# Reading Solutions, T-241 Days – webinar transcript

Full details about this webinar including links to related resources can be found on our website:

<https://daisy.org/news-events/articles/reading-solutions-t-241-w/>

Welcome everyone! My name is Richard Orme and I'm delighted to have you join us today for another webinar hosted by the DAISY consortium. As we count down the days until the European Accessibility Act coming into force, we're bringing you this series of webinars to help you prepare. And today we explore the topic of reading solutions. There are a vast range of options available to users when it comes to reading hardware and software, all offering unique benefits to readers unique, accessible features. And as we'll hear from our presenters, unique challenges, we're delighted to bring you an incredible panel of presenters. So it's my pleasure to introduce you to Terra Masiel from Amazon, Wendy Reid from Rakuten Kobo and Daniel Weck from EDR lab. I'm sure you'll have lots of questions, so do use the Q&A button in zoom to submit them. We'll cover as many as possible towards the end of this webinar.

Hey everyone! My name is Terra Masiel and I'm from Amazon. Here at Amazon, we distribute millions of Kindle eBooks through our Kindle store, and we develop both purpose built Kindle e-readers like the Kindle Paperwhite and Kindle Scribe, as well as free Kindle reading apps for iOS, Android, Fire tablet, PC and web. My role at Amazon as a product manager for accessibility, where I work with dozens of different teams across the company, primarily Kindle teams, to ensure that we are addressing the needs of our customers with disabilities and building accessible solutions that can improve the reading experience for everyone. For Kindle, we rely on our content creators to provide the eBooks that we distribute to customers. This includes big and small publishers, as well as millions of independent authors who publish their e-books through our Kindle Direct publishing tools. Because Kindle has its own proprietary e-book format, we don't directly render Epub or other e-book formats to our users, which means ebooks that publishers provide to us must first go through a conversion process to turn into a Kindle e-book to support our publishing partners in submitting accessible e-books. We communicate best practices such as organizing chapters and sections with a hierarchy of headings, creating well structured tables with captions and headers, ensuring all meaningful images have text alternatives. Adding self describing titles to links. Using MathML for mathematical content. Defining the language or languages used within the book, avoiding the use of images for text and tables, and so on. Converting documents to our Kindle eBooks format allows us to have more control over the way a book renders, and also allows us to provide some of the innovative accessibility features I'll discuss later. But it also means we need to take explicit actions to ensure we are retaining, through this conversion process, the rich accessibility support that the content creator has provided. To this end, we are in the process of making several updates to ensure we're maintaining the accessibility semantics of the books we ingest. For example, Kindle eBooks have historically not rendered MathML content. Instead, when books of MathML are submitted, the math is converted to an image with no alternative text. So screen reader users wouldn't even know if there was any math present on the page. The test case shown here for reading block and inline MathML from the Epub tests. Fundamental accessibility tests for non-visual reading would fail on our Kindle apps. Some of our publishers have understood this limitation and resort to creating unique versions of their ebooks just for Kindle, providing images of math with associated alt text. But this isn't an ideal solution. Not only is it more work for publishers to submit unique versions of ebooks just for Amazon, but alt text can't be navigated granularly via screen reader and tends to be insufficient for reading more complex math. I'm happy to say that we've begun expanding support for MathML in Kindle, starting with our Kindle for iOS app. Now, readers using the VoiceOver screen reader with their Kindle apps can identify and navigate within the MathML using the VoiceOver capabilities that readers are accustomed to on the web. More on Kindle Reading Solutions shortly.

Hi, I am Wendy Reed. I am the Accessibility and Publishing Standards lead at Ratchet and Kobo, where I am in charge of everything to do with accessibility for all of our web, mobile apps and hardware platforms, and some things relating to marketing and other external facing services. in addition to that, I am also one of the co-chairs of the Publishing Maintenance Working Group at 33 C, where we maintain the Epub three and audiobook standards. But today I'm gonna be talking about, reading systems and how we factor accessibility into the ingestion and display of, e-book content. So first, I wanted to talk a bit about, content that comes into Kobo, what we do with it, and some things that we would love to see from publishers in order to ensure that the content that we receive is as accessible and usable as possible. First, upon ingestion, all books that come into Kobo are, processed through epub check, which, allows us to validate the content and check for any major errors. In addition to that, we also, might have heard of the term keep up. keep up ify the books by adding some additional code to allow us to do very accurate reading, position calculation and annotations, positioning calculations. this doesn't change anything about the rendering of the books. It only provides some additional code so that the reading systems can provide the most accurate positioning possible, or user benefit. I spoke to our publisher operations team to get an idea of the things that they would like to see from the content that comes into our system, and they gave me a pretty, well-rounded list. Some of this may not sound like it's related to accessibility, but so much about how content renders and its availability and usability, impacts accessibility in the long run. So it all matters. The first thing that we asked for our publishers to do, if you're not doing it already, is to test your content, run your books through epub check, run your books through a spy DAISY run your books, on devices. before you send them out. it doesn't need to be using close apps or anything like that, but having your books checked against, different screen sizes, making sure that you have, you know, it looks good on a desktop. It looks good on a tablet. It looks good on a phone. this is going to be important for users as they interact with your content. We recommend that you design for flexibility. Make sure that the, you know, any formatting or design that you're putting into your books. As beautiful as it might look on your computer screen, is it going to look just as good on a, you know, iPhone mini? with the font size bumped up 20%? so many users adjust their font settings when they read books to make them more comfortable and usable for them. We don't want to lose, the usability of the book because that really strict formatting or formatting that doesn't take into account these differences. Another recommendation is actually to separate out the files in your book by the at the chapter level or section level. Smaller files actually help improve rendering speed, and most reading systems, especially, you know, lower fidelity or lower end systems. And it improves Navic ability because there's more in the, table of contents for users to navigate to. We also recommend you rightsize your images. What we often see is either images being really low quality, to preserve file size, or images being really, really high quality because the publishers have sent us their print originals. This is wonderful. We love to see your beautiful images, but especially when it comes to the files that are delivered as print originals, we don't need 600 dpi print ready, versions of the files. Well, we really need our high quality files, that are reasonably sized because the more images that are in your book, the larger the epub gets, the more difficult it is to download. And at a certain threshold, the file quality doesn't make much difference in the book. So please don't deliver us or print originals for books that have special characters or, may use, languages or that have unusual sketch or uncommon scripts. We recommend embedding fonts. This allows for ultimate render ability and ensuring that there's no characters that are missing in the book, which may create an interesting reading experience. should they not be supported? We also ask please don't use non Ascii characters in your file names. not Ascii characters or anything like non alphanumeric, characters. special characters. just don't use them. Keep your file names to letters, numbers, dashes. any time we run into a book that has these not Ascii characters in the file name, it tends to cause some pretty interesting problems. And sometimes those are not always predictable. And the last one is, If I'm sorry. Please. We don't, need epub 2 files any longer. Epub 3 is super well supported. It is really stable. please use Epub three. Please send us Epub three files. For reading solutions. talk a little bit about our platform. having reading solutions on multiple platforms for us is essential to meeting user needs and preferences. What we found is that a lot of users have different behaviors and use different platforms throughout the day, and this is for a variety of reasons. but we want to be there for the reader wherever they happen to be. So we have users that read on desktop during the day and then switch over to maybe their phone or dedicated evening device in the evenings. it all depends on their preferences, but you need to have those platforms there to meet those preferences.

Hello everyone. My name is Daniel Weck. I'm a software engineer and I work with the DAISY consortium and the European Digital Reading Lab or EDRLab. My field of expertise is digital publishing and accessible multimedia, and my professional journey includes contributions at the Region Foundation, as well as participating in standardization efforts led by the IDFP and the W3C, notably Smil, CSS and Epub. Over the years, I've been involved in several key areas of digital publishing, such as authoring tools, format converters, content validation. Accessibility evaluation, online distribution. But in this presentation, I will share my experience designing and implementing accessible reading systems. More specifically, I will talk about thorium, which is a free reading solution built with open source software created and maintained by EDRLab. Thorium is a cross-platform application for traditional desktop operating systems, windows, Mac and Linux. Here I use the term desktop to differentiate mobile hardware devices such as smartphones and tablets, which typically run Apple iOS and Google Android. From a developer's perspective, this technical classification is useful, but nowadays, from a user standpoint, the desktop versus mobile distinction is confusing because it does not reflect how we interact with modern technology to access information. For example, there are computers that have touchscreens. There are hybrid laptops that have detachable keyboards and offer a standalone tablet form factor. There are tablets that dock into keyboards, making them look and feel like traditional laptops. There are even smartphones that connect to external displays and switch to a desktop like environment. So although this introduces some design and usability challenges, this also provides creative opportunities to implement accessible user experiences.

As mentioned in the prior segment, Kindle doesn't simply render HTML content like some other reading systems. So when I talked about how we are now using voice overs capabilities to read and navigate math content on our Kindle apps, I should mention that this wasn't a straightforward process. To do this, we had to rely on our previously built custom layer of accessibility support, which is essentially a bridge between Kindle's native code and the operating system. In some cases, the APIs that support certain kinds of accessible navigation or functionality aren't available publicly, and we either have to find workarounds to make things functional from our end, or work directly with the owners of the assistive technology to develop solutions for customers based on the capabilities of the operating system and its associated assistive technology. Our Kindle e-book reading experience can vary across devices. For example, for iOS, we were able to expose the math content in our Kindle books and let VoiceOver handle the announcement and navigation. But on Android, for example, the talkback screen reader doesn't currently support MathML, so we have to get creative and look to other solutions for ensuring that MathML content can be made accessible within our Kindle app.

When it comes to accessibility, building for these platforms and these different, frameworks offers a lot of opportunities and a lot of challenges. Each platform has different considerations when it comes to accessibility. When it comes to platforms like iOS, Android, the web, there's a lot of existing APIs that we can make use of, a lot of existing interaction patterns and user preferences that are already there. users who use their phone all the time and use it on their phones, they have the they have ways they like to do things. We don't need to reinvent the wheel. We don't need to do something, revolutionary. we can just follow what they already prefer when it comes to the hardware side. it's a little more challenging because what we can do depends on our underlying software architecture. what tools are available out there for our underlying software architecture? And we're working in a smaller ecosystem. Oftentimes, as many of us are building reading solutions, we can look at other reading solutions for guidance or, you know, interesting ways they're doing things. it's a little harder on the hardware side. There are other places to look, but it does mean that, you know, it's a smaller group of people at a smaller, thing to compare against. And in some cases, there is no comparison to the experience.

From the very start of the project. One of three core objectives has been to meet the needs of users with diverse abilities and preferences by combining visual, auditory and touch experiences. Eyes, ears and fingers. For example, thorium allows users to override authored publishing styles by customizing color schemes, text spacing, font face, etc. users can disable animations to reduce the risk of motion sickness. The keyboard shortcuts are configurable. Thorium offers a text speech read aloud feature. We use sentence level and word level highlighting. Users can listen to prerecorded audiobooks, and there is support for books with synchronized text and audio. While reading or listening, users can choose to automatically skip footnotes, extended image descriptions, or page breaks. Users can follow links into the table of content or other authored navigation structures like page, list, and landmarks to jump across publication resources. In fact, the fine text feature can be used during a reading or listening activity, and users can navigate search results in a visual or non-visual manner. There are several examples of complex interactions, but one that stands out is bookmarking and annotating content, which requires switching context between publication documents where a text selection is made, and the application user interface where the notes are added and edited, all the while preserving the reading position.

When it comes to building reading systems, and making reading systems accessible. One of the things that I think more people should understand is that reading system accessibility is complex, and there's a lot of layers to it. So when we think about the reading system, we say system for a reason because it's made up of many parts. just think of kind of the average reading application. If you when you first open the application, you have this kind of application experience. It could be the library, it could be a browsing experience. You know, looking for your next read or looking through the books that you already have downloaded. You have that initial layer. Once you've found the book that you want to read and you go to open it, there's, a process that happens in the back end background that most users probably don't see. but that opening process is actually really important because, on the reading system side, we're looking at what type of book this is, what display properties does it have? What do we need to do to populate the reading experience to make it the best possible experience for users? And then that final layer, and this initially is the reading experience itself. The reading experience introduces even more complexity because there's layers within that too. When we look at the reading experience, the first thing you'll see is and think about is the book content, which is often rendered in a web view, and it contains the entirety of the book content, which already has a lot of complexity. You have to consider the different parts of the text, images, potentially interactive components, whether this book is fixed layout or resolvable on top of that, when you're in a reading experience, almost all users have some pretty significant expectations in terms of their control over the reading experience, which introduces the menu overlay. The menu overlay, which gives you options like reading settings, navigation, brightness, all of these things that you want to control within the reading experience that sits on top of the book content. And, you know, has to be interactive and usable, you know, through a number of different means. And then in addition to all of that is the surrounding content to an e-book. This is stuff like the table of contents, annotations, any, you know, maybe supplements to the book that are not part of the main book content. All of these things need to be accessible. All of these things need to be accessible to each other. We need to be able to carry information back and forth oftentimes. And the, we want to make sure the, user is always able to kind of move between these different layers seamlessly and without too much, difficulty. So when you're reading the book content, you want to open the menu. Can you easily open the menu? Can you navigate the menu, do what you need to do, and go right back to the book content without too much, fuss? This is a real challenge when you're trying to deal with assistive technologies and these different layers and applications. It's not impossible, but it just takes a lot of planning and consideration.

When developing our Kindle reading apps across different operating systems and device types, it's important to lean into patterns that are familiar to the user versus rigidly creating a consistent user interface for the app. For example, you might notice differences when comparing the user interface of the Kindle library context menus on iOS versus Android, and this is also how we approach building support for accessible MathML. That is, to create a more intuitive customer experience. We are letting the device level assistive technology handle the reading of math content, rather than building a custom Kindle solution that's identical across devices. It can also be faster and easier to leverage assistive technologies that are more within our control, which can result in unique features available on different devices. For example, for our fire tablets, we were able to collaborate with Amazon's Device Accessibility team to ensure that users of switch access on Fire tablets can use their switches to turn the pages of a Kindle book. We also provide an option for both Android and Fire tablet users to turn pages via the volume boot buttons on their device, something not possible for iOS at this time. Then again, sometimes the device type can make it more challenging to achieve the desired functionality. For example, while our voice, the screen reader available with fire tablets, includes a robust set of gestures that can be used to read Kindle e-books and navigate the app using voice view with our e-readers is a bit different. While fire tablets respond to two three, and even for finger voice view gestures, our e-readers only support two finger gestures today, so there is a more simplified set of actions that can be taken while navigating a Kindle eBook on an e-reader. We are continuing to look for ways to align and close the accessibility gaps that exist across our supported devices. But sometimes it also makes more sense to build a custom solution that's consistent across the different apps and devices we support. And this is how we approach developing the assistive reader. The text of speech based read aloud feature we launched for the Kindle apps earlier this year. Today, iOS, Android, and Fire tablets each offer their own text to speech options and of course, there are many third party tools that can be used across desktop and mobile web. We first considered leveraging these options in Kindle to address our many customer requests to support Read aloud. For example, Ios's text to speech tool called Speech Screen will read out loud the text and provide synchronized highlighting. It is designed to be app agnostic, providing a consistent experience across the device. However, we would need to do custom work in Kindle to support the synchronized highlighting portion of this feature, and we'd still be limited to what the Apple developers decided to build in the future. Knowing that Kindle books are a unique format and that longform reading is so personal, we didn't want to rely on a generic tool that might not meet all our customer's specific needs, either now or in the future, so we decided to leverage the same underlying text to speech engines, but build our own unique user interface for Kindle's read aloud feature, which currently includes optional synchronized word by word highlighting, speed controls, and rewind capabilities with room for future enhancements that can further improve readability. This creates a consistent user interface with controls in the same locations within our apps for all audio content, making it a more seamless experience for customers who enable the assistive reader for accessible access to their e-books, but who also choose to purchase audible audiobooks to consume content in that way. Since its launch earlier this year, we're excited to see so many readers making use of this feature and letting us know how it's transformed their reading habits.

Screen reader users depend on keyboard interaction, but there are many sighted users who simply prefer to navigate the graphical interface using keystrokes. Instead of operating a pointing device like a mouse or a trackpad. During development, we quickly realized that good keyboard support for sighted users does not automatically translate to good screen reader experience, because in order to perceive the information displayed on the screen, visually impaired users require a much finer keyboard control with simultaneous auditory feedback. The level of detail is not immediately apparent to the uninitiated. User interface designer or software engineer. In fact, sighted developers can learn how to use a screen reader, and this undoubtedly benefits the team. But it is clear that people with disabilities who actually rely on assistive technology must be actively involved during testing. They should, in fact, be central to the design and implementation phases of the project. Another lesson we learned is that the various screen readers available for different operating systems do not necessarily behave consistently, despite existing interoperability standards. An application feature which works with one screen reader may not work as well with another screen reader due to slightly different interpretations or sometimes just software bugs. There is also the potential issue of the application's keyboard shortcuts colliding with the screen readers own keystrokes, so it really is important to include expertise for all supporting supported screen readers.

When it comes to assistive technology. There's a lot of options out there and there's a lot of different assistive technologies. They're software based ones, they're hardware based ones. There are creative ways that people have come up with to make, their devices and applications work for them, and it's sometimes a bit overwhelming to think about all the different ways that people use tools. I cover we test with a wide variety of assistive technologies, but we put special focus right now on screen readers, keyboard and magnification. our goal here is to try and emphasize making essential functionality work before we start to optimize for very specific use cases. This is not to say that we don't think about more specific use cases or use cases outside of these, but just that we're focusing here, getting trying to get it right so that we can then put even more focus into the other areas going forward. And we really want to focus on things like braille displays, switch control, voice control, all of these kind of different methods of interaction. The other thing I want to say about assistive technology is that we have a strict no analytics approach for the technology. We don't track that usage in any of our products. even though people like to ask in a, in kind of modern product development, it's very common to want data. And data can be incredibly useful for making good product development decisions. But we have to be mindful about things like user privacy. And we've decided that AT is, as is, a pretty high risk for user privacy. And we don't want to infringe on privacy in any way. So we just don't track the usage of AT. We do other things instead, like user testing.

Now let's move on to another piece of the puzzle. The operating system. As previously mentioned, users can personalize text formatting in thorium, but users can also configure display preferences at the level of the OS burning system. There are differences between windows, Mac, and Linux in how dark and light modes are implemented. For example, whether the colors theme applies to all or only parts of the user interface. Additionally, windows supports individual high contrast styles, which thorium could in principle detect and apply to both the user interface and the publication. HTML documents. Now note that this is not currently super supported, but it is on our to do list. In thorium, these types of system specific features are challenging because the application is generally designed to look and feel identical across all platforms. In reality, special adaptations that enable deeper integration with operating systems can not only improve the user experience, but in some cases they can unlock accessibility related functionality. Besides color themes, OS level native services may include things like notifications, background audio playback, spell checking, dictionary text to speech, and many other things.

For Kindle, developing an accessible reading system has unique challenges that differ from developing an accessible web page or non reading focused mobile app. Sure, there are the obvious requirements to be met in the user interface or the e-book content itself. But there's also the fact that reading is very personal and something that people, regardless of disability, can struggle with at one time or another. Our investments and priorities at Kindle are based on a solid understanding of our customers and their needs, which we gleaned through ongoing voice of customer insights and targeted research with our customers of disabilities. People with dyslexia and other reading related disabilities are one of the user groups most impacted by a reading system that doesn't provide enough support. Readers with dyslexia for example, struggle with connecting sounds of words to their visual counterparts and can easily become fatigued because they're spending so much time focused on decoding unfamiliar words rather than comprehending the text. Reading slowly and while fatigued makes it even easier to get distracted or veer off track while reading line to line. To support the needs of these readers, we offer features that can limit distractions, improve focus and tracking, and reduce eyestrain. Our features allow users to customize the text and layout, understand difficult vocabulary, or consume the text through multiple sensory channels. Prior to launching the Assistive Reader, we heard from many people who said that reading on Kindle was altogether prohibitive if they didn't have a way to follow along in the text with audio. Of course, the needs of people with disabilities vary greatly, and what works for some readers can be a hindrance to others. For example, some of our readers can read significantly more content and for a longer period of time when using the open dyslexic font black background to reduce eyestrain, wide line spacing to improve readability, and the colored overlay of the Kindle reading ruler to stay focused line by line. Whereas for others, doing any of these things might make reading even more difficult.

To get into. User testing. We have seen nothing but benefits from doing user testing. User testing has been the most informative way for us to understand the impact of the efforts that we've been making, and helping us decide on new features and approaches to existing features. If I were to give any advice about user testing or share our biggest takeaways, I would say that the two things we've taken away most are to give users options. Everyone wants to customize their reading experience, and they want to have as much control as they possibly can. The other one is that no disability group is a monolith. You can talk to two people who, on paper have the same disability, use the same assistive technology, same computer, and they're going to give you two completely different perspectives on how they use that technology, how they experience their disability and what they want out of a product. This is true for all users, but I think it is often very easy to make assumptions or say, oh, we talked to this user who has this profile. We've done it. and that's just not the case. you really do need to talk to a variety of users and kind of find, you know, places where either you can add options to make things more customizable or create ways to make things flexible enough that two users of a completely different desires are going to both be happy with the final result giving you some. I put quotes here from recent tests that we've done and a user interview about annotations. the tester told us I've seen a lot of people make attempts at ways to make footnotes using audible beacons and things. That seems like a great idea, but in practice it just gets kind of chaotic. It was, user talking about annotations in a test about, some web usability features and like, experience on our site. A user told us that the issue with the sort by dropdown is that we have a lot of different elements that appear to me to be in a very random order. I'm a big fan of alphabetical order. Never even thought about that for drop down menus. And in an interview we did about reading and using erasure reading applications. A user told us, I'm always looking for efficiencies. If I want to read a book, I don't want to have to jump through a bunch of hoops to choose the book that I want to read, which is fair. You know, if you just want to get reading, no one wants to, you know, go to a library, go to another list, go to a third list, and try to find the book they're looking for. They just want to read and users want oftentimes want the same things, but they just may want them in different ways. User testing has been incredibly impactful for us, and, I can't wait to do more because it's always an interesting practice every single time. But at the end of the day, it's a huge help for us as we try to make products more accessible.

Here are my closing remarks. Accessibility must be a core vertical concern, not an afterthought. Best practice and standards are essential. Follow them for content production and for product design. People with disabilities are the assistive technology experts. Invest in them. They must be included in the process of designing, implement ING, and testing accessible products and services. Thank you.

I'll end today's presentation with four key recommendations for creating an accessible reading solution. First, understand the end to end process from ingestion to conversion to rendering the e-book to the customer. Ensure that all gaps in this process are well understood, and that there are mechanisms in place to ensure that publishing partners, including independent authors, have the necessary tools and support to create and submit accessible e-books. Next, understand the nuances of the different operating systems and leverage OS level capabilities when appropriate. Does it make sense to leverage or integrate a tool that already exists, or build a custom solution? Understand when to deviate from the OS and be self-consistent when you want to have more control over the user experience, and when you want to be able to provide more options that are relevant and specific to your customer's needs. This might be the preferred approach. Lastly, understand the needs of your customers to ensure you're focused on the right priorities and ensuring their needs are being met. In Amazon's case, this includes the needs of shoppers who are considering purchasing or borrowing a Kindle ebook, readers who will read those books on our apps and devices, and the content creators who are developing and submitting that content to us in the first place. Thank you very much for listening.

Well, what a wonderful series of presentations and an incredible insight into the often challenging work taking place to bring accessibility features to these reading solutions. Well, our presenters have covered a lot of ground and will now move into the Q&A section of the webinar. So if you have questions or comments on the content presented by Terra, Wendy and Daniel, you can use the Q&A button in zoom to submit and we'll cover as many as possible. Okay. so the first question to our panel, and this is so we're now seeing color e-readers coming to market, including from Kobo and Amazon. Do these provide some interesting possibilities for people with print disabilities? And are there design considerations that need to be addressed for this new category of devices? so, maybe Wendy or. Yeah. color e-readers have been, I mean, super exciting. I think, it's really kind of reinvigorated people's interest in e-ink devices, which, as someone who really loves them, I'm very excited to see people kind of embracing them. but adding color did. It's added, I think the possibility of a lot of new features. we've seen people really embrace, particularly the annotations features and being able to highlight and interact with their content using different colors. so, you know, now you can group your highlights, you know, by different topics, or you can use, you know, different pen colors to, to interact with your content, be that PDFs or, or Epub. And it's been really exciting to watch. but like when we think about the design and like the, how we, you know, build the software and everything, there's definitely been some interesting challenges. One of the ones that I think we we encountered almost right away is as we were looking at our UI and saying, okay, we're going from a purely black and white grayscale UI to now we can think about adding color. And I had to put my hand up immediately and be like, oh, but we also have to think about color contrast. And, you know, measuring color contrast is, all the calculations and all the ways that color contrast is, is measured, is designed for, moderate or like, like LCD, LED screens. and the colors don't quite look the same yet on, e-ink, it's very, very close. But there's definitely differences. And like it depends on your front light and like, how high, how bright you've turned the front light brightness brightness on. And so we have to be really careful around what colors we used in what contexts, and try to test them because, sometimes you think, oh, yeah, this color looks great and it looks great on your laptop, and then you put it on the device and that's, not as great as you thought it was going to look. Great. And, Terra, any thoughts from you on this? Yeah. Well, I think Wendy covered a lot of the ground. I probably would have covered. we're super excited to see the new Kindle color soft, e-reader device. So. Yeah, I'm really excited about the possibilities this brings. one of our flagship Kindle reading features, which I briefly mentioned earlier is the Kindle reading Ruler, which utilizes you know, a colored overlay to, you know, users can track their reading, stay focus line by line. You can choose from, you know, different, highlight color options. That's something that would have never been possible before on any device. and it's something that, you know, now I'm like, okay, what can we do on e-readers here? Not just for reading ruler, but for other, color support possibilities for our users to, make reading more easy. So yeah, I'm super excited, but I echo a lot of, Wendy's thoughts around sort of the design considerations. one other thing that kind of I remember coming up, during the development of that was, you know, whether we're there needs to be like a black and white mode on the color e-reader. It's like, well, if a user is opting in to purchase the color e-reader, you know what? What is the expectation from the user at that point? Like, do we offer something in addition to, you know, the this standard color? So yeah, lots of interesting things there. I, I didn't work directly on that at Kindle, but I'm really excited about the possibilities for accessibility. Yeah, I'm really looking forward to getting my hands on one. I've done evaluations with people with print disabilities coming from neurodiversity, and for many, color choice is really essential. But also there's some sensitivity to glare there as well. So the ability of having color on an e-paper type device without that glare, I think is really interesting, would be fun to do some, some demos and things there. Right. so the next question is, how do, Kobo and Amazon inform customers which devices support which accessibility features. So maybe Terra, this time we start with you. So I'll say right now that we I don't actually think we're doing a great job of informing our customers about these. we get a lot of questions, around, you know, what what do you offer where. And we don't have necessarily parity for every one of our accessibility features across every one of our apps and devices. And they're just there's so many and there's so many different, limitations and different types of capabilities depending on the surface that we're on. I mentioned just a minute ago, reading earlier. Right, has it historically been available on e-readers? And, I remember hearing from a customer recently who had an e-reader device, they had, dyslexic child, love, you know, reading, e-books, but, you know, wrote to us and said, oh, it would be so great if you could, you know, have the text read out to you, especially if, you know, there's a word that you don't know how to pronounce. It would be so great if you could have some kind of, you know, tracking device. And we said, hey, well, you know, these things are actually available on our free Kindle reading apps. and they had no idea. And that was sort of game changing for them. And so one of the things I would like to see us do a better job at and something that I'm going to be working on over the next year is, bringing a lot more, clarity and information to our Kindle accessibility page, to Amazon Accessibility Hub, our detail pages, anything that would help our customers understand what's available, where and why it is to help them make a more informed choice when it comes to purchasing or using our products. Right. And Wendy, how are you doing? You know, there and I are on the same page. she said a lot of what I'm going through as well as trying to make sure I would like, that's what we're looking at currently, is also how do we best communicate the different features, the different devices, the different platforms. So we do have some information on our device store about the kind of the general accessibility features available on all of our devices currently, but we're definitely working on making sure that, like future devices have, you know, specific callouts. a definite challenge on the hardware side is some stuff, some accessibility features or software based, and you can send them out in an update at any time or build on them. Sometimes they're hardware dependent, and so certain devices may not actually have the hardware capability to offer certain features. A good example is like Bluetooth capability. so, you know, making sure that we're communicating clearly, like this device says, this ability, this device does not have this ability. And here's why. Because I think it's important for people to understand we're not doing things for the sake of doing them. but we're also looking at, you know, making sure that we're communicating clearly also about the book contents. And, one thing I'm looking forward to doing is getting a little more deep into how the books interact with the, with the platform. So, you know, this book has this feature, it works on these devices, this book has this feature, it works on these other devices. just to help people make the best, and most informed buying choices. Thanks. And, Daniel, turning to EDRLab and thorium reader, you mentioned that accessibility was there right from the get go. I wonder at what point you started thinking about communicating those features and how you made them discoverable for people? how have you been on that journey? from from the developments of thorium. I think it's been mostly sort of an organic growth of our contributors. by which I mean people chiming in in the discussion section. on our GitHub repository where we host our code. the issue tracker is there as well. There is a discussion section for people who don't necessarily want to file an issue, but just discuss in a particular features. raise. propose feature requests and things like that. amongst developers, we do our internal work to reach out to people in the community. as I said, I myself, an older member of the DC community, so I know a few very talented people I can reach out to. So it's quite handy. but I would say as we recently released, thorium three, this was during the summer, we knew we would have to put a lot of effort into, revisiting our accessibility testing, specifically with screen readers, because, thorium three is a major departure from thorium two. That's why it's a major number increment, in the sense that the user interface was remodeled and rethought, from our original proof of concept many years ago. so we knew we would have to make, additional effort, and reach out to a greater number of people to test and the way we display, modal dialogs, fly out panels, you know, in, in the, in the graphical user interface, making sure that going back and forth between the publication documents and the user interface, continues to work as it used to in the original version of thorium. all of that is a is a ton of work. And, we have we're a tiny team, so we always, we always welcome, external contributors. I see we have over 30 members here, so spread the word. it's, you can please. Well, it makes me think that, as well as the developers of the systems, of the devices and the apps, there's possibly a role for, organizations such as DC members. And maybe publishers will want to know about this for the, for the book so that, folk won't always know that they need to go back to or feel that they need to go back to the developer of a platform or something like that. They may feel that the the issue is with, publication itself sometimes is maybe not so easy for someone to know where an issue might, lie. So that brings us really to, that whole kind of accessibility testing protocol and and so on. So, Terra, and when do you both mentioned a pub test.org in your presentations? And so for webinar attendees who may not be familiar with this initiative, a pub tested org that provides an evaluation framework testing the accessibility features that are needed by people with different print disabilities. So there are tests included for support for screen readers on different platforms. Visual adjustments including changing the font face and the text size, the colors and so on, and it looks at, support for read aloud. And many reading system developers find these tests and the test books provided on the site really helpful. my question is, based on your user testing as developers for your different, solutions and on the customer feedback you've received other additional features or additional accessibility support that would be helpful to include to the protocols that are there on Epub test. maybe, Terra, we start with you. Sure. so first of all, we really appreciate those test books. they offer just so many different things to be included in the same e-book. And you don't often find that when you're doing some internal testing, we're always we keep a list of, you know, oh, book with, video book with image, book with map, you know, but having that all in one place and book with footnotes and book with internal links and external links, like having that really allows us to be more efficient in our testing, with the latest e-book tests or the latest, test ebooks that came out. we're still going through those and sort of understanding what's been added and what's been changed since the earlier iterations. So I don't know that I can speak to any specific tests that are missing at this point. I do know that we're probably have have worked on things and built things and put effort into bringing improved accessibility for our e-book content and our reading system that may not be coming through. And some of the tests that are currently being, asked about or discussed in those test books. And so one of the things I'd like to do is help inform, you know, send back that feedback to you all so that we can make sure to include those if appropriate. and think about ways that, you know, we're internally leveling up our accessibility support for our customers. but in the meantime, we'll continue going through and learning. And what I appreciate about those books is that it helps me understand a baseline for, you know, what is what are people expecting? You know, we augment that with what we learned about our own Kindle customers to say, okay, well, you know, DAISY and Epub test and all of these, you know, external partners are expecting this certain level of accessibility support. This is the things that these are the things that our customers are expecting and wanting and looking for based on their pain points, and then kind of merging those to figure out what is going to be next on our roadmap for building. Great. Thank you. Terra. so, Wendy, anything from you that needs to be added into the baseline or things to think about that, I want to echo a lot of what Terra said because those that back the same on our side, I think the number one thing that is maybe missing currently in Epub, in the Epub tests, three is a fixed layout accessible fixed layout book to test with. this is still a huge challenge. You know, it's it's very hard to make fixed layout accessible, but there are ways to make it more accessible. but finding test books to actually test whether, we're able to take advantage of those features or properly taking advantage of the features that are there, is tricky. There's just not a lot of accessible fixed layout content out there. similar to Terra, we have a list of books that we keep keep, you know, that are good exemplars of some of the features that we are supporting. But, you know, sometimes when you have several million books in your catalog, it can be really hard to find a good example of something, just with the it's not a simple search, to find those books. So you either have to know about something or you have to go hunting for it. And, the hunting is the really hard part. So having the test books from Epub tests is super helpful because, yeah, everything is in one book. You can test a bunch of things at the same time. You don't have to switch. Okay. So this is a book that has MathML. Okay. So this is the book that has read a lot like it's a lot easier to just test it all in one book. Yeah, right. Thank you Wendy. Well, so from reflow epub to fixed layout epub to PDF this question is coming to you Daniel. it's from Raga Joe Pal. so the question is does thorium reader support accessible PDFs? Well, the short answer is that thorium supports PDFs, for starters. but we do delegate the rendering work to, an open source library that Mozilla, develops and well created and still to this day maintains, it modular. If you if you're not aware, is the organization that hosts the Firefox project the web browser. But anyway, it's a JavaScript library. We use it in thorium to render the PDF pages, as Wendy described in her presentation. we layer on top of that our own user interface to display the table of contents and how to access pages within those fixed layout documents. but we don't we don't do a ton of work to make the experience of reading the actual content of the PDF pages more accessible than what PDF already provides. So your your question very specifically is do we support accessible PDFs, by which I guess you're referring to the, PDF documents that are that use a particular type of, structure and that guarantee that the text flows as actual text and not just pixels on the screen. we don't do anything particular to detect that PDFs are accessible, that they comply with the accessibility specification for PDF files. I should point out just to close in, in, my closing comment about PDF is that we introduced a feature in thorium, but this is not a high priority for us given the size of our development team. We focus on Epub fixed layout and refillable DAISY audiobooks. but we do have on the roadmap, hopefully some resources to, upgrade our PDF support. in the coming months. Great. Thank you, Daniel. And you've provided a nice segue into the next question, which is from Manfred. this talks about audio as well. So the question is, do you see, maybe, Daniel will come to you, then Wendy, then Tere. So do you see potential in supporting epub e-books with media overlays in mainstream readers and apps? So, Manfred mentioned synchronizing text, and also the audio is explicitly required in the European Accessibility Act. for e-books that contain audio. So, Daniel, why is thorium, this at the moment? pretty much from day one. Not quite, but but early on in the life of the project, we decided to implement supports, media overlays, in great part because I'm myself working directly with the DAISY consortium. And as many of you are, I'm sure you're familiar with, DAISY audiobooks, audio only or synchronized text audio. I was able to bring that experience with me when I started working with Eeglab on thorium and we were really keen working together to, to offer, a media overlays and DAISY audiobooks experience in thorium. So we do support it. what can I say? oh yeah, we support it in refillable documents as well as fixed layout. And I know there's some reading systems out there support one or the other. I've just to name a very well-known example, Apple iBooks or books app, support six layer media overlays. I don't think to this day that they support referable media overlays. Right. Thank you. Wendy, where are you at on the, the synchronize text and audio. So we, similar, I guess, to and then EDR lab. We also had support for this for a very long time. however, we're in the process of actually revising a lot of our reading platforms. People who use our iOS app would probably notice in the last year that the reading experience has changed, and that's about to change for some of our other platforms as well. so there was there isn't Smil support in there currently. However, it's getting added very soon. that's on the roadmap in the next couple of months to, bring that back and also to bring it in for, for refillable content because similar to Apple, we only had it for fixed layout content, but kind of worked in refillable, but it was a bit, a bit wacky and not consistent. but we're bringing it in now for a refillable and for sale content across the board. the other place that we're adding it, which is probably the most exciting, is adding it to the e-reader experience, for hardware devices. We weren't able to do this for a long time, mostly because our devices didn't support audio. they didn't have, Bluetooth or audio jacks or anything like that. So our devices that have Bluetooth will get this feature. and, we're excited to see it. it's definitely been a long time coming. I will say, like from the on the content side, we don't actually get a lot of Smil content in reflow, which is why I think it, as a feature was kind of neglected for a long time. It's one of those technically possible but not commonly used features in epub. Right. so for publishers, you know, send us more media overlays, content. It's good stuff. but we don't get a lot of it. It's really popular, I know, in things like kids books, which is why I got prioritized or fixed layout. Perfect. Thank you. And Terra, how are Kindle doing on the synchronize texts and audio. Sure. Well, as I mentioned earlier, you know, Kindle, we have our own proprietary e-book format. We don't, support or we don't render Epub directly. For example, media overlays is honestly something that I don't have a lot of experience with. what I do now, what I can say is that, that audio and and visual text connection is something that we have in multiple places. We support multiple places. Most people are aware about our audible audiobooks and our synchronize text highlighting, which we call immersion reading, allowing users to have the, prerecorded audio synchronized along with the text as it highlights, as the reader is is reading and listening at the same time. And of course, I mentioned previously our new Read Aloud feature for Assistive Reader, which basically takes, any refillable Kindle e-book that you know, the user has purchased or borrowed and allows read aloud experience, which synchronizes the the text in highlights as, as it reads aloud, in real time. So, something that, you know, certainly will continue digging into and working to support for all of our users to make sure that we have those multiple modalities. Fantastic. Well, I think some, very, promising and optimistic answers there for Manfred in the field of, reading with, text and audio. and that has to be our last question.

We're coming to the end of our time today. So thank you again to Terra, Wendy, and Daniel for being excellent guests in this webinar. And to remind you in the treasure trove that is the DAISY Webinar Archive, you'll find more than 30 hours of video articles and links to resources related to accessible publishing. This webinar is the fifth event in our Countdown Series, a 12 month program exploring all aspects of accessible publishing and reading, facilitating knowledge sharing and helping all involved to understand and prepare for the European Accessibility Act. So I'm happy to share the next three scheduled topics on November the 27th, with 213 days to go, join us for accessibility in practice. This webinar, designed to coincide with the European Day for people with disabilities, will share messages from people across Europe and will learn how people read with assistive technology. What differences often small considerations in e-book creation can make, and the impact already being experienced of recent accessibility innovations in digital publishing. We're taking a short break over Christmas and New Year, but will be returning on January the 22nd with 157 days to go for accessibility metadata. Well, metadata is a topic that everyday consumers easily overlook, but it provides the framework that enables the publishing industry to function. Accessibility. Metadata for digital publications is still a relatively new area, but one in which the European Accessibility Act and other accessibility legislation is likely to rely heavily upon. So this webinar will highlight the latest developments and best practices in accessibility metadata, showcasing how far we've come, and discussing some of the challenges that remain. You can find out more information at DAISY Hall. Org forward slash webinars, where you can also sign up to the webinar announcement mailing list to learn about new topics as we add them. And if you'd like to suggest a subject, or you'd like to share your perspective on the forthcoming European Accessibility Act, then please email us at webinars@DAISY.org. Thank you for coming today. I hope you'll join us again next time. Goodbye.