Memorandum

TO :	House and Senate Committees on Education
FROM:	Bureau of Legislative Research, Policy Analysis and Research Section
DATE :	June 9, 2014
SUBJECT :	Broadband Expenditures
PROJECT #	14-001-38

The Bureau of Legislative Research (BLR) was asked to provide information about the portion of foundation funding provided to public school districts to support their need for broadband services. The foundation funding formula, or matrix, funds bandwidth as part of a district's overall technology needs. In 2012-13 the matrix provided a total of $217.60 per student for the technology component. However, until recently there has been no uniform way for districts to identify their broadband expenditures when reporting them through the Arkansas Public School Computer Network (APSCN). There were no specific expenditure codes districts could use for broadband. The Arkansas Department of Education (ADE) has created new codes for broadband expenditures that will allow for easier tracking in the future. ADE recommended districts use the codes for the 2013-14 school year and will require their use for 2014-15. Until those codes were established, districts coded broadband expenditures in a variety of ways. Some districts used technology codes, while others treated broadband more like a utility and used codes for operations and maintenance (O&M) expenditures.

This memo offers information on how districts have coded broadband expenditures in the past. It also includes an overview of the technology and O&M line items of the matrix and districts' expenditures in these areas. This information is provided to give context to the discussion on broadband, but both the technology and O&M components of the matrix cover more resources than broadband alone. A more comprehensive discussion of each of these line items will be provided during the July adequacy study meeting.

BROADBAND USE IN SCHOOLS

Broadband access and other technology are changing the way education is delivered in a multitude of ways. By helping students work more independently, technology gives teachers more time to work one-on-one or with small groups of students. Technology has allowed students and parents increased opportunities for individualizing, customizing and providing access to education through virtual or distance learning. Students who have struggled in traditional classrooms often find success in a virtual setting where the teacher and student communicate one-on-one through computer use and the student can proceed at his or her own pace. It also offers access to highly qualified teachers in hard-to-staff subjects or hard-to-staff urban and rural schools, giving all students the opportunity to take a rigorous curriculum, regardless of their school's ability to recruit and retain teachers. Technology also gives schools the ability to bring rich and diverse materials into the classroom. For example, hundreds of

libraries and museums have recorded parts of their collections in digital form and distributed these sources through the Internet and as software.[1]

Today schools use their broadband access for a wide variety of school functions, including:
- Filing APSCN cycle reports
- Offering distance learning courses
- Downloading educational videos
- Conducting student research
- Conducting professional development using the IDEAS portal maintained by AETN

Additionally in 2014-15, the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment will replace the current math and literacy benchmark exams. The PARCC assessments will be administered online, requiring bandwidth that has not been needed for the former paper and pencil tests.

BROADBAND EXPENDITURES

To get a better sense of what districts are spending on broadband and how they categorize those expenditures, the BLR included several questions on the district survey used for the 2014 adequacy study. As committee members may remember, the BLR conducted surveys of all 238 school district superintendents using an online questionnaire. The survey was distributed to the districts beginning October 28, 2013, and the last district responded January 21, 2014. To elicit the most candid responses, superintendents were assured their answers would not be individually identified, therefore responses are provided only in aggregate. This memo presents the responses districts gave to questions on broadband. The first questions requested information on districts' broadband expenditures.

District Survey Question: How much did your district spend on bandwidth services (broadband) in 2012-13?

Districts reported spending a total of $4.74 million on bandwidth in 2012-13. The total district bandwidth expenditures ranged from $3 for one district to $912,717 for another. These expenditures likely exclude broadband charges that were reimbursed or covered by the federal E-Rate program, although the question did not specify their exclusion. More than two-thirds of the districts reported paying less than $10,000 for broadband. The following tables indicate that the majority of districts (68%) spent less than $10,000 on broadband services in 2012-13.

	Districts	% of Districts
$0 (or left answer blank)	48	20%
$1-$5,000	81	34%
$5,001-$10,000	34	14%
$10,001-$15,000	22	9%
$15,001-$25,000	15	6%
More than $25,000	38	16%
	238	**100%**

The following table indicates that broadband expenditures increase with district size. Additionally, as districts increase in size, they are less likely to have zero broadband charges (i.e., 34% of the small districts reported no broadband charges, compared with 6% of the largest districts). This could mean that smaller districts are more likely to rely on the broadband access

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[1] Grinager, H. (2006). *How education technology leads to improved student achievement.* Washington, DC: National Conference of State Legislatures. Retrieved September 5, 2013, from, *https://www.ncsl.org/portals/1/documents/educ/item013161.pdf*

provided through the state contract (Department of Information Systems) for all of their access, while larger districts are more likely to purchase additional bandwidth to supplement the state-provided broadband.

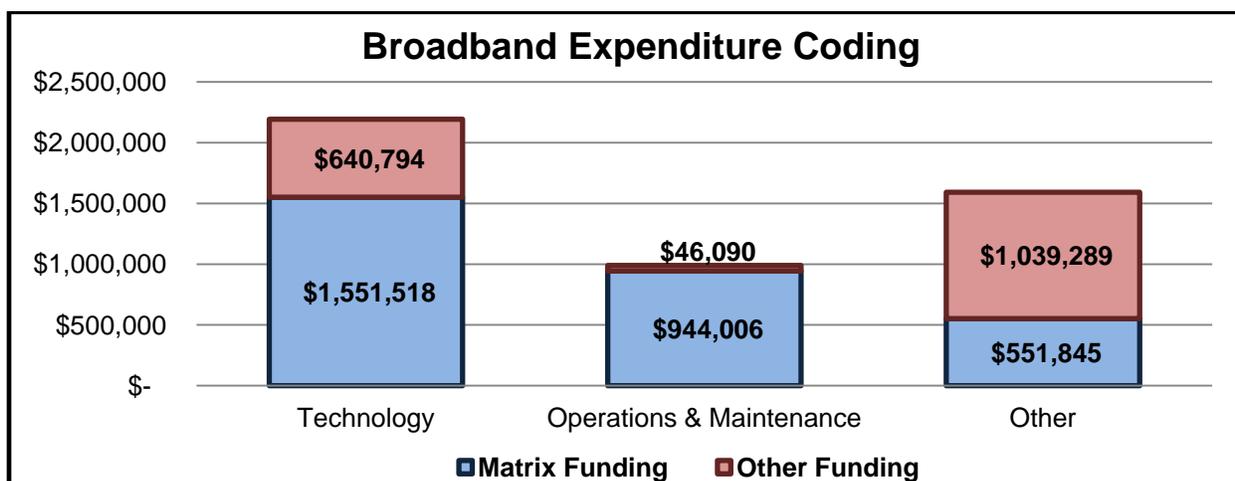| District Size (2012 ADM)	Avg. Broadband Expenditure	Avg. Broadband Expenditures When Districts With 0 Charges Are Excluded	# of Districts Reporting Charges	# of Districts Reporting 0 Charges
750 or less	$5,492	$8,285	57	29
751-5,000	$16,737	$19,269	119	18
5,001 or more	$131,632	$141,035	14	1

Broadband expenditures were also examined by districts' concentration of poverty as measured by the percentage of students who are eligible for free or reduced price lunch (National School Lunch, or NSL percentage). Districts with the highest concentrations of poverty had the lowest broadband expenditures on average. This finding may be related to the fact that districts with higher NSL percentages are awarded greater E-Rate discounts on telecom services.

NSL%	Avg. Broadband Expenditure	Avg. Broadband Expenditures When Districts With 0 Charges Are Excluded	# of Districts Reporting Charges	# of Districts Reporting 0 Charges
<70%	$17,547	$21,495	120	27
70%-< 90%	$25,081	$31,921	66	18
90%+	$7,643	$13,375	4	3

The district survey then asked for specific data on how districts were coding their broadband expenditures.

District Survey Question: Please provide the fund, function, and object codes used to record 2012-13 bandwidth expenditures in the APSCN data warehouse. Please also provide the total bandwidth expenditures for each.

Districts used foundation funds to make about $3 million, or 64% of their broadband purchases. Of the expenditures made from foundation funds, districts coded 51% as technology expenditures and 31% as O&M expenditures. They used other expenditure codes for the remaining 18%. From all funding sources, districts used technology codes to identify 46% of their broadband expenditures, O&M codes for 21% of broadband expenditures, and other codes for the remaining 33% of broadband expenditures.

Broadband Expenditure Coding

Technology: Matrix Funding $1,551,518, Other Funding $640,794
Operations & Maintenance: Matrix Funding $944,006, Other Funding $46,090
Other: Matrix Funding $551,845, Other Funding $1,039,289

■ Matrix Funding   ■ Other Funding

Note: Amounts in the chart total $4.77 million. The total amount is different from the total $4.74 million provided in the previous question due to variations in the districts' answers to the two questions.

The next sections of this memo provide information on the matrix and the two matrix components most affected by broadband expenditures: technology and O&M.

FOUNDATION FUNDING

In 2003 and 2006, the General Assembly hired education finance consultants Picus and Associates, Inc. to help determine the resources needed to provide an adequate education. The consultants helped the state develop a funding formula that identified needed resources (teachers, books, administrative staff, etc.) and the costs of those items. The formula, or matrix, was based on the resources needed for a school of 500 students and was calculated as a per-student amount. The components of the matrix are not specified in statute—only the final per-student amount appears in law. Foundation funding is considered unrestricted money, meaning districts can spend it however best fits their needs. The matrix is used to measure how closely districts' actual spending patterns mirror the funding's intended purpose and allows the General Assembly to determine if adjustments to the formula are necessary.

MATRIX LINE ITEM: TECHNOLOGY

To ensure districts have funding to support their need for computers and other technology, the matrix provided $217.60 per student in 2012-13. The current rate (2013-14) is $221.50 per student. Collectively districts received $99.5 million in foundation funding for technology in 2013 and $101.8 million in 2014.

DEFINITION AND BACKGROUND

The technology line item of the matrix was originally set at $250 per student based on the 2003 recommendations of Picus and Associates. This rate was established to provide districts $125,000 per 500 students to purchase, update, and maintain hardware and software. The funding was designed to provide one computer for every three students and the technology infrastructure needed for distance learning. On the advice of the consultants, the technology funding rate was set at $250 per student, but over the next two years, the General Assembly decreased the amount to $185 per student, due to evidence presented to the Education Committees that the price of technology was decreasing.

In 2006 when the consultants were rehired to adjust the matrix, they again recommended districts be provided $250 per student to pay for technology expenditures. This time they detailed the individual costs comprising the $250 funding amount. This funding was designed to cover four categories of technology expenditures: 1.) computers, 2.) operating system and other non instructional software, 3.) network equipment, printers and copiers and 4.) instructional software and additional hardware. Picus and Associates described the four components and recommended the following per-student cost for each.

	Individual Items		Per-Student Cost
1) Computers	• One computer for every four students, plus one computer for every teacher, principal and other key school staff, which calculates to an overall ratio of 1 computer for every three students		$100
2) Operating system and other non-instructional software	• Operating system (e.g., Windows) • Productivity suite (e.g., Microsoft Office) • Server software	• Database • Antivirus/anti-spyware • Other network	$50
3) Printers, copiers network equipment,	• Network equipment and internet connectivity	• Copiers, 240 copies per student • Printers	$50
4) instructional software and additional hardware	• Instructional hardware: e.g., LCD projectors, smart boards (interactive whiteboard), document cameras (digital overhead), etc. • Instructional software: e.g., Accelerated Reader, multimedia resources such as Discovery.com, etc. • Software for administrators: e.g., Edusoft (helps administrators analyze test scores)		$50

Internet Connectivity

Funding for broadband fell into the third component of the technology line item: network equipment, printers and copiers. In their 2006 report, the consultants emphasized the importance of bandwidth as an instructional tool: "The data lines that make up [a district's] network must remain uncongested for teachers and administrators to maximize their efficiency…It is imperative that administrators, teachers, and students understand that there is a limited amount of bandwidth and that it should be used for educational purposes."[2]

The consultants' 2006 report noted that most elementary campuses nationally have at least one T-1 line with a capacity of 1.5 megabits each and most middle and high schools commonly have two T-1 lines to their site. The report noted that T-1 lines typically cost $250 per month or $3,000 annually, and districts also pay an access charge of about $500 per school year for internet service. Based on a 400-student school, the consultants calculated a per-school cost of $3,500, or $9 per student. (In various places throughout the report, including this section on technology costs, the consultants provided costs based on a school size other than 500 students.)

Technology Staffing

In their 2006 report, Picus and Associates noted that the technology funding was designed to cover the costs of physical technology needs and services, not technology employees. Technology staff, they noted, are funded through other line items in the matrix. Specifically, .5 FTE technology assistant is provided through the instructional facilitator line item of the matrix, and the central office line item supports 1 FTE technology coordinator in the central office line item.

While the consultants, in 2006, reiterated their recommendation that technology should be funded at $250 per student, the Adequacy Subcommittee determined that $185 per student accurately reflected the cost of technology (minus technology staff) in schools. However, the committee opted to increase the technology funding in 2007-08 to $220 and decrease it to $201 for 2008-09 based on a declining inflationary index for computers. Since that time, the technology line item has steadily increased as a cost of living adjustment has been applied each year to the total foundation funding rate.

TECHNOLOGY EXPENDITURES

In 2013, districts collectively spent $34.3 million in foundation funding on technology. This equates to approximately $75.13 per student in 2012-13, compared with $217.60 funded in the matrix. The following table shows the per-student expenditures for 2012 and 2013. (Note: In past adequacy studies, technology staff have been included in the technology expenditures reported in Resource Allocation reports. However, in an effort to more closely align with the established intent of the matrix, school-level staff expenditures have been calculated as part of the instructional facilitator line, while district-level technology staff expenditures have been calculated as part of the central office line item.)

Technology Funding and Expenditures Per Student				
	Matrix Funding Amount	Foundation Expenditures Per Student	Total Foundation Funding Received	Total Foundation Funding Spent
2011-12	$213.30	$65.27	$97.5 million	$29.8 million
2012-13	$217.60	$75.13	$99.5 million	$34.3 million

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[2] Lawrence O. Picus and Associates, Recalibrating the Arkansas School Funding Structure, August 30, 2006, p. 38.

The following chart shows the per-student expenditure costs broken down by district size and percentage of students who are eligible for free or reduced price lunch (NSL %). Mid-sized districts—those with 751 to 5,000 students (average daily membership, or ADM)—spent more on technology on average than other districts. Additionally, districts with high NSL percentages spent less foundation funding per student on technology than more affluent districts. This could result from high-poverty districts having more funding beyond foundation funding to use for technology purchases.

2012-13 Technology Expenditures By District Size and NSL %			
ADM	**Foundation Expenditures Per Student**	**NSL %**	**Foundation Expenditures Per Student**
750 or less	$50.40	Less than 70%	$83.11
751-5,000	$88.74	70%-<90%	$57.65
5,001 or more	$62.12	90% or more	$35.35

Technology Staff in other Matrix Lines

Technology staff are considered part of other lines of the matrix. However, districts' expenditures for technology employees are included in this report to provide a comprehensive view of districts' spending on technology. Districts spent $11.7 million in foundation funding on school-level technology assistants in 2012-13. This equates to approximately $25.63 per student, far less than the $60.56 per student provided through the matrix.

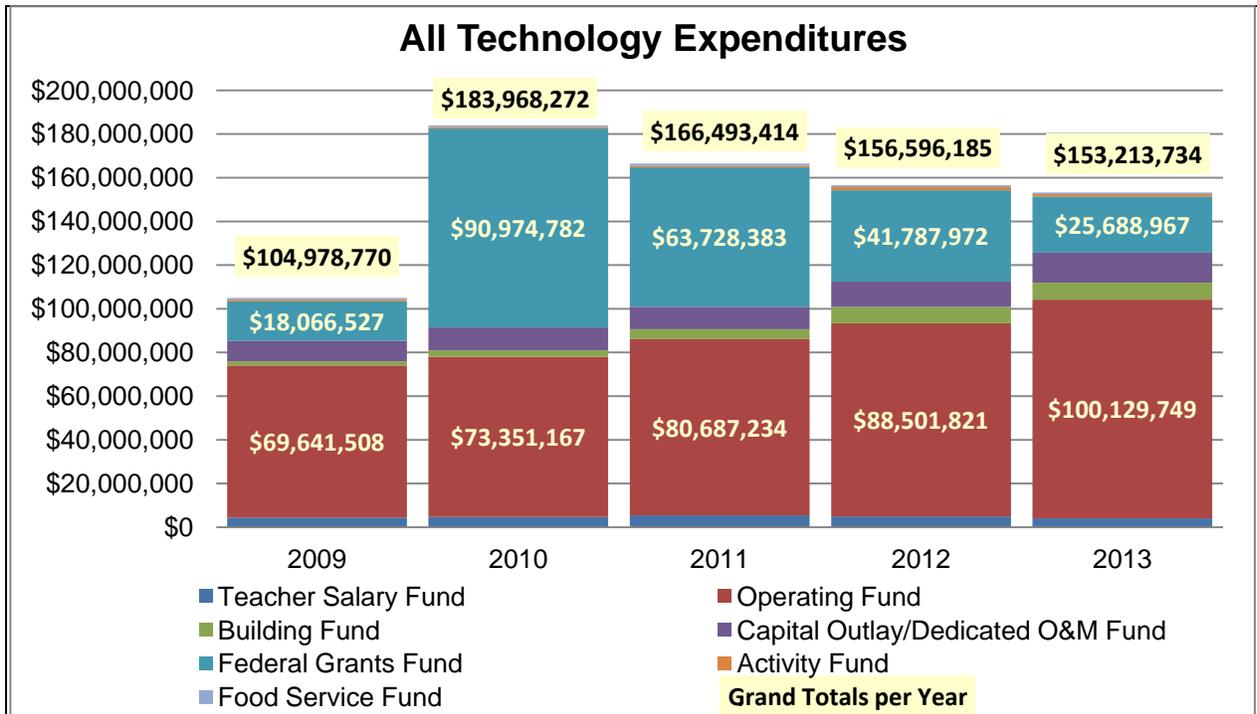| Technology Assistant in Instructional Facilitator Line				
	Matrix Funding Amount	**Foundation Expenditures Per Student**	**Total Foundation Funding Received**	**Total Foundation Funding Spent**
2011-12	$59.38	$24.32	$27.2 million	$11.1 million
2012-13	$60.56	$25.63	$27.7 million	$11.7 million

Districts spent $20.5 million in foundation funding on technology coordinators in 2012-13. This equates to $44.78 per student. The matrix does not provide an amount specifically for technology coordinators. Instead the matrix provides an amount of $415.10 per student for the central office as a whole, and districts spent $335.96.

Technology Coordinator in Central Office Line			
	Matrix Funding Amount	**Foundation Expenditures Per Student**	**Total Foundation Funding Spent**
2011-12	Not Specified	$43.18	$19.7 million
2012-13	Not Specified	$44.78	$20.5 million

Although the matrix formula funds broadband costs as part of the technology component, some districts record their broadband expenditures as operations and maintenance expenditures.

TECHNOLOGY EXPENDITURES FROM ALL FUNDING SOURCES

The following chart shows all expenditures districts made for technology-related expenses (physical items and staffing) from all funding sources. Expenditures of foundation funds are included in two of the categories described below: the Teacher Salary Fund and the Operating Fund. The chart shows that districts greatly increased their use of federal funding to purchase technology in 2010. This likely resulted from the surge of federal funding made available to districts by the American Recovery and Reinvestment Act of 2009. Because districts made large investments in technology in 2010, they may have had fewer technology needs in the following years.

All Technology Expenditures

	2009	2010	2011	2012	2013
Grand Totals per Year	$104,978,770	$183,968,272	$166,493,414	$156,596,185	$153,213,734
Federal Grants Fund	$18,066,527	$90,974,782	$63,728,383	$41,787,972	$25,688,967
Operating Fund	$69,641,508	$73,351,167	$80,687,234	$88,501,821	$100,129,749

Legend:
- ■ Teacher Salary Fund
- ■ Building Fund
- ■ Federal Grants Fund
- ■ Food Service Fund
- ■ Operating Fund
- ■ Capital Outlay/Dedicated O&M Fund
- ■ Activity Fund
- Grand Totals per Year

MATRIX LINE ITEM: OPERATIONS AND MAINTENANCE

In 2012-13, the matrix provided $629 per student for operations and maintenance (O&M), and collectively districts received $287.6 million for O&M in 2013.

DEFINITION AND BACKGROUND

In 2006, Picus and Associates recommended providing $594 per student for O&M. This amount was intended to cover custodians, maintenance workers, groundskeepers, maintenance supplies, utilities, and property insurance. The Adequacy Subcommittee, however, determined that the consultants' recommendations were based on costs in higher priced geographical areas of the country and on more duties than are required in Arkansas. The Subcommittee asked the Academic Facilities Oversight Committee to study the issue further.

The Facilities Oversight Committee recommended that O&M be funded at 9% of the foundation funding rate, based on a requirement set out by Act 1426 of 2005. That act requires districts to spend at least 9% of their foundation funding to pay for utilities; custodial services, maintenance, repair, and renovation activities. If districts do not spend the required 9%, they must transfer unspent funds into an escrow account to be used for future O&M expenses. The Adequacy Subcommittee adopted the Facilities Oversight Committee's recommendation and set part of the O&M component at 9% of a district's foundation funding. Additionally, the Subcommittee recommended providing $27 per student for property insurance. The total O&M

amount in 2007-08 and 2008-09 was set at $581 per student, which included $554 for the 9% of foundation funding and $27 for property insurance. Since that time, the O&M line item has steadily increased as a cost of living adjustment has been applied each year to the total foundation funding rate.

OPERATIONS AND MAINTENANCE EXPENDITURES

In FY2012-13, districts collectively spent $361.8 million in foundation funding on operations and maintenance. This equates to approximately $791.32 per student, compared with $629 funded in the matrix. The following table shows the per-student expenditures for 2011-12 and 2012-13.

Operations and Maintenance Funding and Expenditures Per Student				
	Matrix Funding Amount	Foundation Expenditures Per Student	Total Funding Received	Total Foundation Funding Spent
2011-12	$616.60	$775.14	$282 million	$354.5 million
2012-13	$629.00	$791.32	$287.6 million	$361.8 million

Because districts said they recorded less than $1 million of their broadband expenditures as O&M expenditures, broadband likely is not a significant factor in districts' pattern of spending more on O&M than what is provided in the matrix.

CONCLUSION

Districts reported spending about $4.7 million on broadband expenditures in 2012-13. Districts used about $3 million of their foundation funds to pay for those expenses. Districts reported recording about 51% of their broadband expenditures as technology expenses, 31% as O&M expenditures and the remaining 18% as other types of expenditures.

The foundation funding matrix provided districts with money for broadband expenses through the formula's technology line item. In 2012-13, districts received $217.60 per student for all technology needs (not including technology staff), and districts spent about 35% of that amount on technology needs.

Because some districts code their broadband expenditures as O&M expenses, this memo also examined districts' O&M spending patterns. Districts received $629 per student in foundation funding for O&M needs in 2012-13 and spent 1.25 times as much. However, because so little of the O&M expenditures are tied to bandwidth, the cost of broadband likely had little to do with districts' high spending in this area. A more comprehensive review of this expenditure category will be presented in July.