



## Case Study

# Renaissance dramatically improves assessment development using advanced item editing technology

Copyright Clearance Center (CCC) develops advanced question and answer editing functionality for Star Assessments test platform

## Renaissance background

Renaissance is on a mission to improve academic outcomes by helping students learn better, teachers teach better, and school administrators lead better. More than one third of U.S. schools use Renaissance assessment and practice solutions to accelerate learning for millions of students.

The Renaissance portfolio includes Star Assessments for reliable, accurate insights into K–12 student learning. The assessments help teachers and administrators guide the growth of every student by providing comprehensive interim and formative assessments in reading, math, Spanish, and early literacy. Using the system's advanced technology, the assessment questions adapt during the course of a test based on the student's answers and knowledge base.

## RENAISSANCE®

### Company

Renaissance

### Location

Global

### Industry

Education

### About

Renaissance creates assessment and practice solutions that put learning analytics to work for educators, saving hours of prep time while making truly personalized learning possible. Schools nationwide use Renaissance's solutions to analyze students' abilities and guide high-quality instruction. We help teachers teach better, students learn better, and school administrators lead better — all to improve academic outcomes.

As a global leader in assessment, reading and math solutions for pre-K–12 schools and districts, Renaissance provides educators with insights and resources to accelerate growth and help all students build a strong foundation for success. Over 100 countries use Renaissance solutions.



Renaissance administers 80 million Star Assessments tests — consisting of a series of questions, question prompts, and answers — on a yearly basis. The 40 assessment content authors at Renaissance who create, edit and design the assessment items are geographically dispersed, working from home and corporate offices throughout the United States, as well as the UK, Australia and China.

The Renaissance content team grappled with a number of technological issues while working on the assessment items for the Star Assessment item bank, causing production bottlenecks and required learning platform updates. The processes were also error-prone, difficult to use, and time-consuming.



## The challenge

Specifically, the team needed to address three main issues:

### 1 Isolated tools increased the amount of time to edit items

The Renaissance content authors utilized multiple, isolated tools for equations, charting, images and other elements for building the assessment items. The authors had to save each element in its own application and then import the elements one at a time into the Microsoft Word template. Whenever an element required an update, authors had to locate the source file, apply the change, reconvert it, and then reimport the element into Word. Renaissance hoped to overcome this challenge with a solution that would bring all the tools together in a one-stop-shop environment to speed up the editing process.

### 2 Word templates hindered content creation and editing

Renaissance content authors previously relied on Microsoft Word templates for creating and updating the assessment items. Core to this challenge is that Word is a traditional desktop publishing tool that supports What You See Is What You Get (WYSIWYG) for paper-based documents, which displays the end result as it will appear in hard copy or PDF. But, when content is delivered only to digital platforms, as is the case for Renaissance, what the content author sees is not what end users will get online. The content authors could not “preview” to see how the items presented in the Star Assessments player until after transforming the content from Word into Question & Test Interoperability (QTI) XML, the online format used by the Star Assessments player.

Also, Word templates served as a starting place for Renaissance content authors to create different types of assessment items using predefined styles and layouts. However, they needed in-depth knowledge of how to manipulate Word templates and documents so that styles and sequences were correctly mapped to QTI XML. Because Word is an unstructured WYSIWYG editing tool, the author’s focus is on presentation and page layout. This is problematic for any automation as the source Word files are not predictable and the meaning isn’t apparent. Any slight deviation or complexity from a Word template would cause the downstream automated Word to QTI (unstructured-to-structured) transformation to fail. Content authors would spend countless hours trying to fix the Word files before getting the items to load or present correctly in the assessment player. With many nuances to the troubleshooting process to determine why things didn’t come out right in the player, it was often difficult to nail down exactly what assessment authors needed to do.

### 3 Hotspots were difficult to place

Assessment item graphics presented an extra hurdle, requiring a tedious manual process of switching back and forth within design applications to make sure images looked just right in the Star Assessments platform. The content authors found Math Star Assessments were particularly challenging, given the precise formatting required for equations, geometric shapes, and various math symbols.

Two-dimensional graphics had to be converted into Scalable Vector Graphics (SVG) that could be rendered by the player. For website hotspots that activate when students hover over a designated graphic, the content authors had to go into their design application (Adobe Illustrator or Inkscape), cut and paste, manually determine the hotspot areas, and then test the hotspots on the Star Assessment platform. This was a time-consuming process as it was easy to place hotspots in the wrong place.



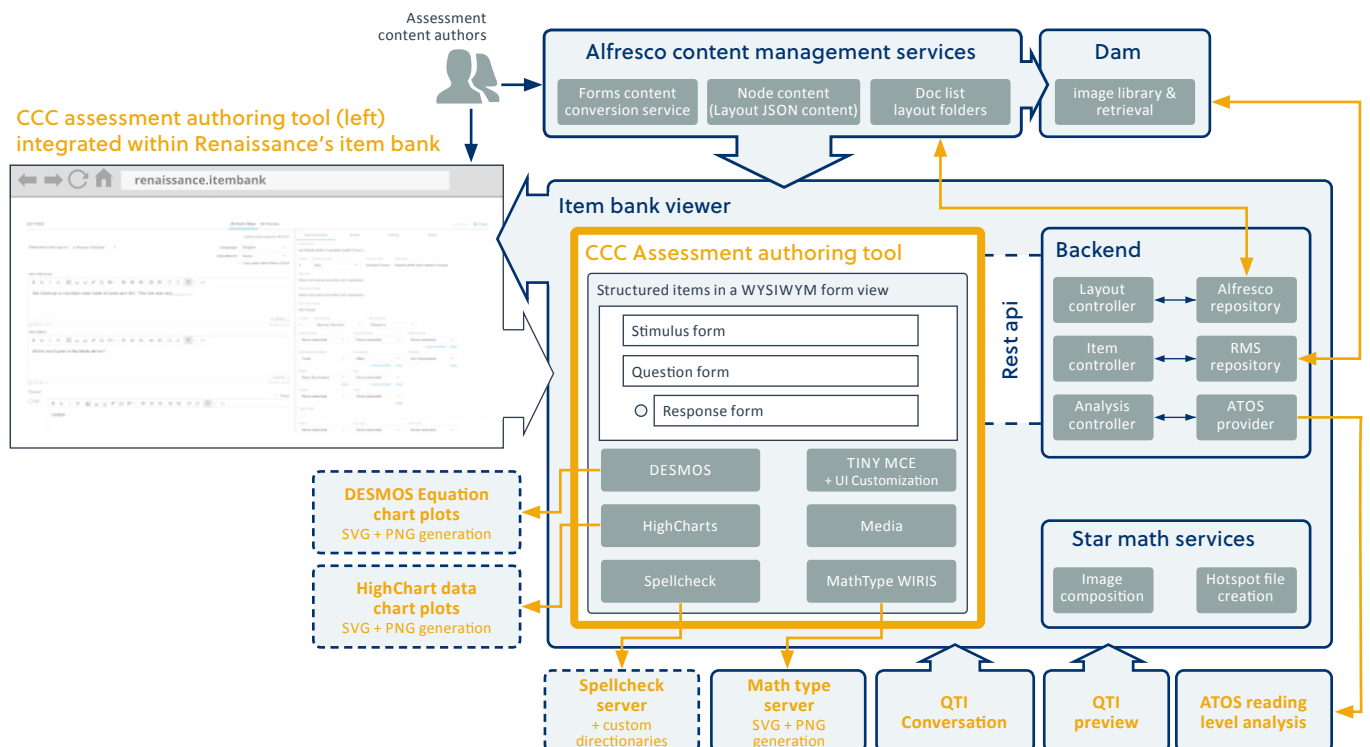
The illustration shows the overall solution with CCC's Assessment Authoring Tool integrated with Renaissance's Item Bank Viewer (Alfresco-based), Digital Asset Management (DAM) system, Star Math Services, and backend.

## The solution

Renaissance decided to rectify the situation by searching for a solution that could help content authors create assessment items, all while making it possible for them to preview content within an editing tool, just as the content would look to students in the Star Assessments player. By simplifying and streamlining the editing process, content authors could create and update assessment items faster, and over time, they could create more content. Renaissance also needed the solution to more reliably transform the assessment items to QTI, so that production processes were fully automated to their digital learning platform.

To solve Renaissance's challenges, they issued a Request for Proposal (RFP) requesting the development of an assessment editor, but their requirements still described a WYSIWYG-based approach. Copyright Clearance Center (CCC), a solution provider with editor application development and integration expertise, responded and recommended a unique approach to meet Renaissance's needs — using WYSIWYM (What You See Is What You Mean) instead. WYSIWYM is a paradigm for authors to create and enrich content in a structured way, allowing them to describe its meaning rather than how the content looks. CCC's content experts advised Renaissance that an unstructured WYSIWYG assessment item editor could result in some or all of the same problems that they had with Word templates.

With competitive pricing and on-target advice of a structured WYSIWYM approach, CCC was selected by Renaissance to take on the project. Justin Hess, the Technical Lead of Integrations at Renaissance, appreciated how CCC presented great ideas that improved the original request. As an example, Renaissance originally thought they could find a single, out-of-the-box tool that would meet their requirements. But after exploring the editorial process and challenges, CCC came back with an offering that supports an integrated solution, allowing assessment authors to create different types of content using multiple best-of-breed editing technologies.





We partnered with Copyright Clearance Center because the solution they proposed was innovative and resonated with us more so than other options. CCC also developed the project scope to precisely match our requirements, and they demonstrated their technical capabilities with the positive past experiences of other clients.

**Justin Hess**

Technical Lead of Integrations,  
Renaissance

### WYSIWYM authoring tool simplifies user experiences

CCC developed a new Assessment Authoring Tool for Renaissance that leverages the WYSIWYM constrained forms-based approach to authoring. It guides assessment authors through a simplified user experience to create the expected format for the downstream Star Assessments player. CCC integrated the Assessment Authoring Tool with an existing Item Bank Viewer (IBV) built on top of an Alfresco repository. The IBV is used for storage, QA, and workflow management of assessment item content.

CCC also integrated the following technologies within the Assessment Authoring Tool, so that the solution brings together all capabilities needed to create any type of assessment. Content authors no longer have to jump back and forth between applications, exporting and importing files, in order to create or update an item. They now experience a “one-stop shop” that includes the following integrations:

- **TinyMCE** – captures components of an assessment item for HTML editing in-browser.
- **Highcharts** – allows authors to create and edit graph content-related items. The graph content is returned to TinyMCE in SVG XML code, which is then rendered as an image to the author.
- **Desmos** – provides functionality to generate charts from equations. The charts are returned to TinyMCE in SVG XML code, which is then rendered as an image to the author.
- **WIRIS** – allows authors to add equation content to items. The equation content is returned to TinyMCE in both MathML and as a static image.
- **SpellCheck PRO** – performs spell check as the author types.
- **QTI Player** – previews assessment items in QTI XML format.
- **ATOS** – automatically analyzes text to determine reading level.

### Automatic conversion to QTI XML

CCC’s Assessment Authoring Tool applies a WYSIWYM approach to create structured, machine-readable data objects in JSON that automatically convert to QTI XML for downstream consumption by the Star Assessments player.

Whenever the content author saves, the Assessment Authoring Tool automatically converts questions, answers, and prompts to QTI on-the-fly, which allows authors to preview how the assessment items will look in the embedded Star Assessments player at any time before they are published. The JSON and QTI files are also automatically stored in the IBV. Once approved, the last version of the QTI assessment items in the IBV are automatically delivered to different channels for consumption by teachers and students.

The WYSIWYM approach applied by CCC contrasts with the classic WYSIWYG web page or paper-based editors that are free-form, non-restrictive, not schema defined, and not rules-based. All of these factors can lead to downstream transformations that do not produce the expected formats for questions, answers, and prompts. Because the assessment authors are focused on just the content, and not on how it should look or troubleshooting misapplied styles, the item creation experience is now simplified and streamlined, and transformation and production is now fully automated.



### Automatic hotspotting

Because content is well-structured when it is created in CCC's Assessment Authoring Tool, it can accurately predict where hotspots are needed within assessment items. The tool determines the coordinates of images within an item and then automatically generates the SVG and JSON files needed by the Star Assessments player, which ultimately turn into links for students and teachers to use to navigate correct and incorrect answers in a quiz.

In summary, the hotspotting process that was formerly manual, tedious, and time consuming for Renaissance content authors is now "lights out" and fully automated.

### The results

Because student testing continues to evolve, the enhanced technology means Renaissance can maintain the high standards the company has set for improving academic outcomes for students across the world.

With the new Assessment Authoring Tool deployed, the content authors at Renaissance have gained a range of new capabilities that make it possible to produce Star Assessments items faster and more efficiently. The new tool:

- Prevents authors from introducing formatting or errors before assessment items are published.
- Shows authors how questions, prompts and answers look to students taking assessments.
- Provides a one-stop-shop authoring experience where authors can create textual content, as well as equations and charts, in one in browser editorial tool.
- Allows authors to browse, select, and reference images from a media library within a Digital Asset Management (DAM) system.
- Analyzes each text field automatically to determine reading level so that authors can make adjustments if needed.



Easy



Fast



Efficient



## Case Study

Since launching the Assessment Authoring Tool created by CCC, Renaissance editors have improved efficiencies while creating and updating assessment items in Renaissance's vast Item Bank. The Star Assessments' new cloud-based editing capabilities were particularly helpful when Renaissance transitioned its assessment content authors from corporate offices to working at home due to the COVID-19 pandemic.

- Converts content from JSON / HTML to QTI XML format automatically when saved.
- Provides static SVG images plus JSON files to specify hotspot click areas for correct and incorrect answers.
- Allows authors to switch between different layouts to select distractors for each item.
- Creates and stores JSON-based layout templates in Alfresco for future extensibility of new assessment types.
- Enables authors to choose different editor experiences, such as layout, quiz structure, editor features, and available plugins.
- Gives administrators the ability to change and define new templates on-the-fly without needing any system restarts.
- Pushes content to the production Item Bank repository automatically after QA is completed.

By working more efficiently, assessment content authors can complete test items faster and move on more quickly to working on new test items. Given that Renaissance administers 80 million tests, this saves a significant amount of time.



### About CCC

A pioneer in voluntary collective licensing, Copyright Clearance Center (CCC) helps organizations integrate, access, and share information through licensing, content, software, and professional services. With expertise in copyright and information management, CCC and its subsidiary RightsDirect collaborate with stakeholders to design and deliver innovative information solutions that power decision-making by helping people integrate and navigate data sources and content assets.

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