# Transcript: Ways People with Print Disabilities Read

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<https://daisy.org/news-events/articles/ways-people-with-print-disabilities-read-w/>

- [Richard] Hello, everyone, and a very warm welcome to you. My name is Richard Orme, my pronouns are he/him, I'm proud to be one of the team at the Daisy consortium. And I'm your host for today's webinar; "Ways People with Print Disabilities Read." Okay, let's get started. Today's session will bring alive the experiences and needs of people with print disabilities, exploring how accessible reading works in the real world. Of course, inaccessible information can impact people living with various impairments, including motor disabilities, deafness and hearing loss. However, in today's webinar, we'll focus on learning disabilities, including dyslexia, low vision, and blindness. We'll hear about the essential features enjoyed by students with learning disabilities. We'll discover how someone with low vision reads an e-book on a smartphone with a small screen. And we'll learn what strategies are useful for a blind person as they start out with a textbook. Strap yourselves in for illuminating case studies, engaging personal experiences, and a fascinating question and answer session. So no pressure, as I pass to our speakers and ask our panel to introduce themselves.

- [Joseph] Hi everyone. I'm Joseph Polizzotto and I'm an accessibility technologist at Wake Technical Community College in Raleigh, North Carolina.

- [Robin] Hi everyone, I'm Robin Spinks, I work as strategic lead for innovation partnerships at the Royal National Institute of Blind People in the UK. And I am a person with low vision. My pronouns are he/him.

- [Amy] Hi everyone. My name is Amy Salmon, and my pronouns are she/her. I identify as an individual who's legally blind, and I have been working in accessibility, digital accessibility for about 21 years, working with publishers and higher education, and working to ensure we have accessible content.

- [Richard] Thanks panel. Well, a really simple structure today's webinar. We're going to cover reading with learning disabilities, and Joseph will speak about that. Before we move to reading with low vision. Robin is handling that section. Then reading without vision from Amy, and then we'll move to questions and discussion. So let me pass now to Joseph, who will tell us about reading with learning disabilities, Joseph?

- [Joseph] Hi, again, as I mentioned in my bio, I'm an accessibility technologist. And in that capacity, I train faculty on teaching strategies that focus on accessible course design. I point this out because not a reader with a learning disability, but an accessibility practitioner. My knowledge about reading and learning disabilities comes from my experience of working with students in a Disability Service Office or DSO over my career in higher ed. In my DSO work, one of my primary tasks was to assess students' needs for an assistive technology programme or an alternative format of a text like braille, or audio, or e-text. The vast majority of students I served had some type of learning disability. And during my assessment, I would often ask a student to share what his reading experience was like, and hear just some of the comments I typically heard. I spend a long time just to read one chapter. I don't remember anything that I've read. I totally missed a word and inferred the opposite meaning. I feel like I have to work a lot harder than others. I know a lot more than I can demonstrate. In my interactions with students, these kinds of comments are representative of the reading experiences of individuals with learning disabilities. So what is a learning disability? A learning disability or LD is a brain-related condition that interferes with some major life activities, such as reading, writing, or math. An LD is often referred to as an invisible disability, as you can't notice it so easily. In fact, many individuals with a learning disability often do not receive a diagnosis until adolescence or college. While there are different types of learning disabilities, and different ways that a particular LD impacts reading, the general readings issues that individuals encounter have to do with their effectiveness at processing and storing information from a printed text. There's often a deficit of some type that affects their ability to use the information they read in an accurate and effective manner. For example, an individual may read a text, underline key parts, and add notes, but have a consistent difficulty applying that information to new information presented later. In this case, the deficit has to do with reasoning about the text and making connections between the old information and new. Other types of deficits may have to do with paying long enough attention to grasp the key point, or missing details in a text that might change a generalisation that they made earlier. Dyslexia, which is a reading based learning disability is a difficulty that stems from recognising the sound of printed words, and sometimes learning new vocabulary. Since a lot of time is spent just trying to read the word and associate it with the meaning, the processing and storing of that information in the text is less automatic and takes a longer time. In any case, it's important to understand that having an LD does not mean that someone is unintelligent. In fact, individuals with a reading disability like dyslexia, for example, are often highly innovative and artistic. And when given the opportunity and tools to learn, they can sometimes exceed their peers in analysis and creative application of what they have read. So I'll just be presenting a few reading techniques and tools that individuals with learning disabilities use to do just that. At the core of most successful LD readers experiences, or reading strategy that helps them overcome the particular deficit that they might otherwise encounter. For instance sometimes, someone who has trouble comprehending texts and drawing generalisations from what they read, will use a method like asking questions before they read. This trains their brain to have a goal oriented approach that seeks specific information in text. It builds an expectation to find connections between ideas in the texts and the ideas one brings to the text. When done repeatedly, this skill can become a habit of finding patterns in a text that can help with later retrieval of information. One of the reading strategies that has proven to be successful as the SQ3R method, where a reader will first survey the text, then ask a question about it, then read, then recite what they've read, and then review the information. Short term and working memory are often an issue for individuals with learning disabilities as well. This means that while reading, there may be a shorter window of time for individuals to hold the information in their heads before the information is lost. Individuals with this type of deficit make a point to identify the concepts that are important in a text and push them to a memory test that can be practised for easier recall. Some online textbooks now have a built-in flashcards tool where readers can develop a set of flashcards by a simple right click or long press on their device. Students who use these tools, or readers who use these tools sometimes look for ways to add pictures or sounds that help them with remembering information. Quizzlet is an example of a popular flashcard making app that allows for students to be creative in how the flashcards look and how they're used. With rote memory exercises variation is important. Mind mapping is another tool that readers with learning disabilities will use. A common characteristic of having a learning disability is not being able to retrieve the information that you've read. So readers may have understood the texts while reading and taking notes, but still not recall what they read when someone asks them about the main points. This does not necessarily mean that they have not stored that information, but that it may not be organised in a way in their brains to easily draw that information out. Depending on an individual's learning style, whether visual, or kinesthetic, or auditory, or reading and writing, it's important for individuals with that long-term retrieval issue to store the information in the way that's easier for them to recall. For some readers in this situation, creating a mind map can make the reading experience more enjoyable and memorable, boosting their ability to recall what they've read. Individuals with dyslexia, for example, are often highly visual learners, who take more naturally to organise the information in a graphical layout. In this connection, using colour coding schemes, or mnemonic devices can also be really helpful. An underlying condition like anxiety or inattention can sometimes exacerbate reading struggles as well. When there's lots of text on the screen, individuals with a learning disability can feel overwhelmed, losing track of what they're reading. In this case, readers may not be using their working memory to make connections about the text and will not process the information deeply enough for later recall. Screen masking, which is the shadowing of lines or areas around the line you're reading helps readers who have this issue. It can also be beneficial for readers with dyslexia, as they are often prone to skip lines while reading. As a low-tech solution, just placing an index card above and below the line you're reading can be a big help. Another characteristic of some readers with a learning disability is the phenomenon of not seeing certain letters or words at all. For example, sometimes a reader may struggle with distinguishing letters and text formatting, like bold or cursive text, which may not even be decipherable. In the early days of research around dyslexia, researchers sometimes called this condition word blindness. The result of this is that readers can not process the information accurately or quickly enough for solid learning to take place. One adjustment that readers who encounter this challenge, maybe to change the fonts, or line spacing in the text so that letters are more distinguishable. Sometimes being able to change just the font or character spacing can make all the difference in a reader's ability to process information in the text more quickly. On a similar note, there's an app called Beeline Reader, where colour gradient is added to texts to help with reading texts more quickly. And this is also a helpful tool for readers who have difficulty seeing texts or skipping lines. One of the hallmark traits of a successful reader with a learning disability is the use of compensatory skills that help them overcome a deficit in their reading experience. In addition to receiving extra time on assignments and exams, perhaps the most common accommodation that students with the learning disability received in my experience is text to speech software. This is a technology that allows readers to hear their texts read out loud, using a voice and speed of their own choosing. Readers who struggle with decoding and learning new words, benefit from seeing and hearing the tech simultaneously. A recent research study, which focused on the benefits of text to speech or read aloud, found that readers with learning disabilities particularly benefited from this type of technology when the text content was more difficult. This suggests that sometimes readers can use text to speech judiciously, and in certain circumstances for greater gains. Another thing about this feature that helps readers is to stay focused on the text and avoid line skipping. Speaking of auditory processing of texts, there are some learners who benefit more from hearing a human narrator read their texts as the inflexion of the voice and intonation boosts their comprehension. Another advantage of an audio book is that some individuals with learning disabilities also struggle with time management and anxiety. An audio book gives these readers more flexibility to read the books when it is convenient for them. In addition, I've seen some readers who combine listening to an audio book with looking at the written text to help them understand what they're reading. To sum up our discussion about reading with a learning disability, here are some general recommendations I like to share. For readers with a learning disability, being successful often means; one, trying to eliminate any distractions before reading, two, scheduling a time to read, three, developing a reading strategy that works, such as note-taking, colour coding, or asking questions about the text. Four, if technology does help, finding a simple tool that can help with a specific deficit that they encounter. And five, since reading with the learning disability is a challenge, I think it's very important that readers reward themselves and recognise the progress that they've made. For publishers and authors, I recommend that they do the following things to help students with learning disabilities or readers with learning disabilities learn. One is, use clear instructions to focus the reading task. What guiding questions can be asked to help with understanding the text? Two, identify which parts of the text are important, perhaps using different text formatting, or sidebars to highlight important topics. Chunking in this connection is important, which means breaking up your texts into smaller units. Three, be consistent about the formatting and structure of the layout of the text so that readers can predict what comes next and how to read more intelligently. And four, deliver your content in a medium that can be repurposed. For example, using a text-based format that can be copied and pasted into a mind map or extracted into a study guide helps readers to integrate their technology with the text they're reading.

- [Richard] Joseph, thank you so much for that. We have time for just one quick question. On the text adjustments slide, you mentioned altering the font. And in both mainstream and specialist applications, we sometimes see fonts that seem to be designed specifically for people with dyslexia. They have kind of names like Open Dyslexic, and so on. Are these something that are a useful strategy? What's your kind of comment on that, please?

- [Joseph] My comment is, it's more of a mixed bag. I've found some students who found them slightly helpful, but others who don't find them helpful at all, that actually what's been more helpful is adjusting the line spacing and adjusting the colours of text. Not so much the actual dyslexia font or open dyslexic font. So it's more of a mixed bag.

- [Richard] Thank you for that. And Joseph we'll return to you when we come to the questions towards the end. But for now, I'll pass the torch on to Robin who will tell us about reading with low vision. Robin.

- [Robin] Hello, everyone. I'd like to pick up from that great session that Joseph just delivered, and link some of those thoughts into reading with low vision. So some of the common challenges might include focusing on text. So very commonly, we find that people will have an issue with what we'd call acuity or sharpness detailed vision, and focusing on text is a real struggle. It's difficult to do that without text being a certain size. Many people find text when it's larger than 14 point is actually more manageable. and typically designing it so that it is a universally accessible format, a font that people would use. So on that issue of fonts, something like Aradhana, or Arial, or Universe, or San Francisco and the Apple font family, those fonts, many people will tell us are very easy to read if they're formatted appropriately and in the right font size. So going for an inclusive text, something that's available on everyone's machine is the most helpful strategy in many ways. We also need to think about reduced contrast sensitivity as an issue that may any individuals will experience from a low vision point of view. And linked to that would be glare and photo sensitivity. So photophobia, many people with low vision conditions will have photophobia. And that quite simply means that reading, for example, in an environment where there's too much light becomes either impossible or extremely uncomfortable. So think about, for example, the use of blinds, and curtains, and maybe window tints, as ways of regulating and managing the amount of light in the environment where you're going to be reading. It's all about finding the right reading spot in the location that you happen to be in. We also need to think about reduced field of vision and the impact that that might have. So for example, a condition which reduces and constricts the visual field will mean that a person is moving their head more from side to side as they read, because that field of vision is very small. And we also need to convert the sensitivity to movement and the (indistinct) actual visual for change. And again, it's worth pointing out that, for many people, actually, the vision will fluctuate throughout the day. So it's not the case that someone with low vision will have the same amount of vision all the time. It will be impacted by environmental factors like the weather, like stress, and tiredness, and maybe also the environment that you happen to be in. If you're outdoors and the sun is coming in and out of the clouds, that can affect the way that you're actually able to read printed information, alongside a whole variety of contextual factors that will impact on individual's ability to read. So rain, for example, if it's raining outside, it will be much more difficult to read things, because already there is a challenge. And in terms of visual energy, people are using more energy to read if they have low vision. So that's compromised farther by for example adverse weather or darkness. So the level of light would be significant. We've got some illustrative images. So we have some images that are based on the descriptions of people with low vision conditions. And it'd been reviewed by a low vision clinician. They're intended to give us an impression of how vision can differ between eye conditions and students experience will be individual to them, that may be quite different. So first up we have an illustration of viewing text with glaucoma, and Retinitis Pigmentosa. And we see here patches of sight loss initially at the edges of vision, leading to tunnel vision. As I mentioned a moment ago, if you had a severely restricted visual field, you can imagine reading text with the level of field that's illustrated in the picture, you would need to be moving your head quite a lot across the text to actually be able to read it. And you can imagine easily that that could generate quite a lot of fatigue and tiredness, and really that might not be the most pleasurable way to read for an individual, that may be very difficult. So I'm going to encourage you to look up some other options. We have an illustration here also, viewing text with cataracts. And we can see here that we've got a washed out and blurry vision, often with yellow or brown tint. And it's often the case with cataracts that people will only realise how difficult the patient has been once there is a procedure to actually remove the cataract. And of course, cataract is quite unique, and that is one condition where it's very often possible to make a dramatic difference to the level of vision. We also have an illustration of viewing texts with Diabetic Retinopathy, and here we can see a loss of central vision. We can see patchy and blurred vision, and we can also see that whole notion of trying to look across an area of text would just be incredibly difficult to do. And again, in terms of reading enjoyment, many people tell us that the reading enjoyment diminishes, if they try to persist with purely visual reading. So we'll come on at the moment, some alternatives that might be helpful. We've also got an illustration of viewing texts with Macular Degeneration. And again, we can see here, this is an end-stage Macular Degeneration is the development of a central scotoma that results in blurry and distorted text in the centre of vision. And again, often people with Macular Degeneration will tell us that they can get about okay, but actually, moving around is not a huge problem, but recognising faces across the road, reading become very problematic. So what kind of visual adjustments might students with low vision want? So first of all, adjusting font size and I've suggested 14 point, really ought to be a minimum font that anyone uses, because it will be super, super helpful for many people who have other reading difficulties. The choice of font, I've spoken a little bit about that. I think going for something that everyone has on their machine is a really good strategy. Think also about colour modifications and how that can help perhaps certain colours of text, or background can be avoided for some people. Also thinking about line spacing adjustments as well, and being sensitive to the fact that that will have an impact on the legibility of the text. Read aloud or speak screen are popular features, and speak screen as one which I happen to use a lot. So literally selecting some text on the iOS devices and hitting speak screen or swiping down rather from the top of the screen will bring up a small play interface that allows you to speed up or slow down and play the text with a high quality synthetic speech. That can be super helpful if you're somebody who cited reads most of the time, then when you become tired, you want to switch into a primarily audio mode. So most importantly, I think is combining strategies for low vision reading. It's not about just using one strategy and sticking to that, it's about combining it in a way that minimises fatigue, maximises productivity, and actually enables you to function in a confident and an enjoyable way. 'Cause reading really should be enjoyed, you shouldn't be reading in a way that is difficult, and problematic, and gives you headaches, and it's stressful. That's not fun for anyone. So it's about finding something that can be pleasurable and enjoyable. Some of the mainstream usability features which are increasingly being used by people with low vision. So Safari Reader is a small facility that you will spot in the Safari web browser. And it's represented really by four small horizontal lines at the left-hand side of the browser bar address window. And where you see that on a website, you can tap it, and it will allow you to specify not only the font size, the background and foreground colours, but it will also allow you to change the font. It's a mainstream usability feature, but it's incredibly helpful if you have low vision. And many people don't actually know about it. So please, if you haven't had a chance to look at it, do go away and try that after the session. I mentioned Speak Screen and again, to me, this is a wonderful bridge between low vision reading and using a screen reader, because it enables you to have content spoken to you and give your eyes a rest. And it might be that you move from reading in a sighted way to using speak screen for a large package of text or a large document, and then moving back to using psychic reading. Those of you who have downloaded iOS 15 since Monday, you will perhaps have made use of live text. And that's the facility to basically grab text from an image or a picture. So any text that appears somewhere that isn't text, but it's actually an image, you can capture that and you can copy and paste that into notes and documents, and that's already proven to be very helpful. So all you do is once you've got iOS 15 on your device, you look in the camera and you quite simply touch a new button in the camera interface, which is the live text button, and the magic will happen before you. I also wanna mention here Android 12, and it has a new design language called Material You. Quite a lot of effort has gone into making the overall interface more accessible for people with low vision. I'm including some of the considerations around reading and button identification. And again, that's helpful. I want to throw in a couple of other things here, Tablet Stands, so many people with low vision, posture is an issue. So a Tablet Stand, and I'm use one very regularly, enables you to have ideal posture to have the best viewing angle of your document. And also to modify that as the day progresses. You should of course also remember camera mounts on tripods. Again, it's about getting the best angle, the best viewing angle, maximising the visual nature of the document and enabling you to enjoy it. But it's also about minimising the obstacles and the hassles, and taking fatigue, visual fatigue, and posture elements out of the equation, and really making a pleasurable, comfortable experience. So some recommendations to learn how reading apps can help them in these ways. Adjust the display to suit their needs, effective ways navigate and search the text, and listen to text, and read out loud. Those are all hopefully helpful strategies. And I'd like to encourage everyone on the call to dip into some of those newer features that have appeared on Android and iOS as of this week, because the wonderful thing is, that the facilities and the features for people with low vision are not static, they're constantly evolving and developing, but it's really important that we encourage students to improve and optimise their reading experience to be the best that it can be, because reading is wonderful, and it can be wonderful if you have a low vision. Thank you.

- [Richard] Robin, thanks for that. You've talked about evolving tools, and Denise has a question related to this, which is that, Denise has seen a demo of Adobe's Liquid PDF display. This is in Adobe Acrobat on the mobile apps, and thought it looked like it had a lot of useful tools for folk with low vision. Is this a feature within an app that you use?

- [Robin] It's not, and it's really interesting to have that question. I need to take a deeper look at that. I am aware of some of those features, and it's not something I have used personally. I've probably tended to use features on PDF, I've probably tended to view on a larger canvas and to use pinching and zooming, but it's something that I'd like to take a deeper look on. Maybe we can bring that into the future webinar, it'd be great.

- [Richard] You can do that using Adobe Acrobat on the mobile app. And it works on some PDFs and it basically brings a kind of reflow experience into that. So you have a play with that Robin, and it'd be good for you to report back at a future date, but let's move now then to the third segment. And this is Amy, who'll tell us about reading without vision. Amy.

- [Amy] Thank you, and thank you everyone for joining us today. I am somebody who is legally blind. I am both an accessibility professional, then working in digital accessibility content as well as an end-user. So we're gonna start out with what, we've learned a lot from Robin and Joseph about learning disability and how readers with learning disabilities read, about low vision, features for low vision. What is the definition of somebody who is what we in the United States refer to as legally blind? So I pulled this out of the World Health Organisation. So they define, and this was recently published this year. So it's as recent as 2021. So moderate visual impairment is acuities of 20/70 to 20/100. So that might more fall under Robin's area of low vision, where they have some vision and they need the reading aids and tools that Robin mentioned. Severe visual impairs is when you're 20, your visual acuity is 20/200 or worse, and/or your visual fields are less than 20 degrees. And then profound visual impairment is visual acuities of 20/500 to 20/1000 and/or visual fields of less than 10 degrees. So when I say, and/or I happened to be an overachiever, I have retinitis pigmentosa, my visual acuity and my best eye is 20/400. My visual fields are less than three degrees. So I meet both. However, somebody could be defined as severely visually impaired by simply having a visual acuity that is between 20/500 to 20/1000 or a visual field that's less than 10 degrees. But I wanna stress here that these are classifications. They're not functional. So when you meet somebody, think about it this way, when you meet somebody who identifies as being legally blind or blind, if we assume that they cannot see anything at all, you are going to be wrong 90 times out of a hundred. Because 90% of people who identify as being legally blind or blind, actually do have some vision, it could be light perception. It could be ability to see large objects, so they don't have fine visual detail, but they might have gross visual detail. So keep that in mind as we're moving through some of the reading, tools and strategies that we're looking at for people who are severely visually impaired, who are legally blind or blind. So how do people who are blind or legally blind read? So we use screen readers. So screen readers are typically software applications or built into the Operating System that basically converts anything that's visual, any visual content on the screen into synthetic speech, which is then communicated as speech, or is communicated to a braille display. So people that use screen readers include people who are legally blind or blind, but also it's a benefit for somebody who might have illiteracy issues, who might have a learning disability as Joseph pointed out, and who might have low vision as Robin pointed out. So we're seeing a lot of heavier lean on using screen readers to support multiple ways of reading. So what are the typical screen reading programmes that we use every day? If we're using a Windows-based computer, we're going to be leaning on JAWS for windows, NVDA, which stands for Non-Visual Desktop Access, or the Narrator, which is the built-in Windows screen reader. If we're using a Mac computer, I'm a MacBook Pro or a MacBook Air, we're going to lean on Voiceover, which is built into the Mac Operating System. If we're using iOS, or iPhones, or iPads, or even our Apple Watches, we're gonna be using Voiceover. And if we're using our Android devices, we're gonna be using Talkback, which is part of the Google Accessibility Suite that you do need to instal from the Play Store, in order to get it fully functioning. So next slide is going to be a demonstration of an actual Screen Reader:
- [NVDA] Heading level two, one, Introduction. This chapter provides a critical review.
- [George] So this is the first paragraph I can read by word.
- [NVDA] Chapter provides a.
- [George] Or letter.
- [NVDA] Space, C-R-I.
- [George] And I'm just using normal reading keys in NVDA, right arrow, left arrow control. I can read by line.
- [NVDA] Factors to international conflict and cooperation as well as to matters of domestic political.
- [George] Next line.
- [NVDA] Conflict and stability. Much of this literature is quite recent, semi, the study of
- [George] And I can go to the next paragraph.
- [NVDA] Studies using religion as an explanatory variable of international and domestic processes....
- [George] Of course I can read continuously.
- [NVDA] Studies using religion as an explanatory variable of international and domestic processes in the post-end, dash, cold war Europe.
- [George] I can navigate by heading.
- [NVDA] Region two, Straw Men in the Religion and Politics Literature, dash, Modernization and the Classical Paradigms of IR. Heading level two.
- [George] I could read graphics. So here's a figure.
- [NVDA] Looking for empirical evidence on religion and politics, graphic degrees of religious legislation, religious regulation, and religious discrimination scores in graphic states. Solid lines indicate absolute level of, semi, dashed lines, indicate scores relative to other states. Graphic in the system.
- [George] Okay, so that's the graphic with its alt text tables. So I can go to the previous table.
- [NVDA] Table 2.1. Intensity of religious and non-religious conflicts, 1946 and dash 2001 left paren, Pearce 2006, 48 right paren. Table with 12 rows and four columns, table 2.1. Intensity of religious and non dash- row one conflict intensity, column one column...
- [George] There was a table caption, and now I'm in the table and I can use Alt to control right and left arrow.
- [NVDA] Non dash religious column, two non dash religious.
- [George] So, I'm in column two and I go down.
- [NVDA] Row two, 22.
- [George] And it read the table cell. If I go to the right.
- [NVDA] Religious column 3, 44.
- [George] It first read the table head, and then the cell contents. So that all works well.

- [Amy] So that was excellent demonstration, confused you there because it was actually done by George Kerscher, who is a phenomenal leader in accessibility for reading and learning content. So again, what you saw was how somebody who uses a screen reader, George was using NVDA, is able to read and navigate and basically consume content. So on this next slide, another tool that we use to read as somebody who's legally blind or blind is a refreshable braille display. And a refreshable braille display is basically a physical piece of hardware that we pair to either our desktop computer or a mobile device. And it is driven by the screen reader. So you can't have a refreshable braille display without a screen reader. So the screen reader is driving the information to the refreshable braille display, the refreshable braille display then converts the screen reader into the braille symbols for the individual to read. They come in sizes from six to eight cell braille displays to pair with your mobile device to 40 cell, which are more desktop, to a full 80 cell braille displays. And there are tools that are used by quite a few individuals who are blind or legally blind in order to consume content. So what is important to a reader who's reading without vision? What are the key things? You saw in the demonstration that George gave us, the first thing was, we need to be able to navigate the Table of Contents and the content. So making sure that Table of Contents is accessible, that's gonna be the first place we're going to start. We're gonna look at what's in the content. We're going to want to be able to navigate to a specific area of that content. Once we get into that specific area, we need to be able to understand how that content is structured. So the next bullet point you see is headings, is really important. Correct use of headings and correct heading hierarchy. So if we've content and it's a chapter, and the chapter starts with heading level two, then we need to make sure that all the headings are properly identified after that. And if it's visually looking like a heading, it should be communicated to the screen reader user that this is a heading. So make sure that you're using headings and using them correctly because that's what we need. When I go to read a chapter, I need to understand how many headings are in that chapter, how many sections, how many subsections, in order to understand how that content fits together. Images. Here's my rule of thumb. If you have an image or a graphic that if you were to visually, if you were to remove it from your content, would a visual user lose anything? So in removing that image, are you changing the meaning of that content? Or is that visual image actually conveying information? If it is, then you need to put all text on it. You need to describe it. So that when I navigate to it with my screen reader, I don't just hear it say graphic. I actually hear a description of the image. And for links, if you're embedding links in your content, what do we need to know from links? Give us where the link is gonna take us. So don't just drop in the URL for the link, don't put in click here or learn more, actually take the time to add a description telling us the purpose of selecting this link. You saw with George's table navigation in the demo, if you're going to use tables, make sure when we navigate to read tables, we're going to read a table, we need to make sure it's got the proper structure, so make sure that you're including that in your tables. Only use tables for data though. Don't use tables for layout, because we have to navigate through that in order to understand the content. So if it is truly data and you're using a table correctly, keep it simple. Don't use complex tables, span cells, nested tables, try to keep your tables to a simple format as possible. And use lists correctly. So again, don't use a visual for structuring list, use the actual list markup. If it truly is an unordered list, mark it as an unordered list, if it's a numbered list, mark it as a numbered list. Because when I'm navigating the content, I hit a list, I hear it say one of seven. So I know that there seven items in this list. If it's numerical, I'm going to know the order of importance. If you're embedding video into the content, how do I access and read it? Well, I'm gonna play the video. If it doesn't have audio description with the video, then I'm going to immediately be looking for a text transcript, because I wanna make sure that I'm getting the same information from the video. Make sure your text transcripts are not just a simple capture of the closed captioning for it. Make sure it's describing visual that's happening so that you're including that in the text transcript. And then finally, whenever you're creating content, make sure you assign the language for the document. So if the language for the document is English, define that. It's really important for a screen reader user because when we open that document, if the language is not defined, our screen reader does not know what language to read it in. And the best example I give here is, if I go to a document and it's written in Spanish and the language is not defined, my screen reader is going to read it using the English synthesiser in a really bad Spanish accent. So I'm going to hear things like (speaking in Spanish) or things like that if it was a menu. So way as we read, we're going to read either our to-go-to's are going to be desktop or mobile device. So where either, and it's really gonna depend how accessible the content is, and where that support is. So we have better support in desktop with our screen readers for certain content, for other content, we may grab our mobile devices and use that. So what do we read on a desktop? Well, because of the limitations of screen reader support on mobile and the apps, we're gonna tend and lean on reading PDFs on our desktop. So if you're sending PDFs to your end users, your students, make sure that they can access it through a desktop. PDFs are not fully supported on mobile for screen readers at this point. Slide presentations, PowerPoint, KeyNote, Google Slides, those are gonna be accessed, we're gonna go, our go-to is gonna be our desktop. Again, because it's a more mature platform, we've got better support to read, the screen readers are more robust. Documents, we're going to tend to go to our desktop for that. That's Word, Pages, Google Docs. Spreadsheets, the same thing. Excel Sheets, Google Sheets, and Numbers, we're gonna have to read on a desktop computer. EPUBs, this is a lower level, we may read an EPUB on our desktop. And websites, we may read a website on our desktop, or we may play a video. So this is an order of priority, kind of in that sense. So what do we use our mobile devices to read? So, what am I going to grab my mobile device to read? EPUB, I'm gonna probably lean on my mobile device more heavily, I'm gonna use the EPUB readers on my mobile device. I use VoiceDream Reader all the time to read content. I also use the BARD App to read, not even use audible. So audio books, definitely I use my mobile for that. Videos, depending on where I'm accessing it, I'm most likely gonna access it on my mobile device. So again, you want to make sure that video has audio description or a text transcript available for it. I may go to websites on my mobile device, but I will be honest, if the content is displayed on a website, I may try it on my mobile device. If I find I can't read it well, I may switch over to my desktop. So my recommendations, when you're creating content to make ensure that it's accessible for people who are legally blind or blind, use accessibility checkers, they're all over the place. Microsoft has them built into all of their apps. So PowerPoint, Excel, Word, Outlook all have built in accessibility checkers, use them. Run your documents through the accessibility checker, fix what you can. Apple, I put a link in here as creating accessible documents using Apple's Suite, which would be your Pages, Numbers, and KeyNote. Read this, follow it, use it when you can. Use the Adobe Acrobat pro Accessibility Checker to check your PDFs. Again, check them, fix them, before you send them out. DAISY has a wonderful tool called the Accessibility Checker for EPUB or ACE. If it's an EPUB, run it through ACE, fix it before you send it out. All right, the last piece, whenever you can, do functional testing. Get somebody who actually uses a screen reader, not just somebody who knows how to use one, but somebody who needs one, to actually check your content before sending it out.

- [Richard] Amy, thank you so much for that. That was just wonderful. I didn't fail to notice that in the list of things that are important, your list was quite long. You talked about the Table of Contents, the headings, the descriptive images, the tables, the lists, any videos having audio description transcript, document language, and so on. How might someone know whether or not a document, a publication they're trying to get into has those kinds of properties, or is it just kind of suck it and see as it were?

- [Amy] Oftentimes it's hit or miss, we don't know until we open the document, especially if it's a PowerPoint, or an Excel file, or a PDF. We may not even know until we open the PDF that it's actually an image only of the PDF, which I don't see as frequently as I used to. But even if it's not an image only, they may not have tagged it correctly. So we're gonna have issues with it. What you can is the ACE tool, if it's an EPUB, I could use that to check before I open it. But also I know that a lot of the publishers are adding accessibility metadata into their content. So check before you buy, if you're a student, or you're purchasing content. For video, for example, I can check on Apple if I'm on my Apple TV or Apple devices and make sure that the programme I'm about to view, the video actually has audio description. Otherwise I don't really bother to play it, especially for leisure viewing. So you can check that in upfront. It's usually indicated that it has audio description for the video. So those are some ways, but you know, I know a lot of the publishers out there like Vital Source are now starting to batch content as being accessible. So look for those, if you do know that your content is accessible, make sure you promote that upfront.

- [Richard] Amy, thank you for that. So we're moving now into the discussion and Q&A phase. And I have a question to each of our presenters. You've done a great job of explaining a lot of really good information. And most of the folk attending these webinars would be professionals. There would be librarians, there would be folks working within disability services, and so on. To what extent though will readers, learners, students, with print impairments know about these kinds of solutions, facilities available to them? And maybe we can tackle this in the same order in which our speakers spoke. What support is there for students to know about these wonderful kind of facilities? So Joseph, your take on that please, how do you support students, or just students come already knowing these kinds of these things?

- [Joseph] Yeah, so in my experience, some students are quite a resourceful in their exploration of what's available to them within their course materials. So many of the students I encountered when assessing them for technology needs related to their disability already knew about audio form of the textbook, so they they'll search for that, or maybe there's an electronic text format of their book available that they will have researched and already downloaded. Many professors nowadays, indeed are going towards a more economical approach towards assigning texts. So most students entering college now are just used to learning online and consuming content, not through the print medium, like many of us in the older generation did, but through electronic texts. So students are typically on a mobile device, their phones or tablets, accessing PDFs, or digital texts like e-text, reflowable texts like HTML or EPUB. And then within the learning management system or online course that they're in, there's also plugins that many professors will make available that allows students to transform that content into a different format. So for instance, at my previous institution at UC Berkeley, we had in the online courses, a tool called Blackboard Ally, which many colleges and universities across the US and the world have, which allows students to download the format of the texts that their professors upload like a Word document, download it as an EPUB or Beeline Reader version of the texts. And this is something that many students are using as well. And students are also familiar with the online, the Speak Screen functionality in my experience, where they will read the texts out loud. So I think what it comes down to is, students are aware of these things, but sometimes the challenge is teaching them how to integrate those tools in a way that meets their particular learning style and their needs for being able to read with success. I think that's a lot of times the issue.

- [Richard] Thank you, Joseph. And I guess with more prominently the use of digital text in its various forms, there are more possibilities for the personalization along the kind of lines that you described. Robin to folk with low vision and your experience, kind of know about the sorts of things that you talked about, or is there more that can be done to support them by maybe service providers, like libraries, colleges, organisations, and so on?

- [Robin] Thank you, Richard, you used the word personalization there in framing the question. And I think that that's probably at the heart of this. One of, you know answer it straight, in a straight forward way, I think not enough people know about the evolution of these features. So I constantly meet people who know about, for example, magnification, or the ability to change text size in their Operating System, but they maybe don't know about some of the features or perhaps, Speak Screen or some of the additional features that are often deemed usability features rather than being specifically in the accessibility camp. So I think there's a really good opportunity for I think, learning institutions to not only stay abreast of this, but also to think creatively about how you might share some of that with your students. And some of it really is no blurring from the arena of accessibility to usability. And I want to just flag one highly helpful example of that, that I was greeted with on Monday night. So there's an update to iOS 15 that came out on Monday evening. And one of the things that's in there, if you use a conferencing client like Zoom, or Teams, or FaceTime, when you hit the mute button, you now get an ear con that tells you that you've muted. And then when you unmute, you get a correspondingly different ear con that tells you that you're unmuted. It sounds very simple, but it's massively helpful for someone who can't see well like me, I can't see whether or not there's a strike through on the mute button, but I can now hear it, thank you very much platform provider.

- [Richard] Very good, yeah. And as you say, it's changing all the time, and indeed even in this webinar, Denise helped us learn more about the liquid mode. So then lastly, turning briefly to you, Amy, just a quick kind of take on folks' ability to use the kind of things that you spoke about like the heading navigation and table reading. And if you could squeeze into your answer too, any experience you have of reading on Kindle, that would be super great. And we just have a couple of minutes for this.

- [Amy] I would say that your knowledge base for your readers who are legally blind or blind is gonna be all over the place. So age is gonna be a big factor, the younger the age of the reader, or person that you're targeting, their knowledge of technology and their knowledge of what's available is probably gonna be higher. But you do have to consider, you've got a large percentage of older coming back to school, especially since the online is there now. And their knowledge of what's available, screen reader support is all over the place, to be honest with you. So being a resource for them is great. I rely heavily on DAISY as a resource for myself and often refer people to DAISY, but also look at other organisations and tap into them and leverage like the American Foundation for the Blind, the RNIB, as additional resources to support your readers and learners, and students in the process. And then the second part of that question, Richard was?

- [Richard] Have you ever tried reading on Kindle and you know what, did you find it accessible at all?

- [Amy] I will be honest, I avoid Kindle like the plague for personal reasons, not professional. I've tried reading Kindle, the only time I've had any success is on the desktop. I have not tried reading it on a Kindle device.

- [Richard] Okay, well maybe that's a topic we can come back to, but we are coming to the end of our session. So once again, thank you to Joseph, Robin and Amy for sharing such great information. Before we close, I want to tell you about some really great sessions we've put together for you in the coming weeks. On October the sixth, we will cover EPUB accessibility 101. When we'll peek under the hood of EPUB publications, to understand the components that support accessibility. This webinar is intended to be introductory, no prior experience is necessary, but you'll come away with some great accessibility bragging rights. Then next up we'll tackle the topic of creating and reading accessible math, and that's on October the 20th. And on November the third, our panel will open up a box of free tools and techniques to help with validating and conformance checking of EPUB. And if you have ideas for webinars, or you'd like to suggest a topic we'd love to hear from you. I hope that you'll join us again soon, in the meantime, thank you for your time, stay safe and well, and have a wonderful rest of your day. Goodbye.