Market Guide for Digital Assessment Platforms in Education

> Authentic assessments have become even more critical with the growing use of AI. While supporting enhanced learning, education faces challenges of test security and data privacy. Education CIOs can use this Market Guide to evaluate platforms for digital assessment, and track trends and capabilities.

Overview

Key Findings

- Education has seen a noticeable increase in the adoption of digital assessment, suggested by the 2023 Gartner CIO and Technology Executive Survey. This trend can be attributed to the growing digital maturity of education institutions and education's response to the pandemic.

- Vendors have responded to the sudden popularity of generative AI by introducing it in capabilities, such as item authoring, feedback, translation and grading, to improve efficiency and accuracy. The efficacy of its use in the assessment process, however, will only be established with sustained use.

- Institutions are rethinking assessments because pedagogical assumptions of what we assess and how we assess are being impacted by digitization and automation of the assessment life cycle.

Recommendations

Education CIOs responsible for technology optimization and modernization should:

- Identify the current and anticipated growing use of digital assessments, whether in-built into learning management systems (LMSs) or independent platforms. Work with stakeholders from across the institution to establish the expected use for key, standard and optional capabilities, and satisfy the need for an enterprise platform or stand-alone components for your institution.

- Educate your teams to evaluate the performance of new capabilities powered by generative AI, introduced in a relatively short time span by vendors, for informed decision making.

- Collaborate with stakeholders to build a roadmap with key performance indicators (KPIs) to measure ROI and gauge what successful use of generative-AI-powered assessment capabilities looks like for your institution. Prioritize the importance of human review by including it in the workflow and roadmap ideation.

Strategic Planning Assumption

By 2025, over 85% of digital assessment platforms globally will offer capabilities powered by AI.

Market Definition

Gartner defines digital assessment platforms as a technology platform that enables the secure digital delivery and, increasingly, the automation of all components of different assessment life cycles. This includes preexam, during the exam and postexam steps for both summative and formative assessments. These are increasingly SaaS offerings and typically browser-based, with access via API integrations to an LMS or single sign-on. Digital assessment platforms help improve the efficiency and accuracy of assessment delivery. They allow institutions to offer exams remotely, enabling them to achieve scale and complement the growing popularity of online learning.

A digital assessment platform is used to digitize the creation, delivery and evaluation of multiple exam types. The transition from analog or manual to digital helps institutions improve the efficiency of the process while reducing the costs incurred to complete the end-to-end assessment workflow.

Some of the key purposes served by digital assessment platforms in education include:

- Complements new models of online and blended teaching and learning by opening up learning in new geographies and for all different types of students to complete their learning.

■ Increases the accuracy of desired processes in testing, such as collaborative test development and grading, randomization, anonymization, and timely feedback.

■ Streamlines administrative processes by automating various tasks, such as scheduling and delivery, results distribution, and so on.

The must-have capabilities for this market include:

■ Authoring tools and question banks: The ability to create question banks of items, typically supported by the use of multimedia, such as images, audio clips and videos. Most authoring tools enable the use of metatags for organizing question items on desired criteria. Tests are put together using items from question banks.

■ Scheduling and delivery platform: Educators can add test takers in the system, organize them into groups and custom-schedule tests based on course requirements. The test engine is the primary interface between the students and the institution, to host the assessment. Test takers can access it directly on the platform via learning management systems through integration, single sign-on or other methods.

■ Grading and publishing: There are usually two options for grading — manual and automatic — depending on the question types and the capabilities available in the platform. Results are published either instantly or at a designated time and, in most cases, exported to other systems, such as a learning management system (LMS) or student information system (SIS), via the requisite integration.

The standard capabilities for this market include:

■ Integration/APIs — It must provide integration with other systems and tools commonly used in education (for example, SIS, plagiarism tools or accessibility tools). Additionally, APIs should be provided for custom integration and extension to third-party tools, such as remote proctoring.

■ Interoperability — Conformance to global specifications and standards, such as 1EdTech's Question & Test Interoperability, which facilitates the smooth flow of test content and results data between learning platforms, assessment systems, analytics engines and other systems.

■ Security/user administration — This enables platform security to mitigate breach and test theft, managing of users, role assignment and role-based permissions, audit trails of assessments, and platform access.

- Accessibility — Improved access to the whole spectrum of assessment types for all test takers. This includes features and compliance with industry-standard specifications, such as Web Content Accessibility Guidelines (WCAG) and Section 508 in the U.S., that promote accessibility as well as support for exams in multiple languages and scripts.

- Insights and analytics — Capabilities that can analyze assessment data and provide trends and patterns for educators on candidates, as well as test question performance.

The optional capabilities for this market include:

- Artificial intelligence (AI) and machine learning (ML) — These technologies are incorporated to automate tasks such as item generation, instant translation, grading subjective answers and generating feedback. They can also be used for increased personalization through adaptive assessments that dynamically respond to a learner's response.

- Augmented/virtual reality (AR/VR) — Growing use of new technologies like AR/VR, especially in professional disciplines such as medicine, aviation and construction.

Market Description

Digital assessment offers the potential for:

- Continuous and diverse evaluation

- Increased personalization and granular insights, regardless of the scale and mode of delivery to the cohort

- Opening new geographies and helping students with different learning styles to complete their learning

Figure 1: Components of the Assessment Life Cycle

Component of the Assessment Life Cycle

Source: Gartner
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Digital assessment platforms typically offer a comprehensive suite that includes all the components shown in Figure 1 for an end-to-end solution. There are also stand-alone vendors for some components, such as item authoring and grading. Because the assessment life cycle does not differ significantly between K-12 and higher education, and most assessment platforms are hosted in the cloud that enables customizations, there is some overlap in the vendors for the two subsectors.

The growing use of AI, especially generative AI, has seen the most immediate impact in its undermining assessment integrity and outcomes, in some formats more than others. However, its potential lies in the dynamic automation of key processes, such as item generation and grading, which is already being beta-tested.

While there has been short-term reflection on the need to revert to analog approaches to testing, such as pen and paper tests and oral exams in some areas, education is gradually aligning the need to embrace technology and realign practices for an AI-shaped future.

Market Direction

Fifty percent of higher education CIOs surveyed in the 2023 Gartner CIO and Technology Executive Survey plan to invest in digital assessment systems in the next 12 to 36 months, while 36% have already invested.

LMS providers have also strengthened in-built assessment tools or acquired enterprise assessment engines to support this growing requirement. The impact of user-friendly generative AI tools has created opportunities for vendors and the end users to rethink assessment design and assumptions.

Assessment platforms are beta-testing generative AI-powered plug-ins for the 2023/2024 academic sessions to automate steps such as:

- Question generation

- Competency and grades alignment

- Real-time language translation

- Grading open-response answers

- Feedback generation

Their efficacy and that of the LLMs used to power this will need time to be established. The challenge to academic integrity has been heightened with generative AI tools, especially in remote, formative, open-book and unsupervised exams. Vendors are introducing capabilities that can detect and block browser extensions and chatbots used for cheating. A parallel market of plagiarism and AI detection, as well as remote proctoring tools, continues to grow and refine its offerings. [1]

As an immediate response to generative AI in assessments, education institutions have adopted a stance that covers the spectrum of ban, brace or embrace response. Some institutions have chosen to revert to pen-and-paper exams on campus in the short term, while others are increasing the component of oral evaluations to counter the inappropriate use of technology. [2,3] Platform vendors have responded by refining and promoting digital observational assessment tools and virtual objective structured clinical examinations for medical assessments, among other solutions.

Most institutions, however, understand the need to prepare for a world driven by AI. Going forward, some directions in which the market for digital assessment platforms could potentially evolve include:

- Training and testing on the use of AI

- Disclosed use of AI in essays and homework

- Controlled use of AI for group assessments

- Peer grading

- Leveraging technology to move assessments out of the classroom and into natural settings

Virtual reality (VR) and augmented reality (AR) are already moving assessments out of controlled classroom settings. However, current assessment practices are insufficient for immersive environments, because these are significantly different from the conventional classroom pedagogy. [4] Current application is seen in professional education, where simulated environments enable hands-on application of skills acquired while reducing the cost and risk associated with learning and testing in real situations. [5]

Market Analysis

Design Assessments

Assessment design is the first step in building assessments. Digitizing this step introduces capabilities that use natural language algorithms to build large question banks in a much shorter time, while helping improve the quality of questions in the following ways:

- **Automated test authoring:** Automates the process by defining the criteria to populate tests with efficiency in significantly reduced time.

- **Collaborative item authoring:** Multiple user roles, such as subject-matter experts, psychometricians and other relevant specialists, such as for culture, gender and accessibility. These can work collaboratively and concurrently to build vast question banks. [6]

- **Multidisciplinary:** Tools that meet the requirements of specialized disciplines, such as medicine, coding and architecture. Technology expands the scope beyond text and introduces elements of interaction and gamification.

- **Metadata management**: Tags each item on multiple criteria, allowing for repeated, varied and appropriate use of items.

Generative AI is being tested to automate the process of item authoring by integrating LLMs into assessment platforms, offering the potential for reducing time to build vast item banks. These banks are aligned with competencies, grades and other criteria that can be customized. GenAI also has the potential to refine the process by automating other aspects of this step, such as dynamic translation, and feedback options. The efficacy of its use, however, will only be established with sustained use.

Deliver Digital Assessments

Digital assessment platforms customize and automate the organization, scheduling and delivery of tests. This allows institutions to efficiently manage different assessment types, such as formative, embedded, summative and adaptive, which can otherwise be a challenge to implement. Diverse test types help institutions refine their assessment assumptions and offer a wide spectrum approach to what is being evaluated:

- **Hyperscalability and concurrency**: Assessment platforms are increasingly hosted in the cloud, which allows institutions to open up evaluation opportunities to all learner demographics, in-person and remote. Concurrency performance is also improving as product matures, with platforms offering testing capabilities for tens of thousands of test takers concurrently. This meets the requirement for large-scale standardized testing while significantly reducing the need for physical logistics.

- **High frequency**: Automated scheduling and APIs to embed assessment items and feedback modules into learning content allow educators to achieve continuous formative assessment and insights into student learning.

- **Adaptive**: Rule-based branched assessments offer multiple pathways to demonstrate learning outcomes. Generative AI holds the potential to refine the process and make it more dynamic and intuitive. However, this will take some time before a commercially viable off-the-shelf product is ready for the sector.

Secured Assessments

Assessment security is critical to establishing the validity and credibility of assessment outcomes. Digital platform providers have the challenge of demonstrating this security at every stage of the assessment life cycle. Education CIOs should expect the following capabilities from assessment platforms that assure test security:

- **Cloud services**: Most assessment platforms are hosted in the cloud, which could be single or multitenancy, private, or public cloud, depending on client requirements and data encryption compliances for transit and rest.

- **Role-based access**: Test development is secured by configurable role-based access assigned and strengthened by multifactor authentication.

- **AI detection**: Platforms are testing detection and blocking capabilities for browser extensions and chatbots that can be layered on top of the assessment window, particularly for timed and synchronous tests. Open-book or asynchronous assessments are supported by APIs for integration with plagiarism and AI-detection tools.

- **Authentication and remote proctoring services**: Assessment vendors either have in-built authentication and proctoring tools or provide third-party support or APIs for institutions to integrate with service providers of their choice.

- **Test content**: Configurable features, such as randomization, delayed results, prohibiting backtracking or timed assessments, allow educators and administrators to secure the test content and discourage its unauthorized use. These are, however, supportive measures only which may not be sufficient by themselves in securing the test content.

Accessible Assessments

Accessibility is a primary concern with digital tools in the classroom, and products are continuously evolving to close the gap, if any, among the diverse demographics of users. Education CIOs should expect the following capabilities in digital assessment platforms to promote equitable access to all users:

- **Compliances and tools**: Most platforms support global industry-standard specifications, such as the latest versions of Web Content Accessibility Guidelines (WCAG) and Section 508 in the U.S., among others. Local compliance should be sought with shortlisted vendors. Platforms can be differentiated on the basis of capabilities, such as support for exams in multiple languages and scripts, especially right to left. Local accessibility needs may or may not be supported and should be sought out per the institution's accessibility policy.

- **Application:** The test engine and other stages of assessment workflow can be accessed through a browser or a native desktop/mobile application or a combination, depending on the vendor. The former supports exam delivery across a wide geography, while the latter supports varied internet bandwidth across the user base.

- **Delivery:** Most platforms support multiple formats of test delivery to meet education's need for a comprehensive view of learning outcomes and accommodate diverse learners and discipline requirements, such as science, technology, engineering, math or the performing arts. In terms of capabilities, it means synchronous and asynchronous, timed or untimed, written or oral, or observational and portfolio-based assessments.

Evaluation Tools for Grading and Feedback

Digital assessment platforms impact two key areas of evaluation:

- **Grading:** Automated grading and grading tools that use deep learning models to grade handwritten objective responses already exist in the market. [7] The refined use of generative AI has the potential to automate subjective and constructed responses. Commercially viable tools are yet to hit the market, but institutions must exercise restraint and use them as assistive tools rather than a replacement for a teacher's evaluation.

- **Feedback:** As with grading tools, options for pre-populated feedback options are available in assessment platforms. As vendors incorporate the use of generative AI to power different stages of assessment workflow, dynamic feedback options may become more viable.

Analysis of Performance

Insights on student performance aid the personalization and improvement of teaching and learning. Digital assessment platforms can be differentiated on the granularity and scope of analysis they can provide:

- **Item analytics:** Patterns of student responses to different questions can help educators improve the quality of assessments and in turn, the effectiveness of the curriculum design.

- ■ **Student reporting and analytics**: Granular insight on individual and batch performance can help educators evaluate their teaching practices and realign as required.

Wider Market Perception

Conversations from social media were analyzed from January 2021 through August 2023 to understand the changing priorities and perceptions about digital assessments and determine the most common topics that are being discussed. In general, we see a continued focus on formative and continuous assessments with an emphasis on ensuring equity, with generative AI topping the discussions in 2023, as expected (see Figure 2).

Figure 2: Market Perception on Digital Assessment Priorities

Market Perception on Digital Assessment Priorities

n = 367,390
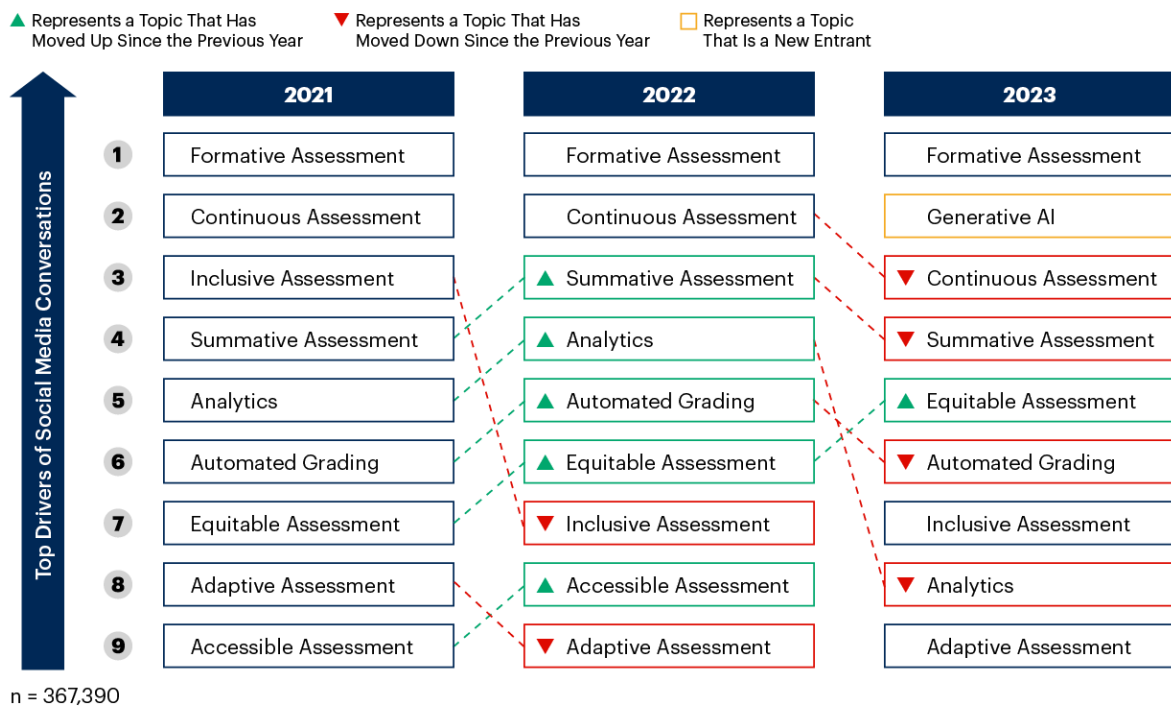
Source: Social Media Analytics Tool; Date Range — 1 January 2021 through 31 August 2023
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Representative Vendors

The vendors listed in this Market Guide do not imply an exhaustive list. This section is intended to provide more understanding of the market and its offerings.

The market for assessment platforms caters to a wide range of requirements across the education sector, including summative and formative exams. Table 1 provides examples of vendors with offerings of complete assessment suites. This includes vendors that specialize in large-scale standardized testing alone, as well as those that provide both large-scale testing as well as enterprise solutions to meet specialized institutional requirements (see Note 1).

The vendors included in this Market Guide were selected to represent assessment capabilities discussed in the Market Analysis section. The vendors included are some of the vendors about which Gartner has received the most client interest through inquiries and interactions.

Market Introduction

Table 1: Representative Vendors in Digital Assessment Platforms
(Enlarged table in Appendix)

Vendor	HQ	Product
BetterExaminations	Dublin, Ireland	BetterExaminations Platform
Cambium Assessment	Washington D.C., U.S.	Cambium Assessment
Excelsoft Technologies	Mysore, India	Saras
Inspera	Oslo, Norway	Inspera Assessment
Janison	Sydney, Australia	Janison
Learning Spiral	Kolkata, India	UCanAssess
Learnosity	Dublin, Ireland	Questionmark
MaivenPoint	Singapore	Examena
Meazure Learning	Alabama, U.S.	Meazure Exam Platform
MyKnowledgeMap	York, U.K.	MyProgress
Qorrect	Giza, Egypt	Qorrect Assess
RM	Oxfordshire, U.K.	RM Assessment
Open Assessment Technologies	Capellen, Luxembourg	TAO
TestReach	Dublin, Ireland	TestReach Online Assessment
Turnitin	Oakland, California, U.S.	ExamSoft
UNIwise	Aarhus, Denmark	WISEflow

Source: Gartner (September 2023)

Market Recommendations

Education CIOs responsible for technology optimization and modernization should:

- Identify the current and anticipated growing use of digital assessments, whether in-built in LMSs or independent platforms, by working with stakeholders from across the institution. This will help to establish the expected use for key, standard and optional capabilities and therefore, the need for an enterprise platform or stand-alone components for your institution.

- Invest time to educate your teams to effectively evaluate the performance of new capabilities powered by generative AI, introduced in a relatively short time span by vendors, for informed decision making.

- Collaborate with stakeholders to build a roadmap with KPIs for what successful use of generative AI-powered assessment capabilities looks like for your institution, to measure ROI. Prioritize the importance of human review by including it in the workflow and roadmap ideation.

Evidence

2023 Gartner CIO and Technology Executive Survey. This survey was conducted to help CIOs and technology executives overcome digital execution gaps by empowering and enabling an ecosystem of internal and external digital technology producers. It was conducted online from 2 May through 25 June 2022 among Gartner Executive Programs members and other CIOs. Qualified respondents are each the most senior IT leader (e.g., CIO) for their overall organization or some part of their organization (for example, a business unit or region). The total sample is 2,203 respondents, with representation from all geographies and industry sectors (public and private), including 131 from higher education. Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

[1] Boost Academic Integrity in Education Using an Ecosystem Approach.

[2] As AI-Enabled Cheating Roils Colleges, Professors Turn to an Ancient Testing Method, The Wall Street Journal.

[3] ChatGPT: Can Students Pass Using AI Tools at University?, BBC.

[4] Game-Based Assessment Framework for Virtual Reality, Augmented Reality and Digital Game-Based Learning, International Journal of Educational Technology in Higher Education.

[5] Case Study: Enhancing Teaching and Learning With Augmented Reality Headsets.

[6] Item Writing: A Collaborative Effort, Ebrary.net.

[7] Gradescope, Stanford University (Center for Teaching and Learning).

Social Media Analytics Methodology: Gartner conducts social listening analysis, leveraging third-party data tools to complement or supplement the other fact bases presented in this document. Due to its qualitative and organic nature, the results should not be used separately from the rest of this research. No conclusions should be drawn from this data alone. Social media data in reference is from 1 January 2021 to 31 August 2023 in all geographies (except China) and recognized languages. Navya Sinha and Ritesh Srivastava from the Social Media Analytics Team contributed to this research.

Note 1: Representative Vendor Selection

This Market Guide provides Gartner's initial coverage of the market and focuses on the market definition, rationale for the market and market dynamics.

Recommended by the Author

Some documents may not be available as part of your current Gartner subscription.

Market Guide for Remote Proctoring in Education

3 Stages in Unlocking the Transformative Potential of Digital Assessments in Education

Innovation Insight: Formative Digital Assessments in K-12 Education

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Excelsoft Technologies	Mysore, India	Saras
Inspera	Oslo, Norway	Inspera Assessment
Janison	Sydney, Australia	Janison
Learning Spiral	Kolkata, India	UCanAssess
Learnosity	Dublin, Ireland	Questionmark
MaivenPoint	Singapore	Examena
Meazure Learning	Alabama, U.S.	Meazure Exam Platform
MyKnowledgeMap	York, U.K.	MyProgress
Qorrect	Giza, Egypt	Qorrect Assess
RM	Oxfordshire, U.K.	RM Assessment
Open Assessment Technologies	Capellen, Luxembourg	TAO
TestReach	Dublin, Ireland	TestReach Online Assessment
Turnitin	Oakland, California, U.S.	ExamSoft

| UNIwise | Aarhus, Denmark | WISEflow |

Source: Gartner (September 2023)