



Intel in Education Digital Assessment

Technology is transforming education, including how students are assessed

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Executive Summary

Today's students are always connected and always learning, both inside and outside the classroom. One of the most important questions asked by those who work to improve education is: "How do we make learning relevant, rigorous and meaningful?". To address this challenge, schools are designing student-centered learning environments, enabled with technology for learning and teaching.

Whether your primary goal is to personalize learning, reduce the achievement gap, increase engagement and retention, foster deeper learning or employ analytics for more meaningful insights, considering how technology helps you reach your goals efficiently is key.

As educators move toward a personalized approach to helping students succeed, assessment is a necessary component of evaluating student progress and accountability. Whether the classroom is traditional, online or hybrid, assessment is a key part of an educator's daily practice. Assessment is important, not just because it provides evidence of student understanding, but because it also provides feedback that can be used to enhance teaching and learning.

Assessments can be formative or summative in nature. Formative assessments are small and take place often and throughout the lesson or course. The goal of formative assessment is to monitor student learning and enable educators to adjust instruction in real time. Summative assessments are used to evaluate student learning at the end of a unit of instruction, such as a chapter test, end of course project or "high-stakes" exam¹.

Increasingly, school systems are using digital tools to assist with formative and summative assessment. Schools are using digital technologies to create, administer, report and manage tests and exams². When used in conjunction with the right device for learning, digital assessment can provide immediate feedback to students and can provide educators with important data that can be used to personalize instruction. Large-scale end-of-year and end-of-course testing can provide school systems with a powerful accountability mechanism. This brief will focus on how to help school systems prepare for the adoption of digital assessment.



Education Challenge

There are many factors to consider when planning to implement digital assessment in a school system. First, school systems need to consider which student devices will provide the best experience and access for student assessment for the largest possible number of students. Schools also need to take into consideration the technology infrastructure that will need to be in place to support digital assessment, from bandwidth to cloud solutions to data storage. Security is another important factor that schools must consider in order to ensure the privacy and security of student data. And finally, school systems must consider what kinds of actions must be taken to ensure that the people in their communities (students, teachers and school leaders) are prepared for the deployment of digital assessments.

1. Devices

The device that a student uses for a digital assessment should provide the best possible experience. The student should be able to focus 100% of their attention on the content of the assessment and have a comfort level with the device before an assessment is delivered. Troubleshooting, device down-time and lack of confidence with the features of the device can all lead to less than optimal testing experiences. Your testing consortium will provide device guidelines, but simply meeting minimum technology requirements is not enough. You also must consider that the device will be used for many purposes besides testing, like day-to-day teaching and learning. In order to set your students up for success, a good rule of thumb is to purchase the highest quality devices you can afford and make sure your students are using it frequently before administering an assessment. Here are a few important factors to consider when choosing a student device:

- **Screen Size and resolution** – Screen size and resolution have a major impact on the text readability. If a student can't read the text of assessment, they are not likely to succeed. A minimum screen size might technically work, but may not provide enough space for the student to read text without scrolling. That does not make for a good test-taking experience. Screen sizes bigger than 10" and higher resolution are better for reading for long periods of time, better for equity and require less scrolling.
- **Durability and dependability** – Student devices will see very heavy use, so durability and dependability are critical. To be sure that your investments are protected, ensure your devices have a good warranty. They should also be easily serviceable. And finally, depending on the type of device, you might consider purchasing protective cases.

- **Physical keyboard** – Virtual and Bluetooth keyboards might be sufficient for consumer usages like social media, web browsing and email, but they are not a good choice for high-stakes tests and day-to-day teaching and learning. When multiple Bluetooth keyboards are used in one setting, like a classroom, they can conflict with each other and cause connection problems. It is highly recommended that students use a device with a physical keyboard during digital assessments. Also, consider that students of varying ages might have different needs. Devices should be sized appropriately for the target age group. A keyboard that is too big can negatively impact the performance of younger students and a keyboard that is too small can negatively impact the performance of older students.

2. Infrastructure

The technology infrastructure that you put into place to support digital assessment and day-to-day teaching and learning is just as important as the student devices that you choose to purchase. The benefits of a high-quality device cannot be fully realized by a student unless there is infrastructure in place to support it. In regards to digital assessment, the most important part of the technology infrastructure is the network on which the students will access the assessment. Here are a few suggestions for how to set up a robust network that can withstand the stress of high stakes testing.

- **Make sure your wireless network is engineered for both capacity and coverage.**
 - Abide by the minimum bandwidth requirements set by your testing consortium and stay within 20:1 ratio of clients to radios in access points.
- **Ensure that bandwidth is sufficient from client to test delivery**
 - As an example, Partnership for Assessment of Readiness for College and Careers Consortium (PARCC) suggests that 50 kbps per student is a minimum level for networks that do not pre-load test content; and a bandwidth level of 100 kbps if the network will be simultaneously used for testing, instruction, professional development, and administrative processes³.
 - If you will expect very low levels of bandwidth during test-taking sessions (5kbps per student), consider limiting access to non-essential resources during testing periods. This can be accomplished by altering content filtering rules to restrict access to non-essential services. Also, consider caching assessment content on a local server.

3. Security

Protecting student data, ensuring privacy, and verifying students' identities are of the utmost importance during and after digital assessment. Although most test security is handled by your testing consortium and secure browser, there are a few additional actions you can take to ensure maximum test security. Keeping your device fleet current and maintaining operating system and software updates are great ways to protect your school system from known vulnerabilities and to limit potential testing interruptions.

4. People

- **Students** - It's important for students to have experience with using technology and taking digital assessments before they get into a high-stakes testing environment. You don't want students struggling with how to use the device on the day of the test. Ideally, devices should be integrated into day-to-day learning in order to ensure the student is familiar with the how to use the device.
- **Teachers** - Teachers need to be trained on how to use technology to give assessments. As with students, this works best when teachers use technology throughout the year, as part of their daily instructional practice. Most testing consortia provide training for teachers who will act as test proctors. When possible, teachers should be provided with post-assessment data and with professional development to help them analyze and learn from the data.
- **Administrators** - Most testing consortia provide teachers and administrators with training on how to manage the testing environment and ensure test security. Administrators need training on what to do with assessment data. When assessments and assessment data are connected to a school's digital infrastructure, the data can be used for roll-up data over the course of the student's education. The data can also be rolled up to the school, district, state or even country level via data systems and centers and connectivity.

Solution Value

Technology is transforming education, including how students are assessed. Intel is leading this transformation, with a complete 360° solutions approach that supports every aspect of a modern education. Keeping the student at the heart of the experience, Intel® solutions provide the right devices for learning, teaching and assessment and the right infrastructure to provide meaningful data to teachers and administrators.

Regardless of where your school sits in the spectrum of preparedness for digital assessment, Intel has solutions that can help make your students successful. When considering which student device will make the greatest impact on student success, think about the wide range of device options. Intel-powered Chromebooks*, 2 in 1s and laptops are excellent choices for day-to-day teaching and learning and digital assessment, because of their outstanding performance, long battery life and physical keyboard.

Keeping in mind that the device is only as good as the infrastructure it's in, Intel provides solutions for network environments that can provide optimal bandwidth to students during testing. For these situations, schools can consider local caching of assessment content on Intel-based servers. Intel can help you build an infrastructure that's efficient, secure, and manageable—and seamlessly integrates with your Intel-based devices.

Conclusion

Assessment is a key part of a 21st Century education and digital technologies are helping school systems to take them to scale. Intel has solutions that enable all stakeholders to succeed. With Intel-powered 2 in 1s, Chromebooks or laptops, your students will be set up for success in any digital assessment. And with Intel server technology, your network infrastructure will be prepared for the of digital assessments.

For more information, visit intel.com/education



¹ <https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>

² 2016 Education Hype Cycle

³ <http://cosn.org/sites/default/files/Raising%20the%20BAR%20-%20Becoming%20Assessment%20Ready%20-%20FAQ.pdf>

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