

EMMA—Educational Materials Made Accessible

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Background

EMMA—Educational Materials Made Accessible—is a collaboration between the libraries and disability services offices (DSOs) at its member colleges and universities to facilitate the interchange of resources that have been remediated for accessibility.

Based at the University of Virginia, it consists of federated repositories of content and the technical infrastructure that enables DSOs to search across those repositories to obtain resources they need for the students, faculty, and staff they serve: either resources to remediate or resources that have already been remediated in the ways needed by the particular individuals who require them.

EMMA was created to address a significant problem, the fact that a resource remediated by a DSO is rarely provided to individuals at other institutions who need that same resource remediated the same way. This results in tremendous inefficiency, redundancy, and waste. The same book or article, for example, might be remediated by scores of DSOs over time, when the one first remediated might have been suitable for many or all of them.

This work is often quite labor intensive, and most DSOs are stretched thin, particularly at the beginning of each semester, when they scramble to provide accessible resources to students with disabilities. This can put those students at a distinct disadvantage, especially when the work involved means that they obtain the books and articles they need much later than their classmates do. Obtaining sufficiently or even partially remediated resources that suit them is a significant benefit to them.

The Development of EMMA

The origin of EMMA traces back to a research project in 2015–16. A planning grant from the Institute of Museum and Library Services (IMLS) funded an investigation of the potential value of a shared, inter-institutional repository of accessible instructional materials in higher education.

That project, “Repository Services for Accessible Course Content,” resulted in both an article, “[Toward Accessible Course Content: Challenges and opportunities for libraries and information systems](#),”¹ published in the *Proceedings of the Association for Information Science and Technology* in December 2016, and an extensive white paper, “[Libraries: Take AIM! Accessible Instructional Materials and Higher Education](#),”² published in March 2017. This work documented, among other things, that it is widely but incorrectly believed by DSOs that they are prevented by law from sharing the remediated files that they create.

That led to a four-year project funded by The Andrew W. Mellon Foundation known as “FRAME: Federating Repositories of Accessible Materials for Higher Education.” FRAME’s mission was to eliminate as much as possible of that wasteful, redundant work by enabling remediated resources to be discovered and shared between responsible parties.

FRAME was a collaboration among academic libraries, repositories, technologists, and DSOs. It involved the libraries and DSOs at eight universities: George Mason University, the University of Illinois Urbana-Champaign, Northern Arizona University, Ohio State University, Texas A&M University, Vanderbilt University, the University of Virginia, and two campuses of the University of Wisconsin.

It also involved the integration of significant repositories and directories of content useful to students at colleges and universities. Benetech’s Bookshare and the HathiTrust were instrumental development partners; they are not currently a part of EMMA because they can only share their content with their own members. The Internet Archive and ACE, the Accessible Content ePortal from the Ontario Council of University Libraries (OCUL), were also instrumental in the development, and they are still part of the EMMA project. In addition, a new repository, EMMA, was

¹ See <https://asistdl.onlinelibrary.wiley.com/doi/10.1002/pra2.2016.14505301027>.

² See <https://dl.tufts.edu/downloads/d504rx736?filename=fn1079946.pdf>.

created at the University of Virginia for the remediated materials created by its member DSOs.

In addition to the three constituent repositories—ACE, the Internet Archive, and EMMA—two other important resources have been incorporated.

OpenAlex, while not itself a repository, is searchable via EMMA, providing links to a wealth of Open Access content, most notably thousands of journals and journal articles that were not part of the initial development of EMMA.

Similarly, EMMA users can search for books published by the University of Michigan Press that are available through Bibliovault; other presses using Bibliovault are expected to be added over time, as well as presses using other services similar to Bibliovault.

The result is that member DSOs have easy access to an ever-expanding wealth of resources via EMMA that have been remediated but were previously unavailable to them, as well as to obtain resources they need to remediate that previously required individual outreach to publishers and other sources of content.

The Legal Foundation of EMMA

The first activity of the FRAME project was to convene a group of legal experts at the Association of Research Libraries headquarters in Washington, DC, “The Law and Accessible Texts,” in January of 2019.

That meeting and the subsequent work by those experts resulted in another white paper, “[Reconciling Civil Rights and Copyrights: The Law and Accessible Texts](https://www.arl.org/resources/the-law-and-accessible-texts-reconciling-civil-rights-and-copyrights/),”³ which clearly established that it is not a violation of copyright to provide an accessible version of a resource to a person who has a disability that impairs their ability to fully consume the published version. This is based on both U.S.

³ See <https://www.arl.org/resources/the-law-and-accessible-texts-reconciling-civil-rights-and-copyrights/>.

law (e.g., the [Chafee Amendment](#)⁴) and international law (e.g., the [Marrakesh Treaty](#),⁵ to which the U.S. became a signatory on February 8, 2019).

It couldn't be clearer: DSOs are permitted to do whatever they need to do to provide properly accessible resources to qualified students and faculty; in fact, their colleges and universities are *required* to do so.

While sharing may be restricted for some resources that have been obtained for remediation under *contractual* relationships that prohibit sharing, there is no *statutory* obstacle to sharing remediated resources with qualified recipients. One of the goals of EMMA is to provide a trusted system that makes a wealth of resources available without such contractual limitations.

The EMMA Technical Infrastructure

Most of the four-year Mellon grant period was devoted to developing a new repository for remediated resources; a unified search for resources across all participating repositories and directories; and a user interface that streamlines both the search process and the process for depositing remediated resources.

A metadata vocabulary was also developed that serves two purposes. It enables identification and description of an available resource so that a DSO can find the version that best meets their needs. It also enables DSOs to document how they've remediated a resource that they're depositing so that subsequent DSOs can obtain files that have been remediated in the manner required by the end users they serve.

⁴ See <https://www.loc.gov/nls/about/organization/laws-regulations/copyright-law-amendment-1996-pl-104-197/>

⁵ Formally, “Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled”; see <https://www.wipo.int/treaties/en/ip/marrakesh/>.

As a repository, EMMA stores all the remediated files deposited by member DSOs, regardless of source, as well as their metadata. Although searching EMMA is open to anyone, only staff at EMMA member institution libraries and DSOs can retrieve or deposit files. The end users—the students, faculty, and staff needing remediated resources—do not have direct access to EMMA other than to search. The DSOs are responsible for ensuring that files are only provided to qualified users with print disabilities who are legally entitled to them.

To avoid unduly burdening the DSOs, the required bibliographic metadata for deposit consists of only six properties: the file name of the remediated resource, its title, its author or other creator, its primary language, the type of resource it is (e.g., text, sound, etc.), and its format (e.g., PDF, Word, EPUB, etc.).

The required remediation metadata is even simpler, consisting of just four necessary properties: whether the whole resource has been remediated or not (often only select chapters of a book may have been, for example); which portions were remediated if the whole resource wasn't; whether the resource being deposited has been remediated (some resources are used “as-is,” and some are “born accessible”); and a free text property for any remediation comments the DSO wants to provide.

The user interface for deposit makes it clear which fields are required. The system won't allow a resource to be deposited without all of those required properties having been provided. But it also enables much richer optional metadata to be provided.

There are twelve additional bibliographic properties that are optional, including such obviously useful ones as identifiers, the publisher name, publication date, rights information, version information, subject, and others. In the interest of not adding work to the over-burdened DSOs, those are encouraged but not required. Part of the design of the EMMA workflow is to enable librarians at member institutions to augment, review, and refine the metadata; they are the experts at bibliographic metadata, not the DSOs. It is

expected that in most cases the libraries will flesh out much of the optional bibliographic metadata—and for users of the bulk upload manifest, many of these fields can be filled through lookup services that EMMA provides and that will be familiar to librarians.

On the other hand, the DSOs are the experts in accessibility and remediation. There are thirteen additional remediation metadata properties that are optional, and it is likely that DSOs will want to provide many of them. In fact, it is likely that they already keep track of them in their own internal workflows. These include properties that record what types of features a resource includes that may present remediation challenges, like tables, math, and images; and properties that record what a DSO has done, such as adding image descriptions or MathML, tagging table headers, and so forth.

The EMMA metadata is described in three companion documents in the suite of EMMA documentation. It is included in summary form in both “Searching for Resources in the EMMA Repositories” and “Depositing Remediated Resources in EMMA,” and it is documented in detail in “A Guide to the EMMA Metadata.”

Searching via EMMA

EMMA’s user interface provides a streamlined, user-friendly process for searching across the many resources available. Plentiful drop-down lists, prompts, and help features were developed and refined based on feedback from DSO staff at the universities participating in the four-year Mellon grant-funded period.

The Search dashboard consists of an expandable set of search fields that enables the precision needed when searching across such a vast corpus of content.

- The top-level field provides a drop-down list consisting of “ISBN/DOI etc.,” “Title,” “Creator,” “Publisher,” and “Keyword.” This field can be duplicated any number of times, to search by any or all of these choices, and by more than one entry of a given type.

- The “Sort By” field offers choices of “Relevance,” “Title,” “Publication Date,” “Upload Date,” and “Remediation Date.”
- The “Repository” field provides “(any),” “EMMA,” “ACE,” “Internet Archive,” “OpenAlex,” and “University of Michigan Press.”
- The “Feature” field provides a list of several different Braille formats, Speech formats, and PDF formats.
- The “Format” field provides a drop-down consisting of “(any),” “EPUB,” “PDF,” “Microsoft Word,” “RTF,” “HTML,” “TeX,” “LaTeX,” “DAISY,” “DAISY Audio,” “BRF,” “Braille,” “Kurzweil,” “Tactile,” and “Other.”
- The “Accessibility” field provides a list of 39 potential accessibility features that might be relevant for a particular end user, such as “Alternative Text,” “Captions,” “MathML,” “Print Page Numbers,” “Tagged PDF,” “Transcript,” and many others.
- A “Page Size” field enables specification of the number of results to display per page.

These features not only make it easy to enter specifications; the drop-down lists also ensure that typographical errors don’t occur.

Search results are displayed by title and repository. Expanding each result will show more bibliographic details and a list of the available formats; under each format, EMMA displays the available remediation and administrative metadata.

When a DSO has located the resource they want, a click on the “Retrieval Link” in that record will download the file to a location they specify.

This search process is described in detail in the accompanying document, “Searching for Resources in the EMMA Repositories.”

Depositing Remediated Resources

Depositing remediated resources is in many ways complementary to searching for them. Fundamentally, the same metadata and a similar user interface are used for both. But where search is optimized to find the most possible useful results with the least comprehensive metadata—many searches can return accurate and useful results with nothing more than an ISBN—deposits are optimized by having rich, comprehensive metadata.

The deposit process has been designed with the understanding that DSOs are typically overloaded with work, so although it enables a very rich complement of metadata to be provided, it only requires the minimum necessary to make the system work. However, in practice, it has become clear that it is in the interest of the DSOs to provide rich metadata, particularly in recording what they've done to remediate resources, as mentioned above, in order to make it possible for other DSOs to locate the best file, having been remediated in the way the individual print-disabled end user they're serving requires.

To make the process of contributing this metadata easier for a DSO—and to ensure that it's accurate—the user interface for deposit provides a wealth of drop-down lists of controlled vocabularies, with prompts in most fields and with links to help documentation throughout.

There is even a bibliographical metadata lookup feature to help populate a record based on metadata found in Google Books, WorldCat, and Crossref.

There are four ways to deposit remediated resources into EMMA.

- **Single File Upload.** This is designed to enable a DSO to record their work and deposit files as they complete them.
- **Bulk Upload.** This enables DSOs to build “manifests” of multiple resources to deposit. This is a popular option because many DSOs prefer to wait until work slows down

later in a semester to deposit the resources remediated that semester, or to deposit batches prepared for each end user.

- **Using a DSO’s Own Tracking Spreadsheet.** DSOs often use Excel, Google Sheets, or other similar tools to keep track of their work. These often include much of the information needed by EMMA, but also information that should not be conveyed to EMMA, particularly personally identifiable information (PII) about the students they serve and their disabilities. Moreover, those DSO-specific spreadsheets don’t use exactly the same terminology that EMMA requires. EMMA has developed a methodology by which these spreadsheets can, with simple modification of some column headers, be exported to EMMA in a way that EMMA only receives the information it needs, in the form that it needs it. This produces a “starter manifest” that can then be completed in the Bulk Upload process.
- **Using the EMMA Manifest Template.** This is an Excel spreadsheet that has been created to streamline the accurate provision of metadata. It has the column headers that EMMA will recognize, and it provides drop-downs for controlled vocabularies that significantly streamline data entry by the DSOs. Best of all, the DSO is free to add columns to keep track of other information, like the PII about its users, that should not be conveyed to EMMA. It is expected that some DSOs will choose to use this template in place of the spreadsheets they had previously used.

All of these deposit methods are documented in detail in “Depositing Remediated Resources in EMMA,” a companion document in the EMMA Documentation Suite.

Useful Resources

Here are resources mentioned in this document, as well as other resources relevant to accessibility that may be of interest.

Background

The report of the initial IMLS funded project, “Repository Services for Accessible Course Content”: “[Toward Accessible Course Content: Challenges and opportunities for libraries and information systems](#),” published in the *Proceedings of the Association for Information Science and Technology* in December 2016.

The white paper published by that same project, “[Libraries: Take AIM! Accessible Instructional Materials and Higher Education](#),” published in March 2017.

The white paper establishing the legal foundation for the FRAME project, “[Reconciling Civil Rights and Copyrights: The Law and Accessible Texts](#).”

Two laws on which that legal foundation is based: in U.S. law, the [Chafee Amendment](#), and in international law, the [Marrakesh Treaty](#).

Standards, Guidelines, and Tools

DAISY’s [Accessible Publishing KnowledgeBase](#).

The [W3C Web Accessibility Standards Overview](#).

The [W3C Web Accessibility Initiative](#) (WAI).

The [W3C Web Content Accessibility Guidelines](#) (WCAG).

[How to Meet WCAG \(Quick Reference\)](#).

The [W3C EPUB 3 Overview](#).

[EPUB Accessibility 1.1](#).

[EPUB Accessibility Techniques](#).

[The Schema.org Accessibility Properties for Discoverability Vocabulary](#).

[PDF/UA in a Nutshell](#) from The PDF Association.

[Create and Verify PDF Accessibility](#) (Acrobat Pro).

[Providing Accessibility Metadata in ONIX](#).

Benetech’s [Image Description Guidelines](#).

DAISY’s [WordToEPUB](#) Converter Tool.