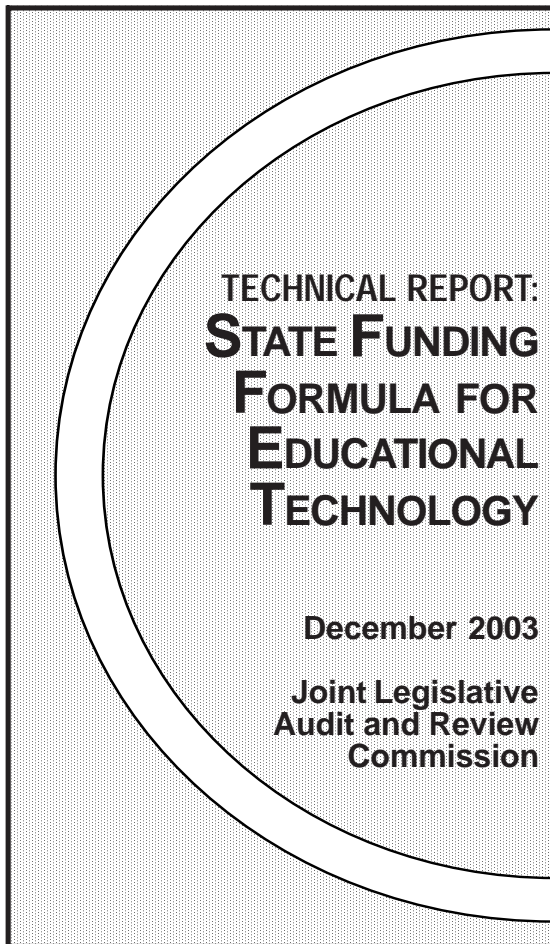


JLARC Report Summary



Educational technology has been an increasing priority of school divisions over the past decade as divisions have sought to improve the use of technology in their schools. However, as divisions have attempted to better integrate technology into the classroom environment, they have been confronted with a number of funding challenges and have increasingly looked to the State to help support these funding needs. In response to these concerns, the 2002 General Assembly passed Senate Joint Resolution 87, which directs JLARC to develop a State funding formula for educational technology and technology support personnel.

This report responds to SJR 87 by providing illustrative funding options for the General Assembly to consider if it wishes to more explicitly support educational technology through the use of a funding formula. The purpose of this report is not to determine the level of technology funding that is justified in school divisions. Rather, its role is to explore how different aspects of educational technology can be addressed through a funding formula. The amount of funding that the State should contribute to school divisions' educational technology programs hinges on a number of policy choices, which is why this report presents funding formula options and does not include specific recommendations for which level of technology funding support should be selected.

There are several key findings and observations that result from this review, which are summarized as follows:

- Significant progress has been made in the Commonwealth in funding technology personnel, in funding non-personnel items such as computers, and in funding other aspects of educational technology such as teacher training
- Nearly all divisions have given substantial access to students to use computers in the school environment.
- The Board of Education has recognized the need to institutionalize technology funding by proposing revisions to the Standards of Quality (SOQ) that would recognize technology in the funding formula for allocating SOQ funds.
- Technology funding will be an ongoing need at the State and local level, particularly personnel costs and the replacement of hardware.

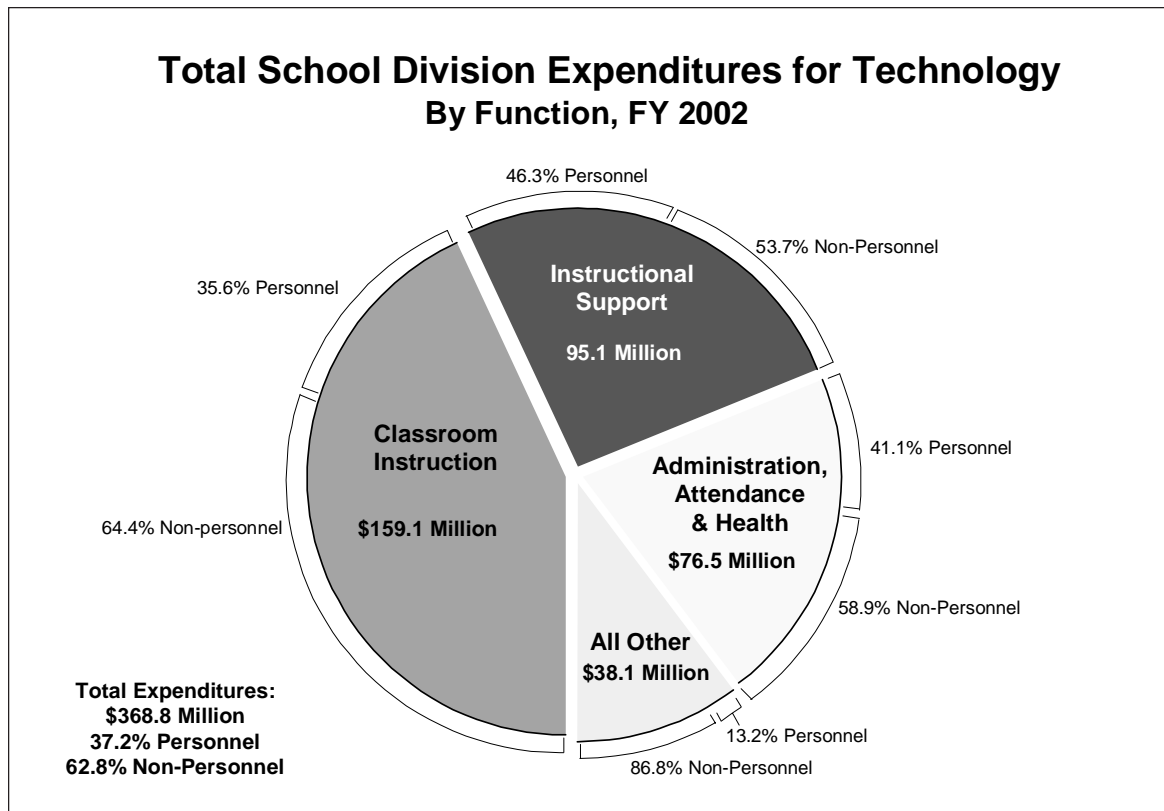
- State involvement in the ongoing support of technology funding could allow more local divisions to replace computers on a timely basis and provide the personnel needed for the effective use and maintenance of the technology. Funding formula options to address these objectives are included in this report.

Funding for Educational Technology

Virginia's school divisions spend a significant amount each year on educational technology. For example, during the 2001-2002 school year school divisions reported spending a total of \$368.8 million on technology (see figure). The majority of these expenditures (63 percent) were for non-personnel costs, such as computer equipment and infrastructure. School divisions receive State and federal funding to help cover these various technology costs, although the greatest share of costs is paid by localities.

State Funding for Educational Technology

There are two ways in which the State has assisted school divisions in funding their technology needs – through specified State initiatives and indirectly through the Standards of Quality (SOQ). The SOQ has been the largest source of State funding for educational technology; however, since funding has been provided indirectly, many school divisions may be unaware that they have received State SOQ funds for technology. To the extent that the State has provided technology funding through the SOQ, this funding has been imbedded with other educational costs. JLARC staff estimate that, based on FY 2002 expenditure data, the State's actual cost to meet its share of prevailing SOQ technology costs in that year was between \$84 million and \$110 million. This range captures the State share of costs reported by school divisions for technology support personnel and non-personnel costs in categories recognized in the SOQ fund-



Educational Technology Funding Provided by the State

FY 2001 to FY 2004

	FY 2001	FY 2002	FY 2003	FY 2004
VPSA Technology Initiative (Amount Authorized in the Appropriation Act)	\$56,910,000	\$58,338,000	\$58,416,000	\$58,598,000
Technology Resource Assistants Initiative	--	\$4,973,521	\$5,072,127	--
Electronic Classroom	\$2,611,658	\$2,611,658	\$2,531,770	\$2,531,770
Administrative Systems	\$1,135,345	--	--	--
Southside Virginia Regional Technology Consortium	\$215,000	\$215,000	\$182,750	\$100,000
Project ECOLE	\$50,000	\$50,000	--	--
Virginia Educational Technology Alliance	--	--	\$50,000	\$50,000
Total State Initiative Funding	\$60,922,003	\$66,188,179	\$66,222,647	\$61,279,770

**Estimated Standards of
Quality Funding for
Technology**

\$84 to \$110 million annually

The SOQ funding provided by the State each fiscal year includes an imbedded amount for technology purposes. The cost range shown above is JLARC staff's best estimate of the annual State share for technology costs reported in SOQ cost-eligible categories, based on actual FY 2002 expenditure data, and provides a rough approximation of the State's SOQ funding level over the fiscal years shown above.

ing formula, as implemented by DOE. The main technology area where it appears State SOQ funds may not have been provided to cover some costs is in the area of instructional technology personnel, such as integration specialists.

Beyond the funding provided through the SOQ, the State has also funded several initiatives aimed at educational technology. The Virginia Public School Authority (VPSA) Technology Initiative is the largest such State program. The General Assembly has authorized around \$58 million annually in technology notes through the VPSA over the past several years to help divisions improve their infrastructure and increase student access to computers. In addition to the VPSA Technology Initiative, the State has provided educational technology funding through several other smaller initiatives, and school divisions may use the local share of the lottery proceeds and funds provided through the

School Construction Grant program for technology purposes.

Other Support for Educational Technology. State appropriations for educational technology in FY 2002 are estimated to have covered about 44 percent of the total technology expenditures made by school divisions. School divisions covered the remaining technology costs through funds they received locally or from the federal government. Most of this remaining share was covered locally. However, the federal government has been an important source of educational technology funding.

In FY 2002 the federal government provided over \$25 million to Virginia's public schools for technology. The two most significant federal programs are the E-Rate program and the Educational Technology (Ed Tech) Grant program. Under the E-Rate program, schools receive discounts that can be applied to telecommunications services,

Internet access, and internal connections. The federal government allows a fair amount of flexibility for the use of the Ed Tech funds, although the Virginia DOE reports that it has earmarked the majority of Ed Tech funds for teacher training in technology.

The mandate for this study directs JLARC to “study ways to enhance the use of federal assistance for educational technology ... and the implementation of state tax credits for businesses that contribute technology resources to schools.” It appears that both the State and school divisions are doing what they can to maximize technology funding from federal sources. Funding for both the E-Rate program and the Ed Tech program are calculated on a funding formula basis. Thus, the Commonwealth and its school divisions are limited in the actions they can take to increase their share of federal funds.

With regard to State tax credits for business, DOE staff indicated that local school divisions, rather than the State, should take the initiative in working with private businesses that may contribute technology resources due to the fact that such opportunities vary greatly from one locality to another. Interviews with staff in the school divisions indicate that there are concerns regarding the use of tax credits to encourage businesses to donate technology resources. In their experience, donated resources have often been too old or have been costly for divisions to maintain. In addition, donated support may not be reliable or effective, and the distribution of donations may create problems of equity among divisions. Furthermore, most school divisions already have education foundations, established in the *Code of Virginia*, through which they can channel donated technology resources. Donations through these education foundations are already tax deductible.

Overview of Educational Technology Funding Options. This report provides

funding options for the following categories of educational technology costs:

- Technology personnel, including technology integration specialists and technical support staff;
- Hardware replacement; and
- Other non-personnel costs.

These costs are reflected across several different types of funding options. (A description of the various funding options is included in the exhibit at right.) The most viable and appropriate funding options for each of the cost categories are organized into different combinations to illustrate some ways in which the State could fund educational technology through the use of funding formulas.

Funding Formula Options for Technology Personnel

Virginia’s school divisions indicated that technology staffing is one of the areas where increased State funding is most needed. Unlike many other technology cost areas, school divisions are somewhat limited in the source of funds they can use for technology personnel. While divisions are able to utilize funding from a variety of sources for technology equipment and certain infrastructure needs, these sources often do not likewise provide a dependable source of funding for technology staff. Furthermore, some sources restrict the use of funds to non-personnel items. A State funding formula that explicitly provides a reliable and recurrent source of funds for technology staffing may be one of the ways in which the State could most effectively enhance its technology support for school divisions.

Funding for Technology Integration Specialists. The success of a school division’s technology program depends largely on having staff available to help teachers integrate technology into the regular

Types of Technology Funding Formula Options

Option Type	Description of Option
Prevailing Cost Option	Bases a funding formula on the typical (or linear weighted average) expenditures made by school divisions.
DOE Advanced Level Staffing Ratios Option <i>(Personnel Costs Only)</i>	Bases a funding formula on the advanced level staffing ratios in DOE's <i>Guidelines for Technology Staffing and Support for Integration of Education Technology into Instructional Programs</i> .
Board of Education-based Model <i>(Personnel Costs Only)</i>	Bases a funding formula on the Board of Education's recent proposed changes to the Standards of Quality to recognize technology support staff positions.
Site-based Model <i>(Personnel Costs Only)</i>	Calculates staffing levels at the school level with adjustments for school size.
Expand the High School Technology Resource Assistants Initiative <i>(Personnel Costs Only)</i>	Expands the former High School Technology Resource Assistants Initiative to include elementary, middle, and adult education schools.
Industry Standards Option <i>(Personnel Costs Only)</i>	Bases a funding formula on the industry standard for providing technology support.
5 to 1 Student-to-computer Ratio/5-Year Replacement Cycle <i>(Hardware Replacement Costs Only)</i>	Bases a funding formula on a 5 to 1 student-to-computer ratio and assumes a 5-year hardware replacement cycle.
5 to 1 Student-to-computer Ratio Plus Administrative Computers/5-Year Replacement Cycle <i>(Hardware Replacement Costs Only)</i>	Bases a funding formula on a 5 to 1 student-to-computer ratio and recognizes administrative computers. Assumes a 5-year hardware replacement cycle.
3 to 1 Student-to-computer Ratio/5-Year Replacement Cycle <i>(Hardware Replacement Costs Only)</i>	Bases a funding formula on a 3 to 1 student-to-computer ratio and assumes a 5-year hardware replacement cycle.
1 to 1 Student-to-computer Ratio/5-Year Replacement Cycle <i>(Hardware Replacement Costs Only)</i>	Bases a funding formula on a 1 to 1 student-to-computer ratio and assumes a 5-year hardware replacement cycle.

classroom curricula. This is the primary role of technology integration specialists, who work with teachers and other staff members to integrate technology into the classroom environment. Despite the importance of this position, nearly half of Virginia's school divisions did not report employing integration specialists. Furthermore, the need for this type of personnel was one of the areas of

concern most often mentioned by school division personnel. Currently, it is not clear whether the State contributes funding towards technology integration support personnel in many cases. Therefore, providing funds for integration specialists is an area where the State could significantly enhance its support for educational technology.

This report includes four options for funding integration specialists. The total State and local base salary and benefit costs for these options range from a low of \$15.2 million for the prevailing cost option to a high of \$93.1 million for the option based on the site-based model. Between these options are an option based on the DOE advanced level staffing ratios and the Board of Education-based option, both of which reflect current State guidance and recommendations for integration specialists. Of these four options, the site-based model produces the level of integration specialist staffing that most reflects the needs articulated by Virginia's school divisions. However, both the DOE advanced level staffing ratios option and the Board of Education-based model would be an improvement in shifting the costs for integration specialists into a funding formula that could be shared by the State and localities.

Funding for Technical Support Staff.

Technical support is the other area of technology staffing where school divisions indicated increased State support is needed. Technical support staff are concerned with technical responsibilities, such as keeping a school division's networks running and trouble-shooting computer problems. Due to the large range in how school divisions provide technology support, it is difficult to devise a funding formula that is representative of all divisions. For example, in very small divisions, a handful of technology support staff may serve a variety of support roles for the division. In contrast, large divisions often have several levels of technology administration and support, and technology staff in these divisions may serve much more specialized roles. Despite the variations in how technology support needs are met, it appears that there are generally three levels of technology support provided to schools – administrative support, support provided at the division level, and school-based technology support.

This report provides six options for funding technical support staff. The lowest cost option (\$49.6 million in base year FY 2002) is to reinstate and expand the High School Technology Resource Assistants Initiative, and the highest cost option (\$196.4 million in total State and local base salary and benefit costs) is to provide technology support at the industry level. In between these options are a prevailing cost option, a Board of Education-based option, an option based on the DOE advanced level staffing ratios, and a site-based option that calculates technical support at the school level. Similar to the funding options for integration specialists, the site-based model (\$100.8 million) reflects what several school divisions visited for this review have indicated is most appropriate in terms of levels of technical support.

Funding Formula Options for Hardware Replacement

Increased State funding for the replacement of technology equipment was also listed as a primary area of need by school divisions. Currently, the State provides funding to school divisions for the purchase of additional technology to meet the State's goal of a five-to-one student-to-computer ratio. However, funding is not explicitly provided for divisions to replace technology hardware as it becomes outdated. Education technology experts recommend that technology should be replaced every three to five years, but the majority of Virginia's school divisions reported that they are unable to fully fund a replacement cycle for hardware. Furthermore, as school divisions continue to add computers to meet the five-to-one ratio, additional funding will be needed to begin replacing a growing number of computers. Therefore, a funding formula that recognizes the ongoing need to replace hardware may be necessary in order to maintain appropriate ratios and to provide up-to-date technology for students.

Five options are presented for funding the replacement of hardware. The lowest cost option bases funding on prevailing expenditures by school divisions for hardware replacement. The total cost of funding this option is \$48.6 million in the base year, which is probably comparable to the level of funding the State currently provides for hardware replacement. The remaining four options are based on specific student-to-computer ratios and identified replacement cycles. Of these four options, the least expensive option (\$63.8 million) is based on a five-to-one student-to-computer ratio with a five-year replacement cycle. The most expensive option (\$299.3 million) is based on a one-to-one student-to-computer ratio and a five-year replacement cycle. The five-to-one student-to-computer ratio with a five-year replacement cycle reflects the State's current goals for student access to computers and a replacement-cycle that is in the range recommended by educational technology experts and school division staff.

Other Non-Personnel Costs and Teacher Training

In addition to costs associated with technology personnel and hardware replacement, school divisions face other technology non-personnel costs and costs associated with training teachers in the use of technology. These other components are vital in supporting a school division's educational technology program. However, in most cases school divisions did not indicate that they are high priority areas for increased funding from the State.

Other Non-personnel Costs Could Be Funded on a Prevailing Cost Basis. Beyond technology hardware, there are other non-personnel technology costs that school divisions must fund. These costs are related to technology infrastructure, software and supplies, Internet connectivity, and

a variety of other non-personnel items. School divisions did indicate that technology infrastructure, such as routers and electrical wiring, can be a high area of need for increased funding. However, infrastructure replacement costs tend to vary from year to year due to the long replacement cycle for some components and the one-time nature of other infrastructure cost items. For other non-personnel cost items, school divisions recognized that they present real costs but did not place them as a high priority for increased State support at this time. The funding formula options for non-personnel costs other than hardware are therefore based on the prevailing expenditures reported by school divisions. The prevailing methodology is used because it is consistent with how these costs likely have been recognized through the SOQ, and in some cases, it is not clear that there is a better way to model these costs.

Funding Integration Specialists May Be the Best Way to Assist with School Divisions' Training Needs. School divisions indicated that teacher training in technology is critical to the success of their technology programs. However, most divisions also acknowledged that existing State and federal funds available for teacher training are sufficient to cover current training needs, at least for traditional forms of technology training such as classes. Further, division staff said that the most effective technology training often occurs when technology staff are available to assist teachers with their immediate needs. Additional State funding to help divisions hire integration specialists may therefore be the most effective way to help divisions better train their teachers. This report addresses school divisions' training needs through the funding formulas provided for technology integration specialists rather than including options for increased funding for traditional technology training.

Illustrative Funding Formula Combinations

There are several combinations of funding options the State could use to help divisions fund their educational technology costs (see table below). The five combinations presented in the report do not include all of the various funding options discussed in the report. Instead, they include only those options that appear to be the most viable and best address the concerns of school divisions. These combinations also largely have the effect of redistributing technology costs currently paid by localities alone into a funding formula where a greater portion of the costs are shared with the State. Providing funds through a State formula would help equalize the funding that is available for educational technology among divisions, which would seem to be an appropriate role for the State. In some cases, however, localities would need to spend significantly more for tech-

nology than they reported spending in FY 2002 to pay for their share of the funding combination.

Of the five combinations, the prevailing cost combination is the least expensive and bases funding on a linear weighted average of what divisions are currently spending on technology. When compared to the total technology spending estimated for FY 2002, the prevailing cost combination still leaves a significant share of technology costs to be funded by the localities. The higher aspiration combination is the most expensive combination and would provide a very high level of technology support and student access to computers. This combination may be most illustrative of future costs as schools increase student access to computers. Combinations Two and Three represent recent State policies and recommendations in educational technology, while Combination Four best repre-

Summary of Illustrative Funding Combinations (Estimated Total State and Local Costs)

	FY 2002	FY 2005	FY 2006
Combination 1: Prevailing Costs	\$203,628,435	\$225,636,256	\$234,101,481
Combination 2: DOE Advanced Level Staffing Guidelines; 5:1 Ratio, 5-Year Hardware Replacement Model	\$240,588,274	\$266,515,578	\$276,450,243
Combination 3: Board of Education-based Recommendation; 5:1 Ratio, 5-Year Hardware Replacement Model*	\$256,858,949	\$285,234,219	\$294,939,999
Combination 4: Site-based Model; 5:1 Ratio, 5-Year Hardware Replacement Model	\$324,214,847	\$359,888,613	\$373,691,846
Combination 5: Higher Aspiration Option; 1:1 Ratio, 5-Year Hardware Replacement Model	\$559,786,490	\$620,027,191	\$642,594,771
Total Estimated State and Local Dollars Spent in FY 2002 \$368,784,677			
*The Board of Education is recommending a 4-year phase-in of the revisions that it is proposing to the SOQ. FY 2005 and FY 2006 costs shown here are the costs for the full implementation of the recommendation.			

sents what several visited school divisions stated would be most appropriate in terms of meeting technology support personnel and hardware replacement needs.

As described previously, the State already provides some funding for educational technology through the SOQ and various State initiatives. This report assumes that any funding that has been provided through the SOQ could be used to help support the technology funding formula combinations. The table below shows the estimated net cost increase to the State if it applied SOQ funding towards meeting its share of the

cost options. The report makes no assumptions as to whether existing State initiative funding, such as the VPSA Technology Initiative, would be redirected to offset the cost of the combinations.

If the General Assembly decides to adopt a funding formula approach to educational technology, such formulas should be revisited on a regular basis. This is needed because the nature of educational technology in Virginia's schools will change over time, affecting schools' needs for technology support, hardware replacement, and other technology items.

Estimated Net Increase in State Costs of Illustrative Funding Combinations* (in millions)				
	FY 2005 (State Cost)	Estimated Increase Over FY 2002	FY 2006 (State Cost)	Estimated Increase Over FY 2002
Combination 1: Prevailing Costs	\$124.9	\$27.8	129.4	\$32.3
Combination 2: DOE Advanced Level Staffing Guidelines; 5:1 Ratio, 5-Year Hardware Replacement Model	\$148.2	\$51.1	\$153.4	\$56.3
Combination 3: Board of Education-based Recommendation; 5:1 Ratio, 5-Year Hardware Replacement Model**	\$157.8	\$60.7	\$162.9	\$65.8
Combination 4: Site-based Model; 5:1 Ratio, 5-Year Hardware Replacement Model	\$200.5	\$103.4	\$207.7	\$110.6
Combination 5: Higher Aspiration Option; 1:1 Ratio, 5-Year Hardware Replacement Model	\$345.1	\$248.0	\$356.9	\$259.8
Estimated FY 2002 State Share of Standards of Quality Technology Funding \$97.1 million				
*Estimates do not assume any changes in current use of State initiative funding.				
**The Board of Education is recommending a 4-year phase-in of the revisions that it is proposing to the SOQ. FY 2005 and FY 2006 costs shown here are the costs for the full implementation of the recommendation.				

Educational Technology and the Annual School Report

The Annual School Report (ASR) is the primary source of data for school divisions' educational expenditures. It was also the primary source of data for the technology funding options provided in this report. Starting with FY 2001, DOE added a new section to the ASR specifically for technology. This new section is very helpful for calculating technology funding levels, but there are currently several limitations with the technology data that are collected through this section that may need to be addressed if the data are to be used for a technology funding formula. Because of these limitations, the cost of various funding combinations may change appreciably in the future if divisions change how they report their technology expenditures.

There appear to be three main limitations associated with the technology expenditures reported in the ASR, if the data are to be used for a funding formula. First, the ASR does not currently provide separate cat-

egories to allow school divisions to report certain technology expenditures independently, such as the expenditures for technology integration specialists and peripheral hardware equipment. The extent to which this is an issue depends on whether the General Assembly decides to adopt certain funding formula options discussed in this report. For example, if the General Assembly decides to adopt funding formulas for technology integration specialists and peripheral hardware replacement, it may wish to direct DOE to collect more detailed data on these technology cost components. DOE staff have indicated that, should more detailed expenditure data be needed for a funding formula, the ASR could be modified to collect such data.

Second, during analysis of the ASR data and site visits with school divisions, JLARC staff found that some school divisions failed to use the ASR technology section to report the majority of their technology expenditures. In most cases, these expenditures were reported elsewhere in the ASR. However, the

Summary of Potential Actions Regarding the Annual School Report (ASR)	
ASR Data Collection:	If the General Assembly decides to adopt a funding formula for educational technology, it may wish to direct DOE to collect more detailed data on certain technology cost components through the Annual School Report (ASR).
Analysis of ASR Data:	If the General Assembly decides to adopt a funding formula for educational technology, it may wish to direct DOE to conduct preliminary analysis, such as outlier analysis, to help identify school divisions that have not reported their technology expenditures in the technology section of the ASR.
Consistency of ASR Data:	If the General Assembly decides to adopt a funding formula for educational technology non-personnel costs, it may wish to work with DOE, and other State agencies as is necessary, to set a consistent capitalization threshold for localities for data reporting purposes. Alternatively, the General Assembly may wish to direct DOE to modify the ASR to distinguish between expenditures for new additions and replacements for non-capitalized hardware and infrastructure.

failure to report technology expenditures in the proper ASR section means that these divisions' costs were not included in the estimates of technology costs. To help remedy this issue, in future years DOE could perform preliminary analysis, such as outlier analysis, to identify divisions that do not appear to be using the technology section of the ASR to report their technology expenditures. In addition, the General Assembly may wish to consider amending Section 22.1-115 of the *Code of Virginia* to include technology as a major classification of funds for school division accounting purposes.

Third, the consistency of the technology expenditures reported in some areas could be improved, particularly regarding the capitalization of hardware and infrastructure.

Because localities have different capitalization thresholds, they report expenditures for various hardware and infrastructure items, such as computers, differently. This means that expenditures for the same types of items may be treated differently in a funding formula. If the General Assembly decides to adopt a funding formula for educational technology non-personnel costs, it may wish to work with DOE, and other State agencies as is necessary, to set a consistent capitalization threshold for localities for data reporting purposes. Alternatively, the General Assembly may wish to direct DOE to modify the ASR to distinguish between expenditures for new additions and replacements for non-capitalized hardware and infrastructure.