



The Smarter Balanced Guide to Technology Readiness

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INTRODUCTION

This guide is intended to help school leaders better understand, plan for, and manage the technology necessary for successful administration of Smarter Balanced assessments. A core feature of these assessments is that they are computer adaptive, which means that technology is used to customize the experience for each student to provide a more accurate measurement of each student's knowledge, skills and abilities.

Given the unique requirements presented by administering tests via internet-connected computers and not via paper-and-pencil, this guide is intended to help school leaders address key questions about technology readiness for the Smarter Balanced assessment system, including what it means to be 'technology-ready' for the Smarter Balanced Assessment.

In the sections that follow, this guide:

- Defines 'technology readiness' and why it is important;
- Discusses the importance of establishing a comprehensive communications strategy for technology readiness;
- Identifies key issues school leaders must address to become technology ready in advance of Smarter Balanced testing windows;
- Offers general advice to school technology staff on ways they can support schools during testing windows; and
- Suggests steps that school technology staff can take after testing has concluded to ensure continuous improvement of school experiences with technology-based testing.

As a high-level overview of technology readiness issues for the Smarter Balanced assessment, this guide is not intended to replace detailed test administration manuals or operating procedures for school leaders and technology coordinators. In case of any discrepancies, educators should always defer to member-approved policies and procedures for Smarter Balanced test administration.

“TECHNOLOGY READINESS” DEFINED

Smarter Balanced is a next generation assessment platform, powered by computer adaptive testing. It represents a significant improvement over paper-and-pencil assessments by being:

- ✓ **More efficient:** Computer adaptive tests are typically shorter than paper-and-pencil assessments, because fewer questions are required to accurately determine each student’s score.
- ✓ **More secure:** The assessments draw from a large bank of questions, and because students receive different questions based on their responses, test questions are more secure and can be used for a longer period of time.
- ✓ **More accurate:** By adapting to the student during test time, computer adaptive tests provide a set of questions that is individually tailored to each student and can quickly identify which skills students have mastered. Thus, they offer teachers and schools a more accurate way to evaluate student achievement, readiness for college and careers, and growth over time.
- ✓ **More relevant:** Computer adaptive tests allow teachers, principals, and parents to receive results within weeks, not months. Faster results mean that teachers can use the information from optional interim assessments throughout the school year to differentiate instruction and better meet the individual needs of their students.

“Technology readiness” is the process by which schools put in place both the technology and technology-related administrative processes to successfully administer Smarter Balanced assessments. Becoming “technology ready” for Smarter Balanced ensures that the required technology operates as seamlessly as possible during test administration, that it does not interfere with or unduly influence the robust and fair assessments of what students know and can do, and that schools are able to live up to their obligations under state and federal education law. While member’s test delivery vendors may have more specific requirements, as of Spring 2017 the universal Smarter Balanced technology requirements (per test administration session) are as follows:

Universal Smarter Balanced Technology Requirements

Device	Requirement
Screen	Display must measure a minimum 9.5 inches diagonal (sometimes described as “10-inch class”). Resolution must be a minimum of 1024×768.
Headphones / Earphones	Headphones or earphones must be available to students for use during the English language arts/literacy assessment and for students who require text-to-speech features on the mathematics test.
Keyboard	A physical keyboard is required to avoid consuming screen space that must be available for test content.
Pointing Device	A pointing device must be included. This may be a mouse, touch screen, touchpad, or other pointing device with which the student is familiar.
Network	Must be connected to the internet with a minimum of 20Kbps bandwidth available per student to be tested concurrently.
Secure Browser	It must be possible to secure the device so that the student does not have access to unauthorized web sites or applications. This is typically accomplished through the use of a secure browser, but may be accomplished by the operating system.
Operating System	The device and operating system should be supported by the member’s test delivery service provider.

Technology requirements do change over time as new tools become available and older devices are rendered obsolete. As such, it is important to understand that technology readiness for Smarter Balanced assessments is not a one-time event, but an annual process that must be revisited every school year.

For those new to the process of administering a technology-based test such as Smarter Balanced, it also is important to understand the ways in which preparing for such a test is different than for traditional paper-and-pencil administrations. While attending to the testing-related technology needs of districts, schools, teachers and students can be a significant task, it is one made dramatically easier by well-laid plans, sufficient staff training, and a strong communications plan.

ESTABLISHING A COMMUNICATIONS STRATEGY FOR TECHNOLOGY READINESS

Just as clear processes and communications have long been essential to the successful administration of paper-and-pencil tests, so too are they critical to the administration of computer-based assessments. Establishing a communications strategy and detailed schedule for testing activities, including for both internal and public communications about Smarter Balanced testing, is a foundational step to becoming technology ready. Important stakeholders of such a strategy will include parents, educators, and students, as well as test coordinators, data managers, and test session monitors. School technology staff have especially important roles in preparing for and administering Smarter Balanced exams, including identifying and remediating any technology readiness shortfalls, preparing the school network and devices for testing, and helping to troubleshoot any issues that may arise during testing itself.

To be successful, a communications strategy must clearly establish a central information source for official news, updates, and policies, as well as clearly delineate the roles and responsibilities of assessment-related staff—whether employed by a school or a vendor—including technology staff. The strategy should establish communication tools and vehicles for regular dialogue (such as via periodic newsletters and webinars), as well as for rapid issue identification and response. Given that some issues will be technical in nature (e.g., troubleshooting network connectivity), while others may be related to assessment policy (e.g., appropriately responding to an unplanned interruption during a test session), it may be useful to offer separate communication channels for different types of issues. In the weeks leading up to test administration it is of the utmost importance that there is no ambiguity about roles and responsibilities, and about what information is to be shared, how quickly, and with whom.

PREPARING THE TECHNOLOGY TO ADMINISTER THE SMARTER BALANCED ASSESSMENTS

Time invested in preparations for the technology to administer Smarter Balanced assessments is well spent. Such preparations are multi-faceted and should include infrastructure and device assessments, as well as efforts to ensure that both educators and students are familiar and comfortable with technology-based testing tools.

Infrastructure Assessment

Because of its complexity, cost, and the potential need to coordinate with third parties, such as internet service providers or other specialized contractors, every plan to evaluate technology readiness should begin with an assessment of the broadband infrastructure to and throughout classrooms and testing facilities. Depending on the scope of upgrades necessary, if any, school leaders should be aware that network infrastructure improvements can take several months to plan and months to years to complete. The good news is that a robust school broadband network offers many benefits for teaching, learning, and school operations and will—if designed well—be cost effective to scale to meet future demands.

Smarter Balanced recommends using a bandwidth test, sometimes known as a “network speed test” to help with this assessment. Several free alternatives are available online, including:

- Education Superhighway: <http://www.schoolspeedtest.org>;
- Microsoft Bing: <https://www.bing.com/search?q=speed+test>; and,
- Speedtest by Ookla: <http://www.speedtest.net/>.

To calculate the number of students that can be concurrently tested, multiply the result of these tests by 1,000 (to convert the scale from Mbps to Kbps) and then divide by 20Kbps.

For an accurate estimate of the sufficiency of broadband within a school, the bandwidth test should be run multiple times, from different physical locations, and in conditions similar to those when testing is scheduled to occur (i.e., during the school day and not in the evening, over the weekend, or when school is otherwise not in regular session).

While the network diagnostics tool will alert schools leaders to instances where a school’s network will likely be insufficient, it does not replace an independent assessment by a qualified network engineer of your schools’ specific circumstances or account for other accommodations that schools may take to manage limited bandwidth (such as reducing the need for concurrent test administrations by scheduling testing sessions over additional days within the approved Smarter Balanced administration window).

In assessing the sufficiency of a school's network for Smarter Balanced testing, two other considerations are important. First, if individual schools share bandwidth with other schools (for example, by routing all of their internet traffic through a central school district office) then it is vital to ensure that calculations of bandwidth sufficiency at the central office account for all concurrent use throughout the entire district, including for any schools that are testing concurrently. That is, in cases where bandwidth is distributed throughout a school district from a central source, assessments of broadband sufficiency must take into account the sum total of all concurrent users both within and across school buildings.

The second key consideration for school leaders is the sufficiency of the distribution of broadband within school buildings, especially via wireless access points. Even in cases where a school building has ample bandwidth, the quality of its distribution throughout a building is important to assess. Each wireless access point can only support a limited number of devices and the quality of their connectivity diminishes due to distance and interference or obstructions (such as walls). Different student computing devices utilize different wireless access protocols and have wireless radios of varying strength and stability. Assessments of the sufficiency of wireless access points are necessary since large numbers of concurrent testers may stress wireless access points in ways that may not be apparent during other typical school uses.

Tactics to Upgrade School Technology

Ensuring the sufficiency of technology for teaching, learning, assessment and school operations can be challenging for many school communities. The good news is that there are a variety of tactics available to schools willing to commit to making a transition to more digital learning tools over time. These include:

- **Better leveraging existing funding:** In addition to any funds that may be made available by your state, the federal government subsidizes the cost of school broadband, including for the distribution of WiFi within schools, via the [E-rate program](#). Educational technology – including devices and software for student use – as well as related teacher professional development can be purchased using [funds appropriated under ESSA](#) (the *Every Student Succeeds Act*).
- **Evaluating leasing/managed services options:** Schools looking to make upgrades to school technology should also consider the pros and cons of purchasing vs. leasing/managed services as a way to minimize the initial outlay of funds and manage costs over time.
- **Pursuing partnerships:** In many communities, businesses and universities may be open to technology-related partnerships to help schools better prepare students for their future. These partnerships can take many forms, but can result in free or low-cost expert IT advice and donations of equipment. Many schools also look to tech-savvy students themselves to assist with school technology support services via student run help desks.

Device Assessment

The Smarter Balanced assessment is designed to support a wide range of personal computing devices suitable for use in teaching and learning, including all major operating systems and many form factors (such as desktops, laptops, and tablets). While Smarter Balanced provides general parameters on device requirements, schools should check with their test delivery service provider for specific guidance on supported devices and required peripherals.

Given that the use of technology for teaching and learning is both increasingly common and powerful, in many circumstances schools will find that they have a large number of computing devices that can be used or re-purposed for Smarter Balanced test administration. As part of the technology readiness assessment, schools will need to determine whether they need to acquire additional devices to test all eligible students within the school's approved testing windows. For instance, the school that chooses to test all eligible students within one week will need more computing devices than one that schedules testing sessions over the course of two consecutive weeks. Given that the Smarter Balanced test is adaptive (i.e., no two students can expect to receive the same set of test questions), the need for short testing windows for test security purposes is greatly diminished.

Tactics to Manage School Technology

Tactics to efficiently and effectively managing school technology resources help ensure that students and teachers have the tools they need when they need them. These tactics include:

- **Monitoring and managing school broadband networks:** Network engineers can monitor school broadband networks to identify websites and/or classes of web services (like video streaming) that may use a disproportionate amount of school bandwidth during testing. During testing windows, these services can be throttled or turned off to ensure a seamless assessment process.
- **Pursuing smart strategies to deploying devices:** In cases where schools have access to computers of varying ages, school IT directors can take steps to extend their useful life. For instance, there are numerous virtualization applications that allow modern operating systems to run on older devices; in other cases, devices can be re-imaged with a free Linux operating system supported by your Smarter Balanced testing vendor. Schools also should not feel restricted to hosting testing sessions in dedicated computer labs. A more flexible strategy – when WiFi is available – is to use mobile devices (such as laptops and tablets) and move them from classroom to classroom on mobile carts.
- **Taking advantage of flexibility in test administration:** Given the unique characteristics of Smarter Balanced assessments, it is not necessary for every student to take their tests on the same day (or even within the same week). In contrast to process for paper-and-pencil test administration, schools can stagger testing windows over several weeks to minimize the burden on school IT systems, including offering teachers and students the option to test students when they are ready (within broad parameters).

Another aspect of the assessment of the sufficiency of computing devices to be used for Smarter Balanced testing is determining how such devices will be prepared for testing sessions. During testing sessions devices must be secured to ensure that students do not have access to unauthorized web sites or applications. This may involve the combination of the installation of new software (such as a secure browser), the turning on or off of features at the device operating system level, and/or the temporary freezing of automatic operating system and plug-in updates. While this can be done on a manual basis for each machine that will be used for Smarter Balanced testing, many schools find that managing operating system and application updates via enterprise device management tools to be much less burdensome and time consuming. As such, it is important that technology staff keep this in mind while making their determinations about how they will ensure device readiness.

Making decisions about where testing will physically occur in the school building will affect device considerations. In addition to ensuring that broadband access is sufficient to support concurrent testing in that location, it is important to ensure that there is access to sufficient electrical power (both in terms of the number of outlets and in terms of the capacity of electrical circuits) and air conditioning (as a large number of devices in an enclosed space may generate an excessive amount of heat).

Those preparing the devices and locations for testing should collaborate with special education staff to make sure they are prepared to meet the needs of all students. Smarter Balanced provides information and guidance about accessibility and accommodations at <http://www.smarterbalanced.org/assessments/accessibility-and-accommodations/>

Finally, given that devices may break or fail unpredictably, it is not unreasonable to ensure the availability of a relatively small number of extra replacement devices that can be quickly deployed during testing sessions.

Student and Educator Readiness

Just as important to ensuring the adequacy of network infrastructure and devices is ensuring that both students and teachers have the comfort and skills to use that same technology to teach academic content and demonstrate learning. Beyond the alignment of classroom instruction to standards, it also is important that teachers take steps to align their approach to instruction with the mode of technology-based testing, primarily by regularly assigning schoolwork that requires the use of computers. In circumstances where teachers are not comfortable using technology for teaching and learning in their classrooms, professional learning opportunities—coupled with hands on training activities on how to use subject specific software and applications—can be valuable, especially when it is targeted to identified student needs.

School leaders should not assume that students have ready access to technology outside of school or are comfortable in demonstrating their mastery of academic content, skills, and knowledge via a computer or tablet. Students may require direct instruction and regular practice in using technology for academic purposes, including having the chance to practice basic keyboarding and mouse skills and the use of word processing software. While this need may be more commonly experienced by younger students, school leaders should be careful not to conflate students' comfort with using technology for personal reasons with the technology skills needed to be successful on technology-enhanced assessments.

SUPPORTING THE TECHNOLOGY DURING TEST ADMINISTRATION

Time spent conducting technology readiness planning and in establishing well-functioning communication plans reaps rewards during test administration. In the weeks leading up to administration, school leaders and technology coordinators should follow and closely adhere to timelines, checklists, and any directives included in special bulletins or alerts that may be issued by a member's test administration vendor. These materials may contain information about how and whether to install browser, operating system or plug-in updates, as well as provide recommended or required server configurations.

During the testing window it is important for technology staff to monitor the status of broadband connectivity within and across schools. Unusual spikes in traffic or an unexpected degradation in service could indicate an issue in need of quick diagnosis and resolution. In advance of the testing window, it also can be helpful to alert the school's or district's internet service provider to ensure there is no scheduled maintenance or downtime that could impact testing sessions, as well as to identify a point of contact to be able to quickly resolve any quality of service issues that may arise. In some cases, it may also be prudent to proactively identify and secure redundant and/or supplemental access to the internet for schools with limited or fragile connectivity.

Designated personnel should be trained and ready to respond to technology-related issues in signing into and completing tests in each school building. Establishing clear roles and responsibilities for troubleshooting, as well as formal escalation procedures for issues is critical to ensuring that issues are dealt with quickly and effectively. Being able to quickly and securely communicate key information to test monitors is important.

Test administration procedures must include information on how to respond to interruptions affecting one or more students that may be caused by a technology-related issue, such as:

- Difficulty logging into testing sessions;
- Computers/tablets freezing or otherwise becoming unresponsive;
- Interruptions in electrical power or network connectivity;
- Lack of familiarity with accessibility supports or tools integrated into the Smarter Balanced test interface;
- Lack of availability or malfunctioning headphones, keyboards, mice, or other required peripherals; and
- Audio issues.

By anticipating the likeliest source of technology-related issues in advance of test administrations, addressing as many in advance as possible, and clearly communicating how issues—large or small—that may arise during testing should be handled, school technology staff can do their part in ensuring that Smarter Balanced assessments perform as intended.

EVALUATING THE TECHNOLOGY USED IN TEST ADMINISTRATION

Technology readiness for Smarter Balanced testing is not a one-time event, but an annual process. At the conclusion of the testing window, school technology staff should document what worked well, note where planning may have been insufficient, and make notes on what could be improved upon in the next year.

Some of these suggestions will be at the school or district level, but other input will be for the member's test administration vendor. The communications strategy established for technology readiness should designate a process for aggregating this input from individual schools and districts and prioritizing areas for improvement, including updates to checklists, timelines, and test administration manuals.

Looking forward to future Smarter Balanced administrations in subsequent school years, school technology staff should note the timing of end of life support for older operating systems and devices by Smarter Balanced, as well as the likely future sufficiency of the school's broadband infrastructure. Given that the usefulness and reliability of computing devices declines with age, it is especially important for school technology staff to identify tradeoffs in how frequently new computing devices and servers are purchased or leased to replace older devices. School technology staff will be instrumental in helping school leaders accurately project and adjust operating budget assumptions for school technology use over time—for all of the purposes it is needed, including teaching, learning, assessment, and school operations.