



NIMAS: AN OPPORTUNITY FOR EDUCATIONAL PUBLISHERS

How XML and Content Management Creates New Marketing Opportunities for Publishers

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Introduction

Many US students with disabilities are impacted on a daily basis by the limitations of print technology. Confronting access barriers, these students are regularly blocked from learning the same information as their peers. With the passage of IDEA (Individuals with Disabilities Education Improvement Act) in 1997, it was mandated that all students have access to general curriculum materials, including those that were previously available only in print. In December 2006, State Education Agencies (SEAs) were required to adopt the National Instructional Materials Accessibility Standard (NIMAS), which is highlighted in IDEA 2004, the special education reform bill that was approved by the bipartisan House-Senate conference committee.

This white paper details how NIMAS should be viewed not as a challenge, but as a new opportunity for educational publishers and as a catalyst for improvements to and implementation of XML in publishing workflows. The key to recognizing and realizing new opportunities while complying with NIMAS is in understanding some of the basic precepts of content management.

What is NIMAS and why is it important?

Students who have difficulty seeing the words or images on a page, who cannot hold a physical book, or who have difficulty deciphering the written word have been provided with few options for accessing “book bound” content. The age-old process of packaging information in a fixed, printed book has made it difficult for materials to be easily converted or ported over to more accessible formats.

The majority of students with a need for special formats and accessible books do not have access to them today. This is due in part to technical challenges at the school level, where the proper technology to deliver these formats is not in place. However, the biggest issue is the lack of a distribution system designed to deliver the

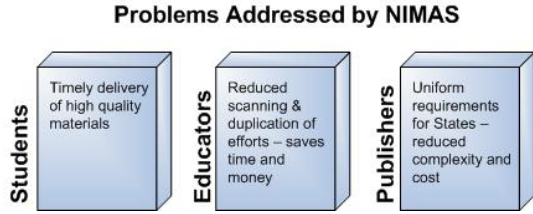
accessible materials in a timely fashion. The adoption of a national standard that requires publishers to provide textbook files in an accessible format is intended to make the production of digital and Braille content faster and more cost effective.

On November 17, 2004, a bipartisan House-Senate conference committee approved a final special education reform bill that reauthorized the Individuals with Disabilities Education Act (IDEA) and set in motion important reforms to help teachers, parents, and schools ensure every student with disabilities receives a quality education.

The IDEA 2004 reforms included the creation of the National Instructional Materials Accessibility Standard (NIMAS) a standard for the preparation of electronic files that are used in the efficient conversion of printed materials into specialized formats. These formats can include Braille, audio, digital text, accessible software, and even large format print. NIMAS applies to materials that are published after July 19, 2006.

How does NIMAS help?

Previously, the lack of a standardized format for accessible content meant that publishers were required to produce materials in multiple formats to meet the needs of various state and local education agencies. In some cases, publishers received dozens of requests for conversion files, in many and multiple formats. This process pushed the burden onto the publisher, resulting in slow delivery of content and increased costs. With the adoption of NIMAS, publishers only need to convert their materials into one standard format and submit it once to a central repository. This streamlined conversion process, and single format, will provide students with disabilities with their textbooks at the beginning of the year, ensuring the same access to resources as their peers.



Which content is covered by NIMAS?

The content covered by NIMAS is limited to “print instructional materials.” IDEA-2004 defines this term as printed textbooks and related printed core materials that are written and published primarily for use in elementary and secondary school instruction, and are required by a state educational agency (SEA) or local educational agency (LEA) for use by students in the classroom. NIMAS also only applies to materials that are published after July 19, 2006.

Under NIMAS, publishers are required to make accessible materials available to the SEAs and LEAs either by:

- 1) Delivering a NIMAS compliant pre-production file to the National Instructional Materials Accessibility Center (NIMAC), a national repository of NIMAS source files maintained and coordinated by the American Printing House for the Blind (APH). These files can then be used by publishers, authorized entities, and others to produce accessible versions of printed instructional materials.
- 2) Making printed materials available in other specialized formats that can be sold directly to the SEAs and LEAs (Braille, large text print, audio book, etc.).

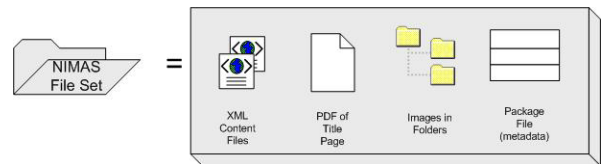
In either situation, the publisher must create a NIMAS file set that consists of:

- XML content file(s)
- a package file (OPF)
- a PDF-format copy of the title page (or whichever page(s) contain(s) ISBN and copyright information)

- a full set of content images in SVG, JPG, or PNG format

In addition to the file set specifications above, the package files must conform to the OEBPS 1.2 standard (the Open eBook Publication Structure Specification Version 1.2), i.e., validate to this specification. NIMAS package files must validate to this OEBPS standard, which means the package must:

- Use the -.opf extension
- Include a list of all files relating to a single publication
- Use text/xml package files
- Use well-formed XML package files
- Have package files with a unique-identifier attribute (example: <package unique-identifier="1234">) and this is mirrored in the Identifier metadata tag (example: <dc:Identifier id="1234">ABC</dc:Identifier>)
- Use Dublin Core (example: <dc:Publisher>) metadata tags



How does NIMAS apply to publishers?

NIMAS requirements

NIMAS creates both challenges and opportunities for publishers. On one hand, the standardization introduced with NIMAS eliminates the duplication of creating materials for each of the states in its own desired format. On the other hand, the process for creating NIMAS-compliant files for each new title can be challenging if a publisher does not currently use a structured format in its workflow.

Impact

Publishers serving state and local education agencies will be required to provide compliant files to the NIMAC. While many publishers already use XML for internal production, there are many who do not. Even more importantly, a relatively small number of publishers are accustomed to distributing products in XML format.

A transition to NIMAS delivery may be relatively straightforward for publishers who already employ XML technology in their editorial workflows and content pipelines. Those who do not fall into this category will have more work to do, as they will need to either modify their workflow or hire an outside firm to convert files to XML, costing both time and money.

Opportunity

While some may view NIMAS as a costly regulatory barrier that must be overcome simply to maintain existing business, it is also possible to view NIMAS as providing an opportunity to assume a leadership position while retooling internal workflows to leverage the benefits of XML. Done right, these benefits include improved quality, enhanced flexibility, and increased speed to market. And publishers who are able to get there first can win market share from slower moving competitors.

Challenges

The biggest challenge some publishers face is changing the way they think about their content. Thinking about content as “content objects” rather than printed publications is the first hurdle to scale. Managing smaller “chunks” of content facilitates content reuse and repurposing. The best way to implement this thought process into a publishing process requires content management using XML.

Benefits of content management

There are many different definitions or views of “content management” and “content management system” (CMS). “Content management” generally encompasses three main aspects: content creation, storage, and distribution. Depending on an individual’s perspective, a content management system can refer to a place where content is simply stored. For other people, it can be a tool that facilitates workflow. And for others, it can be a web platform.

This white paper defines CMS as the **processes, technologies, and people involved in acquiring, preparing, and delivering content.**

Most publishers today recognize that a content management strategy must include methods to manage all of their content as a collection that has ongoing value apart from any one product. The recurring technology that provides the most benefits to publishers is an XML-based CMS.

Publishers who use XML are aware of opportunities that leverage existing content for new and improved print and electronic products. Additionally, the shift from managing content for products to managing content objects facilitates content reuse and repurposing—long the siren song of content management. But implementing an XML-based content management system includes a number of additional benefits. Following are some of those benefits and a high-level review of why they are important.

Streamlined XML workflow

What is an “XML workflow?” Does it mean a workflow based on XML from the beginning to the end, or does it mean a workflow that produces XML as an output (often among others)? The term is confusing as it may mean different things to different people. But generally speaking “XML workflow” does mean a workflow that uses XML throughout, not just produced at the end.

Using XML throughout the workflow makes sense for publishers who re-use content found in previous publications, work with granular pieces of content that are edited and stand on their own, or have direct-to-web publishing requirements.

If publishers are converting content to XML post publication to accommodate NIMAS, it may be worthwhile to consider moving their XML upstream.

XML provides a means to contain richness in the content that can drive various workflow processes. For example, if a document's status is tagged as "edited," this can be the prompt that delivers that document downstream in its production cycle.

Content reuse and repurposing

Educational publishers have long recognized the importance of content reuse and modular document/content creation. The tools have caught up with the concepts as [XML-based content management systems](#) become more refined. And educational publishers are creating instructional materials using learning object-based content models.

Publishers who manage content objects that appear in multiple publications find benefit from managing, storing, and working with XML content in the editing and production processes. An effective XML-based content management system provides a window into content, allowing users to select, manage, and reuse content in ways not possible before.

This is a different mind set focused around the content itself, as opposed to just one package (ie, a book or a journal article). XML is both human and machine readable, and the XML syntax provides additional richness. For example, search can be applied to XML elements or content within XML elements.

Standardized content

XML's use of tagged elements provides a convenient method for publishers to enforce standardized terminology across various publications and content types. XML can enforce standardized content structure as well, allowing authors to focus on the content itself while embedding editorial consistency into a file.

Metadata

Structured metadata results in consistent terminology that enables content discovery, sharing, and management of information.

The NIMAS specification calls for the fifteen elements of the [Dublin Core](#) metadata standard, which provide a consistent and uniform means of describing resources.

Distribution

XML facilitates the distribution of content by providing a universal mark-up language no matter the original information system or application used. XML facilitates the delivery of content to various outputs—print, web, PDA, etc. This capability is often referred to as multi-channel publishing. In plain English this means that a single set of XML files can be programmatically transformed into multiple delivery formats. Typical examples include PDF files that can be used for generating printed copy or HTML that can be deployed on the web.

In the case of NIMAS, XML can also be used to provide input to readers for conversion to audio output or Braille devices.

Using offshore resources for conversion

Publishers can implement XML at many different points in their publishing workflow depending on a variety of business drivers. For some publishers, post-production offshore conversion makes sense both economically and in terms of timeliness.

Offshore conversion shops offer full-range conversion services including DTD development, data clean up, OCR, and validation.

While offshore conversion houses can help meet the NIMAS requirements quickly, using these resources is typically viewed as a short-term solution. Publishers should identify and document their publishing goals to determine if the conversion of completed materials makes sense on an ongoing basis.

Business opportunities for educational publishers

Under NIMAS publishers have the option to produce content themselves under a “market-model” and sell it directly to the SEAs and LEAs. This model creates new opportunities for publishers to package their content directly into different accessible formats and create new revenue channels. Whether it’s the creation of a Braille or audio book, special software that supports text-to-speech, audio, video or other formats, expanding the number of options available to SEAs and LEAs will mean that these organizations can purchase the necessary formats directly from the publisher, rather than from an accessible media producer.

While today NIMAS is limited in scope to blind students and those with print disabilities—approximately 100,000 students in the US—the potential audience for accessible materials is much larger. In the US alone, there are approximately 3.8 million students with learning difficulties who can benefit from accessible materials.

Readiness of staff

In general, NIMAS and other XML output should *minimally* affect editorial, design, and even production. However, staff must be ready to take on *some* tasks to create NIMAS and other exports. For example, systems like the K4 Publishing System provide abilities to add metadata to files. This metadata can be expanded to provide benefits for NIMAS, other XML formats, and downstream electronic products by way of XML.

Editorial may need to provide some of this meta-data.

Furthermore, some staff must be involved in the process of producing XML exports, such as triggering the content export, performing tasks that can’t be fully automated, and so on. This may create new tasks and skills for management to balance.

Incremental approach

As suggested previously, an incremental development effort is strongly recommended. Putting the basic tools in place is a first step. Producing a NIMAS and/or other XML export is the next step. Moving from there to provide an XML CMS, electronic content output streams, and eventual round tripping will keep publishers busy for some time. Producing short-term wins that prove their worth is a great way to both gain acceptance of change and to manage risk of the overall venture, something that management should embrace as the right way forward.

Looking beyond NIMAS

NIMAS has the potential to create significant change in the educational publishing market. It is similar to the stir created when closed captioning was introduced for television broadcasting. While originally developed to meet the need of hearing impaired viewers, the scope of use crept into other markets and the technology is broadly used by a variety of audiences today (from elderly viewers to those just learning a language).

Once an XML workflow is in place and an XML output is available, publishers can easily embrace technology as simply another delivery channel for their content. This allows publishers to manipulate almost any kind of content (text, audio, video, image) into any kind of format (excerpts, text-to-speech, Braille) and deliver it on any platform (computer, web site, mobile device).

Some of the more enterprising publishers already view NIMAS as a catalyst for expanding

beyond print and have explored ways of repackaging their content. But, for many, this broad view of technology creates anxiety—it's challenging to understand where to start. Without a solid foundation of the possibilities that these new technologies, platforms, and delivery channels bring, it's hard to build a plan for creating new offerings out of existing content.

The technology in itself delivers some interactivity, but it's really the storyboard, implementation, and design of the user interaction that is critical in designing a usable and sellable application or product. Working with a technology partner to help define product opportunities, production workflows, and technology architectures helps a publisher understand the best channels, platforms, and technology to leverage.

Publishers often encounter a few technology challenges in developing fully accessible interactive materials. When creating software, video/audio books, games and other publications for students with special needs, it's important to build in support for screen readers and to develop solutions on industry standard technology. As with XML workflow conversion, the process for selecting and implementing the best technology can be significantly reduced when working with a partner that has an intimate knowledge of the capacities of the technology and the best practices for implementation.

While the market for new software, talking books, interactive publications and other content may seem small at the moment, it is quickly expanding. NIMAS foreshadows change in both educational publishing and teaching, as teachers will come to expect, and then demand materials that are flexible enough to meet the challenge of the diversity of all their students. Although originally developed for students with special needs, many of these same resources have the ability to

be more widely adapted as a way of personalizing the learning experience for all students. The publishers that start building new applications and start reusing and repackaging their content for a multitude of different formats today will be ready for this new wave of demand for personal learning tools.

In addition, there is an opportunity for publishers to introduce new products that complement NIMAS offerings and add an extra layer of interactivity. This can be accomplished through the development of assessment tools and reporting applications, such as:

- 1) Testing and assessment software to assess pre-learning level and comprehension.
- 2) Testing comprehension (i.e. formative testing).
- 3) Tracking and understanding learning behaviors and paths for individual students.

Conclusion

Publishers are required by legislation to produce NIMAS, and can readily do so through working with conversion vendors. But the NIMAS requirements also provide the opportunity to go further—to use the NIMAS requirement as a justification to adopt an XML work process that will also help in other ways. Publishers are successfully implementing an automated or mostly-automated NIMAS export today. A pragmatic and realistic understanding of the technical requirements for XML delivery and, even more so, the non-technical issues involved in the process, will reward astute publishers with success through new business opportunities.

About Really Strategies

Really Strategies, Inc. is a privately held company that was founded in 2000 to provide world-class content solutions and services to publishers, media companies, and other content-centric companies. From content creation to delivery, Really Strategies helps bring strategy, content, and technology together to analyze, architect, and implement appropriate tools and technologies. Our solutions encompass XML editorial tools, XML repositories, content management systems, and editorial and production systems. Our services include workflow reengineering; technology evaluation; DTD and Schema development; business, functional, and technical requirements development; and electronic product development strategy. As a recent recipient of the 2006 People's Choice Award for Top Content Management, Deloitte and Touche Fast 500 Award, Benjamin Franklin Emerging Business Award, Deloitte and Touche Rising Star Award (Delaware Valley), the Philadelphia 100® Award, and one of the "Best Places to Work" in Philadelphia Award by the Philadelphia Business Journal, Really Strategies is committed to building the premier content solutions and services firm.

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About Integration New Media

Integration New Media (INM) is a privately held company that was founded in 1989 to provide multi-media support to companies that were just starting to explore the medium. Today, INM has become an expert in interactive media, with specific expertise in developing interactive publications and applications delivered on CD/DVD, kiosks, over the internet, and on mobile devices. Over its 17 year history, INM has worked with a number of publishers to migrate their content over to different formats and platforms as well as develop new interactive applications.

INM is uniquely positioned to deliver projects that balance visual design and usability to create stellar client experiences. The company's history of successful project management and its ability to create solutions that map to our clients' business objectives and technology needs make INM the partner of choice for many organizations. The company's leadership role in the multimedia industry over the years has provided it with the experience and the skill-set to know what works well and to provide guidance to its clients to help them achieve their objectives.

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Resources

- American Foundation for the Blind (AFB) - <http://www.afb.org/Section.asp?SectionID=44&TopicID=16>
- Dublin Core Metadata Element Set - <http://dublincore.org/documents/dces/>
- Individuals with Disabilities Education Improvement Act of 2004 (IDEA) - <http://www.ed.gov/policy/speced/guid/idea/idea2004.html>
- National Instructional Materials Access Center (NIMAC) - <http://www.nimac.us>
- National Instructional Materials Accessibility Standard (NIMAS) Website - <http://nimas.cast.org>
- Open eBook Publication Structure - <http://www.openebook.org/uebps/uebps1.2/download/ueb12-xhtml.htm>