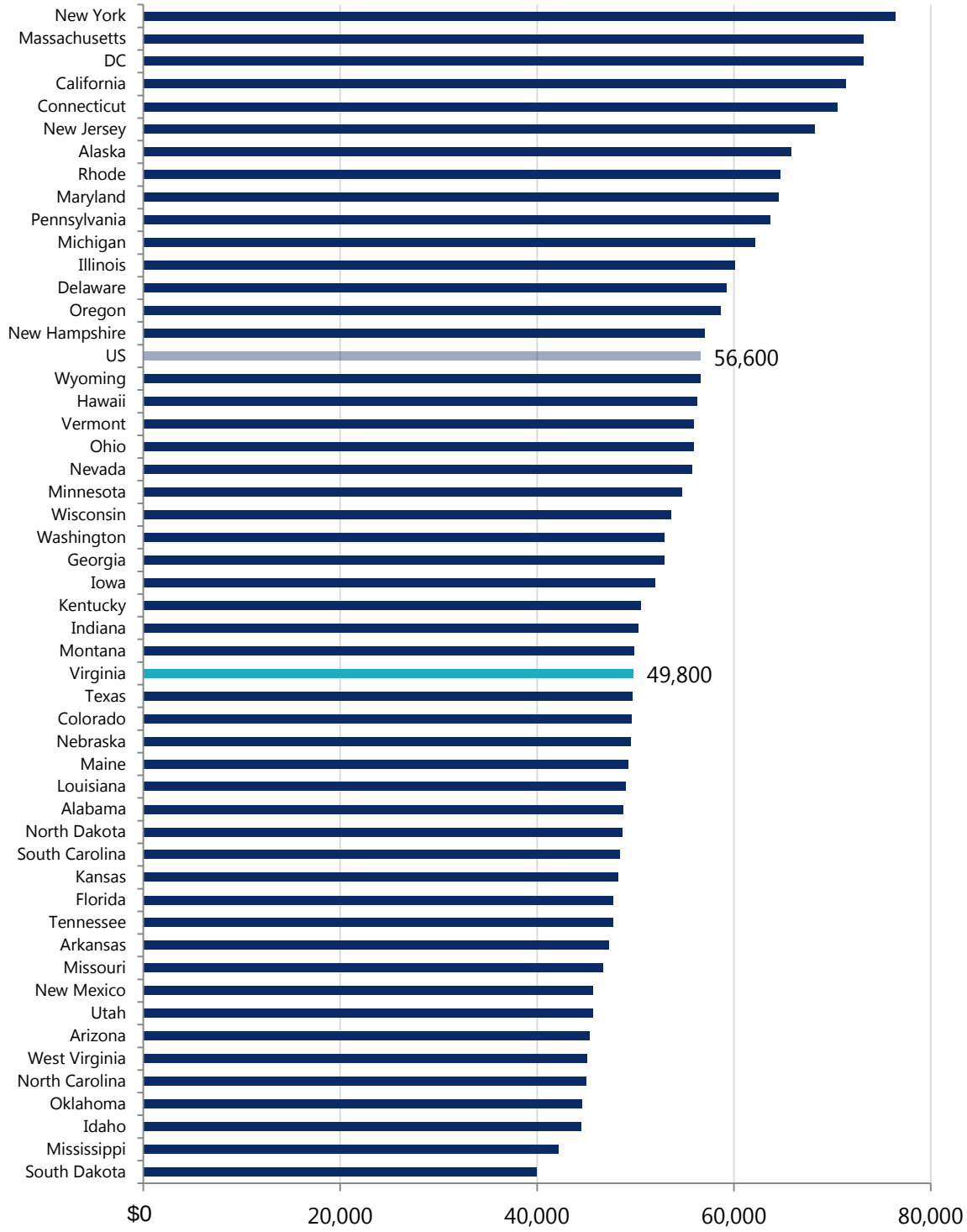
Teachers earn less than many comparable occupations

Research classifying occupations according to the types of skills required and activities performed suggests that teaching is most comparable to certain human services and health professions. Skills that distinguish teaching include strong social perceptiveness, a service orientation, and use of learning strategies. Beyond instruction, activities common to teaching include assisting others, working with the public, thinking creatively, and resolving conflicts. Occupations with similar skills and activities include counselors, psychologists, social workers, and nurses.

Statewide, teachers earn more than social workers and guidance counselors, but less than other comparable occupations (Figure G-4). Occupations with the highest median salaries, occupational therapists and physical therapists, require two- or three-year graduate degree programs, which teaching does not. Slightly more than half of regular classroom teachers in Virginia have master's degrees, which is similar to counselors and higher than occupational therapists, social workers, health educators, and registered nurses.

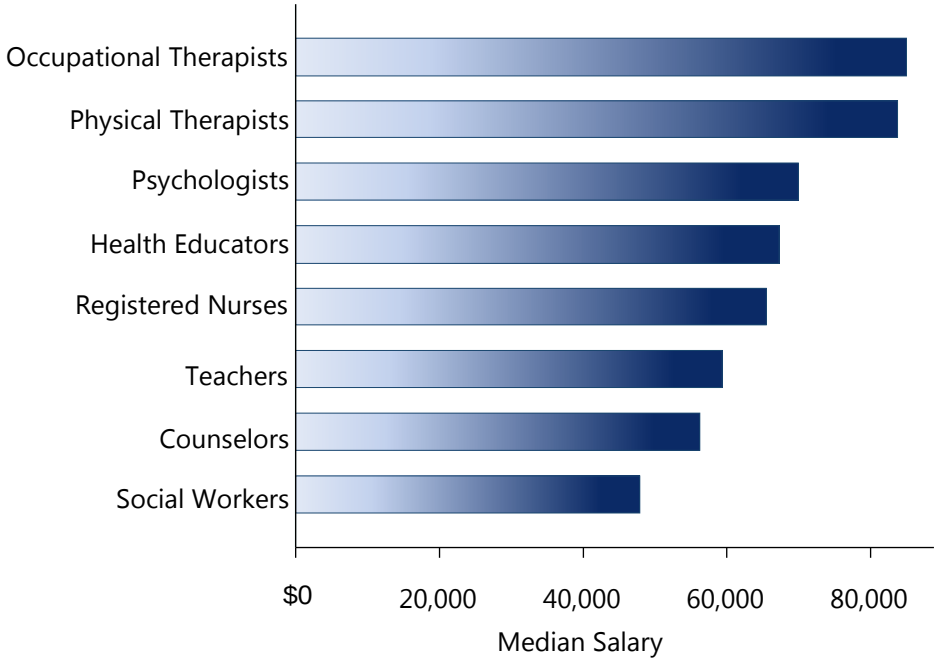
Using the same measure of teacher salaries relative to comparable occupations, Virginia ranks slightly below average among states. In most states, teachers are paid more than three comparable occupations—social workers, health educators, and counselors—but in Virginia teachers are paid more than only social workers and counselors. The average ratio of teacher salaries to salaries of seven comparable occupations is higher in 30 states, meaning that relative teacher pay is higher in most states than in Virginia. (Teachers' relative pay is lowest in North Carolina, Louisiana, and Arizona, and highest in New York, Michigan, and Massachusetts.)

FIGURE G-3
Average teacher salary by state 2014



Source: NEA Rankings and Estimates 2015, Table C-11.

FIGURE G-4
Salaries in Virginia for teachers and comparable occupations 2014



Source: JLARC staff analysis of data from BLS, Occupational Employment Statistics.
Note: Smallest one percent and largest one percent are omitted.

Differences in teacher salaries across school divisions is strongly related to the cost of living

Eight of the ten divisions with the highest median teacher salary are in the Washington D.C. area, and eight of the ten divisions with the lowest median teacher salary are in southwestern Virginia (Table G-1). This geographic pattern is consistent with large differences in the cost of living in these two parts of the state. Arlington County had a substantially higher median salary in 2014 than any other division in the state, at $75,600. Fifteen localities had a median salary below $40,000, with Dickenson County the lowest at $35,900. Half of all school divisions in Virginia had a median teacher salary in 2014 between $42,000 and $47,000.

Adjusting for geographic differences in the cost of living substantially changes the ranking of teacher salaries across divisions. Arlington and Alexandria are still the two highest, but Albemarle County and Charlottesville are in the top five (Table G-2). These localities have lower costs of living than the D.C. area, but teacher salaries are relatively high. At the other end, most of the ten lowest paying localities are no longer in southwestern Virginia but are outlying suburbs in the D.C. area, including Warren, Spotsylvania, Fredericksburg, Fauquier, and Stafford. These localities share many of the high costs of the D.C. area, and that high cost is not reflected in their teacher salaries.

TABLE G-1
Teacher salaries are related to geographic differences in the cost of living

School divisions with the highest median salaries in 2014

Rank	Division	Median salary	Number of full-time teachers of record	Labor market area
1	Arlington Co	$75,581	1,733	Washington DC
2	Alexandria City	68,085	899	Washington DC
3	Falls Church City	61,088	160	Washington DC
4	Fairfax Co	59,590	11,301	Washington DC
5	Manassas City	58,562	496	Washington DC
6	Prince William Co	57,178	4,347	Washington DC
7	Loudoun Co	55,672	3,983	Washington DC
8	Manassas Park City	55,597	201	Washington DC
9	Chesapeake City	52,988	2,318	Virginia Beach/Norfolk/Newport News
10	Isle Of Wight Co	52,961	302	Virginia Beach/Norfolk/Newport News

School divisions with the lowest median salaries in 2014

Rank	Division	Median salary	Number of full-time teachers of record	Labor market area
123	Northampton Co	$39,180	112	Chesapeake Bay
124	Craig Co	38,762	47	Roanoke
125	Lee Co	38,600	224	Southwestern tip
126	Tazewell Co	38,549	389	Far southwestern
127	Buchanan Co	38,133	239	Far southwestern
128	Norton City	38,128	55	Southwestern tip
129	Russell Co	37,773	250	Southwestern tip
130	Bland Co	37,065	62	Far southwestern
131	Grayson Co	36,540	132	Far southwestern
132	Dickenson Co	35,905	155	Southwestern tip

Source: JLARC staff analysis of VRS salary and teacher license data from the Virginia Department of Education.

(One way to measure differences in the cost of living is to compare salaries for other occupations. For example, if occupations in labor market A earn 30 percent more than the same occupations in labor market B, and if this reflects differences in the cost of living, then teacher salaries are comparable in the two labor markets if they are 30 percent higher in labor market A than B. The cost-of-living adjustment in this study relies on such an approach, called the Comparable Wage Index (CWI), developed by Professor Lori Taylor at Texas A&M University. Although the CWI was developed specifically to compare teacher salaries across areas with different standards of living, its accuracy depends on certain assumptions, and it is only one of several ways to adjust for differences in the cost of living.)

TABLE G-2
Adjusting for Cost of Living Changes the Ranking of Teacher Salaries

School divisions with the highest salaries in 2014
Adjusted for cost of living and teacher experience and education

Rank	Division	Adjusted salary	Number of full-time teachers of record	Labor market area
1	Arlington Co	80,725	1,733	Washington DC
2	Alexandria City	77,939	899	Washington DC
3	Albemarle Co	71,255	893	Charlottesville
4	Falls Church City	71,064	160	Washington DC
5	Charlottesville City	70,689	307	Charlottesville
6	Fairfax Co	67,218	11,301	Washington DC
7	Covington City	66,722	64	Western Virginia
8	Nottoway Co	66,510	141	South Central
9	Isle Of Wight Co	66,117	302	Virginia Beach/Norfolk/Newport News
10	Chesapeake City	65,986	2,318	Virginia Beach/Norfolk/Newport News

School divisions with the lowest median salaries in 2014
Adjusted for cost of living and teacher experience and education

Rank	Division	Adjusted salary	Number of full-time teachers of record	Labor market area
123	Craig Co	53,263	47	Roanoke
124	Stafford Co	52,600	1,571	Washington DC
125	King George Co	52,578	248	Northern Virginia
126	Dickenson Co	52,121	155	Southwestern tip
127	Fauquier Co	52,100	784	Washington DC
128	Clarke Co	51,693	128	Washington DC
129	Highland Co	51,055	21	Western Virginia
130	Fredericksburg City	50,704	215	Washington DC
131	Spotsylvania Co	49,083	1,285	Washington DC
132	Warren Co	47,190	331	Washington DC

Source: JLARC staff analysis of VRS salary and VDOE teacher license data, and comparable wage index.
Note: Salaries correspond to teachers with 10 years' experience and a graduate degree, with cost of living comparable to the Washington D.C. area. Based on a regression of salaries adjusted using the comparable wage index on experience, experience squared, and whether the teacher has a graduate degree.

Median salaries can also vary across localities because of differences in teacher experience and education. Divisions with a larger proportion of teachers with many years of experience or master's degrees may have higher median and average salaries. Adjusting for differences across divisions in experience and education, however, has only small effects on the ranking of teacher salaries by division. Using a statistical model to compare salaries for teachers with the same experience and education level—specifically, teachers with ten years of experience and a master's degree—does not change the ranking of the five divisions with the highest median salaries. It does lower the ranking for a few small divisions with more experienced teachers and relatively low salaries.

Appendix H: Research on Cost-Effective Instructional Strategies

This appendix summarizes the best recent evidence on the effectiveness of strategies to increase K-12 student achievement. To determine whether K-12 spending is cost-effective, it is necessary to understand which strategies are effective.

Much of the evidence summarized in this appendix is from random assignment studies, which provide the most accurate estimates of the impact on student achievement. Most of the studies were published within the past five years, although a smaller number of high-quality influential older studies are included. Nearly all the evidence reviewed is from the U.S.

It is not possible to compare cost-effectiveness across strategies with any precision, for two reasons. First, studies measure and report effects in different ways, and often cannot be converted to a common metric. Second, most studies do not include the costs of a particular strategy. It is possible, however, to make broad comparisons of cost-effectiveness, because some strategies are clearly more costly (for example, a salary increase for all teachers compared to targeted financial incentives) and some strategies have small effects.

A further limitation is that most research uses only test scores to measure student achievement, in part because test score data are widely available, and they are associated with long-term positive impacts. But test scores are a narrow measure of educational quality, and subject to "teaching to the test" effects that can overstate student learning. Education experts recommend broader measures of student learning. Research suggests that school-based strategies can increase not just cognitive but non-cognitive skills and affect behavior in ways that contribute substantially to future labor market success. [1]

The research summarized here, and several decades of prior research, suggests that the quality of teaching has a larger effect on student achievement than any other school-based factor. (Research also suggests that factors outside the control of schools, especially family economic circumstances and parenting, have an even larger effect on student achievement.) Average teaching quality can be improved by identifying and retaining the most effective teachers, and by enhancing the skills of all teachers.

Increasing the achievement of lower-performing students is a cost-effective way to increase average student achievement. Improving teaching quality will have a larger effect in low-performing than in high-performing schools, because students at advanced levels of proficiency have less room to increase achievement. Whole school reforms can also be effective.

Besides teaching quality, other strategies shown to increase student achievement include parental involvement, peer tutoring, and positive behavior programs. There is less evidence of effectiveness for after-school programs, teacher aides, and some types of professional development.

Identifying and retaining the most effective teachers

Teacher quality varies widely, and a few studies have estimated the value of high-quality teachers by their impact on students' long-term outcomes. More effective teachers increase students' lifetime

earnings and rates of college attendance, and decrease teen childbearing. [2][3][4] This research is consistent with other studies showing long-term effects for high-quality preschool programs. [5][6]

Teacher effectiveness can be measured through a combination of classroom observation, test score gains, and student surveys. [7] Principal evaluations and portfolio assessments can also identify effective teachers. [8][9] Effectiveness increases with experience, but future effectiveness can be predicted at the beginning of a teacher's career. [10][11][12][13] There is little or no evidence that teacher effectiveness can be predicted accurately from scores on tests such as the Praxis, or having a degree in education or a graduate degree. [9][14][15] Evidence on the effectiveness of licensure is mixed, but national board certification is associated with higher student achievement. [16][17] There is no evidence that teachers who enter the profession through non-traditional routes are less effective. [18][19]

This research suggests that strategies to identify and retain teachers who provide high-quality instruction can increase student achievement. Meaningful assessments early in a teacher's career can identify those likely to succeed (and those who are less likely to succeed). Policies that increase retention of new teachers include allowing them to teach the same grade for several years (which can reduce their workload), and salary schedules that increase steeply in the first few years of teaching (with smaller increases in later years to offset the budgetary impact). [20][21] Teacher induction and mentoring can increase the effectiveness of new teachers. [22][23][24]

Improving the effectiveness of all teachers

Although the gains to experience tend to be largest in the early years of a teacher's career, some studies suggest teacher effectiveness continues to increase over many years. [11][13][25] This fact, coupled with the adverse impacts on students of teacher turnover, suggests that retaining experienced teachers increases student achievement.[26] Financial incentives can reduce turnover.[27][28][29][30] Teacher surveys suggest, however, that other aspects of teacher working conditions also influence turnover, including school leadership and relationships with colleagues. Efforts to improve school climate need not be resource intensive, but can reduce staff turnover and facilitate student achievement.

Although professional development and coaching is the most widely used strategy to increase teaching quality, evidence is mixed. Research suggests that teacher effectiveness is driven mainly by the quality of student-teacher interactions, and that in turn depends on multiple skills: instructional practice; classroom management; and emotional support. [31][32][33][35][35] Individualized coaching that focuses on these skills can be effective. [22][23][36][37][38][39][40] Evaluating teachers and providing feedback can improve their performance. [41] Most studies of less individualized professional development show little or no evidence of an effect on student achievement. [11][42][43][44]

Differentiated instruction based on data on individual student performance has been shown to increase student achievement, especially when accompanied by coaching or teacher training. [45][46][47] This strategy may be most effective when class sizes are not too large to differentiate instruction.

Smaller class sizes can increase student achievement, especially for disadvantaged students. [48][49][50][51][52] But the estimated effects are often small. Given the high cost of additional teachers to reduce class size, a broad strategy of reducing class size may not be cost-effective.

Reducing class size can also have indirect effects, either positive or negative. Evidence from teacher surveys suggests that teachers value smaller classes, so it is possible that reducing class size could reduce teacher turnover, which could indirectly increase student achievement. On the other hand, if reducing class size means hiring more teachers, some of whom are inexperienced, that could have an adverse impact on student achievement.

Budgetary impact can be lessened by varying class size rather than uniformly decreasing it; that is, increasing class sizes for the most effective teachers, and reducing class sizes for less effective teachers. Such a policy would increase average teaching quality, but could adversely affect morale for the most effective teachers.

A few recent studies find positive long-term impacts of smaller class size on post-secondary outcomes and earnings in adulthood, even though test score impacts tend to fade after a few years. [51][53][54] Long-term impacts would make smaller class sizes more cost-effective.

Closing the achievement gap

A cost effective way to increase average student achievement is to increase the achievement of lower performing students. Students performing near or below the median have more room to increase than students at the high end of the achievement scale. Nearly all schools have some lower-performing students, so the achievement gap can be addressed by focusing on certain students at high-performing schools and school-wide efforts at low-performing schools.

The most effective way to increase the performance of lower-achieving students is to improve the quality of teaching these students receive. This includes assigning more effective teachers within a school to lower-performing students, providing differentiated instruction based on individual student assessments, and providing individualized coaching to increase teacher effectiveness. These strategies are likely to require reallocating resources from higher- to lower-performing students and schools.

Low-performing schools tend to have less effective teachers, and lower-achieving students are more likely to be assigned to less experienced teachers. [25][55][56][57] Providing financial incentives can induce highly effective teachers to move to, or remain at, low-performing schools. [27][28][58][59].

Whole school, division-level, and citywide reforms can also narrow the achievement gap. Effective reforms include a statewide strategy in California to provide intensive technical assistance to low-performing school divisions [60], teacher evaluations and tenure reforms in Washington D.C. and New York City [61][62], and out-of-school time programs in New York City. [58] More comprehensive whole school reforms in Houston [64], and school takeovers in New Orleans and Boston also increased student achievement in low-performing schools. [65]

Recent evidence on school choice suggests that urban charter schools can increase student achievement. This includes:

- a national random assignment evaluation of KIPP schools [66];
- a random assignment evaluation of a small high school initiative in NYC [67];
- charter schools in Boston that follow a "no excuses" approach [68];
- the Harlem Children's Zone in New York City, which combined charter schools with intensive parent outreach and community services [69]; and
- the Equity Project charter school in NYC, which combined rigorous teacher assessments with high ($125,000) salaries [70].

However, a high-quality evaluation of charter schools in Chicago did not find evidence of an increase in student achievement. [71] The cost-effectiveness of charter schools is not clear. Some charters raise private funds in additional to public funding. Most successful charter schools appear to use strict behavioral approaches that may not work for all students.

Evidence on other strategies to increase student achievement

A few other strategies have demonstrated positive impacts on student achievement at low cost. Peer tutoring is effective and can be implemented with no additional resources beyond limited training. [72][73][74] Volunteer tutoring is also low-cost and effective. [75] Interventions designed to increase parent involvement in improving their children's academic performance require resources for parent training, but can have moderate to large effects on achievement. [76] School-wide positive behavior programs require resources to implement, but can increase achievement. [77] [78] Other studies of positive behavior interventions have found substantial reductions in discipline problems but less clear evidence of increases in achievement.

Strategies that have been also been subject to high-quality evaluations but show less evidence of effectiveness include after-school programs, teacher aides, and, as noted above, professional development that is not individualized or not focused on improving the quality of teacher-student interactions. [48][79]

References

[1] Heckman, James. 2013. *Giving Kids a Fair Chance*. Cambridge, MA: MIT Press.

[2] Chetty, Raj, John N. Friedman, and Jonah E. Rockoff. 2014. "Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood." *American Economic Review* 104 (9): 2633-79.

[3] Hanushek, Eric A. 2011. "The Economic Value of Higher Teacher Quality." *Economics of Education Review* 30 (3): 466–79.

[4] Chetty, Raj, John Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. 2011. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR." *Quarterly Journal of Economics* 126 (4): 1593–660.

[5] Deming, David**.** 2009. "Early Childhood Intervention and Life-Cycle Development: Evidence from Head Start."*American Economic Journal: Applied Economics* 1 (3): 111–34.

[6] Heckman, James J., Seong Hyeok Moon, Rodrigo Pinto, Peter A. Savelyev, and Adam Yavitz. 2010. "Analyzing Social Experiments as Implemented: A Reexamination of the Evidence from the HighScope Perry Preschool Program." *Quantitative Economics* 1 (1): 1–46.

[7] Kane, Thomas, Daniel McCaffrey, Trey Miller, and Douglas Staiger. 2013. "Have We Identified Effective Teachers? Validating Measures of Effective Teaching Using Random Assignment." Gates Foundation: MET Project Research Paper.

[8] Harris, Douglas, and Tim Sass. 2014. "Skills, Productivity, and the Evaluation of Teacher Performance." *Economics of Education Review* 40: 183-204.

[9] Wilson, Mark, P.J. Hallam, Raymond Pecheone, and Pamela Moss. 2014. "Evaluating the Validity of Portfolio Assessments for Licensure Decisions." *Education Policy Analysis Archives* 22 (6).

[10] Atteberry, Allison, Susanna Loeb, and James Wyckoff. 2013. "Do First Impressions Matter? Improvement in Early Career Teacher Effectiveness." NBER Working Paper 19096.

[11] Harris, Douglas, and Tim Sass. 2011. "Teacher Training, Teacher Quality, and Student Achievement." *Journal of Public Economics* 95 (7-8): 798-812.

[12] Kane, Thomas, Jonah Rockoff, and Douglas Staiger. 2008. "What Does Certification Tell Us About Teacher Effectiveness? Evidence from New York City." *Economics of Education Review* 27 (6): 615-631.

[13] Wiswall, Matthew. 2013. "The Dynamics of Teacher Quality." *Journal of Public Economics* 100: 61-78.

[14]Angrist, Joshua, and Jonathan Guryan. 2008. "Does Teacher Testing Raise Teacher Quality? Evidence from State Certification Requirements." *Economics of Education Review* 27(5): 483-503.

[15] Chingos, Mathew, and Paul Peterson. 2011. "It's Easier to Pick a Good Teacher than to Train One: Familiar and New Results on the Correlates of Teacher Effectiveness." *Economics of Education Review* 30 (3): 449-65.

[16] Cowan, James, and Dan Goldhaber. 2015. "National Board Certification and Teacher Effectiveness: Evidence from Washington." The Center for Data & Research, University of Washington Bothell.

[17] Salvador, Samantha, and Andy Baxter. 2010. "National Board Certification. Impact on Teacher Effectiveness." Charlotte-Mecklenburg Schools, Center for Research and Evaluation, Office of Accountability.

[18] Constantine, Jill, Daniel Player, Tim Silva, Kristin Hallgren, Mary Grider, and John Deke. 2009. "An Evaluation of Teachers Trained through Different Routes to Certification, Final Report." NCEE 2009-4043. Washington DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[19] Glazerman, Steven, Daniel Mayer, and Paul Decker. 2006. "Alternative Routes to Teaching: The Impacts of Teach for America on Student Achievement and Other Outcomes." *Journal of Policy Analysis and Management* 25 (1): 75-96

[20] Ost, Ben, and Jeffrey Schiman. 2015. "Grade-Specific Experience, Grade Reassignments, and Teacher Turnover." *Economics of Education Review* 46: 112-126.

[21] Hendricks, Matthew. 2015. "Towards an Optimal Teacher Salary Schedule: Designing Base Salary to Attract and Retain Effective Teachers." Forthcoming, *Economics of Education Review*.

[22] Glazerman, Stephen, Eric Isenberg, Sarah Dolfin, Martha Bleeker, Amy Johnson, Matthew Grider, and Martha Jacobus. 2010. "Impacts of Comprehensive Teacher Induction: Final Results from a Randomized Controlled Study." NCEE 2010–4028. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[23] Ingersoll, Richard, and Michael Strong. 2011. "The Impact of Induction and Mentoring Programs for Beginning Teachers: A Critical Review of the Research." *Review of Educational Research* 81(2): 201-233.

[24] Stanulis, Randi Nevins, Sarah Little, Erin Wibbens. 2012. "Intensive Mentoring that Contributes to Change in Beginning Elementary Teachers' Learning to Lead Classroom Discussions." *Teaching and Teacher Education* 28: 32-43.

[25] Ladd, Helen, and Lucy Sorenson. 2014. "Returns to Teacher Experience: Student Achievement and Motivation in Middle School." CALDER Working Paper 112.

[26] Ronfeldt, M., Loeb, S., & Wyckoff, J. 2013. "How Teacher Turnover Harms Student Achievement." *American Educational Research Journal* 50 (1): 4–36.

[27] Clotfelter, Charles, Elizabeth Glennie, Helen Ladd, and Jacob Vigdor. 2008. "Would Higher Salaries Keep Teachers in High-Poverty Schools? Evidence from a Policy Intervention in North Carolina." *Journal of Public Economics* 92(5-6): 1352–70.

[28] Fulbeck, Eleanor. 2014. "Teacher Mobility and Financial Incentives: A Descriptive Analysis of Denver's ProComp." *Educational Evaluation and Policy Analysis* 36 (1): 67-82.

[29] Hendricks, Matthew. 2014. "Does It Pay to Pay Teachers More? Evidence from Texas." *Journal of Public Economics* 109: 50-63.

[30] Glazerman, Stephen, and Allison Seifullah. 2012. "An Evaluation of the Chicago Teacher Advancement Program (Chicago TAP) After Four Years." Princeton, NJ: Mathematica Policy Research.

[31] Hamre, Bridget, Robert Pianta, Jason Downer, Jamie DeCoster, Andrew Mashburn, Stephanie Jones, Joshua L. Brown, Elise Cappella, Marc Atkins, Susan Rivers, Marc Brackett, and Aki Hamagami. 2013. "Teaching through Interactions: Testing a Developmental Framework of Teacher Effectiveness in Over 4,000 Classrooms." *The Elementary School Journal* 113 (4): 461-487.

[32] Allen, Joseph, Anne Gregory, Amori Mikami, Janetta Lun, Bridget Hamre, and Robert Pianta. 2013. "Observations of Effective Teacher-Student Interactions in Secondary School Classrooms: Predicting Student Achievement With the Classroom Assessment Scoring System—Secondary." *School Psychology Review* 42 (1): 76-98.

[33] Grossman, Pam, Susanna Loeb, Julie Cohen, and James Wyckoff. 2013. "Measure for Measure: The Relationship between Measures of Instructional Practice in Middle School English Language Arts and Teachers' Value-Added Scores." *American Journal of Education* 119 (3): 445-470.

[34] Guarino, Cassandra, Laura Hamilton, and J.R. Lockwood. 2006. "Teacher Qualifications, Instructional Practices, and Reading and Mathematics Gains of Kindergartners." National Center for Education Statistics, Research and Development Report No. 2006-031.

[35] Oliver, Regina, Joseph Wehby, and Daniel Reschly. 2011. "Teacher Classroom Management Practices: Effects on Disruptive or Aggressive Student Behavior." Campbell Systematic Reviews 2011.4.

[36] Rimm-Kaufman, Sara, Ross Larsen, Alison Baroody, Timothy Curby, Michelle Ko, Julie Thomas, Eileen Merritt, Tashia Abry, and Jamie DeCoster. 2014. "Efficacy of the Responsive Classroom Approach: Results from a 3-Year, Longitudinal Randomized Controlled Trial." *American Educational Research Journal* 1–37.

[37] Campbell, Patricia, and Nathaniel Malkus. 2011. "The Impact of Elementary Mathematics Coaches on Student Achievement." *The Elementary School Journal* 111 (3): 430-54.

[38] Matsumura, Lindsay Clare, Helen Garnier, Jessaca Spybrook. 2013. "Literacy Coaching to Improve Student Reading Achievement: A Multi-Level Mediation Model." *Learning and Instruction* 25: 35-48.

[39] Sailors, Misty, and Larry Price. 2015. "Support for the Improvement of Practices through Intensive Coaching (SIPIC): A Model of Coaching or Improving Reading Instruction and Reading Achievement." *Teaching and Teacher Education* 45: 115-127.

[40] Heller, Joan, Kirsten Daehler, Nicole Wong, Mayumi Shinohara, and Luke Miratrix. 2012. "Differential Effects of Three Professional Development Models on Teacher Knowledge and Student Achievement in Elementary Science. *Journal of Research in Science Teaching* 49(3): 333-62.

[41] Taylor, Eric, and John Tyler. 2012. "The Effect of Evaluation on Teacher Performance." *American Economic Review* 102(7): 3628–51.

[42] Gamse, Beth, Robin Jacob, Megan Horst, Beth Boulay, and Faith Unlu. 2008. "Reading First Impact Study: Final Report." (NCEE 2008-4038). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

[43] Garet, Michael, Andrew Wayne, Fran Stancavage, James Taylor, Marian Eaton, Kirk Walters, Mengli Song, Seth Brown, Steven Hurlburt, Pei Zhu, Susan Sepanik, and Fred Doolittle. 2011. "Middle School Mathematics Professional Development Impact Study: Findings After the Second Year of Implementation" (NCEE 2011-4024). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[44] Garet, Michael, S Cronen, Marian Eaton, A. Kurki, M. Ludwig, W. Jones, K.Uekawa, A. Falk, Howard Bloom, Fred Doolittle, Pei Zhu, and L. Sztenjnberg. 2008. "The Impact of Two Professional Development Interventions on Early Reading Instruction and Achievement." (NCEE 2008-4030). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[45] Al Otaiba, Stephanie, Carol Connor, Jessica Folsom, Luana Greulich, Jane Meadows, and Zhi Li. 2011. "Assessment Data-Informed Guidance to Individualize Kindergarten Reading Instruction: Findings from a Cluster-Randomized Control Field Trial." *Elementary School Journal*, 111(4): 535-60.

[46] Connor, Carol, Frederick Morrison, Barry Fishman, Christopher Schatschneider,and Phyllis Underwood. 2007. "The Early Years: Algorithm-Guided Individualized Reading Instruction." *Science* 315(5811): 464-65.

[47] Konstantopoulos, Spyros, Shazia Miller, and Arie van de Ploeg. 2013. "The Impact of Indiana's System of Interim Assessments on Mathematics and Reading Achievement. *Educational Evaluation and Policy Analysis* 35(4): 481-99.

[48] Krueger, Alan. 1999. "Experimental Estimates of Education Production Functions." *Quarterly Journal of Economics* 114(2): 497-532.

[49] Angrist, Joshua, and Victor Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement. *Quarterly Journal of Economics* 114(2): 533-575.

[50] Cho, Hyunkuk, Paul Glewwe, and Melissa Whitler. 2012. "Do Reductions in Class Size Raise Students' Test Scores? Evidence from Population Variation in Minnesota's Elementary Schools." *Economics of Education Review* 31:77-95.

[51] Fredriksson, P., Ockert, B., & Oosterbeek, H. 2013. "Long-Term Effects of Class Size," *Quarterly Journal of Economics* 128(1): 249-285.

[52] Heinesen, Eskil. 2010. "Estimating Class-Size Effects Using Within-School Variation in Subject-Specific Classes." *Economic Journal* 120: 737-760.

[53] Chetty, Raj, John Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. 2011. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR." *Quarterly Journal of Economics* 126 (4): 1593–660.

[54] Dynarski, Susan, Joshua Hyman, and Diane Schanzenbach. 2013. "Experimental Evidence on the Effect of Childhood Investments on Postsecondary Attainment and Degree Completion." *Journal of Policy Analysis and Management* 32(4): 692-717.

[55] Kalogrides, Demetra, Loeb, Susanna, and Tara Beteille. 2013. "Systematic Sorting: Teacher Characteristics and Class Assignments." *Sociology of Education* 86 (2): 103-123.

[56] Mansfield, Richard. 2014. "Teacher Quality and Student Inequality." Unpublished manuscript, Cornell University.

[57] Sass, Tim, Jane Hannaway, David Figlio, and Li Feng. 2012. "Value Added of Teachers in High-Poverty Schools and Lower Poverty Schools." *Journal of Urban Economics* 72 (2-3):104-122.

[58] Glazerman, Stephen, Ali Protik, Bing-ru Teh, Julie Bruch, and Jeffrey Max. 2013. Transfer Incentives for High-Performing Teachers: Final Results from a Multisite Experiment (NCEE 2014-4003). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

[59] Springer, Matthew, Luis Rodriguez, and Walker Swain. 2014. "Effective Teacher Retention Bonuses: Evidence from Tennessee." Tennessee Consortium on Research, Evaluation, and Development Working Paper. Nashville, TN.

[60] Strunk, Katherine, and Andrew McEachin. 2014. "More than Sanctions: Closing Achievement Gaps through California's Use of Intensive Technical Assistance." *Educational Evaluation and Policy Analysis* 36 (3): 281-306.

[61] Dee, Thomas, and James Wyckoff. 2015. "Incentives, Selection, and Teacher Performance: Evidence from IMPACT." *Journal of Policy Analysis and Management* 34 (2): 267-97.

[62] Loeb, Susanna, Luke C. Miller, and James Wyckoff. 2014. "Performance Screens for School Improvement: The Case of Teacher Tenure Reform in New York City." CALDER Working Paper 115.

[63] Herrera, Carla, Jean Baldwin Grossman and Leigh Linden. 2013. *Staying On Track: Testing Higher Achievement's Long-Term Impact on Academic Outcomes and High School Choice*. New York, NY: A Public/Private Ventures project distributed by MDRC.

[64] Fryer, Roland. 2014. "Injecting Charter School Best Practices into Traditional Public Schools: Evidence from Field Experiments." *Quarterly Journal of Economics* 129(3): 1355-1407.

[65] Abdulkadiroglu, Atila, Joshua Angrist, Peter D. Hull, Parag A. Pathak. 2014. "Charters without Lotteries: Testing Takeovers in New Orleans and Boston." NBER Working Paper 20792.

[66] Tuttle, Christina, Brian Gill, Philip Gleason, Virginia Knechtel, Ira Nichols-Barrer, and Alexandra Resch. 2013 "KIPP Middle Schools: Impacts on Achievement and Other Outcomes." Washington, DC: Mathematica Policy Research.

[67] Bifulco, Robert, Rebecca Unterman, and Howard Bloom. 2014. "The Relative Costs of New York City's New Small Public High Schools of Choice." New York, NY: MDRC.

[68] Angrist, Joshua D., Parag A. Pathak, and Christopher R. Walters. 2013. "Explaining Charter School Effectiveness." *American Economic Journal: Applied Economics* 5 (4): 1-27.

[69] Dobbie, Will, and Roland G. Fryer. 2011. "Are High-Quality Schools Enough to Increase Achievement among the Poor? Evidence from the Harlem Children's Zone." *American Economic Journal: Applied Economics* 3 (3): 158-87.

[70] Furgeson, Joshua, Moira McCullough, Clare Wolfendale, Brian Gill. 2014. "The Equity Project Charter School: Impacts on Student Achievement." Cambridge MA: Mathematica Policy Research.

[71] Cullen, Julie, Brian Jacob and Steven Levitt. 2005. "The Impact of School Choice on Student Outcomes: An Analysis of the Chicago Public Schools." *Journal of Public Economics* 89 (5-6), 729–760.

[72] Bowman-Perrott, Lisa, Heather Davis, Kimberly Vannest, Lauren Williams, Charles Greenwood, and Richard Parker. 2013. "Academic Benefits of Peer Tutoring: A Meta-Analytic Review of Single-Case Research." *School Psychology Review* 42 (1): 39-55.

[73] Dion, Eric, Catherine Roux, Danika Landry, Douglas Fuchs, Joseph Wehby, Veronique Dupere. 2011. "Improving Attention and Preventing Reading Difficulties among Low-Income First Graders: A Randomized Study." *Prevention Science* 12 (1): 70-79.

[74] Scruggs, Thomas, Margo Mastropieri, and Lisa Marshak. 2012. "Peer-Mediated Instruction in Inclusive Secondary Social Studies Learning: Direct and Indirect Learning Effects." *Learning Disabilities Research & Practice* 27 (1): 12-20.

[75] Ritter Gary, George Denny, Ginger Albin, Joshua Barnett, and Virginia Blankenship. 2006. "The Effectiveness of Volunteer Tutoring Programs: A Systematic Review." Campbell Systematic Reviews 2006:7.

[76] Nye, Chad, Herb Turner, Jamie Schwartz. 2006. "Approaches to Parent Involvement for Improving the Academic Performance of Elementary School Age Children." Campbell Systematic Reviews 2006:4.

[77] Horner, Robert, George Sugai, Keith Smolkowski, Lucille Eber, Jean Nakasato, Anne Todd, and Jody Esperanza. 2009. "A Randomized, Wait-List Controlled Effectiveness Trial Assessing School-Wide Positive Behavior Support in Elementary Schools." *Journal of Positive Behavior Interventions* 11 (3): 133-144.

[78] Snyder, Frank, Brian Flay, Samuel Vuchinich, Alan Acock, Isaac Washburn, Michael Beets, and Kin-Kit Li. 2010. "Impact of a Social-Emotional and Character Development Program on School-Level Indicators of Academic Achievement, Absenteeism, and Disciplinary Outcomes: A Matched-Pair, Cluster-Randomized, Controlled Trial." *Journal of Research on Educational Effectiveness* 3(1): 26-55.

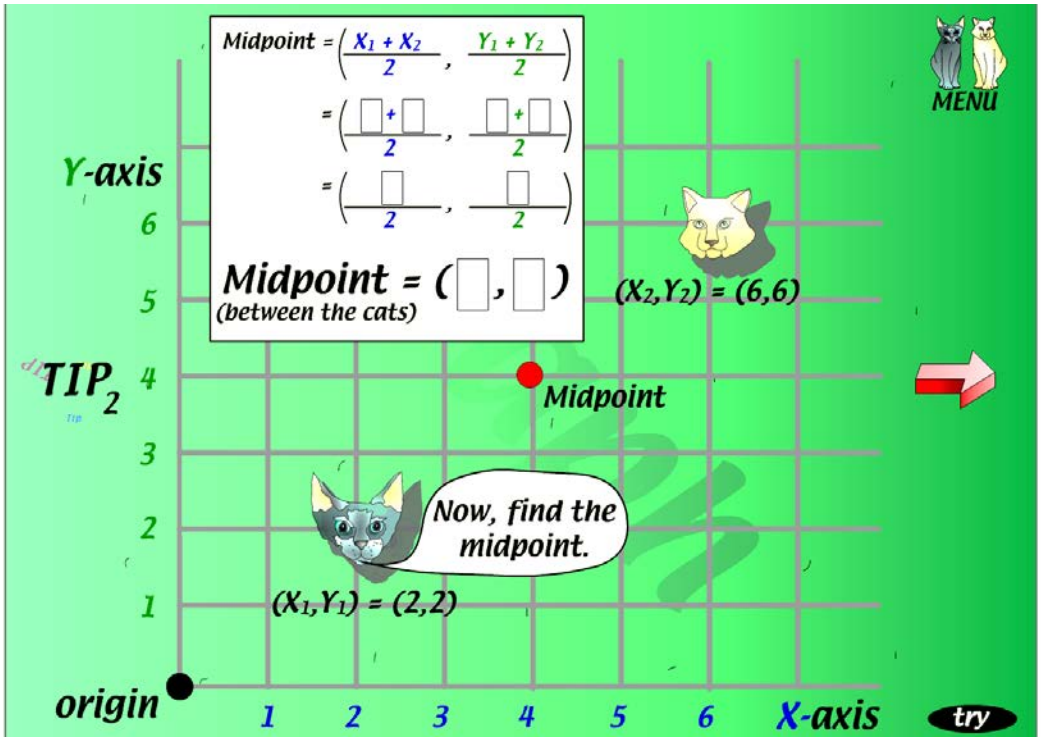
[79] Zief, Susan, Sherri Lauver, and Rebecca Maynard. 2006. "Impacts of After-School Programs on Student Outcomes." Campbell Systematic Reviews 2006: 3.

Appendix I: Course Content in Online Learning Programs

The course content and instructional methods of online learning courses vary based on the subject area and the needs and abilities of the student. Much of the content for online courses consists of interactive online learning modules. Interactive lessons may feature characters that talk and offer reactions and encouragement when students are completing activities (Figures I-1, 2, 3). Interactive lessons first present concepts as students click through the pages of a learning module. Students may then have the opportunity to apply the concepts, often in a problem-solving capacity that also offers instant feedback.

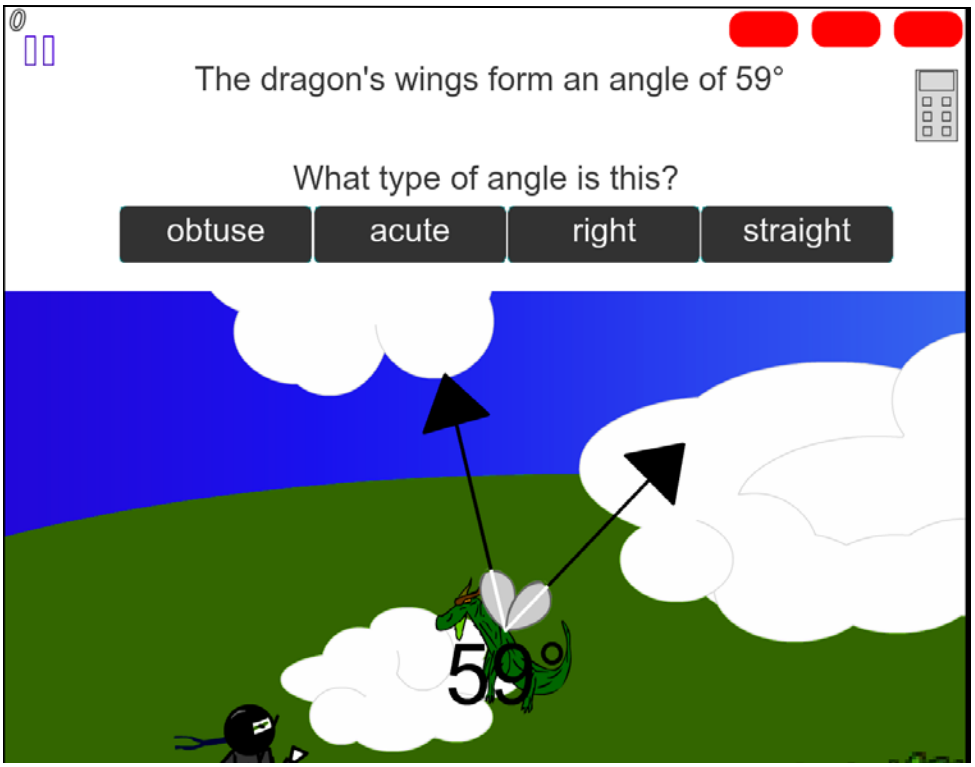
Online courses can also include less interactive online content and even physical course materials. As noted in Chapter 6, in the lower grade levels, most instruction takes place off-line and under the supervision of a learning coach, such as a parent. One online provider interviewed by JLARC staff offers learning coaches a lesson guide, which provides instructions to read to students and questions to ask to confirm their understanding of the material. In the middle and high school grade levels, the courses become more involved and interactive, and the students spend less time in off-line activities. Other lessons are hands-on, and guide students through an at-home science experiment or art project. Still other lessons, such as for an English class, involve reading a passage on the computer, formulating an opinion, and sharing those thoughts on a discussion forum with other students in the course.

FIGURE I-1 High school interactive math lesson



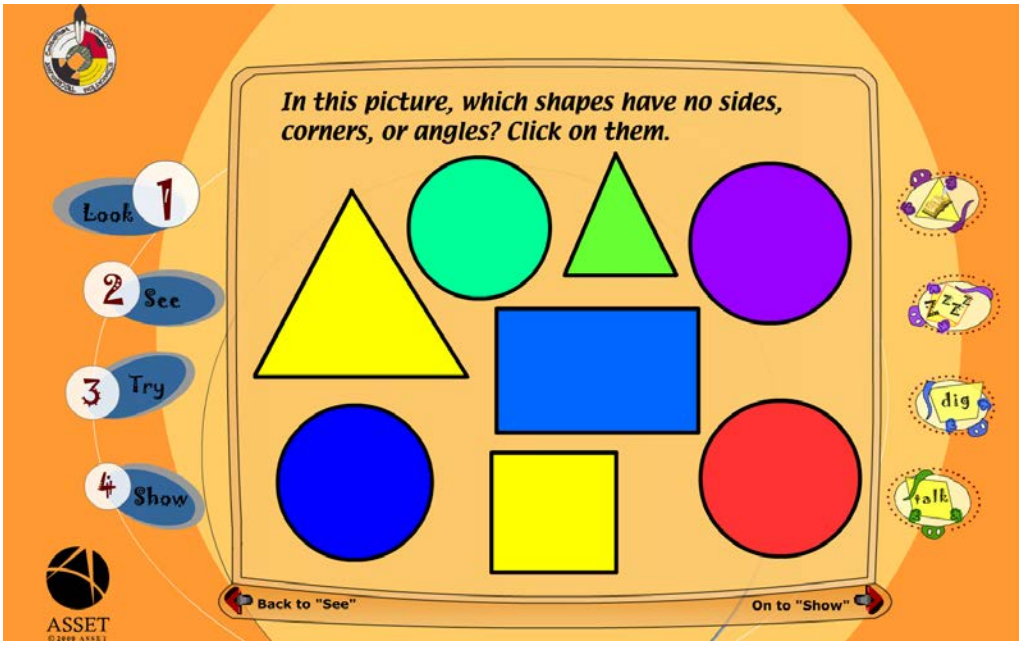
Source: WHRO/eMediaVA
Note: Demonstration only.

FIGURE I-2 Middle school interactive math lesson



Source: WHRO/eMediaVA
Note: Demonstration only.

FIGURE I-3 Elementary school interactive math lesson

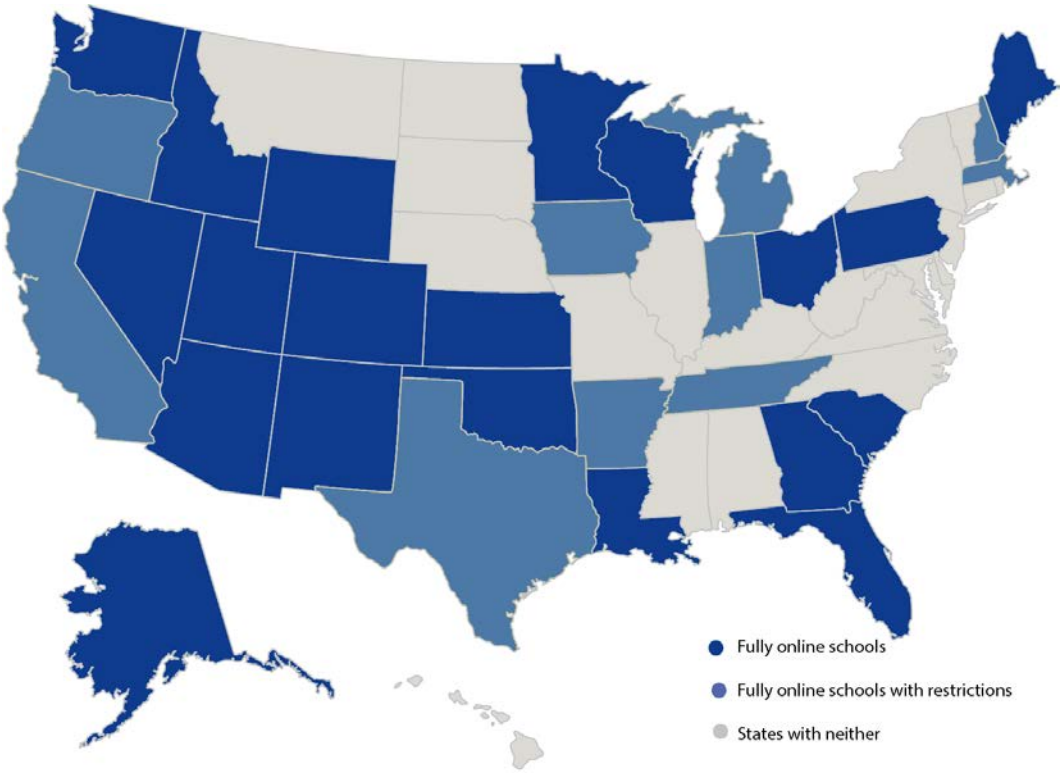


Source: WHRO/eMediaVA
Note: Demonstration only.

Appendix J: Fully Online Schools in Other States

As of the 2013-14 school year, Virginia was one of 19 states that did not have a statewide fully online school (Figure J-1). Of the 31 states that offer statewide fully online schools, 21 offer all K-12 students the opportunity to enroll in a fully online school. The remaining ten states restrict enrollment in fully online schools. Common enrollment restrictions include requiring that a certain percentage of online students be enrolled in public school the prior year, or that no more than a certain percentage of all public school students be enrolled in online learning programs (Table J-1).

FIGURE J-1
Thirty-one states offer statewide, fully online schools



Source: *Keeping Pace with K-12 Learning, 2014.*

The restrictions that states place on their fully online schools are generally intended to manage the growth of fully online schools. This may allow states to limit the budgetary impact of such schools, particularly if a substantial number of students enrolling in fully online schools were not previously enrolled in a public school. In some cases, enrollment restrictions may also reflect concerns about achievement in online learning programs compared to physical schools.

Table J-1
Ten states restrict enrollment in fully online schools

State	Restriction
Arkansas	No more than 500 students who were not previously enrolled in a public school may enroll in a fully online school, with a total enrollment cap of 3,000.
California	Fully online schools are available to K-12 students through partnerships between local school divisions and online providers, and may only serve students in contiguous counties.
Indiana	60 percent of fully online charter student must have been included in the state enrollment the previous year.
Iowa	No more than .018% of statewide K-12 enrollments (900 students) may be enrolled in educational online instruction. To ensure that no one division occupies a majority of available enrollments, no more than one percent of a division's enrollment may participate in instruction and course content over the Internet.
Massachusetts	No more than two percent of public school students statewide (about 19,000 students) may enroll in a fully online school. At least five percent of students in the fully online school must be from the division or collaborative partnering with the online provider.
Michigan	Total statewide online school enrollment is limited to two percent of Michigan's 2011-2012 public school enrollments (about 31,000 students). Online schools are also limited in annual enrollment to 2,500 students in year one, 5,000 in year two, and 10,000 in year three and after.
New Hampshire	Enrollment is limited to students in grades 6-12.
Oregon	Students may enroll in an online school without approval of their home division. However, if more than three percent of a division's students are enrolled in a fully online school not sponsored by the division, any additional students must receive approval to enroll.
Tennessee	For new online schools, enrollment is limited to 1,500 students initially, no more than 25 percent of students may be from outside the division, and no school may have more than 5,000 students. Online learning is limited to grades K-8.
Texas	Enrollment is limited to students in grades 3-12 who were enrolled in a public school in Texas the previous school year.

Source: JLARC staff review of *Keeping Pace with K-12 Learning*, 2014.

According to the 2014 report, *Keeping Pace with K-12 Digital Learning*, no state has more than three percent of its total K-12 student population enrolled in fully online schools. Researchers for this report note that fully online schools are chosen by small percentages of students, but limited enrollment may also reflect the use of enrollment restrictions. As a result of limited enrollment, fully online schools often need to draw from an entire state's K-12 population in order for schools to achieve economies of scale that minimize per-student costs.

Appendix K: Agency Responses

As part of an extensive validation process, state agencies and other entities involved in a JLARC assessment are given the opportunity to comment on an exposure draft of the report. JLARC staff provided an exposure draft of this report to the Secretary of Education and the following state agencies:

- Virginia Department of Education
- Virginia Department of Planning and Budget
- Virginia Information Technologies Agency

Appropriate corrections resulting from technical and substantive comments have been made in this version of the report. This appendix includes the response letters of the Secretary of Education, the Virginia Department of Education, and the Virginia Department of Planning and Budget.

COMMONWEALTH of VIRGINIA

Office of the Governor

Anne B. Holton
Secretary of Education

September 8, 2015

Hal E. Greer
Director, JLARC
201 North 9th Street
General Assembly Building, Suite 1100
Richmond, VA 23219

Dear Hal,

Thank you for sharing the draft copy of JLARC's report on Efficiency and Effectiveness of K-12 Spending. As usual, your team has done thorough and insightful work.

The report makes particularly clear the financial strains affecting public education in Virginia at a time when our schools are facing sharply increased challenges as well.

The report will be a great help to the Board of Education, my office, the Governor's office, and the General Assembly as we contemplate opportunities for improving public education in the upcoming months and years.

Sincerely,

Anne Holton

Anne Holton

Patrick Henry Building • 1111 East Broad Street • Richmond, Virginia 23219 • (804) 786-1151 • TTY (800) 828-1120

COMMONWEALTH of VIRGINIA

Steven R. Staples, Ed.D.
Superintendent of Public Instruction

DEPARTMENT OF EDUCATION
P.O. BOX 2120
Richmond, Virginia 23218-2120

Office: (804) 225-2023
Fax: (804) 371-2099

September 3, 2015

Mr. Hal E. Greer, Director
Joint Legislative Audit and Review Commission
General Assembly Building, Suite 1100
201 N 9th Street
Richmond, Virginia 23219

Dear Mr. Greer:

Thank you for the opportunity to review and comment on the Joint Legislative Audit and Review Commission's draft report on *Efficiency and Effectiveness of K-12 Spending*. The draft report thoroughly addresses each major category of K-12 spending and appropriately identifies key challenges, needs and opportunities in each category.

The draft report favorably addresses the two study mandates by which it was directed. Through the analysis of financial data, thorough research and the use of surveys and interviews with school division personnel, the draft report provides important insights into the negative impact that the 2008-2009 recession had on K-12 spending and explains how the associated budget reductions have hindered long-term efficiency and effectiveness in some instances.

We have provided comments and technical suggestions under separate cover that we trust will be useful as you finalize this report.

Sincerely,

Steven R. Staples

SRS/SBW/kfg

SEP 0 3 2015

COMMONWEALTH of VIRGINIA

Department of Planning and Budget

DANIEL S. TIMBERLAKE
Director

1111 E. Broad Street
Room 5040
Richmond, VA 23219-1922

August 31, 2015

Mr. Hal E. Greer, Director
Joint Legislative Audit and Review Commission
Commonwealth of Virginia
General Assembly Building, Suite 1100
Capitol Square Complex, Darden Garden
Richmond, Virginia 23219

Dear Mr. Greer:

Thank you for the opportunity to review and comment on the exposure draft report, *Efficiency and Effectiveness of K-12 Spending,* relevant to the Virginia Department of Planning and Budget (DPB).

Since the inception of the DPB school review program in 2003, the purpose of the program has been to provide an objective review of the efficiency of non-instructional services in an effort to channel savings into the classroom. As such, we appreciate and support any suggestions or recommendations for the improvement of Virginia's public educational system.

We have provided some technical comments in a separate letter that should be reflected in the final report.

Sincerely,

Daniel S. Timberlake

c: The Honorable Richard D. Brown

FAX (804) 225-3291 (804) 786-7455 TDD (804) 786-7578

JLARC.VIRGINIA.GOV
General Assembly Building
201 N. 9th Street, Suite 1100 Richmond, VA 23219