Technology Task Force Initial Report

To the Advisory Commission on Accessible Instructional Materials in Postsecondary Education for Students with Disabilities

June 6, 2011 [Marked for changes submitted on top of the version distributed after the 6/1/11 conference call]

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Introduction

Deleted: *with comments from 6/1/11 conference call, with the following attendees*¶
Bruce, Stephan, Gaeir, Holly, Jim¶
Dave, Skip, Mary, Scott and Janet¶
Comments in writing (marked changes to this or the earlier, 5/19, version) due by Friday 6/3)¶
Jim to integrate (or comment on open issue) for delivery to CAST on 6/8. ¶
CAST to integrate into a report due to the braillists 6/15 for the late June phone call. ¶

The Technology Task Force examines technical issues within the Commission's Congressional charge. Modern accessibility practice focuses extensively on issues around technology access: electronic file formats and assistive technology are at the core of delivering access to instructional materials for students with disabilities[Gaeir]. Accessible formats and assistive technology are not enough, however. Of equal importance is the successful integration of the two to assure an accessible user experience. (Bruce H)] The Commission's work is deeply intertwined with both specific technical issues around accessibility, as well as general technology trends in society that affect everybody, including students with disabilities.

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The general technical trends that affect the Commission's work include the rapid growth of electronic books, increasing use of powerful mobile devices including tablets, rich online content as well as the general trend to moving technology applications into the cloud. The Technology Task Force was also mindful that technology change is rapid and accelerating. These factors mean addressing the challenges and benefits of technology are crucially important to the goals of the commission. Those goals of the commission are to make recommendations about how to improve access to higher education for students with disabilities.

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The Two Considerations

The Technology Task Force was charged primarily with examining issues around file formats and file repositories. Like the other task forces, it operates under the provisions of Section 772 of the Higher Education Opportunity Act (2008), and specifically the two considerations in 772(b)1(c)(ii):

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- (II) the feasibility and technical parameters of establishing standardized electronic file formats, such as the National Instructional Materials Accessibility Standard as defined in section 674(e)(3) of the Individuals with Disabilities Education Act, to be provided by publishers of instructional materials to producers of materials in specialized formats, institutions of higher education, and eligible students;
- (III) the feasibility of establishing a national clearinghouse, repository, or file-sharing network for electronic files in specialized formats and files used in producing instructional materials in

specialized formats, and a list of possible entities qualified to administer such clearinghouse, repository, or network;

The Technology Task Force Discussions

The Technology Task Force came to consensus on the two considerations rapidly after our initial research. We decided against recommending a NIMAS-style single accessible file format, and against recommending a single NIMAC-style national repository for accessible files for higher education. While we felt that it was feasible to establish a standard electronic format, NIMAS is indeed such as example, we didn't think it was the most desirable approach to this challenge. And while it would be probably feasible to establish a national repository for electronic files in higher education, following the NIMAC example, we also didn't think it was the most desirable approach for this challenge. We felt that that the K12 examples of the NIMAS and NIMAC were useful to explore, but that the post-secondary field is quite different, and that almost a decade later we can come up with new and better approaches to addressing these questions.

File format standards are a crucial element of today's technology environment. Common standards make it possible to edit the same document (the Microsoft Word .DOC de facto standard), take and share pictures (the JPEG standard), listen to music (the MP3 standard) or view content on the World Wide Web (the HTML standard). File format standards need to be implemented by technology on the creation side: the camera, the digital audio recorder or the authoring/editing tool, as well as on the consumption side: the print, the MP3 player or the web browser. Lack of standardization drives up costs, as technology vendors need to support different formats that cover similar kinds of content, and decreases usability, as users experience the frustration of being unable to use a format not supported on their device or in their software.

The Commission's charge from Congress included a directive to examine market model solutions, where accessible materials would simply be purchased. The Technology Task Force kept this market model solution firmly in mind, and we had broad consensus that this would be the best long term solution to most of the accessibility challenges we were examining, including the two key issues around file format and repository.

[Jim F, in response to a comment by Holly A]

Because of our view that technology is rapidly evolving, and that students with disabilities have a wide array of needs, we were disinclined to recommend locking accessibility into a current technology. Our Technology Task Force felt strongly that we should be guided by a more functional approach that allows for technical innovation while describing the functional requirements for accessibility. Because of the costs and delays involved in creating and supporting a new standard, we prefer to influence the accessibility of major standards in wide use. [Jim F, in response to a comment by Holly A]

Our thoughts were driven by a statement of guiding principle, as follows:

> Technology developed or deployed to facilitate access to instructional materials must permit a user with a print disability the opportunity to acquire the same information,

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engage in the same transactions and enjoy the same services at the same time (BH) as the user without a disability, and with a substantially equivalent ease of use.

So, while we will answer the feasibility questions in our Congressional charge, we will also go beyond that to make recommendations about how these format and repository questions can best be addressed for the future.

Relationship of this Technology Task Force to the Other Three Task Forces

While the charges to each of the Commission's four task forces were quite different, there seems to be a high degree of unanimity in the nature of the recommendations coming from the task forces. The final Commission recommendations will be a synthesis of these different task force reports, pulling together these different threads into the final report[Jim F, in response to a comment by Holly A]. We will briefly discuss each of the other three task forces and how the Technology Task Force's work interacts with them.

The Legal Task Force

The Legal Task Force has been working on definitions, existing laws and proposed laws. If the Technology Task Force makes recommendations about what should be done, the Legal Task Force needs to spearhead the effort to translate those ideas into binding legislation and/or regulations. A few technical issues directly connect with legal issues:

- [Where are the definitions of accessible instructional materials? Best practices? The Tech Task Force hasn't addressed this so far. Needs a practical definition of accessible instructional materials. BH]
- The need to encourage the purchase of only accessible instructional materials
- What kinds of instructional materials are covered by existing and proposed laws
- Making "born digital materials" accessible
- Possible licensing regimes beyond the scope of the copyright exception

Market Model Task Force

The Market Model task force is trying to foster the creation of a market model to permit students with disabilities and institutions of higher education to purchase accessible content and technology, when volume and cost factors enable a given accessible product to participate in a market distribution model. (BH). Here are some of our areas of tech overlap with the Market Model Task Force:

- Meaning of accessibility in a digital education world

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- Our listing of the characteristics that define accessibility functionally
- Similar issues around creation of products and content
- Link to the improving mainstream access, with course management systems and accessible ebook products

Best Practices Task Force

The Best Practices Task Force addressed several issues around the requirements of low incidence disability communities (i.e., blind, deaf people). Issues around high cost of materials, as well as timely access, are part of this task force's efforts. Challenges around access to Science, Technology, Engineering and Mathematics ("STEM") content also arose. Some of the issues faced by this Task Force that intersect with technology issues:

- Draft definition of accessible instructional materials.
- Technical format support for image descriptions and tactile graphics, including the making of STEM content accessible
- Technical support for connecting with Braille devices
- Definitional overlap of our functional approach to accessibility means with respect to universal design

Key Issues Addressed by the Technology Task Force

Key issue number 1: File format

The file format issue is at the core of accessibility. Assistive technology needs accessible information in a usable format in order to render it for the person with a disability, whether it's speaking text, enlarging material visually, converting it to Braille or tactile graphic, or captioning or describing video. File formats need to make this information available, or allow for the addition of this information to content that is missing this information.

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[The issue of born print content that wasn't intended for the higher ed market that was designed, and the need to convert it into accessible formats.]

In addition, formats that would generally be accessible can be made inaccessible or partially accessible through the addition of digital rights management technology that locks out the accessibility tools. For example, a highly accessible ebook in the standard mainstream commercial EPUB format, which is natively accessible to most all accessibility tools, can be made unusable by technical protections that stop other programs from accessing the text of the book. Many of the technical protection mechanisms

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employed today cannot distinguish between illegitimate and legitimate requests for the text content, between wanting the text for illegal copying or needing accessibility technology to turn that text into Braille, text-to-speech or large print. [Jim F, in response to a comment by Holly A]And, even when efforts are made to allow some accessibility features to work, this doesn't ensure the usability of a tool. One recent example was the Kindle of 2009, where text-to-speech could be turned on for some books, but a blind person couldn't access the controls for the Kindle.

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The Technology Task Force recognizes that the commercial distribution of materials in accessible formats will greatly reduce the need for parties other than the student with a disability to handle the files. Everything would be much simpler if students with print disabilities bought the same content products as their peers, and that these products were fully accessible. This would reduce the cost and improve the timely delivery of materials to students. However, the taskforce also recognizes a need to provide some recommendations related to source files for the near term, to allow the creation of accessible content, especially for lower incidence disability communities. For example, production of hardcopy Braille or tactile graphics for blind students would benefit from digital source files that could be converted into these special formats. [Jim F, in response to a comment by Holly A]

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We also need to recognize that:

1. Considerable amount of born-print content is not produced by parties with the idea that it will be used in higher education setting;
2. Many titles will continue to be generated by small organizations (not just "publishers") that lack the skills or economic wherewithal to produce accessible product as anticipated in the paragraph above;
3. The number of materials that will migrate to the market model will be limited by market size, costs and technological limitations. (BH)

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The question of formats with today's technologies is a bigger issue than in the past. Accessibility used to be framed in terms of making the text inside textbooks available, and captioning the occasional educational video. But, educational materials are getting richer, in terms of using more formats. Text-based formats continue to be important, especially when addressing book accessibility. But, formats for audio, video, images and web content are all increasingly important for educational materials, as digital delivery of educational content becomes a primary channel of distribution. [Jim F, in response to a comment by Holly A]

Stakeholder Impact

Format questions affect all of the major stakeholder groups, including students, faculty, DSS offices, publishers, authors, websites and technology vendors. Let's briefly explore the impact of formats on the different stakeholder groups.

Students. For students, the challenge is around obtaining student-ready formatted files. Ideally, the standard commercial ebook product should come in a fully accessible format, so that the student can

simply buy the book or download the materials and start using the product on their preferred personal computer, tablet, smart phone and/or specialized device. For many students with disabilities, being able to use the same content on separate platforms is also a requirement, just as it highly desirable for people without disabilities.

Our recommendations also need to address the challenges of students' preferred technology. If, for example, a student is using an older version of JAWS (the screen reading software for blind people), which is costly to upgrade, there is a strong likelihood he or she will not be able to use a newly created accessible product that only works with the latest version and neither the student nor DSS office may have the funds to buy new software. The same holds true for various assistive devices. ~~The Commission needs to be cautious not to advocate policies that will actually harm students.~~ (BH, edits by JRF. Strikethrough shows sentence where JRF did not agree with adding: may be topic for future discussion, since it's an issue well beyond the student stakeholder subsection.)

Faculty. Faculty choose the materials for their classes, with a focus on the relevance for the educational purpose. For faculty, format is a tertiary issue at best, and accessibility mandates are hard to enforce in individual faculty members. Even if they want to do the right thing on format, it's difficult for faculty to become experts in the technical nuances of formats.

Offices of Disability Resource/Service. Currently institutions of postsecondary education have the legal obligation to ensure access to instructional materials for students with print disabilities; while having little-to-no control over how those materials are presented originally for use. At nearly all institutions, this obligation is met through the disability resource/service office. In most instances this results in those offices going to extraordinary lengths and expense to convert inaccessible formatted material into student-ready accessible formats. The scope of this work is increasing rapidly due both to the breadth and diversity of instructional materials utilized in postsecondary education and the increasing numbers of students with print disabilities who are now successfully participating in postsecondary education in the United States. [New section by Stephan]

University Libraries and University Bookstores. The libraries and campus-affiliated bookstores of higher education institutions are frequently on the front lines of providing content for lending, sale and rental to students with disabilities. They share the institutional obligations of their parent school to provide accessibility.

[Gaeir: My one big suggestion is that as part of the stakeholders would should somehow include distance education (maybe Distance Education Providers or some such).]

Publishers. Publishers have challenges between their internal workflow format and the external deliverable formats. Internal workflows utilize formats chosen for the needs of editorial and production work, not necessarily for external distribution. Also, publishers then have the challenge of converting

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the final produced content into formats needed by the content distribution system. Due to proliferation of commercial formats (often connected with differing approaches to digital rights management), some publishers may find themselves needing to convert a book into multiple formats beyond the printed version, assuming that the publisher even offers a printed version. Accessibility requirements can also multiply formats well beyond those needed for commercial distribution, including audio books (on different devices), Braille books, large print books (in different sizes), digital Braille format (with different formatting options) and DAISY formats of different types. One benefit of a standardized accessibility format is that publishers could rely on creating that one format and meet their accessibility requirement. There are format-related issues beyond the format itself, it includes best practices on how to represent content in that format, such as navigation ground rules that indicate the correct reading order, and how STEM (science, technology, engineering and mathematics) content is to be represented. [JRF, based on BH edit] ~~Choosing a single format like Daisy would ignore the various aspects of page layout and its significant for students trying to mainstream in a classroom where page references are important. The cost of employing Daisy is another significant consideration. Higher costs of production do impact the market.~~] (BH, comment not accepted by JRF indicated by strikethrough: technically incorrect on DAISY having a problem with page references: it handles them fine today and the goal is to get mainstream XML publishing formats to support them better. Example: Kindle originally not having print page numbers and recently agreeing to add them. Other two sentences already covered above/ editorial)However, in K-12, they often found themselves delivering in the NIMAS format and multiple other accessible formats required at the state or local level.

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Authors. Authors can be surprised when they find their work provided in formats they don't recall authorizing in their publishing agreements. Most authors are not aware of the copyright exception, or the civil rights obligations of educational institutions to make accessible versions of the author's work under a variety of different legal justifications. There is a distinction between authors providing content under work for hire contracts and authors of content produced for other purposes who own the content and only license for it limited use in instructional materials. (BH)

[Gaeir: the issue of graphical description. Here or somewhere else? What else do we want to say about authors? That they are often enjoined by their contract from providing accessible versions upon request?]

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Providers of Websites. Although students with disabilities frequently interact with websites for performing tasks related to their education (such as paying tuition, registering for classes or reviewing grades), even more frequently students need to use the web for reading required content, doing research for papers, accessing assignments and interacting with fellow students in both required and optional ways. Many of these websites are controlled by the institution of higher education, and many are not. And, the great majority of the people providing these websites are not aware of accessibility requirements. Although the basic web format, HTML, is intrinsically quite accessible, it's easy to start adding inaccessible content or using generally accessible content in ways that make it inaccessible.

Technology vendors. The developers of technology solutions supplied to higher education institutions and/or to students make format choices generally without regard to accessibility needs. Sometimes the technology is developed internally to the institution for its own use [chris toth quote here]. Some vendors gain an advantage by making a format choice that is incompatible with the products of other vendors (example: Amazon ebook files generally cannot be read by competing ebook readers.

We also recognize the wide variety of technology vendors who are relevant in the higher education space. For example, there are publishers/vendors selling technology-based products on proprietary platforms, assistive technology vendors licensing screen readers to institutions, digital distributors like CourseSmart, e-book vendors such as Kindle and Nook, tablet computer vendors, learning management system vendors (including individual colleges) and more. (JRF based on BH comment) In addition, vendors of hardware ebook readers like the Kindle also have software versions of their applications working on Apple, Android, and Blackberry tablet computers and other mobile devices. (JRF, based on Ed McCoyd (AAP) comment)***Accessible media producers.*** There are numerous companies and organizations that produce accessible content. Some are acknowledged as "authorized entities" under the Section 121 Chafee copyright exception: entities that produce content generally without agreements with publishers. These entities include the American Printing House for the Blind, Bookshare, Learning Ally (formerly RFB&D) and the National Library Service for the Blind and Print Handicapped of the Library of Congress. There are also individuals, nonprofit organizations and companies that will produce accessible media under contract from educational institutions and/or publishers.

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[Note: the previous section could truly benefit from sidebars with quotes and testimonies.]

The National Instructional Materials Accessibility Standard (NIMAS)

The statute charges us to look specifically at the mandated K-12 file format, the National Instructional Materials Accessibility Standard (NIMAS). We discussed the pros and cons of this approach extensively:

Pros:

- The XML standard is intrinsically very accessible, easy to convert to audio, large print and Braille
- The structural elements are invaluable in making the content more accessible to students with disabilities, elements such as page numbers, chapters, headings and subheadings, etc.
- The NIMAS standard is close to existing mainstream XML standards like ePub
- The NIMAS standard has made it much easier for accessible material producers to quickly produce student-ready accessible in accessible text
- High quality images are required as part of the NIMAS file set, making it easier to have the images in the content provided to the student (if useful)

Cons:

- The NIMAS files are generally not student-ready, they typically need a school or accessible media producer to convert them into student-ready accessible files
- NIMAS was never envisioned or designed as a student-ready file. NIMAS was designed to be a source file format. (BH)
- The images are not required to be described
- Math and science accessibility hasn't been addressed at this time beyond pictures of equations generally being provided (without description)
- Many textbooks being used and sold after the effective date have not been provided in the NIMAS format[What is the basis for this statement? NIMAC currently has 24,581 file sets of textbooks, which is double the number NIMAC was expected to have by the summer of 2011.

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(BH). The basis for this statement is Bookshare's experience with schools asking us to scan more textbooks than we can handle because they are not in the NIMAC. And, according to the NIMAC, less than 5,000 of the file sets in the NIMAC are textbooks: the rest are supplementary material. JRF: in answer to BH comment.]

- Standard XML production doesn't automatically/easily deliver NIMAS format
- Needs a state or local educational agency to request the NIMAS files as part of their purchasing process
- Many non-textbook materials are not provided
- And, many textbooks still in use date from before the effective date [Federal regulations established the effective date of July 19, 2006. Federal rules do not require publishers to submit all their materials. Materials published prior to that date are "legacy" materials that may still be in use in some schools.] (BH)
- It is especially costly for smaller publishers to produce NIMAS because they do not use XML-based systems and may not be able to cost justify NIMAS production. ~~It is unknown how these additional costs deter creation of products because they became economically unviable.~~] (BH, strikethrough by JRF, editorializing)
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Although the NIMAS format does contribute to accessibility, and thousands of K12 textbooks have been deposited into the NIMAC repository, adoption of a NIMAS-style format in post-secondary was deemed inadvisable by the Technology Task Force. Mandating a specific format requires a slow rule making process, that by definition is years behind the current technology. This would result in students with disabilities being behind the times, and different than their non-disabled peers. A disability-specific format mandate, especially one that was not student ready, would move away from the goal of a market model, where students buy or legally obtain accessible content directly. [Furthermore, it would not necessarily meet the needs of students that NIMAS does not address.] (BH) [JRF: what needs did you have in mind?]

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Other important formats: DAISY and EPUB

[Gaeir: make sure we have definitions of DAISY and EPUB. DaveB: sounds like it will be in the Market Model section.]

We also considered requiring a specific accessible format like DAISY (Digital Accessible Information SYstem), the leading accessible format used by libraries for people with print disabilities around the world (including three of the main national libraries for people with print disabilities in the United States, Bookshare, Learning Ally and the National Library Service for the Blind and Physically Handicapped). Supplying well-structured DAISY files could meet most of the accessibility requirements of students with disabilities, depending on the type of DAISY being supplied. For example, DAISY that includes the full text of a book can be turned into audio, Braille or large print by software used by the student (typically available for free or a nominal price). Audio-only DAISY can meet the needs of many students with disabilities as well.

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The EPUB ("electronic publication") format was also worth a close look. As the primary standard open format used in the commercial ebook industry, EPUB is in wide use and supported by many of the larger publishers. The next version of EPUB is expected to be the same as the next version of the DAISY format: a perfect example of mainstreaming universal design. Most commercial ePUB files come with

all of the structure needed to make the book easily navigable by the student with disabilities: page numbers, chapters and headings and so on.

One challenge faced by the team that devised the NIMAS standard is that formats like DAISY and EPUB, while generally highly accessible, do not have to be highly accessible to be deemed compliant with the standard. For example, a DAISY file that contains a single paragraph with no pages or chapter markings, but with all of the 500,000+ words of the novel War and Peace would pass a standard DAISY validator. It just would be unusable in practice.

Rather than following the NIMAS approach of mandating DAISY with a minimum amount of structure mark-up, we preferred to use a functional approach. In general, DAISY and EPUB files done to current standards would meet the functional requirements we've set forth, as long as the Digital Rights Management (Technical Protection Measures) doesn't stop the accessibility technology from operating fully.

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~~[Due to the popularity of PDF-related workflows within publishing houses, files comporting to the new PDF ISO standard will likely cost considerably less to produce than DAISY in many instances and should be included as an option. In a large number of instances, PDF files tagged for accessibility will provide the quickest, most affordable option for publishers to produce the greatest number of textbooks. Over time, market forces will determine which formats will be utilized. It should also be noted that files tagged by publishers for accessibility could typically be made available as a product, further limiting the need to involve DSS offices in the delivery of materials to students.] (BH)~~

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Due to the popularity of PDF-related workflows within publishing houses, it may be more convenient and less costly for such publishers to produce files that meet the new accessible PDF ISO standard. The Technology Task Force heard mixed reviews of the initial implementation of this standard, but hopes that this new standard as implemented would meet the functional accessibility requirements recommended by the task force. [JRF, inspired by BH comment above]

State Level Initiatives on Formats

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Several states have passed laws mandating that publishers provide source e-text files for DSS offices to use in developing alternative formats of textbooks utilized in higher education in those states, although the largest higher education publishers voluntarily provide e-text files to DSS offices in all states without such laws, as well. These laws (AB422/AB386 in California, Chapter 219 in New York) are covered in more detail in the report of the legal task force report. In general, these laws recognize the critical role that DSS offices play in providing alternative formats when there is not an accessible commercial version available directly from the publisher, as well as the need to allow for flexibility by publishers in determining which source formats to provide. [BH]

Deleted: Several states have passed laws mandating the accessibility of textbooks utilized in higher education in those states. These laws (AB422/AB386 in California, Chapter 219 in New York) are covered in more detail in the report of the legal task force report. In general, these laws have the problems we've described above with the NIMAS/NIMAC solution, but generally mandate even more out-of-date formats such as ASCII

Federal Requirements for Online Content

Section 508 of the Rehabilitation Act requires the federal government to purchase accessible products and develop accessible websites.Section 508 mandates are moving to a more functional approach, designed to ensure that people with disabilities get access to the same content and services as people without disabilities. [Holly Anderson]

It should be noted that some States have adopted Section 508 requirements for their online content, including in many cases, state-operated institutions of higher education. [Gaeir: all 50 states have a web content accessibility standard. Active and increasingly litigious issue.]

[Can we say the following, or are there reservations about this statement?] In general, the Technology Task Force felt that online content that met the requirements of Section 508 would meet the functional accessibility requirements we are recommending.

Campus Approaches [Section new from Stephan]

Campus-level approaches to the provision of different file formats varies based on the resources and expertise available at the campus; the breadth of student requirements; and the magnitude of the accessible media production process on campus. DS Offices need to respond to student requests for accessible materials in a timely manner, and in generally make every effort to supply the materials in the disabled students preferred format. Based on the research done by the Commission, and testimony from commissioners and the general public, the most frequently requested formats (at the time of report writing) are: MSWord files; fully accessible PDF's, and rich text format.

Additionally, when DS offices request and are provided with files from publishers, the provided files are often not student-ready. This, in turn, requires a laborious conversion process. If files are not available or supplied by publishers, or if provided files are not usable, the DS offices frequently will have to destroy a physical book to scan it into an OCR program so that it can be converted into a word processing format like MSWord, a full accessible PDF, or another file type.

[Is this paragraph necessary? Seems to be covered in the first paragraph.] (BH) [Note that Stephan submitted a rewrite of this paragraph, inserted above.]RF]Points of consensus

Don't recreate the K-12 solution

There was clear consensus that recreating or adapting the K12 NIMAS format approach was not the best approach for post-secondary needs.

Provide flexibility for the market model and technical evolution

The consensus was that a functional approach would encourage more rapid development of a market model solution for some of the accessibility needs of students. In addition, a

Deleted: to [what legal standard?] In the area of web content, this is created requirements to create websites that use accessible HTML to deliver government information to government employees and the general public. In general,

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Campuses have a very different approach to formats. DSS offices need to respond to student requests for accessible materials, and generally try to supply the formats students with disabilities request. Based on the research done by the Commission, and testimony from commissioners and the general public, the most frequently requested formats are X, Y and Z. ¶
¶
In addition, when DSS offices request files from publishers, they often get them in a form that is not student-ready. This requires a conversion process that often involves labor. If the files are not supplied, are not usable or are not available, DSS offices frequently scan books, which generally leads to content in word processing formats like Microsoft Word, or sometimes into PDF.

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functional approach would allow for technology evolution, and encourage the accessibility of the new technological approaches of the coming decade.

STEM accessibility

The Technology Task Force recognizes the need to make Science, Technology, Engineering and Math (STEM) content accessible to students with disabilities.

Digital Rights Management shouldn't stop accessibility

The Technology Task Force recognizes that Digital Rights Management is necessary to protect publishers' intellectual property and copyrights. However, the use of the DRM technical protection measures (in both hardware and software) must [should BH, must JRF, the must/should/shall/may issue is a bigger one for the commission report. Must was the word agreed in the task force calls] permit a user with a print disability the opportunity to acquire the same information as the user without a disability, and with an equivalent ease of use. Either the application should be accessible "within" the DRM framework or should~~, with proper approval of the rights holder expressed in an appropriate license,~~ be able to allow assistive technology to have ~~limited~~ access to the content or to export the content so that it may be used with assistive technology. [BH with strikethroughs by JRF channeling Mark R's existing recommendations to the Commission] [Bruce: rapid evolution of DRM. Mark & Bruce issue? How to recommend things to do here? Gaeir: recommends a partnership, perhaps under demo projects? A summit? Accessibility needs to be considered by all parties. OCR letter reference.]

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Authoring tools and accessibility

It would greatly improve accessibility if better tools for making content accessible were available to authors at the time they are originally creating the content. This might include accessibility wizards that encourage authors to add the accessibility information. For example, authors are the best people to describe the educational purpose of a graphic that's part of a textbook or a learning module, since they are choosing that graphic. A person trying to make the graphic accessible after the fact lacks the contextual knowledge possessed by the author. [Jim F, in response to a comment by Holly A. BH also had edits to the original paragraph.]

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Digital does not imply accessible

Stephen's comment on the Nook: linking these questions to real ebook products: what is and isn't working, why digital doesn't automatically mean accessible.

Captioning
[Gaeir]

Points of tension

It's not clear we have points of tension at this point in time around the format recommendation from the Technology Task Force.

(narrative plus a bulleted list)

Recommendations

Guiding Functional Requirements

The Technology Task Force recommends that legislation mandates [to whom?] (BH) that instructional materials must be supplied [to students] (BH) in formats that permit a user with a print disability the opportunity to acquire the same information, engage in the same transactions and enjoy the same services at the same time (BH) as the user without a disability, and with a substantially equivalent ease of use. [JRF: these are important issues that need additional discussion.]

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Required Characteristics

The Technology Task Force recommends that rather than adopting a specific file format, we recommend the criteria below for document characteristics that, when followed, would create documents that would be accessible, as well as easily be transformed into other formats, such as Braille, DAISY, and other student-requested accessible formats. These document characteristics should, at a minimum, include the provision of the following: [Unsure what this paragraph says. (BH) JRF: discussed extensively in the task force.]

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- Text must be supplied for text contained in an image;
- Major heading structures;
- Page breaks;
- Page numbers;
- Properly structured information presented in table format
- Brief descriptive text for images, charts, and graphs;
- MathML for mathematical content, and
- [~~Content MathML or textual descriptions for mathematical content, and~~ (BH) I think that the MathML recommendation from the task force was expressing a choice to omit textual descriptions as an option. JRF]
- a logical reading order.

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In line with our functional requirements, we do not recommend that these characteristics mean that structure that does not exist in the original document needs to be created. So, if there are no headings, page breaks or page numbers in the original document, they are not required for the accessible version.

[Do we drop or move the rationale part?]

Rationale: Source files with these characteristics can be repurposed to various formats, including student-ready materials that can be utilized with the most commonly available assistive technologies; understanding that complex, post-source file markup may be required for the production of more specialized student-ready files depending on end format requirements.

Checklists and Automated Tools

The Technology Task Force recommends that investment be made in corollary checklists and/or automated tools for verifying compliance with the accessibility requirements for source files described in our recommendations.

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STEM Content Accessibility

The Technology Task Force recommends that when posted to Web sites, included in courseware management systems, or as part of electronic documents, STEM materials containing equations and/or scientific notation be made available [by whom? (BH)]to students with disabilities in an accessible form (images of equations alone will not suffice), such as MathML. Electronic copy of books from publishers should also include text-based equations in formats such as MathML (preferred) or LaTeX. [What default requirements are to be provided for students without the sophisticated player technology that might be needed to handle MathML and LaTex? Usability is critical.] (BH)

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Authoring tools and accessibility

We recommend that producers of courseware management systems, Web development software, word processors, and layout programs, among others, be encouraged to create accessibility wizards and prompts that inspect materials for accessibility as they are created and before they are distributed to students. If authoring tools~~, particularly Adobe InDesign,~~ could be employed more efficiently and effectively by course materials producers, the costs of production would be reduced significantly, thereby increasing the availability of accessible materials. (BH) [Not clear that the task force wants to recommend InDesign: I think that it's an unlikely product to be be used by course trialsls authors. JRF]

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(narrative plus a bulleted list)

Key issue number 2: Clearinghouse, Repository, or File-sharing Network

The existence of accessible content does not necessarily mean that the student, faculty member or DSS staffer can find and use it. The question of a clearing house, repository or file-sharing network addresses this major issue: finding the content that's needed. It also addresses the issue of duplication of effort: when an accessible version is not found, DSS offices are obliged to create one and/or students go without the content they need.

The nature of this key issue illuminates the variety of ways to solve the problem for finding the desired content. Is it a clearinghouse, like Access Text Network, which primarily routes requests for publisher files from institutions of higher education to publishers to fulfill? [~~AccessText Network already hosts a growing repository of user-ready files with more than 1,300 publisher-approved higher education files~~

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~~currently available.~~] (BH) [JRF: See edit below] Is it a repository, like the National Instructional Materials Accessibility Center, which holds files for a select set of authorized users? Is it a file-sharing network, which is initially how the Bookshare online library got started? There are many other effective organizations that don't clearly fit into any one of these categories, or cover more than one category. For example, AccessText Network has recently started hosting files as a repository and Bookshare is now handling requests for accessible files on behalf of many publishers to meet their accessibility obligations.

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The main point of consensus in the group was that a single solution was unlikely be the optimal answer to this problem. The combined needs of all of the stakeholders are beyond any one entity to address, especially as we increasingly hope to move from a compliance approach to a market model. Low incidence populations will still require services, such as Braille or tactical graphics, that we don't realistically see being delivered as a commercial product anytime soon.

The solution we are most excited about recommending is federated search: the idea that all of the stakeholders can run a single search for the accessible content that will search all of the places that content might be available from: for sale, for rent, for borrowing or for adaptation. Rather than designating a single entity as the holder of all accessible post-secondary material, we want to make it much, much easier for stakeholders to find what they need from all of the great groups trying to meet those needs.

Stakeholder Impact

Finding the content is a challenge for almost all of the stakeholders. And, the common theme is that they have more important things to do than spending hours combing the Internet for what they need!

Students. For students, the challenge is finding the content that will work for them. Students have plenty going on, and finding accessible content should be just as easy as finding content for students without disabilities.

Faculty. All things being equal, almost all faculty members would be happy to provide accessible content. But, it clearly isn't their job. It needs to be made easy to adopt accessible material, or materials for which an accessible version is available.

Offices of Disability Resource/Service. Currently Institutions of postsecondary education have the legal obligation to ensure access to instructional materials for students with print disabilities; while having little-to-no control over how those materials are presented originally for use. At nearly all institutions, this obligation is met through the disability resource/service office. In most instances this results in those offices going to extraordinary lengths and expense to convert inaccessible formatted material into student-ready accessible formats. The scope of this work is increasing rapidly due both to the breadth and diversity of instructional materials utilized in postsecondary education and the increasing numbers of students with print disabilities who are now successfully participating in postsecondary education in the United States. [Stephan]

Publishers

Publishers are in the business of selling course materials, including books. Making it easier and less costly to produce accessible course materials and books – and making it easier for student to find the commercially produced accessible version -- will make it more likely that publishers will make extra effort to ensure their content is accessible. [Consideration needs to be given to digital distributors that small publishers can license to distribute digital versions of their books. Also, firms like CourseSmart, VitalSource (Ingram) and, soon, CafeScribe (Follett). These distributors will likely work with both large and small publishers, selling directly to students or through bookstores.] (BH)

Authors. Anything on Authors?

Providers of Websites. For the most part, this issue doesn't make a huge impact on website providers, because of the existence of effective search engine technology like Google and Bing. To a great extent, the goal of our recommendations here are to make finding accessible material as easy as finding material on websites.

Technology vendors. The developers of technology solutions supplied to higher education institutions and/or to students [What else should we say about vendors?] [Need to clarify how these companies would benefit from a federated search unless they are marketing titles. If they are marketing titles wouldn't they would be include d in the federated search like any other titles or versions of titles?] (BH)

Accessible media producers. For those accessible media producers with extensive collections of content, catalog-based solutions are an intrinsic part in making those collections useful. The need for federated search is well-understood in the library field, and just like publishers, making it easier to access library content is core to the mission. [~~Needs to be clarified that titles would only be included in a federated search if it could be demonstrated that the rights holder has granted permission to distribute~~.] (BH) [Edit rejected. Forgets that accessible media producers that operate under the copyright exception do not need rights holder permissions, and federated search has clearly been envisioned as helping students find all accessible content from as many sources as possible. JRF]

Other Stakeholders. Who did we forget in the above list? College bookstores and libraries that are required to acquire special books for student use, e.g., reserved reading , because, increasingly, these materials will have to be accessible and the federated search would enable those sources to do their jobs more effectively. (BH)

[Note: the previous section could truly benefit from sidebars with quotes and testimonies.]

Deleted: ***Disabled Students Services Offices.*** DSS offices have the primary job of ensuring that content is accessible for students with print disabilities who request it. But, if it's hard to find, the need to deliver timely material drives DSS offices to scan books: not a great use of limited resources. ¶
¶

Deleted: [question: do we do the large publisher/small publisher split here?]. Publishers are in the business of selling books. Making it easier to buy accessible books will make it more likely that publishers will make extra effort to ensure their content is accessible.

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The National Instructional Materials Accessibility Center (NIMAC)

The statute charges us to look specifically at the mandated K-12 file repository, the National Instructional Materials Accessibility Center (NIMAC). We discussed the pros and cons of this approach:

Pros:

- Ease of discovery: one place to look for K-12 textbooks, organized by professional librarians
- Ease of compliance: if the NIMAC accepts content, a publisher (and education agency) have met the standard for accessibility
- Single format, makes it relatively straightforward to convert to student-ready files

Cons:

- Limited funding restricts use to roughly five authorized users per state [This comment implies end users, i.e. students. What I believe it references are "authorized users" in the states. AUs are administrators and coordinators who are authorized by the NIMAC to order from the center as part of its DRM scheme.] (BH)
- Not all textbooks needed in K12 are in the repository, five years after its effective date. Federal regulations established the effective date of July 19, 2006. Federal rules do not require publishers to submit all their materials. ~~Materials published prior to that date are "legacy" materials that may still be in use in some schools. Also, files created with NIMAC content cannot be shared with a second user due to strict terms of its license agreement.~~] (BH) [JRF: published issue is still open. OSEP says that books sold after the effective date need to be in the NIMAC; many publishers reject this for books first published before the date. Also, second strikethrough sentence is an incorrect reading of the NIMAC agreement as it is implemented. OSEP has a strong mandate to its AIM grantees to avoid wasteful duplication of effort. There is no requirement to recreate from scratch, say a Braille book, for a second user. JRF]
-

Although the NIMAS/NIMAC system is functioning in K12, adoption of a NIMAC-style centralized repository in post-secondary was deemed inadvisable by the Technology Task Force. There are far more books being used in post-secondary than in K-12: the AAP estimates 300,000-400,000 different titles are assigned in a given year in the U.S. The higher education sector is more diffuse in structure than K-12: the hierarchical structure of local and state educational agencies is not duplicated. And, unlike K-12, students are responsible for purchasing their textbooks.

The imperative to encourage market-based solutions also works against a single centralized repository: a state-mandated monopoly for the sale of accessible material seems unlikely to gain traction in the U.S.

Other Repositories

The Technology Task Force also discussed a number of other nationally-oriented repositories beyond the NIMAC. We discussed five national repositories, the American Printing House for the Blind, Bookshare, Learning Ally (formerly known as RFB&D) and the National Library Service for the Blind and Print Handicapped and AccessText Network. (BH) . There are also state or system oriented repositories.

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American Printing House for the Blind

[Best contributed by someone else, such as Tuck Tinsley.]

Bookshare

Bookshare has over 100,000 titles in its accessible library, which are available for free to students and institutions of higher education in the United State, funded by the Department of Education. While its primary focus is on K12 students, Bookshare also plays a significant role in higher education. It has a network of University Partners, schools that contribute the books that they scan to the Bookshare library under the Section 121 Chafee copyright exception. [This statement is subject to legal interpretation and would be best addressed in the documents to be provided by the Legal Task Force. BH. JRF: recommended deletion rejected. Worth noting that Bookshare has far more of these kinds of files than ATN. Happy to engage in these debates in the Commission and/or task force.] In addition, over 100 publishers voluntarily contribute their electronic content to Bookshare. A handful of publishers also delegate to Bookshare responsibility to fulfill disability services requests from colleges, such as Random House and X, Y and Z.

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Deleted: It has a network of University Partners, schools that contribute the books that they scan to the Bookshare library under the Section 121 Chafee copyright exception.

[More can be added after Betsy Beaumon addresses the Commission.]

Learning Ally

[Best contributed by someone else, such as Andrew Friedman.]

The National Library Service for the Blind and Print Handicapped

[Best contributed by someone else, such as Andrew Friedman.]

State-oriented repositories.

AMAC
ATPC
CAM

Clearinghouses

A number of groups operate national or state level clearinghouses. Unlike repositories, their main role is to act as referral networks to reduce the effort needed to obtain accessible content, generally directly from publishers.

Access Text Network

Access Text Network (ATN) leverages modern web technology to provide an online portal for college DSS offices and member publishers to communicate effectively. The application was developed with extensive input from publishers and disability service staff. ATN core services include: verification of eligibility of DSS applicants when registering for services; web-based portal for making and fulfilling requests online 24 hours/day; automated email notifications to track request process; online support log system for efficient communication between publishers and DSS members; secure FTP service for publishers to transfer files; secure file server to reduce duplicate effort by publishers; ONIX data processing to maintain current publisher title data; research to verify and add DSS submitted titles to database when not in ONIX; QuickBase account and user management for publishers and DSS offices; new publisher training and support; new DSS office training and support, and training videos and documents current with application updates.

ATN is developing the Textbook File Finder application is to simplify the discovery of text materials in accessible formats. This service is intended to benefit students with print-related disabilities and disability service providers. Users will be able to search multiple sources of accessible materials by ISBN or title and author. The results will be aggregated and presented to the user in an easy to understand format. Initial search partners include the AccessText Network, Publishers, CourseSmart, Bookshare, High Tech AMX and WorldCat (a library search service). Other sources, including accessible titles available for purchase directly from publishers, will be added as they become available. The search will be free to use and will not require registration. (BH)

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Born Digital Repositories

The Technology Task Force also discussed repositories that focus on "born digital" content. Unlike the preceding repositories, which focus on hosting accessible versions of traditional printed materials, these repositories specialize in material that is primarily intended to be used in a digital form.

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The first group of repositories are for content that is delivered under an open content license such as Creative Commons. These materials are freely redistributable. This group includes: [Unsure why these companies are being categorized as "repositories." They are commercial distributors of accessible materials that will be very happy to have their titles included in a federated search; good for the buyer and good for them.VitalSource and Café Scribe are also digital distributors.] (BH)

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1. Merlot

2. Community College Consortium for Open Educational Resources (*CCCOER*)
3. Flat World Knowledge, a for-profit publisher of open textbooks for post-secondary students.
4. The MIT Open Courseware Initiative
5. CMU Open Learning Initiative
6. Webcast.berkeley [?]
7. Mention the India guys (Which ones?)

The second group of repositories focus on proprietary content, targeted either at most schools or a specific school. These include

1. Coursesmart
2. Ebrary.
3. U of Phoenix proprietary content
4. Others?

Existing approaches to improving content search.

The main existing approach today in the accessibility field is to try to add information about additional content to an existing organization's catalog. These include:
[Editing suggestion: thinking 1, maybe 2 sentences on each of these]] [The Commission needs to do some serious research to find out the cost of creating and maintaining the integrity and infrastructure for the metadata elements.] (BH)

1. The Library of Congress Union Catalog.
2. LibLouis (K-12 focus)
3. PIRG-recommended site [research]

Mainstream approaches

4. Accessibility issues around mainstream catalogs: Lexis/Nexis. Library search systems.
5. WorldCat
6. Google Book Search
7. Amazon, Barnes and Noble
8. BISG and Editeur/DAISY work [GeorgeK research], MARC records

Points of consensus

Avoid a centralized repository ala NIMAC

There was clear consensus that recreating or adapting the K12 NIMAC repository approach was not the best approach for post-secondary needs.

Support multiple sources of content

Instead of a centralized central repository, the Technology Task Force felt that the wide range of needs of students with disabilities would be best supported by explicitly supporting a wide variety of options and suppliers to meet those needs. [Jim F, in response to a comment by Holly

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A] To the greatest extent practical, students with disabilities should be purchasing universally accessible materials ["Universally accessible" needs to be carefully defined and expectations need to be tempered. It will be quite some time before the majority of materials will meet this criteria.] (BH) through the same channels as non-disabled students. But, there remains a strong need for DSS offices and accessible media producers to play a role: it should also be easy for a blind student to find hardcopy Braille versions of the work they require if that's their preferred format.

Reduce duplicative work, ease sharing of accessible content

When it's necessary for stakeholders to augment inaccessible content with accessibility augmentations, it should be possible to share this augmented work with other stakeholders to avoid the costly need to duplicate the accessibility work. This might include such additions as tactile graphics, image descriptions, captioning and descriptive video. These kinds of activities should take place under simple licensing agreements with the content owners that would provide for the sharing of derivative works made from their content, (BH) in addition to activities permitted under the copyright exception (JRF addition to BH edit, can't keep forgetting about Section 121…).

Do provide for Federated Search

There was agreement that federated search is a core requirement to make support of multiple sources of content practical. Just like a centralized repository is not the right answer for this problem, trying to build a single centralized catalog has similar problems. Instead, the different sources of content should support ease of searching their through typical internet search capabilities, where a single search goes to multiple places to find out what's available. Much as a user today who uses a search engine to look for a print book is often offered five places to purchase it online (Amazon, Barnes & Noble, Alibris, the publisher's website, etc.), a stakeholder searching for an accessible book should also be presented with the list of available accessible options. This should be the sum total of what's being offered through commercial websites like Amazon as well as education focused websites such as CourseSmart, as well as specialty providers such as Access Text Network, the American Printing House for the Blind, Bookshare, Learning Ally, the National Library Service and others.

Federated Search Metadata Standards

The Technology Task Force agreed that we should have minimum metadata standards that make finding/buying accessible materials easier, based on existing metadata standards used in the publishing industry and/or library field, for entities serving the higher education field.

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Accessibility of Library and similar interfaces

The Technology Task Force also agreed on the need to make all library/federated search/repository interfaces accessible and usable (i.e. responsive to users in terms of performance).

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Points of tension

It's not clear we have points of tension at this point in time around the repository recommendation from the Technology Task Force.

(narrative plus a bulleted list)

Recommendations

Guiding Functional Requirements

The Technology Task Force recommends that legislation mandates that instructional materials should be findable so that a user with a print disability the opportunity to acquire the same information, engage in the same transactions and enjoy the same services as the user without a disability, and with a substantially equivalent ease of use.

A Federated Search solution

The Technology Task Force recommends the establishment [~~and funding of the AccessText Network~~ to (BH) JRF: edit not accepted, haven't heard this as a consensus position in the task force] of a federated search entity that enables individual students and DSS offices to search a single online resource to find all accessible materials from all sources.

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Improved sharing of accessibility enhancements

The Technology Task Force recommends that sharing of accessibility-enhanced instructional material files be permitted directly among and between organizations producing these accessible materials – including existing and future authorized entities and institutions of postsecondary education – so long as such sharing complies with all laws, regulations, and requirements, then in place, to protect all rights of the copyright holders. [~~It should be clear that all such sharing would be under licensing arrangements with the content owners/copyright holders.~~] (BH) [Edit not accepted, same issue around Chafee]

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Accessibility Metadata standards

The Technology Task Force recommends the establishment of accessibility metadata standards (and require support for them[By whom?] (BH)) to make the discovery of accessible materials easier. At a minimum, these standards should include:

- Title and Author data
- ISBN
- Accessibility metadata on the format, so that the user can distinguish among Braille hardcopy, digital Braille files, human narrated audio, large print, digital text (such as DAISY, EPUB) [Who is going to create and keep up the metadata on multiple available formats and at what cost?] (BH)
- Purchase, free or membership access
- Geographic limitations, if any
- Other options that can be considered as part of a minimum or optional set:
    - Keywords
    - Subject/category
- [I recognize there is some competition here but doesn't it make sense to work this out with AccessText? They already have some of this information and proven expertise. Starting anew would necessitate duplication and additional work for any new entity and for publishers who have already developed the databases for use by ATN to provide more than 90% of textbooks sold. Also, EDItEUR, an international data standards body for the book industry, is currently spearheading an accessibility metadata initiative. (BH)
- [JRF response: doesn't it make more sense to work this out with Bookshare and Learning Ally? They already have far more information and proven expertise. ATN seems to be starting anew, duplicating work that has already been done by other, more experienced parties. For example, Bookshare already has 40 different technology groups accessing our library database through a technology API that demonstrates how federated search could work for the best possible user experience. We're glad that ATN is interested in taking advantage of this capability. But, the terms under which ATN operates are inconsistent with Bookshare's mission, the provisions of Section 121 and our existing federal funding to deliver accessible materials to students, not least because of its commitment to a publisher veto over accessibility.

  The 90% number repeatedly cited is misleading, 1300 files does not equal 90% of the 400,000 books AAP cites being used in higher education. ATN as a valuable member of the ecosystem of accessible materials is something easy to agree to and incorporate. But, the constant positioning of ATN as THE solution, and constant assertion that publishers should always have control over whether students get accessible materials, is going to get constant resistance…]

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Required Characteristics of Federated Search

[Do we have more extensive recommendations here?]

(narrative plus a bulleted list)

Remaining Challenges

The Technology Task Force still has additional work to do beyond the work covered in this initial report. Here are the remaining items for exploration as of May 15, 2011.

- The pilot project questions from the legislation, Section 773
  - We need to identify these issues (more research/action required).
- Definition of instructional materials (make sure this is tackled elsewhere. If not, get started on it here, making sure we mention born digital materials). [This is key to the whole Commission Report and once it is written and agreed to then all of the text of all of the Task Forces should be written with the final definition in mind.] (BH) Serious consideration should be given to tying this work to the World Intellectual Property Organization (WIPO)-funded Enabling Technologies Framework, now available at http://editeur.org/109/Enabling-Technologies-Framework/. (BH)
- Need to review the legislation to see if we've missed tech-relevant issues (more research/action required).
- Need to review our recommendations to see if we got too book-specific and left out key other media (videos, simulations, online content, etc.)
- Recommendations for STEM access (more than MathML, we should assume?)
  Establish a definition of what constitutes accessibility that would include both a performance standard (same information, same transactions, substantially equivalent ease of use to the extent that it is currently technically feasible) and a minimum technical standard that would go a bit beyond the current recommendations of Taskforce 2 to include Math ML and an additional requirement that nondecorative graphics have a description that includes the graphic's purpose and a long description of the information contained in the graphic. (from Riccobono: question is whether what we have above matches this?) [The W3C concluded there should be standards when they created WCAG 2.0 Content Accessibility Guidelines. These are the worldwide standards. Why not use them?] (BH)
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