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Information Brief

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Virginia SchoolSpeedTest Results

INTRODUCTION

The need to ensure high-speed Internet connectivity in our public schools becomes more urgent with each passing school year. In June 2013, President Barack Obama announced the ConnectED initiative, which pledges to connect 99% of students to next-generation broadband and high-speed wireless within five years. On January 28, 2014, he reiterated this commitment during his annual State of the Union address and announced that more than 15,000 schools and 20 million students will get connected over the next two years with support from the Federal Communications Commission (FCC) and private sector partners. To this end, the FCC is in the process of modernizing the E-Rate program and focusing more on high-capacity broadband.

The Commonwealth of Virginia has demonstrated how quickly the demand for high-speed connectivity has grown. Virginia has been and continues to be a national leader in providing Internet access to students for instruction and assessment. Since 1989, the Commonwealth has invested approximately $1 billion in infrastructure and hardware to create and maintain high-speed Internet connectivity in all schools. Since 2001, the funding has focused on improving online instruction and testing capabilities. Despite this investment, though, the demand for ever-increasing bandwidth continues as the education landscape changes. During 2012-13 all public schools in the Commonwealth administered state assessments online for a total of more than three million assessments. This growing number of online tests and technology-enhanced test items are continually requiring more capacity. At the same time, there is an increasing demand for more bandwidth to support daily instructional needs, such as virtual learning and access to high-quality, media-rich digital content. Furthermore, students who entered ninth grade in 2013-14 must complete one virtual course to earn a Standard Diploma. This new requirement is increasing the need for virtual course options for all students.

The Virginia Department of Education continues its push to provide digital resources at all levels. EduWidgets, the Infinite Learning Lab, eMediaVA, the Share the Skies Internet Telescope, and Virginia on iTunes U are among the growing collection of resources that are freely available to schools and families. In addition, the Virginia e-Learning Backpack Initiative, which helps schools transition from traditional print-based textbooks to tablets and digital content, is placing even greater demands on the existing infrastructure.

Due to these initiatives, all school divisions in Virginia are assessing their technology capabilities. To assist in this process, the Virginia Department of Education, in collaboration with EducationSuperHighway, conducted a statewide school speed test in October and November 2013. This effort was part of the National School Broadband Test organized by EducationSuperHighway, a nonprofit organization dedicated to improving Internet access in schools nationwide.

Statewide School Speed Test

The Virginia Department of Education asked the Commonwealth's public schools to participate in this statewide test of Internet connection speeds. The goal was for each of the state's 1,867 public schools—and buildings housing regional and specialty education programs—to conduct 10 connection-speed tests at different times over several days. The Virginia SchoolSpeedTest measured the Internet speed in every Virginia public school division to gather data about real-world Internet performance and the current readiness of K-12 institutions. Unlike many typical speed tests, this effort reflected how students and teachers actually use the Internet on a regular basis.

The individual tests, which took approximately one minute to complete, were administered through an online application that measured the available bandwidth. The tests documented upload speeds, download speeds, and the browsers and operating systems of school devices. Divisions designated an individual staff member—such as a division technology director—to coordinate the testing and ensure that the tests were conducted in every school.

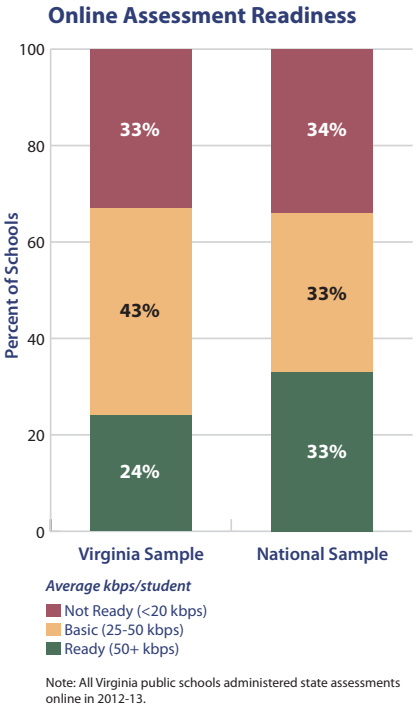
EducationSuperHighway has summarized the results in the context of online assessment readiness and digital learning readiness, as defined by the State Educational Technology Directors Association (SETDA) and consortia that are in the process of developing assessments to test the national Common Core State Standards.[i, ii, iii] EducationSuperHighway established, for purposes of the SchoolSpeedTest, definitions based on SETDA and consortia guidelines. The results from the Virginia SchoolSpeedTest are discussed within these definitions.

SETDA Standards for Digital Learning

Category	Bandwidth	Example Activities
Technology Rich	100+ kbps/student	Full 1:1; media-rich content; robust Web-based projects/courses, student management, and conferencing
Emerging Reliance	50-100 kbps/student	Implementation of partial 1:1; dynamic content/streaming video, Web projects; Web-based office/student management
Basic Connectivity	10-50 kbps/student	Rotational computer lab; basic online research and e-mail activities
Pre-Basic	<10 kbps/student	Basic activities; limited by bandwidth

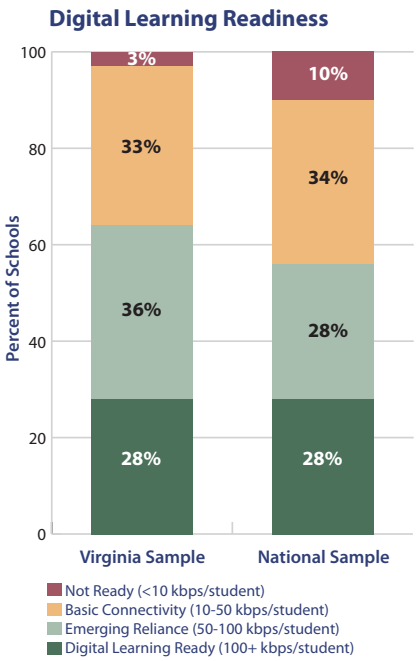
Findings

The tests were completed by 1,671 schools in 132 school divisions and by five buildings that house regional and specialty education programs. Due to invalid tests, 99 schools were excluded from the analysis; another 91 schools were excluded due to a lack of enrollment data. During the testing period, 82% of the sites completed six or more tests, with an average of 16 per site. This sample represents approximately 86% of all students across the Commonwealth; although, it should be noted that most schools in major cities did not participate, and none completed six or more tests.



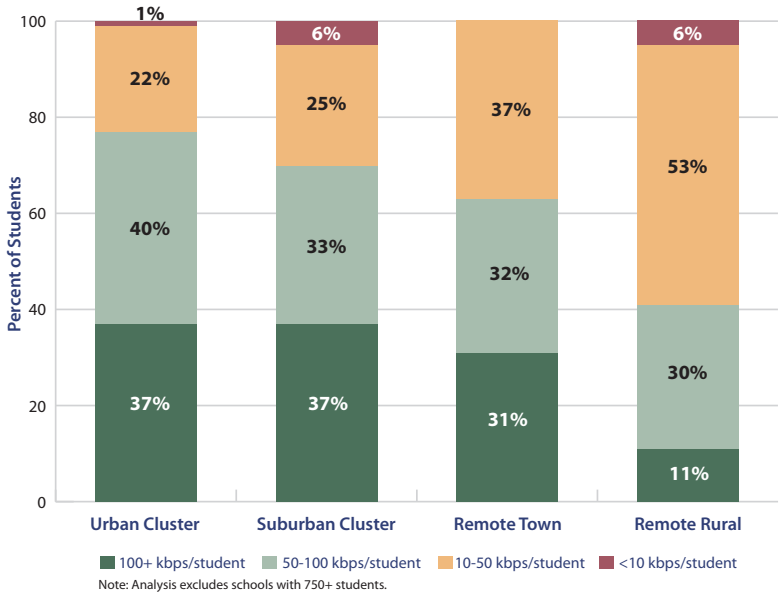
Note: All Virginia public schools administered state assessments online in 2012-13.

The results indicate that 67% of Virginia's schools are ready for online assessments with the requirements described by Education-SuperHighway. As noted earlier in this document, the readiness criteria for online assessments used in this test were not the same as those used to determine readiness for administering Virginia's online tests. All Virginia public schools currently meet the criteria required to administer the Standards of Learning (SOL) tests online. Of this number, though, only 24% appear to be ready for media-rich online assessments. The study found that the remaining 33% of schools are not ready for any online assessments. This overall figure is close to the national average of 66% of schools being ready for online assessments; however, the percentage of schools nationally that are ready for media-rich online assessments is 33%, signifi-cantly higher than the 24% of Virginia schools that meet this same standard.



Only 28% of Virginia schools are digital-learning ready, which is defined as having 100+ kbps per student; 36% fall into the emerging reliance category (50-100 kbps per student); 33% are in the basic connectivity category (10-50 kbps per student), and 3% are not ready for digital learning at all. Nationally, 28% of schools are digital learning ready, the same as in Virginia.

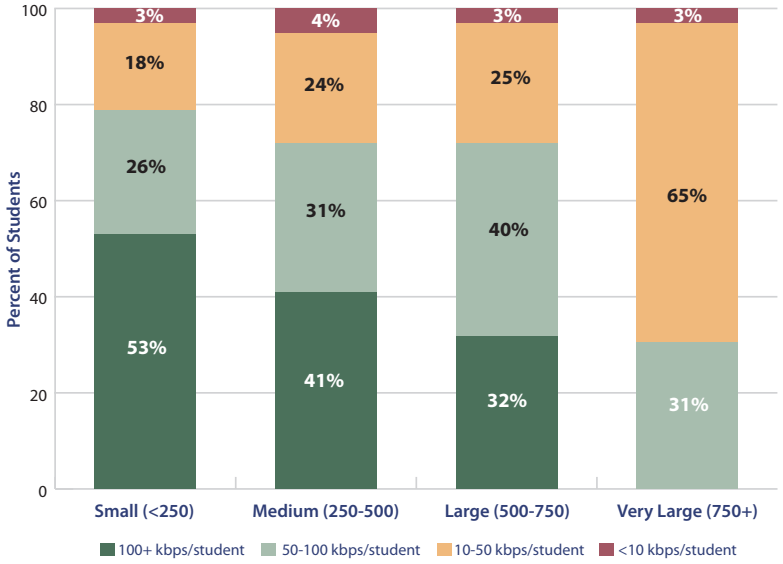
Bandwidth per Student by Locale



Note: Analysis excludes schools with 750+ students.

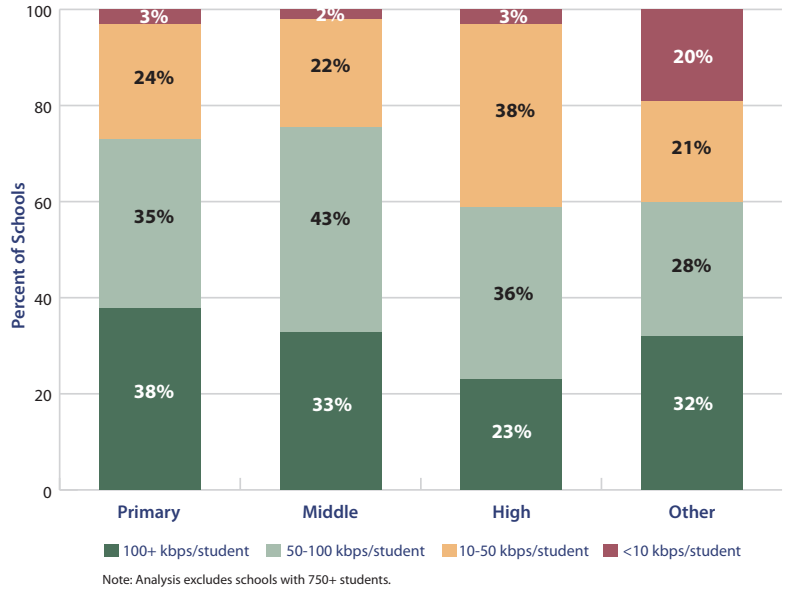
Bandwidth per student appears to vary significantly by locale. Only 11% of remote rural schools reported 100+ kbps per student connectivity as compared to 37% in the urban and suburban clusters and 31% in remote towns.

School Size Effect



School size also appears to be a factor. In very large schools (750 or more students), none reported speeds of 100+ kbps per student. In fact, 65% reported 10 to 50 kbps per student. In small schools (less than 250 students), 53% reported bandwidth of 100+ kbps per student, and 18% reported 10 to 50 kbps per student. Across all school sizes, no more than 4% reported less than 10 kbps per student.

Measured Bandwidth per Student: School Level



Note: Analysis excludes schools with 750+ students.

In measuring bandwidth per student at the school level (primary, middle, high, or other), the study excluded schools with enrollments of more than 750. Of Virginia's primary schools, 38% had connection speeds of 100+ kbps per student as compared to 23% at the high school level. Only 24% of primary schools and 22% of middle schools had a bandwidth of 10-50 kbps per student versus 38% at the high school level.

Discussion

Although all of Virginia schools are currently conducting online testing, many have simply adjusted to the connectivity demands—for instance, by restricting other Internet use during testing. Teachers have long reported that this practice impedes their ability to use technology for instructional purposes during testing. Given these findings, it appears that the bandwidth needed to support increasingly robust online testing and media-rich instruction is limited and that the teachers' concerns are warranted. As Virginia embraces technology-enhanced test items, computer-adaptive testing, and other improvements in its assessment practices, the Commonwealth will continue to rely on caching technologies and other bandwidth management techniques to maximize the current levels of connectivity in schools. Schools must, however, consider how to better meet the increased demand for real-time Internet access. By aiming for levels of connectivity that support robust digital learning, schools will naturally build their capacities to support online assessments.

The Virginia SchoolSpeedTest results suggest that only a small percentage of remote rural schools have adequate bandwidth. These are the very schools that could benefit most from access to virtual learning experiences and media-rich digital content. The fact that these schools have three to four times fewer students with 100+ kbps per student bandwidth is a particular concern.

It is not surprising that small schools tend to have greater bandwidth per student. Managing technology in larger schools has become more complex as many have moved to one-to-one and Bring Your Own Technology (BYOT) models. This exponential increase in the number of supported devices has undoubtedly increased the demand for bandwidth.

Finally, the current capacity at the high school level is also concerning, particularly due to the mandate that *all* high schools must now provide virtual course offerings. This will be a significant change for schools that, in the past, have limited their virtual course offerings to those provided by Virtual Virginia—primarily to meet the needs of Advanced Placement students. Other factors impacting many high schools will be the dramatic increase in tablet computers and the robust digital content associated with the Virginia e-Learning Backpack Initiative, which will be implemented over the next four years.

Conclusion

The results of the Virginia SchoolSpeedTest show a significant variation in school connectivity speeds across the Commonwealth. Given that school divisions individually negotiate contracts with Internet providers, which often have a sole market share in particular geographic areas, this variation is understandable. In many divisions, the inadequacy of local broadband capabilities will greatly hinder the ability of schools to provide robust learning opportunities and to administer the Commonwealth's assessment program effectively. It is critical to our long-term education goals to implement a robust infrastructure that provides equal access to online resources and virtual learning experiences for all learners. Ensuring high-capacity broadband in schools and communities must be a priority.

The information gathered during the Virginia SchoolSpeedTest will be used for a variety of purposes to advance this priority. Data have been provided to the Secretary of Technology and Center for Innovative Technology (CIT) and will be used in the Commonwealth's broadband mapping efforts. Individual reports will be sent to each school division. As we collectively work to increase broadband capacity across Virginia, this information will inform policy, planning, budgets, and professional development. Finally, it will contribute to the National K-12 Broadband Inventory and become part of a database of available bandwidth in classrooms across the United States.

[i] Fox, C., Waters, J., Fletcher, G., & Levin, D. (2012). *The broadband imperative: Recommendations to address K–12 education infrastructure needs.* Washington, DC: State Educational Technology Directors Association (SETDA). Retrieved from http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1517.pdf.

[ii] Partnership for Assessment of Readiness for College and Careers (PARCC). (2013). *Technology guidelines for PARCC assessments version 3.0—September 2013 update.* Retrieved from http://www.parcconline.org/sites/parcc/files/TechnologyGuidelinesforPARCCAssessmentsV3.0Sept2013.pdf.

[iii] Smarter Balanced Assessment Consortium. (2013). *The Smarter Balanced technology strategy framework and testing device requirements*. Retrieved from http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Executive_Summary_Tech_Framework.pdf.

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