# Webinar: Accessibility at Apple

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The recording and further details from this webinar are available at:

<https://daisy.org/news-events/articles/accessibility-at-apple-w/>

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Richard >> Hello everyone. And a very warm welcome to this week’s webinar. My name is Richard Orme, I’m from the DAISY Consortium and I am your host for today.

Over the last few weeks we’ve heard some great information about the revolution in born accessible digital publications, and some new possibilities for educators, disability professionals, organization and authors to create accessible content. But how can individuals with print disabilities access these publications? Increasingly, people are making use of standard computers, tablets and smartphones, using the assistive features that come built in, or that can be added. This means that for accessible reading to be a reality, we’re more and more reliant on the big tech companies paying attention to accessibility for everyone, to build assistive technologies into everyday technologies, and to partner with third parties.

Last October the face to face meetings of the DAISY Consortium were in the heart of Silicon Valley. We made the best of this opportunity by meeting with many of the big tech companies who create the products and services that students, library users and customers rely on. One of the wonderful presentations was about what Apple are doing, and I’m delighted that we can bring this information to a much broader group of people in this webinar. So it’s my great pleasure to ask Sarah to introduce herself and tell us all about Accessibility at Apple!

>> Sarah: Hi, I'm Sarah Herrlinger. I lead Apple's accessibility efforts. In that role my two areas I cover are both externally making sure that people understand the depth and breadth around accessibility in our products and everything that we do at Apple from the products to our services to our stores to our workplace. And then I also work to ensure that every employee at Apple understand what accessibility means to us and the fact that accessibility is one of our 6 core corporate values so that we end up with an army of individuals who are all working to make sure that everything that Apple does is available for everyone.

At Apple we believe that great technology is simple and intuitive and easy to use, but we also believe that exemplary technology is accessible. We believe accessibility to be a human right. Therefore we build it into everything that we do.

The reason for this -- there's a few reasons for it. One of which is the numbers. We know that there are over 1 billion people on this planet who have some type of disability whether that be a sensory disability around vision, hearing or physical motor or a more hidden disability like a learning and reading disability. That equates to 1 in 7 people on the planet or 15% of the world's population. As we brill down a built one thing we know in the U.S. is that 1 in 5 students has some type of learning or attention issue involving things like dyslexia, dyscalculia and also other elements like ADHD and nonverbal learning disabilities. All kinds of things that are out there that can affect a student's ability to learn. And interestingly one of the other things we know is that 1 in 10 students is an English language learner. We know that certainly that is something that is affects so many students in our education system today.

And even beyond that we know that regardless of how you cut the numbers, millions are unidentified or just could benefit from tools.

At Apple we believe technology can play a powerful role in helping people to be more productive, creative, collaborative, more motivated, more empowered, and independent. To help foster dignity and at the end of the day to be able to live out their dreams. I would like to take a moment and show a quick video that gives a little bit more information on the depth and breadth of the kind of work that we do.

>> Sarah: Video shown with captions and audio description in there. A couple of things on that one. It's worth noting that that video was actually edited by the woman shown in the video. When she said you can edit a video like this one, she wasn't saying that as a generalization. She was the principal video editor. She see a woman with cerebral palsy. She has become one of the top editors in the country. That is one of the -- a great example of why we do what we do. We want to ensure that everyone who wants to use our technology has a means by which to do so.

So because of that, we focus on two main design principals as we design. First we build accessibility into the core of our products, into the operating systems. We don't rely on third parties to do accessibility for us. We don't bolt it on as an afterthought. It is part of our DNA. As we design products, we think about how anyone who wants to use them has the opportunity to use them for such.

The other thing we do though is we also focus on creating a cohesive ecosystem. We control our own hardware software and operating system. We can infuse accessibility in ways that other people may not think about. For example, if you take voice over and you have a student or child whose first interaction with Apple technology is using an iPad, well we were actually the first company in the world to make a touch screen accessible to the blind by building the voiceover screen reader into iOS. We did this in 2009. So this is something that has actually quite robust and has been around for a long time within our operating system. We have iterated year over year to make it better. I will talk more about it later on in this. To focus on that element of voiceover on the iPad. When we did this, we didn't build it specifically for iPad. We built it for iOS. So if someone picked up an iPhone, they would have the same experience as they had on the iPad. When we realized how much the blind community was gravitating to voiceover on iOS and statistics tells us 69% of the blind community is using an iOS device, we looked at our Mac and our track pads and realized we could port all of those gestures to the track pad on the Mac as well. At the same time we were working on the Apple watch. So we looked at how to take the same gestures and port them to the watch. And then the Siri remote and the home pods. So by building it into all of these different areas what that means if you learn voiceover on any device, you have essentially learned voiceover on all of our devices. In terms of supporting a community of who memorization is important, this gives us a way to give that seamless continuity across every product that we make. Voiceover is one example of this. We look at building other accessibility features across all of our products as well, but it's something that only we can do because we are able to really look at how do we build -- how do we have one team that's building these features for all of our products? So it's not separate product teams that do a separate UI for each one. There's continuity across everything that we do.

When we talk about accessibility, we actually consider this across a really broad range. We don't see accessibility as being about compliance. So we aren't looking at one thing as checking a box. We really define accessibility in broad strokes. Therefore we look at -- we do put them into four broad pillars which are vision, hearing, motor and cognitive. And in each of these areas, we see accessibility as a spectrum. For vision, that could be anyone from someone who is fully blind to other types of vision challenges to just being an eye glass wearer or just color blind. For hearing it is everything from being able to -- someone who is profoundly deaf to someone with age related hearing loss to even situational hearing loss of loud restaurants or loud spaces in general.

With motor it's everything from someone who is a quadriplegic and may never touch a touch screen to someone who might have a tremor or low muscle strength. It could be that you only have one single access. You can only use one finger or a toe. We look at short-term disabilities or things like having broken an arm or situational like having your arms full of groceries when you walk up to the front door and trying to get your door open. Home kit can be great for that around automating a house. And then with cognitive and learning and literacy we look at a lot of areas from neuro diversity like autism and dyslexia to other types of learning and reading challenges, developmental delays. A lot of things we try to support a wide range of users. We even look at things like motion and how motion on a screen might affect a user and so trying to look at ways to really just simplify everything because at the end of the day, one of the things that we always try and focus on is that regardless of whether one self identifies as having a disability or not, every person on the planets usage of technology is unique. We all customize and personalize our devices to the ways that work best for each of us. So we want to make sure that regardless of what your individual needs are, there's a scaffold available to you to make our technology better.

So because of that, we work to build in a wealth of accessibility features across all of our products, to support a wide array of individual use cases and needs. I'm going to take a few minutes to talk through a few of these. So that you have a better understanding of some of those tools that are built in to support vision and reading challenges. The first one I want to talk about is voiceover. So voiceover is a full free featured screen reader. It's incredibly robust. We built the first iteration in 2009. One of the things that's been incredibly important to us through the years is to continue to iterate on voiceover. We do that both by not only making sure that everything every other in -- engineer is accessible but that we also work on features within voiceover so that there's something new for our users every year.

Over time what that has meant is that we have a lot of features that are built in. Voiceover supports over 35 languages. It supports over 70 models of blue tooth refreshable braille displays to be connected to the device.

Another feature worth noting, the image that's on the screen right now is of something we call braille screen input. That's a feature that we built in 6 years ago to allow someone who is blind to enable them to be able to type directly on to the face of an iOS device using 6 or 8 dot braille. We support over 80 models -- excuse me. 80 international braille tables. So that braille screen input is very robust and would support a lot of different languages for different use cases.

And so it's something that we find users have really embraced as members of the blind community.

One of the other things I want to show is in regards to math and data. One of the other things we supported for years is mathML. In support of having individuals who are blind being able to read and work with different complex equations, but one of the things we just launched this past year is work in terms of sonification of charts and graphs. So I'm going to run a quick demo of this sonification. It's going to give you an idea of how this system gives additional information around a graph on the screen.

[Synchronized speech] temperature verses miles hiked. Temperature Fahrenheit 57... data comprehension. Play graph. [Ringing]

Complete. Describe data series. Decreasing linear very strong association. No out liars.>> Sarah: So that's an example of some of the things that can be done with that sonification. It is something we are really excited about to have in support of students who want to work in the STEM realm, ensuring they are able to continue in science and mathematics and engineering in a way that works for them and the content that they work with is always accessible.

This type of sonification works in iOS in things like pages, keynote, numbers. It works with health data on a device. It works in things like the stocks app. So in working with financial stock information. A great way to hear what's going on today in the market.

Moving on to another features speak screen. Speak screen is a text-to-speech giving the option to speak or have text spoken back while you are on a page. This can work with anything from an e-mail or any text on a screen to reading full books.

The action is to do a two-finger swipe down from the top of the screen once you enable speak screen in settings. It will read everything from that point on until you tell it to stop by tapping. You will see on the screen right now is an image of speak screen. It shows the speak screen menu that shows up when you enable it that would give you the opportunity to pause, move forward, backward, or whatever you need to do while using it.

One of the other things that speak screen has though that I really love is being able to do highlighting. That can be done as either word by word or sentence by sentence or both together. You can choose the color that you would want to do the highlighting and it moves seamlessly along as you move through content. That multimodality is a great feature because for students who for example has dyslexia, great opportunity to not only have the words spoken out to you but also be able to have words highlighted and see that has it is spoken for better comprehension. There are -- there was a study done back in the 80s that was called the 32-million-word gap that I have looked at a little bit in regards to text-to-speech. They looked at families that came from lower income families to middle income and then high-income earners. Looking at the fact that children in the different groups were exposed to very different levels of spoken words per hour. In fact they found that in the -- what they referred to the professional homes -- they were exposed to more than 1500 words an hour than those in the lower income homes. Over one year that amounted to about 8 million words. By the time children are getting into preschool gave a gap of 32 million words. They found that there's a gap in terms of tone in the complexity of the words being used.

Regardless of one would look at this and see it as a total of 32 million words or something less or more or whatever it might be, just that element of not having that exposure is so important in terms of being able to prepare a child for later on in life and having that knowledge of words and the complexity of words throughout time.

So, really sort of looking at text-to-speech not just as a tool for reading disabilities, but also looking at this as a tool for early childhood development and also we are seeing it used for language learners. Whether that be here in the U.S. and the statistic I had about 1 in 10 students in the U.S. is an English language learner but for any language being able to improve that reading comprehension and the multimodality of having the words being highlighted on the screen while trying to learn that language can be really valuable as well.

Another tool being able to invert colors. Whether this be done through tools like smart invert or dark mode on a device, being able to provide a version that is lighter letters on a dark background. There's research shown that this can be beneficial for individuals with reading disabilities. Some of it might be personal preference. Whichever way you are better able to take in the information and have that comprehension of whether it be dark letters on a white background or white letters on a black background gives the ability to personalize your usage and customize it in a way that works best to you.

Even for individuals who don't self-identify as having a disability, one of the other things we find is this is a great tool for night reading. It can cut down on some of the eye strain that you would have from a bright screen in a dark room. So just a way to help for any type of a reader who is trying to better work with information in a dark area. Also a feature called safari reader. This is a great feature that's built into the safari web browser. As you go to a news outlet and go to read articles, we find that while the article may be a fantastic read, surrounding the article is all kinds of other information that may pull your eyes away from what you are trying to read. So for example it could beads running or animated gifs or whatever. Tons of different types of material that would keep an individual from keeping their attention on the content that you want them to be reading.

So with safari reader by tapping on the set of letters of the two A's at the top of the screen, you can invoke safari reader and set it that any time you go to a page that you can use safari reader it will convert over. This clears all the clutter on the page and leaves the content of the article along with any media associated with the article. It means that all of the ads or links to other elements at the bottom of the screen, other articles all get pushed away. So it just comes down to the content that you want to be focused on. Within that safari reader option, you can also do things like choose the text size that you want to be using, you can change the way that it shows up so whether you want that to be with the black letters on a white background or different elements of black to gray. So a lot of different options to be able to read something more effectively.

And tools like safari reader work really well with voiceover and speak screen. So having both of those as options for auditory reinforcement, as well as while using safari reader on a page.

>> Richard: This is great information. We have great questions coming through. So what do you think? Another 10 minutes of the presentation and then leave time for questions?

>> That sounds great. I will hit that on the dot if I can. Maybe a few minutes early. So these are a few of the features that are available to support a wide range of use cases and in particular those who may be blind or low vision or have reading challenges. When looking at reading books or other content, just great tools to enable on your devices to make sure that you or the students that you work with have the opportunity to be able to take in that information really fluidly.co.

A couple other programs I want to bring up before Q&A, one of those is everyone can code that's built around some of the work we have done with swift playgrounds. We created swift playgrounds which is an app to teach coding to individuals. It is an app that was designed to -- we game based -- the idea is to move through a series of puzzle words and as you do so you learn to code and putting in the coding elements to get the characters in these games to move through and accomplish the goals that they are trying to do. When we built this in 2016 we built it to be fully accessible. And so we were finding out that working with schools and finding out if there were students that were blind, deaf or had physical motor limitations that were using this to learn to code. But as time went by, we actually felt there was more we could do. In 2018 we started a program to really look at not only all of the resources that were currently available for every school and making sure that those were fully accessible not just from the perspective of whether a screen reader user could use them but also just that every activity was done in a way that would give you options to learn to code using activities that were accessible to all, but also looking at whether there were additional resources that we might build that would be helpful too.

So we actually worked to build a couple of additional swift playground resources which included tactile puzzle world maps. So as you move through the puzzle levels in order to learn to code, we made actual brailled materials that were images of these puzzle worlds. So a student could follow along feeling what the puzzle was, where the character starts out, what they are trying to accomplish and then be able to use that with voiceover to go through the process of whatever that stage or level of the game would be.

So something that for some students they may work solely with the information on the device and be fine. For others they may want the additional resource of having an actual tactile puzzle map. Those are available through a couple of different resources in the United States. You can get them through the lighthouse for the blind in San Francisco. RNIB in the UK has been producing them for the European market. They are available in UEB and you can also if you have your own embosser you can download the files from our website so you can produce them as well for your own students. We also developed videos in American sign language as well to support this and worked with two great engineers from the [inaudible] lift who talk about how they got into engineering and coding and then how to explain a lot of the things that you need to know in order to really get the most out of coding. So really looked at creating resources that were not just for the general public but looked at these audiences as being unique and what might be tools that would best support the learning experiences of those students.

The slide that's up now is a quick image of a drone flying above a group of students in the middle of a library. This was actually done at the Texas school for the blind. We came in and did a workshop around everyone can code with the students there. Within an hour of using the -- getting through a couple of levels of swift playgrounds they had taken what they were learning in that and applied it to a couple of drones that we brought with us. So these were the students who were already learning how to control drones and same with robots and all kinds of things. There's a lot of really cool things that could be done with the learn to code -- or the everyone can code resources to help students really get a foot hold in the realm of coding.

Another program I want to bring up quickly is called everyone can create. This is a program that focuses more on the creative side of what we do at Apple. It's about recognizing the power of creativity and the fact that there's an artist in all of us.

We know that it can have a profound impact on self-expression and communication. We see this on multiple fronts. From individuals who are autistic to those with developmental delays, those with sensory disabilities. All kinds of different things where conventional verbal communication might not be the right fit for sharing and expressing oneself. It could be that written communication isn't the best modality either. Some students are just better able to communicate when they are doing their work in a creative format. Creating a video or a song or something. So this really taps into everyone can -- those elements around creating and in the everyone can create world.

I encourage you to look at both of those programs which you can find in the education area of Apple's website. Really quickly just a couple last things. We definitely see that the intersection of our values of education and accessibility is around equitable technology and we want to help level the playing field. If we can really teach students, teach kids how to use technology and turn it into a valuable tool kit it will help support them for life.

A couple quick resources before I jump into Q&A.

There are great things that we have done around remote learning in this time frame. One of them is the app store has a number of great collections to support educators and parents. That includes everything from things like the learn and study from home to remote institutions to accessibility app collection that we have available as well. There's also an education learning series with a growing series of videos designed to help educators use the built-in features of their Apple products. We are also doing a different types of virtual conferences that are led by Apple professional learning specialists. These are follow ups to the learning series we have. Those run for about 30 minutes each. They give opportunities for educators to engage with teams. There's the Apple teacher learning center which is a self-pace professional learning program. It offers unlimited access to materials and how to use technology. Tools on how to use the iPad and Mac and how to engage students.

I'm going to end on this slide and leave it up for a little bit as we start to move into Q&A. This gives you an idea of a number of different resources we have that are available to everyone. Apple.com/accessibility is our subsite under Apple.com that covers the depth of our accessibility features. You can find out more than what I talked about today. Accessibility @ Apple.com you can write us with questions. We have phone support at (877) 204-3930 in the U.S. There are options in other areas around the globe too. Look at the contact us page to find what is available in your area. And our Apple support twitter handle gives information around how to use our technology in general but often gives interesting tips and tricks on the accessibility features of our products. I definitely recommend subscribing to that and following us. With that Richard do you want to share questions?

>> Richard: Absolutely. Let's see how quickly we can move through them. We will start at high level and dive deeper into topics. At the beginning of our presentation you talked about the numbers of people globally with disabilities. It's said that most live-in developing countries. I wonder if there's something you can share in the efforts to ensure that folks in less well resources areas get access to these amazing technology?

>> As a global company we are working to ensure that our technology is available in as many places as we possibly can. In our view as long as we have the option and ability to work with a country to set up sales, to be able to get all of the proffer elements in place we want to have our technology available.

>> Richard: A question asked about voices for new languages or less commonly spoken languages. How does one go about adding that capability?

>> I would say probably the best thing you could do would be to write to accessibility @ Apple.com and share what your priority languages are so we can take a look at what is feasible. We continue to add voices to the operating systems in general over the years. We want to always make sure we are doing that with the best resources that we can but always happy to look at where there's opportunity for improvement. So please share some of those through the accessibility @ Apple.com account.

>> Richard: Thank you for that demonstration you did of the graphs sonification. Matthew asks where’s the data coming from that was processed by that? Is that available in other apps like maybe Apple books?

>> So the data is data that has been input as part of that graph. So behind the scenes is where you -- as you create a graph in pages, you are given what is on the columns and rows, X and Y axis. So that is inputted in and the output is what shows up in the graph. Hopefully, I answered that if that's what you are getting at. In terms of where it's available, it is available in all of the iWork elements pages, numbers, and keynote. At this stage I would say it's not yet available in books, but we do understand the value of that. So I think we are -- we don't talk about unreleased products, but we understand there's value to making that happen.

>> Richard: Sticking with books for a couple more questions. Catty asks about using books on an iPad noticing that alternative text for images isn't read. Is that something that needs to be switched on?

>> I would be curious to know what type of book that is. Catty if you wouldn't mind sending that to accessibility @ Apple.com, so we can check on it. If there's an accessible description, it should be read out. It is something built in to first iBook’s author and then pages for the export to books. I would have to take a look at whether that's something that you are creating or whether it's coming from external source or whether it's -- what it was built in. Our goal is to be able to read out all accessible descriptions. So it may be a bug or a way something is produced. We can definitely have some folks look at it so if it is a bug in a specific type of document that we can try to fix it.

>> Richard: Richard, not me, another Richard has a comment that's related to Books. Richard says that learning the Mac was so much easier for him because he was able to use the track pack functions which is the same as the touch screen. You mentioned this. Richard wonders what work is being done to make sure the apps behave across the different platforms, so the user experience is more consistent?

>> I assume you are referring to third party apps.

>> Richard: He mentioned Books. Great that he can use the touch pad and use all the learning of the touch screen but when he uses books on the Mac he found the experience was different using it than on the iPad or iPhone. This is what I interpret from Richard question.

>> I can take a look at some of the differences. It may be that the same gestures work across but the way something works -- how it's optimized for one operating system to another there might be a slight difference. There are more and more apps being developed with a base of iOS to work on the Mac which helps deport accessibility. That's why I was asking Apple or third party? It would apply to both. Being able to create an app and port over to the other operating system and bring accessibility with it. So all of the hooks for voiceover or switch controls or any of the kinds of things we build in allowing those to port over. So with that being said, we are starting to see more synergy coming up for most apps out there. We are working to try and make the experience if not the same given once again there may be differences on operating systems that make it better to have some differences but something that at least brings the accessibility and gives an experience that's fluid across both.

>> Richard: Here's a related question from Marcy. Apps still make it to the app store that are inaccessible. What's the process to go through a check list before they are allowed on the platform?

>> We work with developers pretty closely on giving them all the tools to make an app accessible through the API's that we have available. So a lot of things that developers can do to make their apps accessible and to test through the accessibility inspector. This past year we worked on a tool to help for developers that don't make their apps as accessible as we would like to help them in that cause by using machine learning to identify elements within apps that may have otherwise been inaccessible. So imagine if it's a video playing app that it says button possibly play. So working with apps that are not as accessible as we would hope them to be and take that heavy lifting off so that we can just help the community have a better experience.

>> Richard: Great. So just to illustrate we have a global audience. Terra asks a question saying he encounters with voiceover pronouncing words in his language which is Hindi.

>> We love details. Use the accessibility@ Apple.com. If you have specific examples and as we work with individuals who are native speakers within the company that helps us to make sure we are giving a -- a good starting place for people to check on that and help us as we try to fix those problems.

>> Richard: We had a surprising number of questions related to those developing braille devices and looking for support and ensure they provide support to folks using Apple technology.

>> I would say the first step is to look at the braille hid that was developed industry wide I believe it was in 2019. This was a standardized human interface guideline around supportive braille which codified a lot of the different commands and such in order to both make it something where if you are using that hig it would seamlessly connect products industry wide. So whether you are using an iPhone or Mac or some other type of product that you could do that sort of seamless plug and play by having the standard element and then codify across other elements, so it creates ease of use for any braille user.

And that is available out in the world and something that we worked with -- really everybody in the industry got together whether it be the manufacturers of the consumer products or the braille displays or the screen reader manufacturers to make sure that we had something that covered the needs of everyone. So I would say starting with that we are looking at that as sort of our baseline for future additions to our list of braille displays that we support. That's the first question that gets asked is did you build this to the hig specifications. So I would start there.

>> Richard: Wonderful. Thank you so much for rattling through so many of those answers and helping us get towards the top of the hour. I wonder if you can move the slide forward to the closing slide. While you are doing that. Sarah thank you so much and the image of the blind students at the Texas school for the blind with the drone over their heads the sheer joy on their faces will last with me for a long time.

>> Richard: OK, we’re coming to the end of this session. Sarah, thank you for sharing your wonderful insights and information. And thank you to everyone who joined us for today’s webinar. Coming up in the next few weeks we have some more wonderful topics for you:

On June 3rd will be the second part of our feature exploring the revolution in born accessible digital publications: “The future of accessible publishing and standards – where are we going? “

And on June 10 we’ll be learning about some legislation that will impact on one of the world’s largest marketplaces- “The European Accessibility Act: considerations for the publishing industry and benefits to consumers globally”

On June 17, in response to many requests for this topic, we have “Describing Images in Publications – Guidance, Best Practices and the Promise of Technology” Find out more information at daisy.org/webinars, where you can also sign up to the webinar announcement mailing list to learn about new topics as we add them. If you would like to suggest a subject, or if you are considering presenting a webinar, then please email us at webinars@daisy.org

I hope you will join us again next week. In the meantime, thank you for your time and have a wonderful rest of your day.