FEATURE

Approaches to Rare Books Cataloging and Reducing Backlogs of Hidden Collections

A Review of the Literature

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As rare books and special collections have become a focal point in libraries, the need to reduce backlogs or hidden collections has become even more of a priority for the rare books cataloging community. This literature review examines methods and approaches librarians have used to catalog rare books to reduce backlogs of these materials. As rare books catalogers are pressed to eliminate backlogs more quickly while balancing the needs of description and access, an evaluation of past cataloging practices may be used to help inform their future efforts to catalog rare books and reduce backlogs. The findings indicate minimal-level and phased cataloging approaches have been used, and various forms of cross-departmental collaboration have been incorporated into workflows. Also, new technology and online tools have been adopted as they have been developed. This review identifies upcoming areas where future research is needed, such as the application of artificial intelligence to rare books cataloging and the implications for rare books cataloging workflows in the Linked Data environment.

Introduction

In 1998, Judith Panitch conducted an Association of Research Libraries (ARL) survey of special collections in ARL libraries that spawned an ARL Special Collections Task Force (2002–2006). The task force developed an action plan to "enhance access to collections and backlogs, surface 'hidden collections.'"[1] The results of the ARL survey and White Paper by Barbara Jones reporting on the work of the task force are credited with bringing the issue of rare books backlogs to the forefront of the rare books and special collections community.[2] However, several years before the survey, rare books catalogers were discussing the existence of backlogs and how to address them.[3] The need for creating fuller bibliographic records to describe and provide access to the artifactual aspects of a rare book, as well as a lack of records in major bibliographic utilities, has fostered the development of rare books backlogs.[4] A shortage of staff with the specialized skills necessary to create catalog records for rare books has also contributed.[5]

Rare books professionals have not only acknowledged the issue of backlogs, they have been committed to finding ways to reduce them. Suzy Taraba wrote, "How to reduce dramatically and ultimately eliminate our backlogs without throwing quality to the winds is an enormous challenge that must be met. Who better to address this issue than catalogers?"[6] Beth M. Russell conducted a second survey of ARL libraries in 2004 that revealed "no clearly dominant trends in organization, staffing, or workflow" but "a commitment to providing access to special collections was evident."[7] In their 2010 survey,

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Melissa A. Hubbard and Anna K.D. Myers found that catalogers were making significant strides in formulating practices to boost productivity.[8] In 2011, Jackie M. Dooley shared that the OCLC research survey of special collections and archives in the United States and Canada showed "56% of backlogs of printed volumes have decreased in size."[9] Although there has been considerable discussion and focus on eliminating rare books backlogs and the factors that contribute to their development, the ways that catalogers have cataloged rare books and attempted to reduce backlogs have not been systematically assessed. This study aims to identify methods and approaches rare books catalogers have employed or discussed to help inform future rare books cataloging practice and efforts to reduce backlogs. For the purposes of this literature review, the term "rare books" will be used to refer to books that are held as part of a rare books collection or a special collection. Based on the literature, this article will discuss approaches such as minimal-level cataloging, phased cataloging, cross-departmental collaborations, and the technology and online tools that have been employed to facilitate workflows.

Method

To determine the methods used or discussed by rare books catalogers to catalog rare books and reduce backlogs, the author searched the Library, Information Science and Technology Abstracts (EBSCO) database in the summer of 2025 and spring of 2026 for journal articles and reports related to keywords such as "hidden collections," "distinctive collections," "rare books cataloging," "special collections cataloging," "cataloging," "rare book backlogs," "special collections backlogs," "backlogs," "rare books," and "special collections." The following subject headings for the database were also searched: "Cataloging of Rare Books," "Cataloging of Special Collections in Libraries," "Rare Books," and "Rare Book Libraries." In addition, the archived contents of past issues of *Rare Books and Manuscripts Librarianship* (1986–1999) and *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* (2000–2002) were manually searched for articles related to hidden collections, distinctive collections, rare books cataloging, special collections cataloging, rare book backlogs, special collections backlogs, rare books, and special collections. This article reviews fifty-six articles published between 1984 and 2026 and will identify methods and approaches used by rare books catalogers to catalog their collections and reduce backlogs.[10]

Minimal-Level Cataloging

The most frequently discussed approach for eliminating rare books backlogs is some form of minimal-level cataloging. Minimal-level standards for books were recognized in 1978 with the National Level Bibliographic Record—Books (NLBR).[11] These records include the title proper, first statement of responsibility, publisher name, date of publication, and extent. These records do not have fuller levels of description used to describe the artifactual aspects of a rare book or access points to provide access to the artifactual aspects.[12] The greatest advantage to minimal-level cataloging is that the presence of the rare book in the library's collection can be more quickly communicated to potential users. The rare books cataloging community has supported the philosophy that some level of access at a more minimal

level is better than no access at all. In 1992, Taraba proposed that one of the cutting-edge approaches to making materials accessible is minimal-level cataloging. She observed, "Forms of access to materials are changing. 'Hot' approaches are not the elegant, detailed full-level records we all know and love—and love to create."[13] Writing on cataloging backlogs at the University of Virginia, Beth Picknally Camden and Jean L. Cooper reported that 4,664 provisional records were created in 1991 and 1992 for items in the rare books backlog. Before these records became available, there was no other way for patrons to find these books held in the collection.[14] Elaine Beckley Bradshaw and Stephen C. Wagner wrote that in the future, priority may be given to eliminating backlogs and ensuring there is minimal access to all of the items in a collection using less full levels of cataloging instead of creating fuller level cataloging records for every item.[15] Jones reported in the White Paper on the ARL Special Collections Task Force's work, "Though this issue needs further discussion, most believe that it is better to provide some level of access to all materials than to provide comprehensive access to some materials and no access at all to others."[16] Richard W. Clement's observations are in line with Jones's and support minimal-level cataloging. He stated that in order to eliminate backlogs, rare books catalogers must "break our collective mindset." He explained this "mindset" was the result of striving to produce fuller level cataloging records for huge backlogs without the resources needed to create them.[17] Beth M. Whittaker, writing on new challenges to providing access to special collections, shared her observations on creating "perfect" special collections cataloging:

> I am also coming to believe that we can never achieve perfection, even with all the time and expertise in the world. Any mode of access (MARC record, finding aid, etc.) may be a thing of beauty and elegance, providing every conceivable piece of information and meshing perfectly with existing records in the catalog, but its only actual purpose is to link users and materials. Since we can never really anticipate what users will be looking for, the extra effort required to create a "perfect" record is (to my mind) often unjustifiable.[18]

Two cataloging approaches based on levels of fullness, Lawrence J. McCrank's "phased cataloging" and James R. Ascher's "progressive bibliography" method, begin with minimal-level records.[19] The Hubbard and Myers survey results showed that respondents accepted less than full-level records.[20]

Defining a set of guidelines for minimal-level rare books cataloging is not easily accomplished. Karen Nipps reminded us of Paul S. Dunkin's comments in *How to Catalog a Rare Book*. Dunkin stated, "Anything written on rare-book cataloging just now is bound to be controversial" and "Probably no two catalogers will probably agree" on how much is enough.[21] M. Winslow Lundy pointed out that Bradshaw and Wagner acknowledged that when working to eliminate a rare books backlog, there is always a "tension" between creating fuller level records for every item in a collection and providing access to the complete collection with less full records.[22] Hubbard and Myers cited Stanley N. Katz who "recommends streamlining cataloging" because he thinks "that good metadata (as opposed to perfect metadata) is sufficient for access despite the trade-offs involved."[23] Hubbard and Myers's view on less than full levels of cataloging aligns with those of Katz. However, they maintained that "sufficient metadata" is not easily defined, and less full records with copy-specific notes can provide a sufficient description of a book.

They further stated that "adequate" is not "ideal," but if backlogs are going to be kept under control, "good enough" records need to be considered for some books.[24]

The rare books cataloging community addressed the question of "how much is enough" by calling for and developing standards for minimal-level rare books records. In 1986, Melissa C. Flannery, writing on recent developments in rare books cataloging during the very early days of automation, insisted "there is a more pressing need now than ever before to determine 'minimal standards of completeness for both current and retrospective cataloging of rare books."[25] Stephen Paul Davis wrote that the usefulness of using minimal-level cataloging for rare books should be investigated so it might be used to catalog new acquisitions faster, reduce backlogs, or replace full-level cataloging if it becomes too expensive. With these points in mind, he called for a minimal-level standard for rare books records to be defined.[26] Writing on the future directions for automated rare books cataloging, Susan A. Adkins proposed, "With the inclusion of new MARC format fields for rare book cataloging, a standard is needed for minimal level completeness and full-level cataloging guidelines to facilitate consistency and database sharing on a national and international basis."[27] The revised version of *The Bibliographic Description of Rare Books* (1981), renamed *The Descriptive Cataloging of Rare Books* (1991), includes an appendix to help guide minimal-level cataloging.[28] In 1992, Belinda D. Urquiza wrote on the use of this appendix in conjunction with AACR2 to apply enhanced minimal-level cataloging to the Bound Pamphlet Collection held by the Library of Congress. Although the collection had been recognized for quite some time for its wealth of historical resources related to American and British history in the late eighteenth and nineteenth centuries, only about half of the pamphlets were cataloged and available for discovery by researchers.[29]

In 1999, the *Descriptive Cataloging of Rare Books Core Standard* was established. It is based on *Core Standards for Books (Books Core)* and the full standard, *Descriptive Cataloging of Rare Books (DCRB)*. The core standards written for the BIBCO program are meant to encourage "'faster, better, cheaper cataloging."[30] It is interesting to note the results of a survey conducted by Lundy in 2001 on the use of this standard. It was undertaken shortly after the results of the 1998 ARL survey that showed backlogs were a concern for special collections departments. The majority of libraries that responded to the survey reported that they did not use the DCRB Core and chose to use full standards, the *Descriptive Cataloging of Rare Books* (DCRB) or *Anglo-American Cataloging Rules* (AACR2). Some respondents reported that descriptions created according to the standard were "not accurate enough" and there were "not enough access points."[31] A revision of DCRB followed in 2007 with the publication of *Descriptive Cataloging of Rare Materials (Books)* (DCRMB). It includes guidelines for creating Minimal-Level records (appendix D), as well as Collection-Level records (appendix B) and Core-Level records (appendix C). Whittaker wrote in 2006 that collection-level cataloging has not solved the backlog problem as expected. However, she proposed that collection-level records could play a significant role in making special collections materials accessible.[32] The current standard for rare books cataloging, the *Descriptive Cataloging of Rare Materials (RDA version)* (DCRMR), was released as an online tool in 2022. Minimal Level Cataloging (appendix D) is currently under construction.[33]

In addition to minimal-level cataloging, the literature highlights what can be called "very minimal cataloging." In 2017, Marcella Tam suggested making materials available for public before they are cataloged. Furthermore, she acknowledged that special collections professionals might be reluctant to do this but then highlighted how a few were doing so with positive results. Tam highlighted the Beineke Rare Book & Manuscript Library's Uncataloged Acquisitions database. This database contains a very brief descriptive record of uncataloged acquisitions that allows these materials to be seen and more quickly accessed.[34] This approach is similar to that taken by the University of Colorado Boulder (UCB) Libraries. Lundy wrote about their attempt to train a graduate student to download bibliographic records from WorldCat into the local catalog to serve as in-process records and provide access to collections. The student was not trained to do copy cataloging. Permanent staff would then complete the cataloging in the future.[35] She reported the initial findings from the UCB project support the notion that minimal-level records contribute to greater collection use.[36]

Phased Cataloging and Progressive Bibliography

Some of the approaches proposed for cataloging rare books involve handling the rare book more than once. Writing in 1984 during the early days of online catalogs, McCrank described a "phased cataloging" method that consists of ten levels. With new technology allowing for continuing updates to records, it assumes minimal-level records can be developed into fuller records over a considerable period of time. When it becomes cost-effective to rehandle the book, records can be enhanced and new data added from ongoing research. Level four provides for item-level cataloging, level five for descriptive bibliographic cataloging, and level six for advanced descriptive cataloging.[37] McCrank posited, "It may be a justifiable trade-off to have developing collections controlled at lower levels of description in order to have premiere collections where development has been comprehensive, cataloged with greater precision and accuracy than normal."[38] In 2000, Bradshaw and Wagner wrote they "believe that the wisest course is to build slowly and steadily a high-quality catalog rather than face the possibility of either cataloging every item twice or never cataloging materials to rare book standards."[39] Lundy also commented, "McCrank's phased cataloging, the handling of materials more than once in the cataloging process is a luxury few libraries can currently afford."[40] Writing soon after Lundy, Ascher observed that using in-process records to provide access is based in part on the idea of McCrank's phased cataloging. He advocated for the use of "progressive bibliography" because the "touch-it once mentality" does not work for special collections materials. Ascher cited McCrank's levels of bibliographic description as support for the process of progressive bibliographic description that proceeds from minimal-level to fuller level descriptions. Like McCrank, he saw the possibilities for continuing enhancements to records in online catalogs over time that were not possible in the card catalog environment. Also, like McCrank, he stated important additional information may become known about a rare book after it has been cataloged.[41]

Rare books cataloging projects that used a phased cataloging approach are recorded in the literature. In 2015, Briony Aitchison and Christine Megowan reported on a project to eliminate a backlog of 135,000 rare books within ten years at the University of St. Andrews Library. With only one full-time

rare books cataloger, they devised a two-tiered phased approach. Phase 1 books were given basic bibliographic records to identify them to users. Phase 2 books were set aside for full-level DCRM(B) cataloging. Phase 1 books were to be upgraded to Phase 2 when they had the cataloging resources needed to enhance the records.[42] Writing in 2017, Yvette Campbell and Barbara McCormack described a project to catalog the rare books using a phased approach. In order to allow access to the collection as quickly as possible, they adopted a two-part process. For phase 1 they compiled a list of items in the collection and cataloged each at a minimal level. They also cataloged fourteen books considered to be too rare for minimal treatment according to the *Descriptive Cataloging of Rare Materials (Books)*. After phase 1 was completed, they planned to move to phase 2 and provide all of the materials with full-level descriptions according to DCRM(B).[43] Although some catalogers suggested phased cataloging approaches are not practical, others embraced them as a way of making rare books more quickly available to users but with a commitment to providing fuller cataloging in the future.

Collaboration and Cataloging Staff

Forms of collaboration is another common theme throughout the literature dedicated to rare books cataloging. Samuel T. Barber also noted that collaboration was a solution suggested for addressing hidden collections or backlogs.[44] Bradshaw and Wagner's "customized cataloging" that "ultimately ends with the fullest use possible of the collections for scholarship and teaching" is frequently cited.[45] The key to this approach is a close collaboration between the rare books cataloger and special collections curator on cataloging policy and practice. Customized cataloging is the practice of joining together subject expertise with cataloging skills "to customize the catalog" to produce the best match between catalog records and the items in the collection they represent.[46] Issues to be considered before cataloging work begins include deciding which books to catalog first, appropriate level of cataloging for the collection from minimal to fullest, and which records will be customized and in what ways. Levels of description for cataloging are proposed: "(1) A minimal AACR2Rev records for all incoming materials, (2) A full AACR2Rev records for currently published secondary source materials and nineteenth and twentieth machine press books, (3) A full DCRB records for all hand-press books and some machine-press."[47] Bradshaw and Wagner asserted the greatest opportunity for customization exists within notes area. Other areas for potential collaboration are access points and genre terms in bibliographic records.

The literature contains several accounts of how collaboration was used to facilitate cataloging projects and workflows. Tatiana G. Barr wrote that in order to refine cataloging policy at her institution, the paraprofessionals, original cataloger, and unit head confer on a regular basis with the rare books curator. The curator shares details about access points he needs in bibliographic records.[48] She concluded, "Given the right institutional support and attitude, curators and bibliographers can collaborate with catalogers to provide access to special collections."[49] Jacqueline Vigilanti reported on her project that was just underway to catalog the rare books in the Reverend Allan Longworth Collection held by the Manchester Wesley Research Centre (MWRC). They took a customized cataloging approach. Before any rare books were cataloged she met with the director and associate director of the MWRC and their librarian. They considered which characteristics of the rare books were of the greatest

value and needed to be included in the records in order to benefit users searching the collection.[50] James H. Cho and Elayne Gardstein cited Bradshaw and Wagner in their report on cataloging the Alice Hoffman Collection. They stated that "the discussion of collaboration between cataloger and curator was relevant. Settling on appropriate subject headings, access points, relator terms and notes serve the goal of providing access and the ultimate use of special collections."[51] They determined that continuing discussions between catalogers and curators enhanced cataloging accuracy.[52] Ruthann E. Mowry and Bing Wang described a partnership between the Area Studies and Special Collections to catalog Chinese materials that were underutilized and rarely accessed. They reported that the collaboration between the Chinese studies librarian and a special collections curator demonstrates "the transformative potential of such partnerships."[53]

Catalogers who are not rare books catalogers have also collaborated and contributed to rare books cataloging projects. Rachel Berman Turner and David Schuster related how they forged closer collaborations and improved communication between Special Collections and Technical Services catalogers. As a result, "Librarians from both departments began to talk about how to best ensure items would get cataloged, and how to facilitate working through the backlog."[54] M. Winslow Lundy and Deborah R. Hollis reported on a backlog pilot project in progress at the UCB that involved the collaboration of Special Collections department staff and original catalogers and copy catalogers in the cataloging department. The Special Collections department had lost its cataloging positions. They utilized a "participatory management" approach based on the premise that issues are too complex for one person to address alone. Instead, decisions are made by taking into consideration "the collective expertise, experience, and wisdom of their employees."[55] Together they cataloged the mountaineering collection, a relatively small but significant collection. After being underway for a year and a half the pilot project was yielding positive results, including increased use of the collection.[56] Barr gave an extensive overview of how the University of Florida's Contributed Cataloging Section (CCS), which performs original and complex cataloging and Central Bibliographic Services (CBS), responsible for copy cataloging, contribute rare books cataloging. Both the CCS and CBS collaborate with the Special and Area Studies Collections Department (SASC) to most effectively utilize their resources to catalog special collections materials. A number of the cataloging unit's staff provide cataloging to the SASC as a part of their regular workload. Paraprofessionals who would like to work with SASC materials can spend some of their time on special collections projects.[57] Barr also suggested curators who are not catalogers "might be asked or volunteer themselves to provide some form of cataloging."[58] A trend reported by the Hubbard and Myers survey was using staff members who had not previously cataloged rare books to contribute cataloging.[59] In addition, Abigail Connick et al. explained in detail how subject specialists can help with cataloging tasks.[60]

Employing students to work on special cataloging projects to facilitate workflows is discussed in the literature. Russell's 2004 survey reported on the use of student assistants for special collections cataloging. Respondents were asked approximately how many graduate students or student assistants were responsible for special collections cataloging. She noted that many respondents left this section blank rather than indicate less than one full-time equivalent (FTE) student. More than 46 percent

of respondents reported less than one FTE student. All the other respondents, 13 percent, answered between one and three FTE students were assigned to special collections cataloging tasks. Although information about the types of special collections cataloging tasks the students performed was not collected by the survey Russell proposed, "Special collections in academic libraries have long relied on student assistants for paging of materials and patron assistance; there is no reason why similar attention cannot be given to cataloging tasks."[61] Janice Braun and Lola Raykovic Hopkins used student assistants to input the cataloging data for a project to collection-level catalog the Hoover Institution Pamphlet Collection on Revolutionary Change in Twentieth Century Europe.[62] Barr reported on students helping with cataloging for the Baldwin Library of Historical Children's Literature at the University of Florida. She described how a Ph.D. student interested in the Golden Book series volunteered to catalog them so she could review each one for her dissertation project. As a result, several hundred were cataloged by the student. The library's curator, who has done original cataloging, "has a student working for her who is trained to bring in copy, edit it, and enhance it with access points specific to the Baldwin collection."[63] A comprehensive overview of utilizing students for rare materials cataloging tasks was provided by Connick et al.[64] Lundy's project to train a graduate student to download bibliographic records from WorldCat into the local catalog to serve as in-process records and provide access to collections was noted previously.

Not all the literature depicts collaboration as being a useful approach to reducing backlogs. An attempt to address special collections backlogs by collaborating at the national level stemmed from the working conference, "Exposing Hidden Collections," held at the Library of Congress in 2003. A survey of hidden collections was conducted to identify backlogs of materials in specific subject areas. The aim was to find materials on specific subjects held in common by other institutions to support an attempt to secure funding for processing them. The survey focused on five topics: "women, advertising, pamphlets and printed ephemera, materials from the end of the American Civil War in 1865 through the end of World War I in 1918, and collections highlighting ethnic histories and cultures."[65] The literature shows a lack of support for a national collaborative effort. Carol Mandel stated, "Although the problem is national, the solution has to be local."[66] Katz wrote, "The notion of a national collaborative plan is extremely interesting, but most of the fundamental problems are local. The core institutions are local, and I have much greater concern about getting it right at the local level than I have for vast schemes, which have a way, in my experience, of not happening."[67] The literature review shows many forms of collaboration have been employed to facilitate rare books and special collections cataloging workflows. These involve both professional and paraprofessional staff from both rare books departments and cataloging departments, as well as area studies faculty and students.

Tools and Other Approaches

It is important to summarize what the literature records about the application of older technologies such as computers to rare books cataloging. Catalogers currently practicing who have experience working with card catalogs are becoming fewer and fewer. It is easy to take the initial impact of older technologies on workflows for granted or overlook them altogether when they have been in use for

several decades. It must be noted that this area in the literature clearly demonstrates that the rare books cataloging community was actively investigating the application of computer technology to the rare books cataloging process early on. In 1979, the Independent Research Libraries Association (IRLA) reported on the significant activities of its Ad Hoc Committee on Standards for Rare Book Cataloging in Machine Readable Form. The committee was investigating the potential for computerized cataloging to serve as a beneficial tool for rare books and research collections.[68] Flannery wrote that "it was the possibilities inherent in computer technology that engendered a reexamination of rare book cataloging, and indeed it is the implications of computer applications that are at the heart of current issues in rare book cataloging today."[69] As noted previously, Flannery, Davis, and Adkins called for minimal-level standards for rare book records in response to the development of automated rare books cataloging. The literature shows that opinions on whether automation speeded up the cataloging process were mixed. Taraba observed in 1992 that automation did not facilitate the cataloging process in practice. The reasons for this included unrealistic assumptions about how much computers could increase production, along with unanticipated downtime and changes in technology that necessitated rethinking workflows.[70]

Writing several years later in 2000, Bradshaw and Wagner concluded that automation had speeded up the process of rare books cataloging. They credited the development of the bibliographic utilities, OCLC and RLN, which made it possible to download and modify bibliographic records instead of filling in all of the necessary MARC fields in a blank bibliographic workform.[71] However, Whittaker pointed out a significant limitation to OCLC, noting that its structure is based on one master record that makes it impossible to include the level of detail rare books catalogers often enter into records in their local catalogs.[72] Davis went so far as to question whether online bibliographic records are really superior to old-fashioned card catalogs.[73] The pitfalls of retrospective conversion of rare books and special collections records were discussed. Howard Pasternick, a systems librarian, advised:

> Do not try to save money by converting less than the full record for special collections. Once an institution has invested substantial sums of money in acquiring and preserving rare and unique materials, it makes little sense to try and save a few dollars by converting a less than full record. Full bibliographic information about these items should be included in the online catalog, including copy-specific local notes.[74]

There is a lack of confidence in including rare books in the same retrospective conversion project as books in general library collections. Brad Oftely reported that curators at the James Ford Bell Library did not want the rare books records to be included in the library-wide retrospective conversion project. They had significant concerns about the quality of the records produced as part of these large-scale projects. He pointed to Nicolas Baker's evaluation of retrospective conversion: "Recon project records, particularly those for rare books, can be notoriously incomplete or inaccurate."[75] Davis advocated for standards for retrospective conversion of special collections records. He reasoned that without these standards there was a very real risk that special collections records could be converted according to the same standards as nonspecial collections records determined by a local vendor or computer center.[76]

Bradshaw and Wagner reported that a number of retrospective conversion projects had not fulfilled initial expectations. They blamed these shortcomings on overly optimistic projections of the cost and labor necessary to carry out the work. They stated:

> In fact, the motivation behind retrospective projects is a rapid and straightforward conversion of the card catalog into a new, very useful form … Not only do retrospective conversions typically work from existing, often brief, cataloging cards and not the actual item (either straight data input from the existing cataloging card or a match to an existing OCLC record), but they also rarely allow for cataloging to current rare book standards, which requires much additional time, research, and expertise. In effect, this means re-cataloging the rare books, a process that runs counter to the goal of relatively inexpensive retrospective conversion.[77]

The literature does include retrospective conversion success stories. Pasternick reported on the successful grant-funded retrospective conversion project for the monographs in the John Hay Library at Brown using the OCLC Retrocon service.[78] Oftely described the successful outcome of the James Ford Bell Library retrospective conversion project. It took longer to complete because they worked through the collection in-house with the items in hand. However, they produced complete and accurate records that were in keeping with the library's standard of quality.[79] As online catalogs transition away from MARC records to Linked Data, some of the lessons learned from rare books retrospective conversion projects may apply. It may be more beneficial to invest the time and money necessary to ensure the most successful outcome than to try and save money by cutting corners.

Although easily taken for granted today, the impact of the emergence of the internet and its resources on rare books cataloging at the time was indeed revolutionary. This impact is recorded in the literature. Eric v.d. Luft highlighted how "with the Internet, the cataloger is able to complete the record in a cheaper and faster way, with less effort, and with a better quality result."[80] A diverse pool of resources both historical and bibliographic are made available to catalogers who can draw from them to create or enhance bibliographic records "in less time and with less legwork." He also pointed out these resources can facilitate the work of catalogers who do not work for large universities with extensive reference collections. Other vast improvements at the time, for example, listservs such as ExLibris and email, could be used by catalogers to exchange information to aid their work more quickly and efficiently than faxes and expensive long-distance phone calls.[81] Of interest to rare materials catalogers, Chris Evin Long conducted a survey to determine "for which areas of cataloging the internet was a valuable tool and for which areas it was not useful."[82] Respondents remarked that the internet served catalogers as a beneficial resource because it facilitated better access to cataloging documentation, especially the documentation found on the Library of Congress website. It also had a positive impact on their ability to perform authority work.[83] The review results do include compilations of online resources with sections devoted to rare books and special collections.[84] The link to the rich listing of resources available on the ACRL RBMS Bibliographic Standards Committee website now included in the American Library Association's Resource Guide "Cataloging Tools and Resources" is highlighted. It can be found in the "Rare Books Cataloging" section under "Specialized Cataloging Issues" and is the only resource

listed.[85] Bradshaw and Wagner concluded the ability to access other libraries' online catalogs helped catalogers because they could see how other practitioners had augmented or revised minimal records by enhancing their descriptive elements, adding genre terms for artifactual aspects of the rare book, and assigning subject headings.[86]

There is very little mention in the literature of the possibilities or the use of outsourcing to help eliminate backlogs of rare materials. Bradshaw and Wagner identified outsourcing as a specific trend in cataloging in 2000 but wrote, "In special collections, outsourcing is useful only for a limited range of materials." They further wrote:

> Even drawing up the profile for adequate cataloging is highly labor-intensive, as is reviewing cataloging records and making any in-house enhancement of inadequate records. Moreover, for preservation and security reasons most curators would never consider sending special collections materials outside the library.[87]

Allen B. Ashman and Delinda Stephens Buie shared how the OCLC Tech Pro service cataloged many of their rare monographs at the University of Louisville. They reported, "This fee-based program has been crucial in cataloging materials in Icelandic and Hungarian, as well as in such non-European languages as Urdu, Japanese, Chinese, and Korean."[88]

Joy DuBose wrote about a case study that investigated the different kinds of processes and online tools the Special Collections cataloger at Mississippi State University used to catalog foreign language materials in the Todd A. Herring, Major William Starling, and John Grisham collections. The languages included "Slovak, Portuguese, Iceland, Albanian, Swedish, French, German, Norwegian, Latvian, Bulgarian, Hungarian, Russian, Japanese, Latin, and Greek."[89] Freely available online tools capable of both identifying and translating ancient and Asian languages in addition to European languages were required. Stars 21 and Google Translate were chosen to help catalog the collection. Dubose noted Stars 21 has a virtual keyboard function that allows the user to input non-Roman script characters into the translator itself, and Google Translate's strength is its "detect language" function. Stars 21 was used more than Google Translate because it offers multiple translations of a word. DuBose reported:

> Google Translate was more widely used with more modern materials and those that use Roman characters. However, the older the piece in hand, the more likely Stars 21 was used. While Google Translate was used for 20th century French, Stars 21 was used for 17th century French. This is simply because of how the language has changed and some words are no longer used in the current vernacular.[90]

Although their study did not focus on rare books cataloging, Harriet E. Wintermute and Mary K. Bolin described a successful cataloging project at the University of Nebraska-Lincoln (UNL) that may be relevant for other types of special collections. The Metadata Maker, an open-source product developed by the University of Illinois at Urbana-Champaign (UIUC) that can be used to quickly generate MARC records for print monographs with a minimum of training, was used to catalog a collection of local publications in English. These are ephemeral in nature with local significance and created or issued by

UNL faculty, departments, or units or by Nebraska authors. There were no records available in OCLC. Using the Metadata Maker, less experienced staff were able to create "good enough" records for this backlog of 44 monographs.[91] Jennifer A. Maddox Abbott reported on cataloging a large backlog of Spanish plays at the University of Illinois Library using the Metadata Maker. She shared that they were able "to make good enough records, which cleared up a large backlog of unique items stored in the main bookstacks sub-basement."[92]

New models for addressing rare books and special collections cataloging have been proposed. Anna Dysert noted Joyce Chapman and Elizabeth Yakel emphasize the new focus on data-driven management in library and university administration. They assert that archives and special collections must increase their efforts to adjust to this different kind of environment. Dysert stated, "The drive to promote hidden collections, combined with this interest in data driven management, has launched many initiatives designed to systematically evaluate collections to determine their level of processing, preservation needs, and research value."[93] Ruth Fischer, Rick Lugg, and Kent C. Boese suggested applying a business model to cataloging. They wrote, "In many cases, though not all, backlogs exist because cataloging departments still seek to provide a level of service that is not supported by the institution. Backlogs can be eliminated by changing either the process or the product."[94] They listed ten business principles, including control the "expert mentality," adhere to standards, design and produce an economically viable product, and establish production goals and measure performance. They stated, "Applying these principles to non-English, music, multi-media formats, serials and rare book cataloging may result in even more library efficiency."[95] While arguably not an approach to reducing backlogs, Jaime Groetsema wrote that rare materials catalogers should stop thinking in terms of backlogs and number of books cataloged and emphasize the other things they do. She suggested changes to the ways that catalogers characterize their work:

> For example, moving away from a purely statistical view of the number of items cataloged as "original" or "copy" within a specified timeframe, to prioritizing DEI collections, supporting reference requests and instruction, and working with communities to provide a human-centered approach to analysis and description. With a shift in emphasis, we can develop a more holistic understanding of Rare Materials Cataloging work and find frameworks that advocate for catalogers and cataloging as impactful to library users and to public services.[96]

Future Research

The search results for this literature review did not include writings on the application of open-source editing tools such as MarcEdit and OpenRefine to support rare books and special collections cataloging projects. This may be in part because of the nature of rare books cataloging and its emphasis on the copy-specific, artifactual aspects of the books being described in bibliographic records. This focus may limit the usefulness of batch processing and editing tools. The benefits of using macros and constant data to facilitate the rare books cataloging processes are also not addressed. However, Jawahir Javaid stated, "Macros have long been the industry standard to automate MARC field creation and editing in

the OCLC Connexion Client," but they "have become less reliable" in Client 3.X.[97] He concluded, "The ability to change large quantities of records without running into technical problems makes MarcEdit more powerful than OCLC macros."[98]

Writings on the specific implications of artificial intelligence (AI) on rare books cataloging were also not included in the search results for this review. However, Edward M. Corrado suggested that AI could help librarians create and assign subject headings and create content for descriptive fields. Even so, he maintained librarians must evaluate the metadata created by AI to verify its quality and that it serves user needs.[99] Richard Brzustowicz also cautioned that more research development of AI technology is needed to make certain "its responsible implementation in the field of library cataloging."[100] Heather Moulaison-Sandy and Zach Coble stated, "The notion that freely-available general purpose AI systems are able to solve cataloging problems easily, with the click of a button, if only the right prompt is created, is problematic to perpetuate-at least for now."[101] They pointed out a danger of using large language model (LLM) tools for cataloging is spreading bias from the models into library catalog and knowledge bases.[102] Further research into the possibilities of applying AI to rare materials cataloging workflows is needed to determine whether it can facilitate the process.

Studies on the implications for rare materials cataloging workflows in the Linked Data environment or more specifically how they may be enhanced using a BIBFRAME editor do not appear in the search results. However, the results do include a description of the Linked Data for Production (LDP4) project that was underway at Princeton University to encode handwritten dedications on books in the library of Jacques Derrida as linked open data, an important artifactual aspect of his library.[103] The creation of the RBMS Controlled Vocabulary for Rare Materials Cataloging (RBMS CVRMC), which published the vocabularies as linked open data in March 2023, is also noted in the review results.[104] In addition, music cataloging practitioners discussed the potential for MARC data from notes and statements of responsibility to provide bibliographic relationship information for the linked data environment.[105] For example, music catalogers often include name access points based on 245 subfield $c (Statement of Responsibility). They may choose to record the name of a lyricist in a 700 field found in the 245 $c with the relationship designator $e lyricist. Rare books catalogers may find they can advocate for creating fuller levels of cataloging to bring out bibliographic relationship information contained in fields such as the 260 and 264 (Publication Statement), including 700 fields with $e publisher and $e printer or the names of former owners and inscriber contained in the 590 (Local note).

Although Bradshaw and Wagner and also Luft and Long highlighted the benefits of cataloging resources available on the internet, the search results do not include a recent overview and evaluation of resources currently available for rare materials catalogers. A review of both the benefits and pitfalls of catalogers' use and potential dependence on these resources would be timely in light of the British Museum hack in 2023, which cut off access to the English Short Title Catalogue (ESTC) for an extended period of time until it was migrated to a new host, the Consortium of European Research Libraries (CERL), in 2024. The survey results show there are several areas that need further research. Studies are currently lacking on how macros and constant data and online tools such as MarcEdit and OpenRefine may be used to

facilitate rare books cataloging projects. The advantages and disadvantages of using AI to enhance rare books cataloging workflows have yet to be investigated. Finally, there is a need for an updated overview of freely available online resources for rare books cataloging.

Conclusion

The literature review shows that the rare books and special collections cataloging community has consistently sought to find better methods and approaches to facilitate rare books cataloging and bring materials into the hands of users more quickly. They have been cognizant of backlogs and tried various methods to reduce them. Although rare books with artifactual value benefit from fuller level cataloging records that provide more description and access points for users, minimal-level or less full-level standards that can speed up the cataloging process have been considered and used. Gradually enhancing the bibliographic record of a rare book over time, phased cataloging and progressive bibliography have also been discussed. During the early days of automation, minimal-level standards for rare book records were called for in the online environment. New rare books cataloging standards were crafted that contained appendices with guidance on creating minimal-level and collection-level records. Rare books librarians and curators have collaborated with rare books catalogers and other cataloging staff, as well as faculty within their institutions with relevant subject expertise. Students have been trained to minimally process and make available some special collections. Rare books catalogers have embraced technology adopting their workflows to automation and utilizing internet cataloging resources and online tools such as Google Translate, Stars 21, and Metadata Maker. The review also shows that although rare books catalogers have been focused on less full levels of cataloging, there continues to be interest in making the artifactual aspects of rare materials discoverable.[106] It has been suggested that rare books catalogers stop focusing on number of items cataloged and backlogs and emphasize how their work supports other priorities such as reference and teaching. It has also been suggested that a “less process more product” approach could benefit rare books cataloging.
The review results point to a need for an updated bibliography of current online resources for rare books cataloging. They show that the potential benefits of using batch editing tools in rare books cataloging processes have not been reported on, as well as the utilization of macros and constant data. The implications, if any, of AI as a viable tool for rare books cataloging are yet to be discussed. Also, the riches of MARC data contained in full-level rare book records and its role in the linked data environment need to be evaluated. There may be justification to include more descriptive fields and access points in bibliographic records because they provide bibliographic relationship information. Also, the potential for BIBFRAME editors to speed the rare books cataloging process needs to be investigated. A careful consideration of the results of this study reveals that rare books catalogers have employed a wide variety of methods and approaches in terms of levels of cataloging, staff resources, and technology to effectively facilitate cataloging workflows and successfully reduce backlogs.

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FEATURE

Accessibility Analysis of Academic Library EPUBs

Adina Mulliken

The European Accessibility Act requires accessible ebooks as of June 28, 2025, and the Americans with Disabilities Act requires digital content used by Title II educational institutions to be accessible, with a strong emphasis on course content, as of April 2027 and 2028. It is therefore increasingly important for librarians and others who select digital collections that may be used as course material to understand the current landscape of full-text accessibility.

The EPUB specification has promise because it includes accessibility features tailored to ebooks, is generally easier to make accessible than PDF, and allows content to be downloaded. However, the extent to which the accessibility features in the specification are implemented by publishers and vendors has not been widely examined in the literature.

The first part of this study assessed nineteen EPUBs from four vendors and eleven publishers. The evaluation included visual, manual checks in Thorium e-reader; automated checks using Ace by DAISY; and manual spot-checks in Calibre ebook manager. The study assessed whether tables of contents, references, notes, and indexes were linked; whether alt text and extended descriptions of images were present where needed; whether headings were appropriately structured; whether MathML was used for mathematical content, if any; whether Ace identified significant specification violations; how thorough publisher-provided accessibility metadata was; and the degree of alignment between publisher metadata and observed accessibility features. In the second part of the study, accessibility metadata for five books each from nine publishers was analyzed. This paper also includes a brief summary of publicly available accessibility information from several library EPUB vendors. The findings indicate substantial inconsistencies among accessibility potential, actual implementation, and reported metadata.

Introduction

The European Accessibility Act (EAA) required accessible ebooks as of June 28, 2025, and the Americans with Disabilities Act (ADA) requires digital content used by Title II educational institutions to be accessible, with a strong emphasis on course content, as of April 2027 and 2028.[1] EPUB, short for "electronic publication," is a standard for reflowable ebooks and other digital publications. The EPUB specification includes accessibility requirements that build on the Web Content Accessibility Guidelines (WCAG).

Although the EAA does not explicitly reference the EPUB standard, its wording and criteria closely align with EPUB accessibility requirements. Authors of the EPUB specification describe how the standard can be used to fulfill EAA requirements.[2]

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The ADA requires digital content to meet WCAG 2.1 Level AA and explicitly declines to require conformance to EPUB.[3] However, it states that "public entities could still choose to comply with additional standards or guidance related to … digital textbooks to the extent that the standard or technique used provides substantially equivalent or greater accessibility and usability." Additionally, under the ADA, ebooks must provide "effective communication, reasonable modifications, and an equal opportunity to participate in or benefit from their services, programs, and activities."[4] It might be argued that features such as accessible page numbers, which are outlined in the EPUB specification but not addressed in other guidance such as WCAG or Portable Document File/Universal Accessibility (PDF/UA), are necessary for effective communication in classroom contexts.

PDFs of journal articles and typical course reading formats are widely understood to be problematic for accessibility in that most are not fully accessible and they are difficult to remediate.[5] Websites avoid the potential for misrecognized text present in PDFs and tend to be easier to remediate for accessibility. Pitfalls for websites include that the website on which the ebook is located may be complex to navigate or have accessibility problems; saving and organizing books or chapters posted as websites can be complicated or unfamiliar to users; and the accessibility specification for websites, WCAG, does not include important accessibility features specific to books. The EPUB specification has promise in that it includes accessibility features tailored to books, is easier to make accessible than PDFs, and can be downloadable. Especially because of potential accessibility advantages of EPUBs, the implementation of accessibility features in EPUBs among library vendors and publishers is important to understand.

A brief overview of accessibility of several library EPUB vendors, based on the vendor's publicly available information, is included in this study. The overview incorporates critical accessibility issues such as use of digital rights management (DRM). The Accessible Publishing knowledge base for EPUBs says, "The most important of these [distribution] issues is to not apply digital rights management schemes to a publication that limit access to the content. When this occurs, a perfectly accessible publication might no longer be readable at all if, for example, assistive technologies are prevented from reading out the text."[6] However, this study selected only titles that were DRM-free and downloadable because that was necessary to allow the books to be examined.

This study assessed nineteen EPUBs for conformance to certain accessibility criteria. The EPUBs were from four library vendors and eleven publishers. The study used visual, manual checks in Thorium e-reader, automated checks in Ace by DAISY, and spot checks in Calibre ebook manager to identify accessibility issues. Additionally, publishers' reported accessibility metadata was compared with accessibility criteria observed.

Besides the nineteen EPUBs assessed, this study examined accessibility metadata for a separate five books each from nine publishers. The thoroughness, or lack thereof, of the metadata offers some indication of the publishers' attention to EPUB accessibility.

By examining both implementation and metadata, the study aims to illuminate gaps between accessibility standards, actual practice, and user-facing representations of accessibility. The findings

indicate substantial inconsistencies between accessibility potential, actual implementation, and reported metadata.

What Is an Accessible EPUB?

EPUBs are created using "Open Web Platform technologies like HTML and CSS."[7] EPUBs are required, by the EPUB specification, to meet WCAG 2.0 Level A but are encouraged to meet the most current version of WCAG at level AA.[8] EPUB extends WCAG by including accessibility features that are uniquely necessary for document-specific and book-specific content, such as "accessibility metadata, page navigation, audio-text synchronization and Digital Rights Management guidance."[9] As the DAISY Accessible Knowledge Publishing Base explains, "Unlike the general web, where each site's design often brings its own unique [accessibility] issues, books are more often composed of the same sets of building blocks, making accessibility mappings useful to a broad range of publishers."[10] In comparison with WCAG, the EPUB Accessibility specification offers a more specific way to make ebooks work for people with disabilities, including assistive technology (AT) users who need to be able to locate and navigate to the features of a book. Speaking at a 2018 Charleston Conference panel, Kasdorf and colleagues explained, "EPUB 3 uses the markup that publishers and vendors routinely use: HTML 5 is the structural semantic foundation; WAI- ARIA augments it for Web accessibility; and DPUB- ARIA adds publication-specific terms like 'doc- chapter' and 'doc- footnote.' This is spelled out in EPUB Accessibility 1.0, which specifies EPUB features for accessibility; proper navigation and structure so AT can find things and skip to them (e.g., going straight to Chapter 5), or skip over them (for example, choosing not to bother reading the footnotes); and accessibility metadata describes how accessible the pub is (using the identical accessibility properties in schema .org)."[11] EPUB Accessibility 1.1 is now current, but Kasdorf's explanation is still relevant.

Further requirements and recommendations for aspects of accessible EPUBs that are relevant to this study are described here.

Required Metadata

Accessibility metadata is intended to help users determine whether a publication meets their needs prior to accessing it. The EPUB Accessibility 1.1 specification identifies schema.org accessibility metadata that publishers must include:

- A list of all accessibility features
- The modes in which the content is expressed and modes that are sufficient to consume the book
- Any potential physical hazards presented by the content[12]

The specification offers an extensive list of "accessibility features" that can be included, such as alt text, extended descriptions, described math, MathML, reading order, structural navigation (accurate headings), index, and more.[13]

The "access modes" that can be listed are auditory, textual, tactile, and visual.[14] This lets users know whether a book is accessible to their senses. For example, a Deaf person would not want to select a book with an exclusively auditory mode of expression. The access modes of "textual" and "visual" are relevant to the EPUBs in this study. Textual is used for "a publication [that] contains information encoded as text character data," not images of text that must be read visually.[15] Visual "indicates that the resource contains information encoded in visual form," such as images that are necessary to understand the content, not only images like cover art or corporate logos.[16] More than one access mode is often included.

The specification states metadata should also include "sufficient access modes" for the book. This is defined as "a set of one or more access modes sufficient to consume the content without significant loss of information. An EPUB publication can have more than one set of sufficient access modes for its consumption depending on the types of content it includes (i.e., unlike access modes, this property takes into account any alternatives for content that is not broadly accessible, such as the inclusion of transcripts for audio content)."[17] A sufficient access mode of "textual" ensures that the whole publication can be consumed through the text alone, meaning that screen readers will be able to provide all the information to a blind user.

The potential hazards include flashing, motion, and sound, which could trigger seizures.[18] It is also recommended to include a "brief, human-readable summary of any information that cannot be expressed through the other schema.org metadata."[19]

Besides metadata required by EPUB Accessibility 1.1, recommendations for displaying metadata are offered by the publication "Accessibility Metadata Display Guide for Digital Publications 2.1,"[20] put out by a W3C Community Group. These are not requirements, but Community Group recommendations sometimes evolve to become standards.[21]

Pagination

EPUB Accessibility 1.1 requires identifying the source of the pagination in the EPUB metadata in many situations, such as when the EPUB is a recreation of a print book or can reasonably be expected to be used as such.[22] The relevant technique explains, "A student in a classroom, for example, needs to know whether the pagination was derived from the same version of a print book that the rest of their class is using." If the EPUB is not a recreation of another source, "none" can be listed as the source.[23]

EPUB Accessibility Techniques

As noted earlier, meeting WCAG 2.0 or better is required by EPUB Accessibility. The EPUB Accessibility specification and techniques do not repeat the success criteria or techniques provided by WCAG.[24] However, particular WCAG techniques that tend to be relevant for EPUBs are summarized by EPUB Accessibility Techniques 1.1.[25] Both WCAG and EPUB separate their specification from their "techniques." Techniques are examples of ways to meet the requirements, although other methods are also allowable.

The WCAG techniques summarized by EPUB and relevant to this study include EPUB Accessibility 4.2.2, which mentions the requirement for a table of contents and encourages providing an index in order to meet WCAG Success Criterion 2.4.5 regarding "more than one way to locate a web page within a set of web pages."[26] Linked indexes are convenient for everyone, but it can be especially time-consuming for blind readers to locate relevant sections from a table of contents or index if they are not linked. Furthermore, EPUB Accessibility 4.4 describes methods to meet the requirements for headings, and 4.5.1 offers resources about creating the required alt text and extended descriptions.

EPUB Accessibility Techniques points to the DAISY Knowledge Base for additional guidance. The latter document describes ways to meet the WCAG Success Criteria related to color contrast and using alternatives to color to convey meaning.[27] It also explains how to make footnotes and endnotes identifiable, and prescribes backlinks, which are links from notes back to the related location or locations in the text.[28]

Finally, "links to reference marks," such as endnotes or footnotes, are explained: "two-way linking is also beneficial as many reading systems lack a back button, so once a user has followed a link, the only way they can return to where they were is manually." This is inconvenient for everyone, but blind AT users must listen to extensive content to find the place in the text they were reading when they left to follow a reference.[29] However, there is now an effort to make this backlinking unnecessary by promoting e-readers with a back button.[30]

Besides the WCAG techniques summarized by the EPUB Accessibility specification and techniques, accessible math and extended descriptions are important. Math is often challenging for accessibility because mathematical notation is sometimes conveyed by images or LaTeX and is not interpretable by text-to-speech technology. Accessible math is required by several related WCAG Success Criteria, including 1.1.1, which requires "providing a text equivalent for nontext content." MathML is one way of rendering accessible math, and the DAISY Accessible Publishing Knowledge Base explains that this is the preferred method.[31]

Extended descriptions are required by WCAG if a short alt text does not fully describe the information conveyed by an image. For example, a complex diagram may be impossible to explain briefly. An extended description can be skipped by the reader, if desired, more easily than alt text can be skipped.[32]

Literature Review

In 2020, Zhang et al. performed a systematic review of accessibility in Open Educational Resources (OERs). Although many EPUBs are OERs, they did not mention EPUB specifically.[33] In 2019, Schindler reviewed DRM use and ebook platform accessibility. These are important and related issues for the present study, but they do not examine the accessibility of ebooks or EPUBs themselves.[34] In 2018, Reed and Turner examined the accessibility of open-access ebooks from several established OER publishers but mentioned the EPUB format only once and did not focus on it.[35]

Two studies examining accessibility of ebooks that included EPUBs were located. A 2024 poster by Hellman and Snijder examined 1,144 EPUBs and 36,000 open-access ebooks for accessibility. They found that only 156 of the EPUBs had useful descriptions of images in alt text, 226 had "accessibility data but no useful alt text." They did not include an explanation of what they considered to be "accessibility data." It is possible that they were referring to metadata. Their poster did not describe their methods in any detail, but their findings indicate the remaining 785 EPUBs were more problematic for accessibility.[36] A 2021 article by Azadbakht, Schultz, and Arellano also tested open-access ebooks, including EPUBs, for accessibility. Theirs was the most in-depth analysis located. They found that "Overall, most of the books did not meet basic accessibility requirements, such as including alternative text for any images, properly coding/tagging any tables and following a logical heading order structure."[37] For EPUB titles, the maximum number of failures was nine of fourteen rubric criteria. Two EPUBs received no failures. Regarding specific criteria, 71.60 percent of EPUBs failed for alternative text, 58.72 percent failed for content order ("is the content ordered to make sense for someone tabbing through the document?"), and 73.39 percent failed for ordered headings ("are headings properly ordered, such as a Heading 2 falls under a Heading 1, a Heading 3 falls under a Heading 2, and so on?").

They found a higher percentage of alt text (28.4 percent) than Hellman and Snijder (14 percent), but this likely reflects methodological differences. Azadbakht, Schultz, and Arellano assessed whether any nontext content had alternative text, whereas Hellman and Snijder evaluated whether the alt text was useful. This study counted useful alt text and found a somewhat higher percentage of relevant alt text (26 percent) than Hellman and Snijder (14 percent). Due to this study's small sample size, however, these findings should not be considered representative.

This study examined heading structure but looked at different criteria than Azadbakht, Schultz, and Arellano. The latter studied whether headings were properly nested, whereas this study looked at whether heading levels corresponded to the hierarchy visually presented in the table of contents. Because this criterion extends beyond proper nesting, the findings are not directly comparable.

This study did not examine content order and other criteria used by Azadbakht, Schultz, and Arellano. Although content order is important, it was not feasible to examine all aspects of WCAG conformance.

Another difference between the studies is that Hellman and Snijder examined books from OAPEN, whereas Azadbakht, Schultz, and Arellano focused on criteria that "were most likely to be under a textbook author's control as opposed to a web developer's or publisher's." Both of these samples are more likely to include works published by individual professors than those in this study. In contrast, implementation of the criteria examined in this study is more likely to be controlled by publishers because the books analyzed here were produced by commercial publishers, both large and small. This study also differs in the data examined: it is the only one that examined both publisher-supplied accessibility metadata and library vendor accessibility metadata, when available, and compared those claims with findings from direct examination of the books. It is also the only one that examined links

for tables of contents, references, and indexes; backlinks for references; and indications of math accessibility.

The author also located several articles addressing ebook and EPUB accessibility from the perspective of publishers. Carey discusses industry debate regarding the EAA's application to previously published ebook titles.[38] Enis reports publishers' views regarding accessibility practices and challenges. Enis notes that "according to surveys of more than 1,400 academic publishers conducted in 2020 and 2023 by EBSCO Information Services, 'For ebooks with publication years 2022–2023, 77 percent were provided in EPUB, contrasting with 68 percent of ebooks with publication years 2020–2021,'"[39] which is movement in an accessible direction, suggesting increased adoption of EPUB. However, he also reports that only 30 percent of survey respondents indicated that their organization had a dedicated "accessibility program," and 42 percent were not aware of the EAA.[40] Stacy Scott, accessibility lead at Taylor & Francis, describes the company's efforts to improve accessibility, including avoiding DRM and converting some ebooks to EPUB3 "to improve the structural integrity and navigation of these files, with accessibility in mind."[41]

Vendors' Accessibility and Selection

This study examined ebooks from four major academic library ebook products or vendors: EBSCO Ebooks, Ebook Central (ProQuest), Springer Nature, and Taylor & Francis. Some vendors provide extensive accessibility information online, including accessibility statements, Voluntary Product Accessibility Templates (VPATs), sometimes called Accessibility Conformance Reports (ACRs), information for users and librarians, and recordings of presentations about accessibility. Others provide relatively limited publicly available information, although this does not always reflect a lack of attention to accessibility. Accessibility reviews by the Library Accessibility Alliance (LAA) also provide useful information about certain vendors' platforms. These reviews tend to focus primarily on platform accessibility rather than full text.[42]

EBSCO and ProQuest both provide extensive information about their accessibility. A concern with both vendors is the use of DRM. Both offer alternatives for users with disabilities who are excluded by DRM restrictions, but it is unclear whether these workarounds fully meet requirements to provide "substantially equivalent ease of use" and "equally effective" access,[43] as the alternatives can be burdensome.

For downloaded books, ProQuest uses Adobe Digital Editions (ADE), which manages DRM. Until April 2026, EBSCO did as well. Inclusive Publishing, an initiative of the DAISY Consortium, states, "Our evaluators found [Adobe] Digital Editions on Windows to be unstable and it struggled with larger books. Reliability issues are also reported on iOS and Android. Navigating the table of contents with a screen reader was unsatisfactory."[44] Users with and without disabilities may find installing and using ADE cumbersome.

ProQuest offers a "text-only mode" for users with disabilities to access their PDF format DRM-protected titles. ProQuest says its EPUB format does not need "text only mode" and is natively accessible.[45] Text-only mode provides text but does not necessarily include markup necessary to meet WCAG, such as headings, alt text, and more. Lack of this markup introduces significant accessibility barriers. ProQuest also states, "If the existing content does not meet the needs of users, remediation options are available and can be requested via the Support team."[46] No time frame for responses was identified. It is unclear whether ProQuest could create a fully remediated, WCAG-compliant ebook or only a DRM-free file. A DRM-free file allows a library or disability office to remediate the ebook, but this is time-consuming. ProQuest indicates that end users with disabilities can contact them and they will "work with you [end users] to identify the best option for remediation, subject to content licensing restrictions and technical capability."[47] ProQuest does not appear to have contact information dedicated for accessibility or remediation requests but offers its general contact information.

In April 2026, EBSCO rolled out Readium LCP, a DRM system that is more compatible with AT than ADE. Readium integrates with the Thorium e-reader, which is free e-reader software for Windows, Mac, and Linux. Thorium's website states that "massive efforts are … made to make Thorium Reader highly accessible for visually impaired and dyslexic people."[48] EBSCO also offers to provide a DRM-free version for users or librarians, who can obtain these by using the "Accessibility Support" button on the ebook interface. This is typically available in three to five business days, according to EBSCO, but occasionally can take up to thirty days if files have to be requested from a publisher.[49]

The author requested one ebook for two students with disabilities in fall 2025. She was routed from the EBSCO email, to its form, and then to Bookshare because the publisher of that book deposits its books in Bookshare. Bookshare is a service that provides more accessible versions of ebooks to users who register with a disability through Bookshare or through their school so that the school can distribute the Bookshare books. Finally, Bookshare routed her to her school's accessibility office, where the book was eventually obtained for the students. The accessibility office then added the author as a sponsor on the school's Bookshare account. This allows the author to search Bookshare, view book files, and make them available to users who have been added to Bookshare by the disability office. This reduces the delay in getting books to users. Now she checks Bookshare either before or at the same time as requesting through EBSCO. In May 2026, the author communicated by email with a director from EBSCO who said that typically EBSCO has access to the remediated files of EBSCO ebooks that Bookshare would have.[50] Therefore, if she was routed to Bookshare, the author might email accessibility@ebsco.com to request EBSCO's copy if it would be preferable to the Bookshare copy. If a user did not yet have a Bookshare account, this could be an additional minor impediment or delay, although she finds many students do have a Bookshare account. She finds Bookshare books tend to be fairly accessible but do not always entirely meet WCAG and sometimes need further remediation.

It is not entirely clear whether EBSCO will fully remediate an ebook to meet WCAG. However, in the experience of the author and others at her school, EBSCO does fully and quickly remediate journal

articles using the same Accessibility Support request form as is available to request ebooks. This vendor remediation is extremely valuable in reducing the delay for users.

Taylor & Francis offers to provide more accessible alternative formats and uses DRM infrequently. Per their platform's accessibility documentation:

> When a work is unavailable for purchase in a suitable format, we aim to provide one within three working days.…The texts we provide are Digital Rights Management (DRM)-free and are mostly available in searchable PDF format. This works with most screen reading software. We can also supply texts in Word, EPUB, or XML format.…Some content in PDF format may not have been designed for accessibility. For example, older archive content reproduced from original printed sources may be presented as scanned PDFs, or images of text. We will always attempt to supply an OCR PDF (with optical character recognition) for screen reading, but this may not always be possible.[51]

Taylor & Francis provides a VPAT, a detailed accessibility statement, and reports improvements such as incorporating alt text for all relevant images in some of their books, including all books published from June 2024 forward.[52]

Springer Nature provides an accessibility statement, a VPAT, and an option to request alternative format for accessibility reasons.[53] A 2023 LAA evaluation was fairly positive, saying, "There are very few WCAG 2.1 compliance issues with the platform. Those identified are very minor overall.…The evaluation of the PDF documents, however, did reveal major accessibility issues."[54] Notably, Springer Nature does not use DRM on its ebooks.[55]

Additional vendors at the author's institution were considered but not included. ACLS Humanities E-books has given extensive attention to accessibility, but its EPUBs are not downloadable for analysis. Ovid was excluded because its EPUBs are not downloadable. Although no information about accessibility in Ovid was found online, a third-party review from LAA gave Ovid Medline a relatively positive review in 2024. The review said, "There are very few WCAG 2.1 compliance issues with Ovid Medline and they are very minor overall with the most pressing issue being with ARIA implementation and a few color issues."[56] Based on the screenshots in the review, Ovid Medline seems to use a separate section of the same interface as its ebooks, so the review may be partially relevant to its ebooks. Gale, JSTOR, and APA were examined but do not offer EPUB; all are DRM-free.[57]

The selected vendors meet two criteria: they are available through the author's institution, and they offer EPUBs that are downloadable without DRM, allowing examination using Ace by DAISY, Thorium, and Calibre. These were typically open-access EPUBs.

EPUB Selection

This study focuses on books because adoption of EPUB format is more common for books, although the specification is intended for other professional publication formats as well. "The expectation is that

publishers will utilize the EPUB 3 format for a broad range of content, including books, magazines, and educational, professional, and scientific publications."[58] For example, Sage publishes journal articles in EPUB format. Because several criteria examined in this study are not relevant to journal articles, however, the analysis focuses exclusively on ebooks.

For the first part of the study, EPUBs were selected from each vendor based on several criteria. Only titles in English were examined because this is the author's only fluent language. Titles had to be downloadable without DRM for the reasons described above. At the time the study was conducted, all vendors in the study except Springer offered some EPUBs that were either restricted to online viewing or protected by a version of DRM that limited the ebook to use within ADE. After the study was completed, EBSCO changed from ADE to Readium LCP for DRM. The number of titles that were downloadable and without DRM limited the selection considerably.

Titles were chosen to represent a range of publishers available through the vendor at the author's institution. When multiple titles were available from a publisher, an effort was made to select the most recent publication because newer titles may reflect more current accessibility practices. When possible, titles in math and science were included to allow examination of accessibility features relevant to mathematical content, complex images, and tables.

For the second part of the study, which examined only metadata, EPUBs were again limited to those that were in English and available through the author's institution. Then EBSCO's filter by publisher option was used to view how many books by each publisher were available. Because EBSCO's filter by publisher option was especially useful to focus on publishers, only EBSCO was used. The publishers that had the most results were prioritized. Five of the most recent EPUBs for each publisher were selected.

Methods for Examining Books

The author selected Thorium Reader to examine the books because accessibility features within the EPUB were unlikely to be blocked by the reader's functionality. She also examined some books within the vendors' ebook viewers. She used either Thorium or the vendor viewer to check the following:

- Linked table of contents
- Linked in-text citations or footnotes
- Links from references back to in-text citations or footnote numerals
- Linked indexes, where present

Ace by DAISY is an automated, open-source tool designed to assist in evaluating conformance with the EPUB Accessibility Specification.[59] Ace reports violations of WCAG 2.0, EPUB, and issues it categorizes at "best practices." It displays a table listing the violations of each specification and of Ace's list of "best practices." It classifies the violations as serious, moderate, or minor. The number of violations should not be interpreted as a direct measure of a book's overall accessibility. In Ace, the following issues were examined:

- Presence and adequacy of alt text

- Appropriateness of headings compared with the table of contents
- Violations identified by Ace
- Metadata violations identified by Ace
- Accessibility features reported in publisher metadata
- Accessibility hazards reported
- Publisher accessibility summaries in metadata

The author documented discrepancies between publisher metadata and findings from manual or automated examination. For EBSCO books, she recorded the vendor's "Ace by DAISY" score; for Springer titles, she noted accessibility descriptions on the Springer interface.

For books in which mathematical notation was observed visually, mentioned by Ace, or indicated in metadata, Calibre was used to examine the EPUB code for the presence of MathML. Calibre can expose the ebook code, which was searched for indicators of MathML such as the <math> element. Calibre was also used to check for extended descriptions that may not have been visible through other methods. At least one chapter requiring an extended description was examined for code indicators such as aria-describedby, desc, details, summary, or longdesc, and for relevant hyperlinks near images. The list of sections outside the chapter was also reviewed for files such as descriptions.xhtml.

In addition to direct examination of EPUB files, accessibility metadata available via EBSCO was examined for five books each from nine publishers.

Findings and Discussion

Tables of Contents and Access Modes

Findings are shown in Spreadsheet 1, EPUB Analysis. All of the books the author examined included linked tables of contents, which supports accessibility, as noted earlier. All books also reported an "access mode" of "textual, visual." This indicates that the default modes of consuming the book is reading text—either visually, via text-to-speech AT, or through refreshable Braille—and perceiving visual content such as images.

In the "access mode Sufficient" field, seven of the books examined listed sufficient access modes of both "textual, visual" and "textual" alone, indicating that they claimed to be fully accessible without vision. One additional book listed "textual" alone as a sufficient access mode.

Of these eight books that claimed full accessibility without vision, three were judged by the author to provide adequate alt text or extended descriptions. One of these three included alt text that duplicated figure captions; although this practice is not ideal, it would still allow access without vision. The remaining five books that claimed full accessibility without vision were judged to require additional extended descriptions, as discussed further below.

Eight books listed "textual, visual" as the only sufficient access mode, indicating that not all nontext content was described and that the books were therefore not fully accessible to users without vision. In

four of these cases, alt text was missing for some or all relevant images, and the metadata accurately reflected this limitation. In two cases, alt text likely would have duplicated figure captions and therefore may not have been necessary. In one case, the only images identified were a cover image and logos. In these three cases, it is possible that the books could have claimed "textual" as a sufficient access mode, meaning that they would comply with WCAG in this respect. However, because this study did not examine every image in each book exhaustively, it remains possible that some nontext content was not accessible without vision. In the remaining case, detailed alt text was present, but additional extended descriptions were judged to be necessary; the metadata therefore appeared to report this limitation accurately because the book was not fully accessible without that.

Three books did not include any accessibility metadata, making assessment of metadata accuracy inapplicable.

Table 1. Access Mode Sufficient

Publisher metadata	Reported accurately?	Reported inaccurately?	Not applicable
Textual, visual; textual (vision not necessary)	2	5 Extended descriptions were needed or possibly needed	
Textual (vision not necessary)	1		
Textual, visual (vision necessary, does not meet WCAG)	4 Some or all alt text was missing	2 Possibly not accurate, alt text likely would have duplicated captions and so not needed. Possibly could have claimed textual, visual; textual (meets WCAG) 1 Possibly not accurate, no meaningful images were located; possibly could have claimed textual, visual; textual (meets WCAG)	
Textual, visual (vision necessary, does not meet WCAG)	1 Alt text was present but extended descriptions needed		
No accessibility metadata present (violates EPUB specification)			3
Totals	**8**	**8**	**3**

Alt Text and Extended Descriptions

Alt text in the books examined was marked "Yes" in Spreadsheet 1 when it was present for most images where relevant and provided a meaningful description. Five books met this criterion. Of these, three were marked "yes, detailed," indicating that comparatively rich alt text was provided. In one of these cases, the author judged the alt text to be clearer and easier to understand than the diagram it described. One book was marked "Yes, but duplicative," indicating that alt text was present but repeated information already conveyed in figure captions. In this case, null alt text likely would have been more appropriate so that screen reader users would not hear the same description twice.

One book was marked "Yes, detailed but not adequate," reflecting the presence of a comparatively lengthy description of a complex image that nevertheless failed to convey the image's full meaning. Three additional books were marked "Yes, but may not be adequate," where it was unclear whether the alt text sufficiently conveyed the information presented in the images.

Seven books were marked "No" for alt text when descriptions were missing or not meaningful, such as cases in which random strings of characters appeared in the alt attribute. Three books were marked "Not applicable" when alt text was not present but also not needed, such as when figure captions fully described the images and additional alt text would have been improperly redundant. Further detail for each book is provided in Spreadsheet 1.

Extended descriptions provide a mechanism for conveying information about complex images that cannot be adequately described using short alt text alone. Extended descriptions were identified in only one book. Of the remaining nine books that included alt text, additional extended descriptions were judged to be necessary in three books, potentially necessary in three additional books, not necessary in two books, and in one book the images were too complex for the author to determine whether extended descriptions were needed. Books that lacked alt text entirely were marked "not even alts" in the extended-description column and were not examined further for the presence of extended descriptions.

Table 2. Alt Text and Extended Descriptions

Alt text	Number	Extended description needed?	Extended description present if needed?
Present and descriptive/ relevant	6 Total 2 of them had detailed alt text 1 of them had duplicative alt text	2: Needed 1: Possibly needed 2: Not needed 1: Unsure/Image too complex for author to determine	1: Yes 2: None found
Not present and not needed	2	2: Not needed	N/A
Present and detailed, but not adequate	1	1: Needed	1: None found
Present but may not be adequate	3	1: Needed 2: Possibly needed	3: None found
Not present or relevant for all images when needed	7	1: Not needed (most images in this book had adequate descriptions in fig captions, but some images needed alt text) 6: Did not even have any alt text, so were not examined for extended descriptions	N/A

Notes, Indexes, Headings, and Math

References, footnotes, and endnotes—referred to here collectively as *notes*—should be hyperlinked to the portions of the text to which they refer. Fifteen of the books examined included notes, whereas four did not. None of the books that included notes were missing hyperlinks from the text to the corresponding notes.

In addition to links from the text to notes, accessible navigation requires a mechanism for users to return to their original location in the text after following a note reference. Backlinks are a common solution. Six books included backlinks from notes to the text. In four books, selecting a note reference opened a callout box rather than navigating to a different location; in these cases, users could close the callout box to return to their place in the text, and a backlink was therefore unnecessary. This is a feature of Thorium reader and might not work as well in other readers. Two books contained multiple sets of notes, with some sets implemented using callout boxes and others using links and backlinks. Five books did not include any mechanism to return readers to their place in the text after accessing a note.

As mentioned, efforts to create an e-reader with a "go back" button might obviate the need for backlinks in the future.[60]

Table 3. Return mechanism for references, footnotes, endnotes

Mechanism to return to user's place in text	Number
Backlinks	6
Callout boxes	2
Backlinks and callout boxes	2
No mechanism to return	5
Not applicable, No references, footnotes or endnotes in book	4

Indexes should be similarly linked to the portions of the book to which they refer. Fourteen of the books examined included indexes. Of these, ten provided links from index entries to the relevant content, whereas four did not.

Headings play a critical role in navigation for blind readers and other AT users. Headings should be marked using appropriate heading levels so that screen readers can identify section structure and hierarchy. To assess heading quality, the headings identified by the Ace checker were compared with the corresponding tables of contents. Six books included more heading levels than appeared in their tables of contents, which is likely to support more granular navigation. Eight books included heading structures that corresponded adequately to their tables of contents. Four books included fewer headings or fewer levels of headings than their tables of contents suggested, indicating insufficient structural markup. Two books used separate headings for chapter numerals and chapter titles, which is unnecessary and duplicative. In one case, the headings were otherwise adequate, and in the other there were fewer headings than needed. One book included headings that differed substantially from its table of contents, suggesting inaccurate or inconsistent heading structure.

Mathematical content was identified in three books. Two of these included MathML, as required for accessible math; however, the author is unable to assess the accuracy of MathML. One book contained only one short equation and did not have MathML. In cases involving simple equations, it is sometimes possible to provide accessibility by describing the equation in alt text; however, no such description was provided in this instance.

Violations Found in Ace Checker

Violations of relevant accessibility specifications identified by Ace are summarized for each book in Spreadsheet 1. The total number of violations reported by Ace should not be interpreted as a direct measure of a book's overall accessibility. Like other automated checkers, Ace reports the same issue repeatedly when it occurs multiple times within a publication. For example, if a book's standard link text has insufficient color contrast, Ace reports a separate violation for each instance of that link. As a result, books with many repeated instances of a single issue may appear to have more violations than books with fewer but more substantive accessibility problems.

In addition, Ace cannot always interpret contextual factors that affect the practical severity of violations for ebook users. For these reasons, the author's assessment of the significance of the reported violations is summarized alongside Ace's findings in Spreadsheet 1. For example, in five books accessed through EBSCO, Ace reported numerous violations related to a small link regarding EBSCO terms and conditions that appears at the end of book sections. Although these violations increased the total count, the author judges them to be unlikely to have a meaningful impact on most users. These issues appear to be vendor related rather than indicative of publisher attention to EPUB accessibility.

Six books had no violations reported by Ace. Four additional books were judged by the author not to have significant accessibility issues based on Ace's findings because they contained very few violations and those present were unlikely to substantially affect user experience. The remaining nine books were judged by the author to have more significant accessibility concerns.

Seven of the books with more significant issues had problems identifying the source of pagination. In instructional or classroom contexts, this can pose a serious barrier when users need to locate the same page numbers as peers using a print version of the same text or when citing the book. Six books had color-contrast issues, which may make content difficult or impossible to perceive for users with certain visual disabilities. Three books did not specify a language, which can impede AT's ability to interpret and present content correctly. Three books were missing all accessibility metadata, which presents a substantial barrier for users who need to determine whether a book will be usable before purchasing or spending time to obtain it.

Publisher's Metadata

Ace reports specific violations related to accessibility metadata requirements in addition to content-level issues. Aside from cases in which all accessibility metadata was missing, the only metadata-specific violation identified by Ace concerned a single book that lacked an accessibility summary. Because that same book also incorrectly reported the presence of alt text when no alt text was found, the publisher's metadata for that title appeared to be unreliable.

Most books reported "none" for accessibility hazards. Four books are marked "not applicable" in Spreadsheet 1, EPUB Analysis, because they did not include any accessibility hazard metadata. One anomalous case involved the ebook *Flowing Progress* by Purdue University Press, for which ProQuest's

hazards field stated, “Accessibility Hazards: No California Proposition 65 hazard warning necessary.” California Proposition 65 concerns exposure to toxic substances and is not relevant in this context. However, the publisher’s hazard metadata embedded in the EPUB itself was more substantive than most, specifying “noFlashingHazard,” “noSoundHazard,” and “noMotionSimulationHazard,” whereas many other books simply listed “none.”

The content of accessibility summaries varied widely across books, as shown in Spreadsheet 1. Many, but not all, summaries claimed conformance with a version of WCAG, EPUB, or both. In several cases, summaries explicitly acknowledged accessibility limitations, but most did not. For example, one Springer book stated, “This publication is missing alternative text for complex diagrams. The publication otherwise conforms to the EPUB Accessibility specification at WCAG Level A.”[61] Another Springer book acknowledged the absence of backlinks. A Taylor & Francis Group book summary noted that “some images and tables may appear on pages different from the print version,” information that may be especially relevant to readers working alongside others using print copies.

Some accessibility summaries listed certain aspects of accessibility, whereas others did not, even if such features were present. For instance, Amsterdam University Press stated, “When necessary, short alt texts and/or extended longer descriptions are provided.”[62] A Purdue University Press summary described a range of features, including alternative text, tables of contents, page lists, landmarks, structural navigation, indexes, and semantic structure.”[63] Several summaries mentioned the presence of structural markup and others did not, even when such markup was observed.

Beyond summaries, the accessibility features fields also varied substantially. These are displayed in Spreadsheet 1. In at least four cases, information listed in the features field was largely duplicated in the summary, limiting its usefulness. Some books listed structural markup, alt text, tables of contents, and other accessibility features, whereas other books with similar features did not report them. Although the EPUB Accessibility specification does not require standardized content for these fields, at the present stage of adoption it may be helpful for publishers to describe accessibility elements explicitly in either the summary or features fields because many EPUBs still lack required accessibility elements and users cannot assume their presence.

Discrepancies between publisher-supplied metadata versus accessibility findings based on Ace and manual examination are summarized in Spreadsheet 1. For four books, no discrepancies were identified. For three books that lacked publisher metadata entirely, discrepancies could not be assessed. The remaining twelve books all exhibited some form of inconsistency. In one case, alt text was reported but not found. More commonly, publishers claimed conformance with a version or level of WCAG or EPUB Accessibility while the book lacked alt text, extended descriptions, appropriate heading structure, or sufficient color contrast, any of which means it does not fully meet the version or level of WCAG claimed. Several books were missing page source metadata, which is a violation of EPUB Accessibility 1.1, while the publishers claimed to meet it. Two books from one publisher listed a print page source as an accessibility feature in the summary but did not correctly enter it into the relevant metadata field, causing Ace to identify pagination source violations.

Vendor Metadata

Several vendors provide book-level accessibility-related metadata in their platform interfaces. In EBSCO eBooks, each title is given a score labeled "EPUB [×]% pass (provided by Ace by DAISY)." EBSCO developed its own automated checker based on the DAISY Consortium's Ace tool. In the seven EBSCO books examined in this study, reported pass rates ranged from 98 to 99 percent. No explanation of how these percentages are calculated was located. The scores appear potentially misleading, as one book with a reported 99 percent pass rate lacked alt text, had heading problems, omitted accessibility metadata, and did not specify a language. Based on the author's sampling, EBSCO's "Ace by DAISY" score does not appear to be a reliable indicator of overall accessibility.

On the positive side, EBSCO provides access to publisher-supplied accessibility metadata through a "view all metadata" link on each title's record. This allows users who seek accessibility information to locate it without opening the ebook itself. However, some metadata elements are presented in a technical format that may be difficult for readers to interpret. For example, "schema:accessMode: textual, visual" is unlikely to be meaningful to most users without additional explanation. In comparison, Thorium's user-facing explanations of EPUB accessibility metadata—such as "all content can be read as read-aloud speech or dynamic Braille"—are clearer. Thorium's explanation conforms with the guidance of "Accessibility Metadata Display Guide for Digital Publications 2.1."[64]

In Ebook Central, ProQuest provides its own accessibility-related fields for each title, which differ from the metadata required by the EPUB specification. Not all fields are populated for every book. Titles with more extensive metadata may include fields such as:

- "Screen Reader Friendly,"
- "Accessibility Summary,"
- "Accessibility Information,"
- "No reading system accessibility options actively disabled (except),"
- "Table of contents navigation,"
- "Single logical reading order,"
- "Short alternative textual descriptions,"
- "Use of color is not sole means of conveying information,"
- "Use of high contrast between text and background color,"
- "Next / Previous structural navigation,"
- "All non-decorative content supports reading without sight," and
- "Publisher contact for further accessibility information."

One concern identified is that, for all eight books examined in Ebook Central, ProQuest listed "Accessibility summary: not provided by publisher," even when the publisher's EPUB metadata did include an accessibility summary. Even if ProQuest means that the summary was not provided through a separate metadata exchange process, the presentation is misleading because it ignores information embedded in the EPUB itself. Another concern is the use of the phrase "screen reader friendly," which

is not clearly defined. Many accessibility criteria specified by WCAG and EPUB affect screen reader behavior, and without further explanation users are left to guess which features are included.

Springer's platform provided a notably detailed accessibility description for one ebook, covering both the PDF and EPUB versions. The EPUB description stated that the ebook was designed to meet EPUB Accessibility 1.0 AA and WCAG 2.2 Level AA, highlighting navigable tables of contents, structured headings, alternative text for images, reflowable and resizable text, sufficient contrast, and Springer's email address for accessibility queries. However, the metadata embedded in the EPUB itself stated that the publication "conforms to EPUB Accessibility specification at WCAG 2.2 Level AA," a stronger claim than the platform's phrasing of "aiming to meet." This distinction between intent and conformance is significant. In addition, Springer's platform description did not mention accessible math features that were present in the book, whereas the ebook metadata did. Another Springer title with more accessibility issues simply indicated that accessibility information was forthcoming.

In Taylor & Francis's platform interface, accessibility information on search results was limited to an icon labeled "Global Certified Accessible by Benetech EPUB Accessibility 1.1 WCAG 2.1 level AA." This certification applies to the publisher's workflow rather than to individual books. Publishers certified under this program may include Benetech-certified metadata in each EPUB, but certification is awarded for one year"[65] and does not guarantee that every title meets the stated criteria. The author learned from Taylor & Francis that its Taylor & Francis eBooks, Reference Works and Collections product does have detailed accessibility information on its interface for each book; however, that was not the case for the product to which the author has access.[66]

Rather than vendors wrestling with these issues and inventing their own metadata, using the "Accessibility Metadata Display Guide for Digital Publications 2.1" would likely be effective. Avenues for recommending changes to these guidelines are available.

Additional Books' Metadata Examined by Publisher

Spreadsheet 2, Metadata Analysis by Publisher, and Spreadsheet 3, Publishers with No Metadata, present data for five books each from nine publishers. Metadata was collected from EBSCO's display for each book. To account for the possibility that metadata practices have improved over time, the most recent titles available to the author through her library were selected. These titles ranged in publication year from 2019 to 2022, and the most recent year examined for each publisher is indicated in Spreadsheet 2.

For six of the nine publishers, none of the five books examined included any accessibility metadata. Three publishers included accessibility metadata for the majority of the books examined: Routledge; University of North Carolina Press; and University of Nebraska Press and its imprint, Potomac Books. In the case of the University of Nebraska Press, identical accessibility metadata was reported across all five books examined. Four of these titles were also included in the first book analysis and were found to have multiple discrepancies between publisher metadata and accessibility findings based on Ace and manual examination. This pattern suggests that metadata may have been reused across titles without verification against the actual accessibility of individual books.

Routledge's and the University of North Carolina Press's metadata varied. The University of North Carolina Press's "summary" fields metadata offered lists of features mostly the same as what they listed in the "features" field. Routledge's "summary" fields, however, offered more robust and human readable descriptions than what was in their "features" field.

Conclusions

It is positive that most of the books in the first analysis—sixteen of nineteen—included accessibility metadata; however, the examination of additional titles by the publisher did not bear this out, as only three of nine publishers had any accessibility metadata, and one of the three appeared to be unreliable. Of the books in the first analysis, slightly more than half accurately reported their "access mode sufficient" so that users with disabilities could predict whether the books would work for them. At this level of accuracy, it seems unlikely that users with disabilities would want to rely on this information. Less than half of the books examined had adequate alt text, and only one book was found to include longer descriptions, so improvement seems to be needed in this area.

In the first analysis, all of the books had linked tables of contents and notes, if they contained notes, and the majority contained linked indexes if they had indexes. More than half of the books that had notes included a mechanism for readers to return to their place in the text after accessing a note. Almost two-thirds of the books had adequate headings. Just over half of the books were found to have either no errors as detected by Ace or no significant errors. Areas for improvement in the remaining books included color contrast, specifying language, and identifying the source of pagination. Most books did not report any hazards. Although this type of content is probably not extremely common in academic EPUBs, it is important to identify hazards for those impacted.

It would be useful for publishers to increase their identification of accessibility features in metadata or summaries because many EPUBs still do not include these features, even though they are often required; therefore, users cannot yet take them for granted. Publishers' self-reported metadata claiming conformance with WCAG or EPUB accessibility criteria was not found to be fully reliable.

Generally, vendors' interfaces seemed less reliable than ebook metadata, with the exception of EBSCO's direct display of the publisher's metadata itself. EBSCO's Ace by DAISY score did not seem helpful, and ProQuest's metadata was misleading at times. Springer's interface seemed hesitant to mention accessibility features in one case. Taylor & Francis did not have any metadata on its search results interface that was unique to each book in the product to which the author has access. Use of the "Accessibility Metadata Display Guide for Digital Publications 2.1" could improve vendor display of metadata.

The examination of metadata by publisher revealed some patterns. Routledge and the University of North Carolina consistently included accessibility metadata. However, one University of North Carolina title in the first analysis did not include accessibility metadata. Routledge and its parent company, Taylor & Francis, were found to have consistently robust accessibility metadata in three books in the

first analysis. The other seven publishers examined consistently did not include accessibility metadata, or the metadata seemed unreliable in the case of the University of Nebraska Press.

Although there are many areas for improvement in EPUB accessibility, it is encouraging that some features of the accessibility specifications were used in more than half of the books examined. It is reasonable to hope that, with the European Accessibility Act and the new regulations under the ADA, future studies will find further improvements. Additional studies examining larger numbers of EPUBs and publishers would be useful so that reliable generalizations could be made.

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