

# THE PRACTICAL GUIDE TO DIGITAL ASSESSMENT



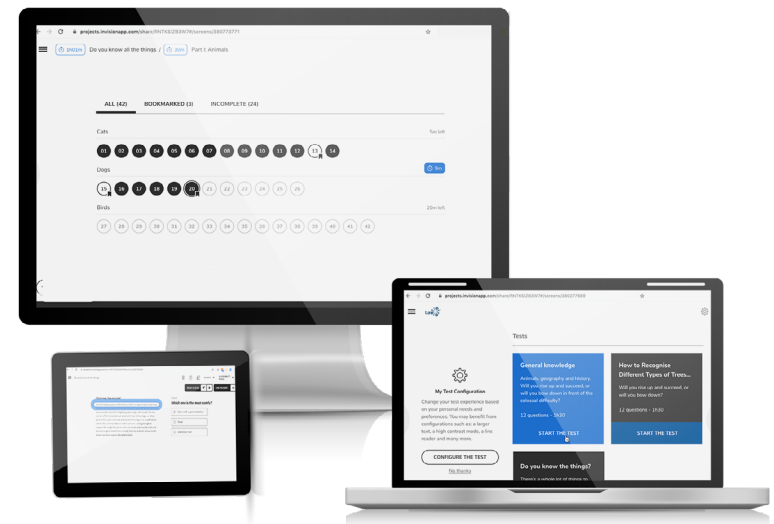
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# INTRODUCTION

Digital assessments can equip students to perform their best in complex disciplinary fields and to progress with confidence as lifelong learners. Unlike paper-based testing, digital assessments can deliver individual and organization-wide benefits, such as interactive learning experiences and actionable data insights, without adding to the burden on school or university staff.

However, with many vendors offering various types of assessment tools for K-12, universities and credentialing programs, it can be difficult to determine which technology will reap the best results for your institution.

**In this guide, we've laid out the blueprint for selecting a digital assessment platform that not only smoothly integrates into your existing systems, but enables you to do more in the classroom and organization-wide.**



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# WHERE TO START: INTEROPERABILITY

Before you dive into the intricacies of modern digital assessments, there is one concept you should strongly consider starting with: interoperability. Interoperability is arguably the most important foundation in a modern tech ecosystem that enables technology to work to its full potential.

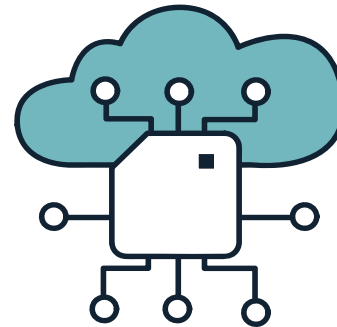
## What is interoperability and why does it matter?

At its core, interoperability describes the ability of all tech within your ecosystem to seamlessly communicate data and work together. In short, interoperability defines digital tool compatibility. However, the term goes beyond that simple idea.

True interoperability is established by ensuring that all new and existing technology follows the same open standards.

**Interoperability standards, like the ones set by IMS Global**

**Learning Consortium**, enable your EdTech tools to operate efficiently — and deliver real results.



Interoperability breaks down silos between schools, educators and EdTech systems. By defining standards for interoperability, IMS Global equips educational leaders to innovate solutions that support learning — which has led to the modern digital assessments available today.

## An interoperable framework allows your institution to:

- ✓ Release siloed data in a secure way, including student information and test results
- ✓ Pursue rich integrations between learning platforms and tools
- ✓ Move assignments from a platform to a learning tool and send the results to a central database
- ✓ Enable inter-organizational data communication, allowing accessibility to all data
- ✓ Align all online testing tools or other tech with strategic plans
- ✓ Enable personalized, contextual testing experiences for students

# Open Interoperability Standards

Two IMS Global standards, the QTI standard and the LTI standard, ensure your learning and assessment tools work together and communicate data seamlessly.

## Question and Test Interoperability (QTI)

The IMS Global QTI specification enables student and assessment data to feed into item and test content — and vice versa. QTI-enhanced items within the digital assessment provide a more engaging testing and instruction experience. Within a QTI framework, organizations can take advantage of:

- Assessment item type and test results that directly inform test content and test delivery platforms.
- Assessments that better reflect daily instruction and individual mastery.
- An online testing environment that is accessible to all students.

**Keep in mind:** Assuming a solution's interoperability based on the claim of QTI or LTI compliance can cost an organization in time, effort, resources and budget. To be truly interoperable, assessment solutions must be IMS certified.

## Learning Tools Interoperability (LTI)

The LTI framework allows organizations to integrate any Learning Management System (LMS) with any web-based application. This makes it possible for tests to be launched directly from within the LMS and also provides faster results to educators and students.

- The LTI standard serves as the foundation for rich integration available between assessment platforms and learning and content creation tools
- The specification ensures that all external applications are available from a single-sign-on point in the Learning Management System (LMS)
- In addition, the LTI framework aims to preserve all learning context and user roles between all tools and applications

We will discuss these open interoperability standards and their unique benefits further on in this eBook.

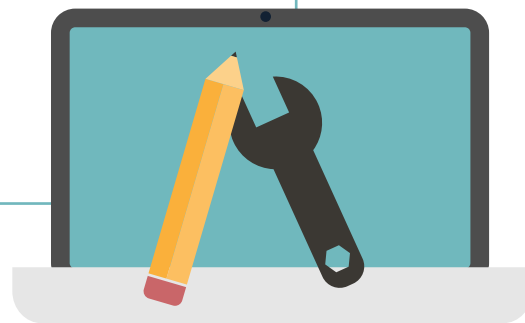
# MEET THE MODERN DIGITAL ASSESSMENTS

Traditional testing techniques can be fairly limited. With the introduction of all the possibilities that tech can offer, modern assessments are not only unifying testing, instruction, and learning into a single experience but are also becoming increasingly personalized.

Some of the primary tools enabling personalization in learning and assessment include **Technology Enhanced Items (TEIs)** and **Portable Custom Interactions (PCIs)**. These item types go beyond multiple choice and assess deeper problem solving and collaboration skills.

## Examples of Useful TEIs Include:

- Graphing Interactions
- Math Equation Builders
- Hot-spot
- Matching (drag & drop)
- Multimedia
- Ordering
- Audio & Speech



## Technology Enhanced Items (TEIs)

TEIs are computer-based assessment items that include specialized interactions for collecting response data. TEIs engage students with interactive content and provide practice with item types they will encounter in modern digital assessments. These items offer many advantages over traditional testing items:

- 1.** TEIs assess a range of skill sets through a variety of computer-based interactions, allowing educators to identify gaps in knowledge and address them during instruction.
- 2.** TEIs allow students to engage with content and show their understanding of the material in a range of ways. In addition, TEIs offer more options for auto scoring.
- 3.** TEIs can replace several multiple-choice questions, reducing the time students spend taking tests without sacrificing the depth of assessment.

By using TEIs that align with IMS interoperability standards, educators can create informative, engaging assessments that prepare students for various disciplines.

## Portable Custom Interactions (PCIs)

PCIs are simply TEIs built on the QTI PCI standard. By deploying assessments that include interactive items built with PCIs, it's possible to craft creative, contextual testing scenarios for students. In fact, assessments built using PCIs allow educators to gain insight into thought process throughout an entire problem-solving activity.

1. TEIs built on the QTI PCI open standard are interoperable by nature, and can enable game-like scenarios and simulations to be imparted into testing.
2. PCIs make it possible to collect much more than just digital answers, and provide data to facilitate the feedback loop between teaching, learning, and assessment.
3. These items capture rich log data, including the start and stop time during an assessment, mouse movements, the use of different on-screen tools, idle time, and a screenshot of the last actions.
4. Educators can then gain insight into how students approach each problem, and identify areas that might require additional focus.

PCIs and their log data can provide feedback to educational stakeholders, from admins and policy makers to teachers, regarding student engagement level, understanding of the subject matter, and how they approach problem-solving.

Item authoring modules that are compliant with the PCI standard — such as TAO's Item Creator module — allow item author(s) unlimited creativity to conceptualize problem-solving tasks that leverage any number of interaction templates from the entire range.

## The French Ministry of Education (DEPP) uses PCIs to Foster the Link Between Teaching and Learning

In May 2016, DEPP first introduced math and science PCIs built with TAO to a nationwide standardized test administered to 8,000 9th grade students.

DEPP worked with Capgemini to analyze the resulting log data from the three math PCIs. This exercise provided very rich observations with respect to the students' problem solving strategies.

For instance, one question asked students to estimate the circumference of a lake. The log data collected showed that oftentimes students confused "circumference" with "area", judging by the steps they took to solve the problem.

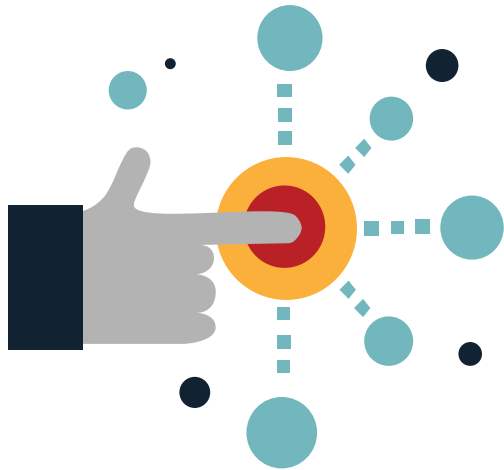


# INTERACTIVE, PERSONALIZED TESTING

Digital assessment tools present the opportunity to add personalized elements to testing across multiple disciplines. These tools increase student engagement, providing opportunities for skill development in an interactive way. However, to ensure that these tools work in this way, it's vital that your assessment platform follow the guidelines of the **IMS Computer Adaptive Testing (CAT) standard**.

## Adaptive Testing Capability

Testing and learning can be united in assessment once you establish interoperability between your systems. With the CAT specification set by IMS Global standards, you can create assessments that adapt to individual students' learning levels and create a clear picture of what's happening in the classroom. Leveraging an assessment platform with adaptive testing capabilities also eliminates the need for costly proprietary integrations.



## Text to Speech

For language arts, a tool such as **SpeechStream from TextHelp**, included in TAO, enables students to interact with literature through flexible text-to-speech technology. This simple tool integrates across any device and content-type to support learners of all reading and writing abilities.

Interactive digital assessment tools allow educators to create personalized assessment experiences for students. However, to realize the full potential of this modern tech, it's crucial that K-12 and University leaders procure solutions that follow open interoperability standards and can be integrated into new or existing environments.



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# WHAT TO LOOK FOR IN A DIGITAL ASSESSMENT SOLUTION

Now that you know where modern digital assessments can go — and all they can accomplish for both student and organizational needs — it's time to find the solution that fits your institution.

There are many vendors marketing to schools and universities. However, we advise that you focus on specific areas, including accessibility, security integration and scalability, as the determining factors in driving your next tech initiative. In fact, without them, your next investment may not deliver the benefits that fully integrated and flexible solutions can provide.

## Accessibility Features

Accessibility has long been a challenge in traditional assessment models. In fact, it continues to be a challenge even in modern, high-tech institutions. However, providing accessibility for your students has multifaceted benefits.

Designing digital assessments for accessibility at the foundation of your tech stack increases your number of users and enables scale. More importantly, accessibility ensures that students of various abilities may use your platform with ease and receive optimal outcomes.



### **An accessible digital assessment platform can provide the following benefits to the end user:**

- Consistent assessment interface across the assessment experience
- Flexible options for navigation and answer selection
- Logical sections for headings, titles and answers
- Contrasting text and color use for increased visibility
- Descriptive text with test items and high-contrast visual elements
- Assistive technologies like screen readers, speech to text and more

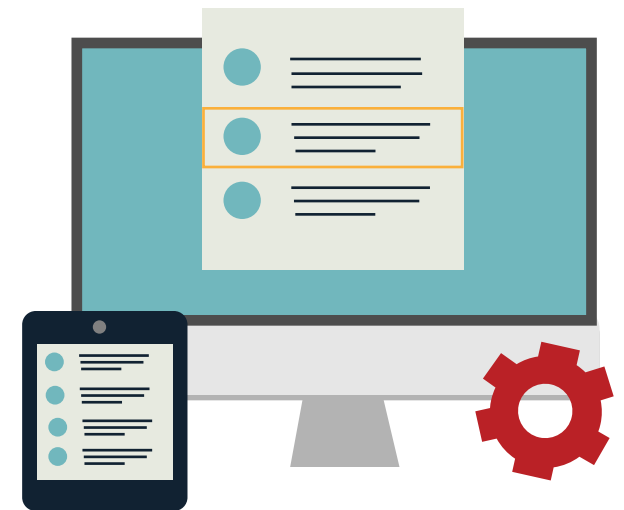
## Accessibility Features Cont.

The frameworks provided by IMS focus on adaptation or personalization of tools, platforms and content to meet the various needs of students. That's why the interoperability standards set forth by IMS support the international Web Content Accessibility Guidelines (WCAG) for web content that adapts to the needs of people with disabilities, and extend assessment accommodation capabilities in the new QTI 3 standard.

Whether you prefer to use third-party or original content within your digital assessment, optimal control and flexible customization options provide a solution for a personalized and accessible testing experience for all students. The key to having those options — investing in products that follow the IMS standards.

## Usability

If you're building any kind of assessment beyond simple quizzes, authoring and storage environments can quickly become complicated or even unwieldy. It can be difficult to evaluate how "usable" an interface is. If training takes weeks instead of a day or two, you know you're into troubling territory. If you can talk to existing users of the system and ask "how long did it take before you actually felt like you could get work done in the application?" You'll learn a lot. Time training means less time working, or delaying timelines.



# The Importance of Usability for Creating and Taking Tests

Interfaces that have been patched over many times to cover issues and create workarounds are not the most user-friendly. This can force you to complete regular tasks in convoluted ways, which means getting less done during your work day. You can even become dependent on resident application “gurus” as opposed to best practices.

## Creating Assessments

In assessment construction interfaces, authors need to be able to quickly find the content they need, make changes, and preview their work without needing to switch through multiple systems or environments. Changes across systems take time, and if any one of the systems is not working, you're not working.



## Taking Assessments

Interfaces used by test takers need to work for all users, including users with different abilities. In assessment, the interface should take a back seat to test takers' ability to understand and respond to the test content. The common buttons like “next question” need to be prominent and easy to use.



Interfaces incorporating Universal Design solutions make a platform work better for everyone, not just people with specific needs. Solutions should work on a number of different kinds of devices, with controls that are keyboard and touchscreen friendly.

# Security

Safety of all students is crucial to all educational institutions. More specifically, student privacy and data integrity are vital to any party responsible for maintaining that data.

One way to ensure your digital assessment tools are all optimized for security is to check compliance with IMS Global specifications. For example, the latest LTI 1.3 framework aligns its tool requirements with industry best practices for security. When the tools within your ecosystem follow the IMS specification, all data is secured, easily managed and protected from vulnerabilities.

## Here are the functions of an LTI compliant digital assessment tool:

- Full control of personal data sharing, including the manual “data sharing off” button.
- Safeguards to ensure the privacy of personal data sharing.
- Privacy controls are accessible, viable and changeable at any time.

## Prevent Cheating Online

Student-facing tools, like **lockdown browsers and remote proctoring**, enable security in a remote learning environment. For example, you can conduct online tests on student laptops securely by combining your assessment platform with lock-down browsers such as the free open source Safe Exam Browser.



## Integration & Scale

Accessibility and security are at the crux of choosing a digital assessment platform that meets your school's or district's needs. However, as mentioned previously, if the new technology does not integrate with your existing systems, your investment will quickly fall flat. For seamless integration between your platforms and digital assessment tools, you must ensure all tech within your ecosystem follows interoperability standards.



When your digital assessment platform has the ability to integrate with your existing learning applications, you gain deeper access to data and the ability to review test results or scoring in real time. These are the factors that you want to consider before investing in a digital assessment platform for easy integration and effortless scale across your organization:

### QTI Enabled Framework

As the possibilities for educational solutions become more advanced, it is inevitable that your technology requirements will eventually change. Anticipating that your solution will need to evolve with your organization is key to getting the most from your tech investment.

An assessment platform built on QTI open standards give you the most control over your testing content and flexibility to build a plug-and-play digital ecosystem. A QTI framework ensures that your items, tests and data are completely interoperable and not locked within a proprietary system. This means that you don't have to forfeit any of your hard work as your technology needs expand.

### Learning Management System (LMS) Integration

Ensuring your Learning Management System (LMS) integrates with different digital assessment tools empowers your institution to create a complete cost-effective and time-efficient solution.

One way to do this is by leveraging solutions that use the IMS LTI framework for integration. In doing so, you can be sure that all changes created within in the assessment platform, like content and authoring, are reflected in the LMS, saving you from having to update multiple platforms. This also cuts technology costs for your institution, as educators need to provide only a single login point to students.

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## CONCLUSION

Digital assessments can deliver a myriad of organization-wide benefits — and support your students throughout their multidisciplinary academic and professional careers. By ensuring all new learning tools and platforms follow the IMS interoperability framework, you'll be able to select the digital assessment platform that optimizes your current operations and brings your academic organization to innovation.

### **Is your school or organization ready for a next-generation digital assessment solution?**

The innovative TAO Testing digital assessment authoring and delivery platform may be the simplest, most transformative choice for you. Our tech and best practices are based on IMS Global interoperability standards — ensuring virtually endless integration options and optimal control for users.

Schedule a consultation with one of our specialists to learn about how you can leverage TAO to evolve with today's learners!

**Contact Us**

## ABOUT TAO

TAO, from Open Assessment Technologies, is the leading digital assessment solution for education and career advancement. Modular, customizable and interoperable by design, TAO empowers you to break free from the confines of proprietary silos, eliminate expensive licensing fees, take full control of your testing resources.



# Additional Resources

Our case studies and white papers are developed with assessment technology experts to demonstrate practical applications of digital assessment and the power of an open solution.

## PRODUCT

### ACCELERATING INNOVATION IN DIGITAL ASSESSMENT

Three TAO editions, one powerful platform. Download our product sheet to learn more about TAO's digital assessment platform solutions for assessment authoring, delivery, rostering and reporting and find the product tier that's right for your organization.



## CASE STUDIES

- **Transitioning an Item Bank from Paper to Digital with The Finnish Matriculation Examination Board (MEB)**
- **TAO Addresses the Unique Assessment Needs of Students with Cognitive Disabilities**
- **Beyond Multiple Choice: UMass Enriches Adult Proficiency Tests with Engaging Interactions Types Using TAO**
- **The Swiss Conference of Cantonal Ministry of Education (EDK) Uses TAO to Ensure Consistent Nationwide Learning Standards**
- **New York City Department of Education (NYCDOE) Adds Technology and Multimedia to Language Proficiency Exams**
- **Leveraging Portable Custom Interactions to Foster the Link Between Teaching and Learning**
- **The Comenius Program in Europe Uses TAO to Deliver Self-Assessment Surveys to At-Risk Youth**
- **Elsevier Incorporates TAO with Ease, Gauging Career Readiness in Healthcare Fields**

## WHITE PAPERS

- **Next Generation Science Standards (NGSS): Opening the Possibilities for Deeper Learning and Assessment**
- **Redefining Digital Assessment**
- **The Importance of IMS Certification and QTI Compliance**
- **The Practical Approach to Successful Large-Scale Online Assessment**
- **Three Tangible Ideas for Engaging Assessment Content**