A Future Date | XR Access Improving A11y of VR AR MR - Bill Curtis-Davidson and Dylan Fox.mp4

BILL CURTIS-DAVIDSON: Hello, everyone. We're glad you could join us today for our session on XR Access, which is about Virtual, Augmented & Mixed Reality for People with Disabilities. My name is Bill Curtis-Davidson. And I'm one of our hosts for today's talk.

My role in XR Access is I am a leader of the guidelines and practices working group, which we'll learn about during this talk. I also am the accessibility leader at Magic Leap. And I'm joined today by my co-host Dylan Fox.

DYLAN FOX: Hi, everyone. I'm Dylan Fox, the application accessibility group leader for XR Access. And today I'm going to run you through what XR is and why accessibility for it matters.

So what is XR? XR stands for extended reality, which is an umbrella term for a group of immersive technologies that mix the real and the digital worlds to various degrees. So virtual reality involves full immersion into a new virtual setting, covering up the user's vision and putting them into a simulated reality. We see on this slide an example of this with someone wielding a sword immersed in a fantasy world and combat against a virtual foe.

Augmented reality involves augmenting the world with digital information. So here we see someone looking at some manufacturing machinery through the camera of a tablet. And on that tablet, they see additional digital information overlaid on the real image of the machinery.

Finally, mixed reality merges the physical and digital worlds, bringing digital objects into physical spaces. So here we see a group of designers wearing Magic Leap headsets and discussing a digital car model that floats in the air in front of them.

Now XR is already in use in a variety of different industries. On this slide, we see a collage of those uses. We see VR for education with a boy wearing a headset reaching out to touch his studies. We see VR for entertainment with a man wielding motion tracked controllers against dinosaurs and aliens. We see AR for communication, letting us see faraway colleagues as though they were in the same room, and AR for navigation, seeing Google Maps instructions superimposed on the real world through a smartphone camera.

And we just see all kinds of different 3D models and reviews. We see a family looking at a hologram of a dinosaur skeleton in the museum. We see architects reviewing a house model. We see doctors, both remote and on-site, reviewing 3D brain maps. So there's just a ton of

ways that people are finding to use XR in productive and entertaining ways.

Now as we look at all these, consider a question. I'll have a couple of these throughout the deck. What XR applications are you already familiar with or using? Go ahead and type your answers in chat, because we're there, and we're looking forward to seeing them.

Now the question that brings us here today is this. How can we ensure that the future of XR technology considers the needs of people with disabilities? We don't have all the answers on this already, but we know it will take both new and old techniques to make that happen.

First, XR accessibility is still going to have to utilize many of the tools and techniques that have been developed for traditional technology systems. People have huge variation in their abilities. Some people may have visual or cognitive mobility or hearing disabilities of various kinds. They may have combinations of disabilities unique to them or other ones that don't cleanly fall into any of these categories.

Now we have decades worth of studies and practices that show us how to make applications accessible to people in all of these categories for a whole variety of existing technologies. And it's going to be important to take all those into account when designing for XR. And a very few of this just goes out the window.

But in addition to that, XR offers some unique new challenges as well. For example, there are a lot of motion-tracked VR games that expect their users to be able to jump, and duck, and dive, and turn to fight enemies or solve puzzles. But that doesn't work very well for, for example, people in wheelchairs. On this slide, we see someone in a wheelchair using a tool called WalkinVR to simulate motion controls so that he can enjoy the game without needing to be able to move his lower half.

This kind of innovation is going to be necessary to define a new generation of inclusive design. And it's worth noting here that the curb-cut effect is in full swing here. Techniques like this help not only people in wheelchairs but also those who don't have a lot of space to play or a job that keeps them stationary. Making applications more accessible benefits everyone. And in addition of that, there's some traditional techniques that actually need to be reinvented in the context of XR. For example, people who are deaf, or hard of hearing, or who have cognitive challenges, or who are language learners have long benefited from subtitles and captioning.

Now in 2D, the captions can simply just go in the bottom of the screen. But in XR, there are all

kinds of new spatial challenges with that. So you can have situations where the source of the audio could be behind you or somewhere out of your view. Maybe there isn't a bottom of the screen to place the captions on if you're in a full 360 world. And objects can come in between the user and the captions, which could potentially cause occlusion or motion sickness. Now developers like Alchemy Labs have started to address these challenges.

We see on this clip their game *Vacation Simulator.* We see the user holding a watering can and talking to a gardening robot in a park. The robot has captions that start next to it. But as the user moves to the right to water some flowers, the captions remain visible, showing an icon of the gardening bot and an arrow pointing towards it so that the user always knows who is talking, where they are, and what they're saying, even if they don't have hearing or a direct line of sight. Now since hearing users would be able to hear the spatial audio, hearing the voice of the bot from the left, this kind of captioning helps ensure that we have equivalent access for people with disabilities.

Another question to think about as we continue is that these examples represent just two of the challenges we'll need to consider. What other accessibility challenges and solutions can you think of for XR applications? Go ahead and enter some in the chat.

Now finally, it's worth noting that XR offers some unique possibilities for people with all kinds of disabilities. We see on this slide all kinds of research that utilizes XR. Going clockwise from the top left, we see from Caltech a mixed reality application with a view of real world objects surrounded by bright lines and labeled with their object names, laptop, chair, et cetera. This would enable people with visual impairments to locate objects and a range to help navigate.

From NYU, we have a mobile AR app for sign language, sign language to text and text to sign language transcription where a deaf signer and a hearing person are communicating [COUGHS]-- excuse me-- about making an appointment at a service counter. From Microsoft, we see SceneVR tools that offer different ways to support low vision access to VR, showcasing contrast lens, edge enhancements, peripheral remapping, recoloring, and more that can be applied not only to make VR apps more accessible but to objects in the real world as well.

From Cornell Tech, we see a low-vision app on a head-mounted display that helps a woman focus on different objects while grayscaling the surrounding objects. Now this would help people with visual impairments find specific things in a grocery store, for example. And finally, in the bottom left, we see from the Dan Marino Foundation, Magic Leap, a VR simulation that

employs digital humans to help young adults with autism improve their social skills.

So clearly there's many, many ways. This will only touch the tip of the iceberg of the ways that XR can help people. So another question to consider-- how do we move from all of these great ideas, and possibilities, and research subjects towards actual implementation and widescale impact? Now that is what XR Access is here to do. So I'll pass it off to Bill to tell you about us.

BILL CURTIS-DAVIDSON: Thanks, Dylan. That was a great overview. And I think everyone can appreciate that this is really-- we're in an exploratory phase where there's been a lot of great work done. And really one of the reasons why XR Access exists now is to recognize all of the great work that's happening around the world in XR accessibility, whether that's VR, augmented reality, or spatial computing amidst reality. And so we're really excited to talk to you today about XR Access, recognizing that-- and really the goal of XR Access is to advance XR accessibility by promoting inclusive design and these practices that are emerging in the industry and in all of the organizations that are part of our stakeholder groups.

So what is XR Access? It's a community-driven effort. We're not a standards development organization, but we interact with them as well as many other constituencies. We're proud to say we have about 140-plus cross-sector participants. And really one of the intentional ways that we're working is to be inclusive of all of the stakeholder groups in the community. And that includes tech companies such as the one I work for and many others who are interested in learning more about this and building better products to associations that are in the profession.

We've got the XR Association and others actively involved, XR in Learning, for example. Disability advocacy groups as well as people with disabilities who are thought leaders are involved in XR Access as well as government, education, researchers, and developers. There's a lot of great organizations doing great things, and we want to bring them all together.

This was launched last July through the leadership of Cornell Tech. Dr. Shiri Azenkot and Larry Goldberg of Verizon Media were both instrumental in bringing this effort to fruition. And now we're in a phase where, once we launched last July, we formed research, education, and working groups. So I'm going to tell you a little bit about that today and invite you to participate.

So how is everyone getting involved in XR Access? And we invite you to as well. We have a technical working group stream that's happening where-- these include hardware devices, guidelines and practices, application accessibility, and content experiences.

So we're bringing together a lot of thought leadership, pulling together a lot of resources, documenting user needs and use cases. We'll be launching some surveys to help gather that information. We also have a lot of curating of what exists out there in a body of knowledge. So we're compiling a lot of information.

We are coordinating with standards organizations such as WC3, a very important organization, of course, that we have members from that involved in XR Access. And we're sharing information with each other. And we're looking to define assistive tech features, testing techniques, practices for development.

Again, this is a beginning stage of this massive effort, which will likely be a years long effort to help ensure that accessibility is a core topic in XR technology. Of course, aside from the technical work, something that's really important that we're involved in is educating and engaging. Of course, this presentation is one example of that.

We're presenting at different forums. We have a blog post and social media-- blog posts from our website, social media such as our LinkedIn group, our partnerships and associations. We're trying to work through them to focus this topic in different associations as well our industry associations. And then, of course, there's a lot of work going on with education and research in higher ed and other venues, corporate research functions as well as public research done as part of cross-government, NGO, and higher ed.

I really want to comment on how important it's been to have support from a very important organization, the Partnership for Employment and Accessible Technology, known as PEAT, who is funded by the US Department of Labor. We've been very lucky to have this organization help lead this this community of practice. And they're really providing a lot of support. They're doing this as a part of their future of work efforts to help ensure that XR is born accessible. And really this is key in helping harness the potential of XR to break down barriers to employment and workplace inclusion of people with disabilities.

And I think all of us can appreciate, especially during this pandemic crisis, that we all need to use technology to do our jobs, to be connected socially with each other, and to really collaborate and communicate with each other. It's very, very critical. And I think all of us are getting a very important lesson with that with this crisis, of course. And there's a lot being said about that.

But some examples of accessible XR technology that are really key to the future of work and inclusion of people with disabilities are to make sure that virtual online learning and collaboration practice platforms, excuse me, support remote workers and that we can have multi-modal communication tools, whether those are embedded in head-mounted display type devices, such as VR or mixed reality spatial computing devices, or on augmented reality flat screen type implementations. Regardless, having ways to communicate fluidly and in multi-mode is very important.

And then one key area of uptake in XR is indeed in training and education, whether that's training the next generation of leaders or if it's training people who are working in a workplace like such as on a factory who might be getting spatialized remote assistance or training in the context of the work that they're doing. It's very important that we continue making sure that XR is accessible for all of these type of use cases. But there are many more as well to consider.

I want to recognize some key collaborators. I mentioned 140 plus. But some of the important efforts and organizations that are supporting us-- of course, Cornell Tech, Verizon Media, PEAT, US Department of Labor, and WC3 I've mentioned. And just to name some others-- Able Gamers; BBC Research and Development; Immersive Accessibility Project, which is out of the EU and is very, very important effort netting a lot of great research and practices in immersive media that are highly valuable; Open Inclusion; VR First; and XR in Learning. Again, there are numerous others that are involved, and we're excited to engage even more organizations.

For WC3, I do want to mention there are some really important efforts underway. There's a editor's draft of XR Accessibility User Requirements, abbreviated XAUR, that you can find online that the WC3 is welcoming input on and review of. So we encourage you to do that, to look at that.

And also there is an immersive web working group as well as an immersive captions community group. And these efforts are really helping develop the user requirements but also looking ahead to the spatial web and spatial applications that will utilize open standards. So we really want to encourage you to learn more about that and become engaged with those efforts if you see fit.

Finally, I'll just wrap up. Dylan actually posed some questions earlier. And we've been looking at any questions that are posed during the course of our session today. But I'll leave a couple

other ones here. And as time permits, we'll answer these questions during this session. And certainly, we ask that you reach out as well after the session if you'd like to dialogue with us more.

So some of the things we'd like to hear more about from you is what XR accessibility challenges have you observed and what are some barriers to overcoming those challenges. We'd love to hear your stories.

And we'd also like to know, based on what organizations you work with-- maybe you've explored, or considered using, or are already using XR technology. We'd love to hear about your experience and hear about your ideas about accessibility that may be specific to your industry or organization. So please engage us in those ways as well.

And I'll just wrap up today's session by providing a list of links. Our website is xraccess.org. You can reach us by email at xraccess.org. On Twitter, we're @xraccess. And you can also locate hashtag #xraccess. I'm on Twitter @BCurtisDavidson. And Dylan is on Twitter @UsabilityFox.

And for those of you interested in another online event, our most significant next event is going to be our annual symposium. It's the second year. Last year was our founding symposium. This year we're going to have a symposium with broader participation. We'll be all virtual July 20 and 21, 2020. And you can find out more and apply to attend online at www.xraccess.org/symposium.

And with that, we'll say thank you. Dylan, thank you for being my co-host today. We're both delighted to speak to you about this important effort and hope that you learn more and engage with us.

DYLAN FOX: Absolutely. Thanks everyone for listening. And we'll look forward to speaking with you more in the comments.