# EPUB Accessibility 101 Webinar Transcript

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<https://daisy.org/news-events/articles/epub-accessibility-101-w/>

- [Richard] Hello everyone, and a very warm welcome to this DAISY Consortium Webinar EPUB Accessibility 101. Okay, let's get started. My name is Richard Orme, my pronouns are he, him and his and I'm proud to be one of the team at the DAISY Consortium, and I'm your host for today's session which is for anyone interested in what happens under the hood of an EPUB publication to support accessibility.  
Now, maybe you're a regular consumer of some of the hundreds of thousands of eBooks available for retail and in academic and public libraries, or you could be relatively new to the format and just getting started. Perhaps you create EPUB content yourself, or commission it from a third-party vendor. Whatever your role and experience, this session will provide you with an understanding of what happens inside EPUB to support accessibility and provide you with a list of resources should you wish to dig even deeper. Now we're fortunate to have two wonderful experts who are perfectly placed to demystify EPUB Accessibility and answer your questions. So I'll ask our panel members to please introduce themselves.

- [Rachel] Hi, my name is Rachel Comerford, my pronouns are she, her, hers. I am the Senior Director of Accessibility Outreach and Communications for Macmillan Learning.

- [Tzviya] I'm Tzviya Siegman, my pronouns are she, her, hers, I'm with Wiley. I am the Information Standards Principal at Wiley, and I do a lot of work with the World Wide Web Consortium on EPUB Standards. I'll offer a bit of an overview of what we're talking about today. We're gonna give a little tour of EPUB starting with the basic structure of the EPUB talking about what the HTML inside EPUB looks like, and then talk a little bit about how you can give a little bit more meaning to the HTML with DPUB-ARIA and epub:type. We'll talk about how to navigate an EPUB and how you can give a little bit information about your EPUB with metadata.

- [Rachel] All right, thank you so much Tzviya. So we're gonna launch into just a quick overview of what is actually included in an EPUB. If you read the next slide quick EPUB overview, you can see that it is basically acronym soup the contents of an EPUB can appear to be kind of intimidating. The first time that I looked under the hood of an EPUB I had no idea what these elements were. I saw the Mimetype which is a file the META-INF, which is a folder that contains the container.xml, and then there was this folder usually called OEBPS or OPS which is the actual content folder. And that had an OPF, HTML, CSS and Images. So as I said, acronym soup, it's an intimidating bunch of terms. So what we've done is just broken them down into their basic meanings. The Mimetype, all this does is it tells the reading system what you've just opened as an EPUB. So it gives the reading system an idea of how it's supposed to interact with the file, In this case, the reading system is iBooks, RedShelf, VitalSource, any place where you open up your EPUB. The META-INF, this is just a file that points to the package file of the EPUB, so the reading system can find it. Basically, just says to the reading system, hey, this is where you can find the contents of the EPUB. And then finally, the Content Folder, this is the actual stuff that you're reading and you're seeing, right? So, there's a package file in there, but more importantly, there's the HTML and the CSS, HTML being like the basic code that gives you all the written content the CSS being the design and I'll tell you a little bit more about that in a second. And then of course, any images, any audio files, any videos, all of that content that's being put into your eBook. The CSS is also known as the Cascading Style Sheet. And this basically, just tells you how the book is gonna look, how big headings are, if there's space between the lines and how much space which buttons are being used. On the right hand side of this slide, there's a excerpt of a code from a CSS, from a book that I worked on. There's a lot of text here. So just to look at line 350, you'll see that there's an h1, subtitle and this defines what that subtitle what the h1 subtitle is gonna look like. So, there's extra large font that's centre aligned. It has a bold weight and the bottom margin is 4em's. We have another type of h1 here which is the contents, and that one has a medium font size. It's also centre aligned, the font style is italic and the font weight is bold. So you can make definitions for these different elements in your text and then you take that element and you use it in your HTML to say this is how I want this h1 for the contents to look, and this is how I want this h1 for the subtitle to look. So I will pass it to Tzviya, to give a little bit more information on what the HTML in the document is.

- [Tzviya] Exceptional, so let's talk a little bit about HTML, HTML HyperText Markup Language is the way that we convey text on the web and also in eBooks. The text of our publications is written in HTML, actually XHTML, Extensible HyperText Markup Language. All HTML tags have native semantics that convey meaning that might sound a little confusing. That means that not only do we have a visual display, but there's also something that conveys meaning to machines such as screen readers, keyboards, and other tools that people are using to read their books. So for example, this is the way that you would mark up unordered list such as a bullet list. We have those tags that say unmarked list, list item Rachel, list item Tzviya, and then we close the list. So this is the list of speakers for today. This conveys visually and non-visually that these contests are a list. So if we were doing this for just visual rendering, this would be displayed on a browser or an EPUB reading system as a bullet list. But what this also enables, is for somebody who's using assistive technology to have this read aloud in exactly the way that I just did it. And say unordered list, list item Rachel, list item Tzviya. And some tools will allow you to do things like display all of the lists in a book or a document object model, is what we say is generated by the HTML, each HTML document has that thing called the DOM which you may have heard of, the Document Object Model. And all of things in a given DOM can be searched in a variety of ways. And what's really important to know is that, all this information needs to be conveyed for both visual users and non-visual users. And we are often accustomed to just looking at what's visual and a lot of people who create HTML don't necessarily recognise that all of this matters. So why does it matter, every HTML element has a very specific meaning. So, Rachel gave the example of the h1s in the CSS and how different h1 can have different visual displays. It's important for us to know that an h1 is a heading and we may be tempted to just use let's say bold large font for a heading, but that will only convey the meaning to a cited reader. If we are trying to convey the meaning to all readers, then we need to tag that as an h1 so that when we're navigating with just let's say a keyboard, we can jump to the all the h1 in the book in a machine usable way and we can tag all our paragraphs as paragraphs. And using the correct element for your content, is actually the thing that probably makes your books more accessible than anything else you'll learn today. And this brings us straight into the next section which is DPUB-ARIA and epub:type. So ARIA, Accessible Rich Internet Applications is a language that was created to provide more meaning to HTML as well as any other language which it's applied. Sometimes content is a little bit more complex or nuanced than basic HTML elements such as div which is a kind of generic element that can be used for just about anything, or you may be provided HTML that's not as accessible as you want it to be, or perhaps you're working with JavaScript that doesn't necessarily have encoded HTML. This is a way of telling users what a component means. So for example, if you have a div but you wanted to act like an HTML button, you add the ARIA role button. So if you encoded div role equals button, it will act like an HTML button. We have a vocabulary DPUB-ARIA that's a specialised vocabulary for publishing and it roughly maps to some of the terms in the original EPUB type vocabulary that was created with EPUB 3 several years ago. DPUB meaning Digital Publishing, and it has several rows such as, which are all prefixed with the term doc as in document. So we have for example nav role equals doc-toc, and then you also add epub:type equals toc, T-O-C. That tells the systems that this is not just a regular navigation element, it should also be treated like a table of contents. And just a word of caution about epub:type, they're very helpful terms for publishers to use internally. The majority of the terms don't actually convey meaning for accessibility purposes or even for reading systems purposes. There are a handful of exceptions such as TOC, but for example the second example here section epub:type equals chapter role equals doc-chapter will convey information for accessibility using that role value, epub:type equals chapter is more useful for internal processing purposes. So you know that this HTML file is a chapter, but it doesn't actually have any accessibility meaning except for that role equals doc-chapter. And now I will pass this back to Rachel.

- [Rachel] Hi, so Tzviya mentioned that navigation role for a TOC, and what we're gonna talk about now is how to navigate an EPUB. There is a required document that's within the EPUB package which is called the nav document. This is really specialised HTML, and basically, it's used by any of your reading systems to generate the table of contents that a reader actually sees. It can also be viewed directly, but this is what the reading systems are using in order to generate that information. The navigation document has only one required navigation element and that is the table of contents. But there are several different types of navigation that can be included. Most commonly what you'll see are navigation by landmarks and the page list especially if there is a print equivalent to the digital book that you're looking at. These are all structured as ordered lists, and they're depending on the reading system that you're using, some may be available for navigation, and some may not. So what you put into the EPUB isn't necessarily everything that your user is going to see, but the more variety that you can provide to users, the more options they have for actually navigating the text. If you're an editor of an eBook and you're looking for ways to make changes within the content, you can find your way around the EPUB by thinking like a reading system. So you are going to look for that navigation document which is going to be inside the OPF. You're gonna open it up, and you're gonna look for the different chapter titles. And those chapter titles will usually be the chapter name dot XHTML, might be a slightly different naming convention depending on who created the file but it should say something like chapter two disability and the teaching of writing dot XHTML. And then that will be your link to the XHTML file so that you can start editing. If you're a user and you're trying to navigate around an ebook, the most common form of navigation are the table of contents and the headings. So we use the table of contents as an echo of the print book experience that we're all familiar with, headings tend to go to a lower level than the table of contents. So you have not just the name of the chapter, but also all of the subheads within the chapter that you can navigate in order to find the specific information that you're looking for, a little bit less common when you're looking in a fictional narrative, much more common when you're thinking about reference books or textbooks. We have some some less common forms of navigation links being one of them. And again, the link navigation might be created for the navigation file, but it doesn't necessarily mean that it's gonna be available in the reading system, that's gonna depend on how the reading system displays the information. But these links can be used internally, so you can say link to specific pages. So going to the learning objectives for the beginning of a chapter. They can also be external links. So pointing to the DAISY Consortium website or pointing to an accessibility resource. Using those links for navigation is kind of a quick way of hopping around and finding relevant information when you're looking through say reference material. And so, it can be pretty useful for readers as they're navigating through. The page numbers additionally, they're like a way finding tool for the pages of the text. So these tend to be a mirror of the print pages in the textbook. So if you search for page 13 in your ebook, you will come across the same content as page 13 that's in the print book. This is great for students, because if some of the students in the class are using a print book for navigation and other students are using the ebook, they're having exactly the same experience if an instructor says, "I'd like for you to read pages 23 to 89." It's a long assignment. I hope nobody is assigning that many pages of a textbook at once. So we include the page list in the TOC, we do this by including the epub:type of page list and Tzviya went over before what the epub:type is, then we set up an ordered list. So we can say, this file from starting at this page is equivalent to the print page number. Some digital-only contents also will have page numbers, because page numbers have traditionally been used in publishing as a wayfinding tool. It is helpful sometimes for users to be able to see that experience on their digital environment as well. It is possible that that will change over time as we have more digital natives entering the system, and we have more and more digital only projects that are going into formats like EPUB. But these are helpful reference points for readers. You can also label page breaks in content so that you can say, this is where a page is starting or ending. We've included some sample code here which is that the the doc page break identifies the ID of page 24, and then of course there is the aria-label letting you know that this is 24. So that kind of brings us into EPUB metadata. I consider myself to be a little bit of a metadata nerd, and probably could have included a lot more information in this section, but what I'd like to do is to just give you overview of what kind of metadata you find within your ebook, and what metadata is going to be the most helpful for you in terms of finding out about the accessibility of a product. So, you find the metadata in the OPF file, and it's there in order to provide information about the accessibility features and the limitations of the EPUB. Now there's a huge number of properties that you can include within your accessibility metadata and I've included some examples in the screenshot that's on this page, they include things like access mode, which is how our user can access the information. So in this case, textual and visual are there. There's accessibility features. So things that the publisher has added into the book in order to make it more accessible, this includes things like structural navigation, which we just talked about. But also providing MathML to make sure that the math is usable by screen readers, alternative text for images, long descriptions for complex images. It has section for accessibility API. So if you are using ARIA, you can include that information for accessibility control, which means that if you're using, if you're trying to read the ebook and you are a keyboard-only user or mouse-only user or any other alternative, then you can identify these usages. And then of course hazards. So, is there flashing that could cause a seizure? Is there sound or motion simulation that might make somebody feel physically ill? You can identify these in advance, and this way when it's exposed to the reader you get a little bit of information about why you should or should not use this version of the textbook. Exposure of accessibility metadata is fairly limited right now. I know of two reading systems that have worked to make sure that this is exposed in their catalogues, one is RedShelf and the other is VitalSource. The idea here is that, as users get more and more familiar with this information, they can make smart decisions about what type of book they need for their course, or what type of book they would like to read in their free time. There is another piece of accessibility metadata that I think is particularly important. On the previous slide, we just had a very short accessibility summary. This publication conforms to WCAG 2.0 AA, but there is an opportunity with accessibility summary to give a really significant amount of information to your users, this is a plain text summary, so there's no specific language that has to be used unlike the other ones. And this can be completely non-technical, it's meant to be human readable, it's meant for you to for anybody to be able to read it and understand how accessible the book is, and how it will work or not work for them. I included an accessibility summary that we've used in some of our textbooks as an example. This is the accessibility summary that has been going into the vast majority of our global certified accessible eBooks, and has gotten really positive responses from users for the information that it provides. So this publication meets the EPUB Accessibility requirements and it also meets the Web Content Accessibility guidelines at double AA level. So we included both of these because there is an EPUB Accessibility specification which I believe Tzviya will go over during the additional resources, as well as WCAG the Web Content Accessibility Guidelines which I think we're all familiar with. It's screen-reader friendly and is accessible to persons with disabilities. So right off the bat, letting people know that we've tested this against JAWS, NVDA, Voice-over, the biggest screen readers that are on the market and this has been found to be accessible to screen reader users. The publication was designed to be as accessible as possible to all persons with disabilities. If we tried to list all of the potential assistive technologies and all the potential disabilities that could be impacted by the reading environment, it would be much, much longer summary, so we're trying to give as much information as possible in this brief statement as possible. So basically, we did our best to make this accessible to any user. It is compatible with a wide range of Assistive Technology on the market today. As I said, this is to demonstrate that we did testing with different types of Assistive Technology. Extensive navigation is provided to make it easy to use via table of contents and page numbers. So this goes back to the navigation conversation that we were having before that we've made sure that there are easy navigation methods throughout the book. And then all non-decorative images have alt text or captions or described in the surrounding text. So we work in textbooks, which means that there is a large number of images that's included within any given page. Often, those images are described very well within the actual text around it. And so, putting alt text on those images would be redundant for the user. We wanna make sure that we clarify that we're providing alt text for any images that actually need the alt text and that are not already described in a different environment. And then finally, the additional summary elements. So these are other things that could be possibly included within your summary that will make it a little bit clearer depending on the subject matter that you have. Again textbooks, I'm constantly thinking about math and chemistry. So you can consider including something like math was created with and is represented by MathML, because we know that MathML is an Assistive Technology-friendly format. For chemistry, the same there is a language called ChemML, it's not widely used and it's not widely supported. And so generally, we tell people that we are using MathML to represent math and chemistry. In the original summary, it was mentioned that we have alt text for any images that need it. In some cases, when you have particularly complex images, when you have graphs that have a lot of data in them, it's necessary to include a long description or an extended description as well. And so it's helpful for to note in that summary that the long descriptions are also present. And the goal here again, is just to get as much information to the user about how accessible the file is in the simplest language possible. So letting you know what we've done, or in some cases what we haven't done and how students, or users or readers or customers might be able to use that product. So I will hand it off to Tzviya, to talk about some of the resources for accessible EPUBs.

- [Tzviya] Thank you, so this is by no means an exhaustive list, and I'm sure I've left out some valuable tools but we put together a few items here. The first is the DAISY Accessible Publishing Knowledge Base, which breaks down the common elements in an EPUB and tells you how to make them accessible. It's my go-to whenever I have a question about EPUB and it includes metadata. There's a course on lynda.com for how to make accessible EPUBs using InDesign by my good friend Laura Brady, it's really a must use if you're creating EPUBs from InDesign. There are two emerging draughts of the EPUB specification. If you're familiar with EPUB, you know that we release it on a regular basis release updates, EPUB 3.3. Is not much of a change to what you're familiar with if you're creating valid EPUBs now, according to the EPUB 3.0 or 3.2 specification, you'll still have a valid EPUB 3.3. A lot of what's happening in eve EPUB 3.3 is maintenance and language clarification, but I encourage you to take a look you can see the change log at the end of the document. And EPUB Accessibility 1.1 is an update to EPUB Accessibility 1.0. There's some update to the metadata section and some information about how to be compatible with WCAG in your EPUB files. And if you confirm with that, then really you'll be confirming with everything we've spoken about today. BISG, the Book Industry Study Group which is an organisation that caters primarily to publishers in the United States, but the information is valuable everywhere has a guide to accessibility. It's a relatively old document, but a lot of the information isn't still valuable today. The DEPUB-ARIA specification that I alluded to before has all of the roles listed and information about how to use them, and I would be remiss if I didn't mention the document called Aria Authoring Practises. It does not include the DPUB-ARIA rule specifically, but this is a document that you should go to if you're going to be using ARIA at all. It doesn't walk through the actual specifications of what the meaning of each ARIA role is, but it has a set of design principles how to use ARIA appropriately, because one of the things that we should all be aware of if we're using ARIA is, that it's possible to override the information that's in HTML because that's really what it's designed to do. So we have to use it with caution, so it's very important to take a look at this document, read through in particular the rules of ARIA that it starts with. And then if you're trying to design something like a checklist, there are actually design principles in the document and it can teach you how to design those things in an accessible way. And with that, I think we are open to questions.

- [Richard] Thank you so much Tzviya and Rachel. I'll just add, thank you for that list of resources there Tzviya. As I mentioned in the introduction, the slide deck will be posted on our website and we'll also be extracting the list of those resources and making them available as links on the associated article page too. So the first question I have here Rachel, is for you and it's from Hans, and Hans asked, "We saw an example of the accessibility summary there and you kindly took us through it. How detailed should the accessibility summary be and what's kinda best practise in this area?" Are there maybe some examples and things that people can take a look at?

- [Rachel] So there was a best practises document that the DAISY Consortium, Benetech and other stakeholders were working on. I'm not sure that that has reached completion yet, but I will look into it and ask Richard to follow up for me. For us when we're using the accessibility summary, our goal is to provide as much information about who can use it, how they can use it, and where they can use it. So sometimes that means that we're providing just a couple of lines of information, but for most books it's going to be probably six or seven sentences that breaks down, that it was tested with Assistive Technology or not, that it includes accessibility features like alt text, like MathML and that it's interoperable with different assistive technology.

- [Richard] Great, thank you. And I think you also mentioned that, you can talk about accessibility that you haven't managed to include or hazards in that description as well. Would that be good practise, or would you rely on the metadata flags for that?

- [Rachel] I would definitely include that information. I'd say that because this is the human readable summary, because this is far more accessible to anybody that's using the book, it is really important to raise those alerts very early. So to say if there is a flashing hazard, to say if there is a motion hazard, to say if there's different sounds that are gonna pop up in the book, those are all very important.

- [Richard] Great, thank you Rachel for that answer, and thank you Hans for the question. The next question is to you Tzviya. You mentioned EPUB 3, 3.2, 3.3 and we even see EPUB 2 out there as well. Are there differences in terms of the accessibility affordances from these different versions that people should know about?

- [Tzviya] Great question. I will say first of all, that EPUB 3 has been around for 10 years now. One of the main reasons we began EPUB 3 was to introduce accessibility into eBooks. One of the biggest differences between EPUB 3 and EPUB 2 is the accessibility that it offers if you build it according to the specification. So the differences between EPUB 3 and EPUB 2 are primarily in the accessibility and also the ability to include some multimedia. So between EPUB 3 and EPUB 2, yes, the biggest difference is native accessibility. The differences between EPUB 3, EPUB 3.2 and EPUB 3.3 are primarily in some specification maintenance. I skipped EPUB 3.1 for those of you listening carefully, because a lot of that specification was kinda redacted I'll say. (Tzviya laughs) If you want a little bit more of the political intrigue, contact me offline. But there's very little that changed between 3.0, 3.2 and 3.3. The biggest change was really in what we call satellite specifications and introducing the EPUB Accessibility Metadata, which is not part of the main specification, it's in a standalone specification which is called EPUB Accessibility. So the accessibility affordances have been there since EPUB 3.0 and then we added the metadata in a standalone document.

- [Richard] And I think it's related to accessibility. So maybe it's a valid follow-up question. We still see EPUB 2 as an option for exporting from certain kind of publishing tools and conversion tools and so on. Is there a reason why people would be sticking with EPUB 2 or really should we just be switching over to EPUB 3 and that's just the default?

- [Tzviya] We should really be switching over to EPUB 3. I would have to do a little bit of digging for it, but there was an article at least two years ago at this point about, there's a misconception that some reading systems don't support EPUB 3. And to the best of my knowledge, every reading system supports it now. I will have to find that article, but I do not know of a reading system now that does not support EPUB 3. So if you're still creating EPUB 2 it's time for a change. I have not looked at an EPUB 2 file in many years, but the last time I looked at one I just got frustrated. It's really more complicated to create EPUB 2 than it is to create an EPUB 3. EPUB 3 relies on HTML for a lot of things like the navigation, the way that we navigate in an EPUB 2 is just messier the the old NCX file was really hard to work with, and I personally find EPUB 3 a lot easier. It might be a bit of a hurdle to clear to make the change, but once you get past that it's a lot easier to work with.

- [Richard] Great and thank you. And if we find the link to that article, we can post that also on our website, thank you for that. The next question Rachel is for you. And Eileen asks, "So, JAWS and NVDA, are these the tools that you would do your testing for Assistive Technology compatibility?"

- [Rachel] If I wanna do manual testing on my eBooks, then we will we use JAWS, NVDA, Voiceover, Kurzweil and Read&Write Gold. We also do some text testing with ZoomText. However, when I'm testing an EPUB, my first step is always to run it through EPUB check which is a free and open checker for EPUB quality to make sure that it works well. And then also through ACE which is a DAISY build or a DAISY product which is also free and open and allows you to test the accessibility of an EPUB. So those are my first steps to running through those systems and make sure that we're not getting back any errors.

- [Richard] Thank you for that. Well, let me turn and build on that question to Tzviya. I think we heard quite a lot from both you and Rachel. You were talking about screen reader kinda benefits. But what other kind of accessibility benefits from this come from using an accessible EPUB format for group, or individuals who maybe aren't using a screen reader as their Assistive Technology?

- [Tzviya] Great question. I like to talk about accessibility as enhanced usability. My experiences with accessibility are that, it ultimately benefits every user. But I'll talk first about specific disabilities. We have users especially in the education market with cognitive disabilities, think about learning disabilities, cognitive disabilities. students with dyslexia. That's the request we get most often and this sort of creating books that are accessible helps all of those students. So the ability even just to, excuse me. The ability just to adjust the font size helps those students and really helps me with my vision getting worse and worse every year. We also have students not just students, I widely publishes all sorts of books. We also have to think about people, not just we often think about blindness as one disability that we have to cater towards, there are all sorts of vision disorders, people with low vision, so that would often involve using ZoomText or Zoom functionality, we test by zooming up to 400% usually. There are people in the deaf community, so we try to accommodate people who have hearing issues or poor hearing not just complete deafness. And then there are also mobility issues. Let's say, somebody has broken their arm, it's not just somebody who has a permanent disability it can be a temporary disability as well. And one of the things that we also like to talk about is situational disabilities. And this really is actually fairly common in students on college, campuses in particular. So a situational disability might be something along the lines of weak Wi-Fi. They're sitting outside the library and the Wi-Fi connection to the library is not fantastic. A lot of the things that we do for accessibility can help with that as well. Another situational disability might be a migraine. You can't necessarily process everything the way that you normally would when you have a migraine that would be similar to a cognitive disability. So there are all sorts of situations that we have to take into account when we're creating accessible files, and ultimately, it affects everybody.

- [Rachel] There's also just the general benefit to users. For example, the accessible book files make a text-to-speech function so much cleaner. I have a seven-year-old who loves to listen to books while he's reading, and it allowed him to learn how to read faster and understand the pronunciation of words better.

- [Richard] Great, thank you. Rachel, I think you covered the section on page navigation, so Sarah asked the question. And by the way, we're getting a great slew of questions through. So, please keep them coming, this is great. Sarah asked the question in the part about navigation and page lists, you actually had the page list hidden in the code there. Now if it's hidden, how can people use it for navigation?

- [Rachel] Well, if you put the navigation in the spine, you can basically see everything. So the hidden attribute allows you to include the page list for the reading system to use it to function, but it doesn't actually like clutter up the eBook itself. So instead of having like a page list navigation right underneath your table of contents that says just one, two, three, four, five, six of all the page numbers, instead the system can use it in order to find something, you can use a go-to page function in the reader which I don't think I've come across one that doesn't have one, and say you're going to page 10 and it knows from the navigation that you put into the spine where page 10 is. So you can include it, you can not hide it, but in general when you when you just have that like list of numbers there, it is an overwhelming user experience. It doesn't provide a huge amount of information to the user that's looking to navigate, whereas, the go-to page accesses that information, and in a much less overwhelming way.

- [Richard] And sticking with page numbers for just a little longer Rachel, so we don't just use page numbers to navigate to a page, they're still as you mentioned a very common way of including a page number in citations in references and so on. So, is that page number useful also when you're looking to kind of reference a part of a journal or a book or publication?

- [Rachel] Are you asking in terms of cross referencing within.

- [Richard] yeah. How do you know what page you're on basically? Is that page numbering useful there, or is it just for finding your way to a specific page?

- [Rachel] It is definitely helpful for figuring out where you are, you have a choice as somebody who's making an EPUB to either expose that information on the page visually, or to hide it on the page but to make it available to say screen reader users. Generally, it's an interesting experience in an EPUB when you have a page break that is visually identified. So if you have a block of text and then page 24 and then a block of text, it is sort of this clash of the print book experience and the digital book experience and I think that as eBook creators and as people who are trying to meet the needs of their audience, we're still trying to figure out what is the very best approach in that way. But cross references which I mentioned before which I think is a little off topic from what you were asking, those are incredibly helpful. And so if you are on page three or I should say, if you're on page 30 and it references a diagram that was on page 10, being able to link back to page 10 and link back to that diagram and bring back that information to the reader, that's really important.

- [Tzviya] I'll just add to this that many people have suggested that with the shift toward eBooks especially in the education world. We don't need page numbers anymore, this is something we've discussed a lot in the EPUB Working Group and some of us have experimented on in the real world, people really like page numbers when we've tried doing things like chapter 7, paragraph 32, people just hate it. It's confusing and so we've just created, we're working on an algorithm in the EPUB Working Group now to generate page numbers even when there is no print equivalent so that it's uniform across all reading systems.

- [Rachel] Yes that has been our... That has been our experience as well when we're building textbooks. If it is a digital-only experience, people ask for the page numbers and so we create kind of a faux page list even though there's not a print equivalent.

- [Tzviya] Yeah, we do that also and now we're trying to standardise that so that all publishers can do it the same way and all reading systems can process it in the same way.

- [Richard] That's really interesting. When I've done workshops with librarians and with lecturers and disability service officers, sometimes people say we're not so sure about EPUB because you don't know what page you're on. So I think we've heard from that slew of answers there that's actually not the case at all with EPUB so long as you include it in the EPUB itself. That's great, thank you. So the next question, maybe I'll come to you Tzviya and you can add to it Rachel if you can add to it. We've seen you both talking about lots of things to think about as you make sure your EPUB is as accessible to as many people as possible. But how much does this all cost? Is this all a very expensive thing to add on to a kinda a standard, a production workflow that maybe doesn't pay attention to this recognising you both work for commercial organisations that have a bottom line to consider. So, where does this feature in that kind of discussion and how expensive is this?

- [Tzviya] So it's a complicated question because obviously there's a cost and I'll break down the cost without providing numbers 'cause I can't really provide numbers. But keeping in mind that with the European Accessibility Act which is already a law, if you publish eBooks in Europe beginning in 2025 that are not accessible and the definition of accessible is coming soon, but let's just say that we'll assume it's something along the lines of WCAG 2 AA, you'll be fined if your content is not accessible if you sell it in Europe beginning in 2025. So we have merchant orders, we have to take into account the following things, the cost of production, the cost of remediation and the cost of fines. Just for books, if you're also working on platforms, you also have to take those things into account for your platforms. So in my experience and I assume that this is the case for Rachel as well, the cost of remediation is far more expensive than the cost of production. So what I've do, what I have been doing for the last several years is trying to roll in the cost of born accessible and slowly integrated into our workflow. It's a big lift and it may take a lot of convincing, but it's going to be a lot cheaper than remediating hundreds of files in 2025 and it's certainly going to be a lot cheaper than the cost of fines. So my recommendation is to start working on this now. You can start in sneaky ways that's what a lot of us have done, like integrating shifting toward semantic we correct HTML. That's a great place to start. Rachel, anything to add?

- [Rachel] I think that Tzviya really covered everything. What we tell our teams is that, it's more expensive to fix it later than it is to to build it the right way the first time. And what this comes down to is just providing customers with the best possible product. We wouldn't intentionally ignore a usability feature in an eBook and not including accessibility in that process is intentionally ignoring a usability feature in an eBook. So, there's certainly an investment on the business side, there's content that needs to be authored that was not authored before like alternative text, but the cost of authoring alternative text at the beginning of the project versus the cost of rebuilding an eBook because a customer is is unable to use it, I prefer the former to the letter.

- [Tzviya] I'll also just add one more thing. It's important to think about who you're not selling to when you don't make your books accessible.

- [Richard] I'm not sure I follow you.

- [Tzviya] So if your books are not accessible, certainly in the textbook world, you're losing adoptions. And in outside of the textbook world, you're probably losing customers too and you're certainly risking your reputation.

- [Richard] Great, of course. 'Cause we were talking about the the cost and of course there's an opportunity cost if you don't do it too, thank you for that. Rachel, this one's coming to you from Rajesh. Thank you Rajesh, Rajesh is wondering, how necessary it is to use that EPUB type, because, how many systems actually leverage it other than for footnote pop-ups?

- [Rachel] I am actually gonna default to Tzviya for this one. (Tzviya laughs)

- [Richard] Okay.

- [Tzviya] All right, so there are a handful of epub:type terms that are used by reading systems. Epub:type equals toc, any of the navigation ones. So that's TOC, page list, LOI, LOT, which is illustrations list of tables, footnote, endnote and I may be leaving one or two out. Other than that, I would say it's not absolutely necessary, I think that ACE by DAISY might flag them as recommendations but there might be someone here like Rachel who knows better than I do.

- [Rachel] I believe they are flagged as recommendations, but it is something that I would have to go back and double check. Sadly, my specification memorization is not complete. (Richard and Rachel laughs)

- [Richard] Okay, well, this links I think to Marianne's question who is saying, well, Marianne's got an EPUB 3, it's reflowable, they have epub:type for the table of contents, the cover, the body matter is all valid, all that kind of stuff. Without the ARIA roles, is their EPUB accessible, or ARIA roles on all the content chunks mandatory? And I didn't say who that was to, so potluck. Who would like to go for that?

- [Rachel] I think Tzviya and I are doing like a digital rock, paper, scissor right now. (laughs) I'm gonna default to Tzviya, but i will say, I don't believe it's necessary on all content chunks.

- [Tzviya] Agreed.

- [Rachel] It may be necessary on some though.

- [Tzviya] I agree.

- [Rachel] For me the general rule of ARIA is, if you can do it in HTML, then don't use ARIA.

- [Tzviya] And that is rule number one of ARIA: Only use when necessary, that's exactly what that ARIA Authoring Practises says.

- [Richard] That's great, thank you. And our final question, again I don't know who to put this to. But we have the question from Presker which is that, so they've got an EPUB file, where's a good place to go and edit it afterwards you've given us some code snippets on the slides here. So you've got an EPUB file, where's a good place to go and edit it, is there an app or some other kind of tool that you might suggest for people to use as resources? Either have you got some suggestions there?

- [Rachel] Yeah, if you are looking for a fancier text editor, then you can use something like Sublime which I found is really nice. If you're looking for something that's quick and easy, a lot of computers have either TextWrangler BBEdit already installed on your computer. You don't need um anything fancy, it's just an HTML editor.

- [Richard] And can you open an EPUB right there, or are there tools that you use to kind of unpack and repack the EPUB?

- [Rachel] Yeah, there's a couple of, oh sorry.

- [Tzviya] I was gonna say, I think one thing we didn't mention is that, an EPUB is a glorified zip file. You can't just re-zip it in the regular way if you're looking for a tool that will allow you to edit without zipping, sorry without unzipping. There aren't a lot out there Oxygen, which is a costly XML editor will let you do that. I think Calibre still is out there or Calibre. I've heard it pronounced both ways. Does Sigil still exist Rachel?

- [Rachel] Yes, Sigil is still around.

- [Tzviya] Okay, so there are those as well.

- [Richard] Yep, great, thank you. Yeah, Sigil is my go-to tool and that's regularly updated too. And it supports EPUB 3 and two. So, covers all the bases. Okay, we're coming to the end of this session. Once again, thank you to Rachel and Tzviya for sharing such great information. Now before we close, I want to tell you about some other great sessions that we've got put together for you in the coming weeks. This webinar series is brought to you by the DAISY Consortium, a global nonprofit organisation. And our organisation and our members work on innovative and impactful projects to further our mission to develop global solutions for accessible publishing and reading.

And on October the 14th, we have a special webinar for the DAISY Information Sharing Day, where a series of presenters will update you on DAISY projects, also member activities from around the world, and accessible publishing developments. The topics are really diverse, so just register in the usual way and then you can drop into the segments of this webinar that interests you.

Then next up, we tackle the topic of Creating and Reading Accessible Math on October the 20th, followed by Validating and Conformance Checking of EPUB on November the 3rd.

And if you have ideas for other webinar topics in the area of accessible reading and publishing including any that you might contribute to, we'd love to hear from you. Well, that's it for this session, I hope that you'll join us again soon. In the meantime, thank you for your time, stay safe and well and have a great and wonderful rest of your day, goodbye.