>> So we have two guest speakers today. We have Melissa Green from the University of Alabama and Jim Tignor with Tobii Dynavox. And I'll go ahead and introduce Melissa first and then let her share with us and then we'll have Jim go next. So Melissa is a Technology Accessibility Specialist with the University of Alabama Faculty Resource Center's Technology Accessibility team. A teacher, librarian and technology enthusiast, as well as helps to ensure technology users, including those with disabilities, have a functional and accessible technology experience with the University's web presence, and instructional and emerging technologies. Melissa holds a master's in education in curriculum and instruction with a concentration in assistive technology from George Mason University, and a master's in library science from the University of Alabama. Melissa embraces technology's potential to foster access and inclusion for all, a perspective informed by her work in the disability community, libraries, and information technology. All right, Melissa, are you ready?

Yeah, I'm ready. Let's do this.

All right.

Hi, everyone. Thank you so much for the warm welcome. As was mentioned, I am Melissa Green, a technology accessibility specialist at the University of Alabama. My unit, the technology accessibility unit, that makes it sound really big. It's actually like two and a half of us. But the technology accessibility team is housed as part of the university's Faculty Resource Center, which is the unit that provides support and instruction around the instructional technologies that are used on campus. We utilize the Blackboard learning management system, our office supports that as well as other technologies, such as Tegrity, TurnItIn, and clickers and so on. But my team specifically works to ensure that everyone is able to access and use the university's websites as well as technologies used for teaching, learning and conducting the business of the university. One of the ways that we do

this is by providing access to a couple of assistive technologies on a campus-wide basis. So we license two pieces of software, or really four pieces of software from two companies, and make those available for use by all faculty, staff, and students. So today, my plan is to talk a bit about assistive technology that's used for digital access in general, and tell you about those specific pieces of software that we have made available to students, faculty and staff at UA. So the focus of today is assistive technology. What is assistive technology? It's my understanding that you've done a little reading on the topic. So this is probably not news to you, but I'll share the definition as defined by the Individuals with Disabilities Education Act. According to IDEA, assistive technology is any item, piece of equipment or product system, whether acquired commercially, modified or customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities. So in other words, assistive technology is used to perform functions that might otherwise be difficult or impossible. So along with the hardware and software that people use for technology access, assistive technology also includes mobility devices, such as walkers and wheelchairs, communication systems, and devices that support activities of daily living, like bath chairs or grab bars, tools to help reach and pick up or so on. Assistive technology for computer access typically falls under two categories, input devices and output devices, and we'll take a look at those now. So conventional computer access involves using a standard keyboard and a mouse or touchpad to input information. Assistive technology for computer input works to mimic the functionality of a mouse or keyboard to provide the same sort of functionality that a standard mouse or keyboard might have. On the more standard variety of QWERTY keyboards, there's quite a big variety of alternative keyboards. Alternative keyboards may provide a more functional layout, like this Dvorak keyboard, that places the most commonly used letters in the home row so your fingers move less. Or this split keyboard that enables you to place the two keyboard halves in such a way that better supports natural hand positioning. Alternative keyboards may also be designed for one handed use. On this slide is depicted a half QWERTY keyboard that allows you to type with one hand. The way it works is that you place your hand on the keyboard in the standard position with the letters under

your hand as they would be on a standard keyboard. But when you hold down the spacebar, the characters produced by striking the keys under your hand change to those produced typically on the other half of the keyboard. Alternative keyboards may be color-coded to show correct finger placement. This can be especially helpful to users with cognitive disabilities as well as those learning to type. Some variations assign different colors to consonants and vowels. To help users understand the roles of the different characters and language. A large key keyboard is another example of a type of alternative keyboard. Bigger keys make the keys easier to locate and strike. And the larger print on the bigger keys can make it easier for the keys to be seen. Kind of in the same vein, the large print keyboards help make keys easier to see for older adults, users with low vision, or others who just want to reduce or prevent eye string. This slide depicts an EasySee brand keyboard, and it has large, bold, black letters on white keys. So in addition to the standard white on black, they're also available in black on white and high contrast color combinations such as just black on yellow and yellow and black. A variety of accessories have been designed to make keyboards more accessible to people with disabilities. Like key guards make it easier for users to strike the right key or avoid striking the wrong one. Key guards may be used by people with unsteady fingers, or those using pointing devices, which we'll talk about momentarily. Another type of keyboard edition is a moisture guard. A thin sheet of plastic that protects keyboards from spills, saliva and other moisture. Alternative keyboard labels add visual clarity or tactile information to keys like large print or as shown on the slide large print and high contrast. Tactile labels might also be available in things like Braille. So we've been looking at some hardware, alternative keyboards and keyboard additions, which are physical. Another alternative is an on screen keyboard. On screen keyboards are software generated images of a standard or modified keyboard that are placed on the computer screen. And the keys on the on screen keyboard are selected by a mouse, a touchscreen input, trackball, joystick, switch, or electronic pointing device. There's lots of possible features of these like the ability to change the appearance, the ability to load different character sets for different languages, and use things like different word prediction, abbreviation, word expansion to speed up text entry. And

this slide includes a screenshot of the Windows 10 on screen keyboard. So earlier I said that conventional computer access involves using a standard keyboard and a mouse or touchpad to input information. Let's quickly look at some alternatives to the standard mouse. These alternatives may be especially beneficial for users who have difficulty controlling fine motor movements, or who lack upper body control. For people who have shaky or unintentional arm movements, joysticks are a good replacement for a traditional mouse because they provide greater control of the direction and the speed of the cursor on the screen. Joysticks can also be used in whatever position the user finds most comfortable, including while reclining or even lying down. A trackball mouse is often easier for a person with a motor disability to operate than a standard mouse. And trackballs are sometimes recommended for those experiencing pain from repetitive strain injury or those who perform repetitive tasks. And want to prevent strain or injury. Continuing our look at assistive technology or AT or computer input, pointing devices are another alternative for individuals who may not be able to use the mouse and keyboard to input information because they have limited or no movement in their hands and arms. And there's lots of different types of pointers available from the low tech, low tech end of the spectrum, where someone might be using a wood stick or plastic stick worn on the head, held in the mouth, strapped to the chin, or held in the hand that's more on the lower tech, less expensive end. Higher tech options enable a user to control their device through head or I movement. The Tracker Pro, for example, takes the place of a mouse for a person with little or no hand movement. And when the device is combined with a small dot that's attached to a person's forehead, glasses, or the rim of a hat, users are able to access their computer in the same way that a conventional mouse provides access. So this particular device is called The Tracker Pro, it's something you would purchase. But there are also some free tools out there that you can play around with. One I remember experimenting with as part of my master's program was called Camera Mouse. And it's software that you can install on your computer and use with a standard webcam. You would designate a feature on your face as the mouse pointer so the end of your nose, your chin for example. The Tobii Dynavox enables a user to control their device through

eye movement. I'm really excited that the other panelists today is from Tobii Dynavox. I'm not going to say anything else about that. But that's another example of a high tech pointing device. Switches also offer an alternative method of providing input to a device when it's not possible to use the standard keyboard or mouse. And if a user can control one body part, they can operate a switch. And switches come in various sizes, shapes, methods of activation and placement options. Some different examples are depicted on this slide, such as the pressure switch that can be activated with the head, hand, elbow or another body part. Another example that you might see someone using for computer access or to operate a mobility device or to use a communication device is a sip and puff switch that uses inhaling, or sipping, and exhaling, or puffing, to send signals to a device. So lots of different kinds of things available that all kind of fall under the category of switches. When switches are used for computer access, they're typically used in conjunction with scanning. The scanning indicator is a visual indicator or an auditory indicator that moves through items, highlighting each item on the screen or announcing each item via voice output. And when a visual or auditory prompt indicates a specific keyboard or mouse function, the user then activates the switch and the desired function occurs. Switch Control is the iOS accessibility feature that lets you control your iPhone or iPad or iPod Touch using a switch. I'm going to attempt to play a video demoing Switch Control being used with the pressure switch. I know we've got a lot going on multimedia-wise today, so may or may not be successful, but I'm going to give it a try.

This is our single switch auto scanning set up with

This is our...

Bluetooth and iOS 7 Switch Control. First thing we're going to do is triple click our home button to turn Switch Control on. So 123. And you're going to see the scan show up on

Cool, sorry for the little, little hiccup there, I clicked out the screen. So we did set it to pause for three seconds on the first item as you saw there. And it's just going to auto scan through all the options on the home screen. We've set up Bluetooth, so the white, and the... so I'm going to go into the browser, we did turn auto tap off. So it's going to bring up this menu here to select an item, you're going to

select the first option, tap, this is going to take you into the application. So as you can see here, I was on Amazon last night. And it's going to start scanning through the web browser. So if I want to exit, I'm just going to tap either the white or orange switch is going to bring up that menu. And I'm going to wait for it start scanning here and go to home. So that is the single switch auto scanning setup. of the video momentarily. So in that case, we're looking at a pressure switch a switch that's activated by pressure, again with the hand or the elbow or what have you. In this case, it was set up as a dual switch. So there were two switches the left switch and the right switch. Left switch is white, the right switch is orange. And those were both being used for different functions. So you can use Switch Control to have an auto scan, where the visual indicator kind of moves through at a specified pace. And then you press one of the buttons to activate or make a choice. Or you can use one button to advance the indicator and the other button to make a choice. Sometimes when I try to explain the auto scan to people, I would compare it to Press Your Luck video, game show, I don't know if anybody's ever seen that. But anyway, it's sort of similar, there's a little indicator that goes around the screen and you hit a button to stop it. So another alternative to the standard keyboard or mouse is voice recognition or speech recognition software that converts spoken words to computer texts allowing the user to speak to the computer instead of using a keyboard or mouse to input text or control computer functions. Dragon is probably the most well known speech recognition software. But if you have a smartphone, you're probably already using some form of speech recognition. And speech or voice recognition can really enhance productivity for all users, but is especially beneficial for people with physical disabilities who have difficulty accessing key board. And individuals whose oral or spoken language abilities are stronger than their written language abilities. So we've looked at several examples of assistive technology that work through the keyboard or emulate the functionality of the keyboard. And that's why ensuring that the digital content you create is operable by both keyboard and mouse is so important. If you'll ensure that the functionality of your digital content whether it's your website, or document or video player, what have you, is usable with a keyboard, generally the input devices and software will take care of the rest. So that's assistive

technology for computer input. Let's move on to assistive technology for output. Conventional computer access involves a monitor or screen for information output, and assistive technology for output works to provide the same sort of functionality that a monitor and screen provides. A Braille display as is what's depicted on this slide is an example of AT used for computer output. You're probably all familiar with Braille, the raised dot printed language used by many people visual disabilities. With Braille, each raised dot arrangement represents a letter or word combination. And Braille displays provide access to information on a computer screen by electronically raising and lowering different combinations of pins to form the arrangements of raised dots. So it's a dynamic piece of technology. And if you've never seen one, anyone use one you know, I suggest looking for a demo on YouTube, it's really neat to see the pins raise and lower so quickly and see the user be able to detect what it saying. Some Braille devices or Braille displays, also include functions for interacting with the keyboard or doing computer input using Braille as well. A screen reader is a software program that converts digital text to synthesize speech, enabling the user to hear content and navigate with the keyboard or through touch input. Screen readers are used most often by people who are blind or have low vision. But they may also be used by people who have cognitive or learning disabilities, people who prefer to take in information or learn by hearing information read aloud, or who people who maybe learn best by hearing both. Some folks, for example, are better able to maintain attention when reading written text by hearing it spoken aloud at the same time. Screen magnification software magnifies or increases text and images on the screen, the size of the text and images on the screen, making them more visible to users with low vision. Most programs have variable magnification levels, and some also offer a text-to-speech option. magnification software is built into the major operating systems. But third party software typically, typically provides more functionality or features like the ability to zoom to a higher magnification level then you would using what comes with the computer or more color combinations. So that brings me to one of the assistive technologies that our team licenses for campus wide use. ZoomText Magnifier Reader is a screen magnification and reading program that enables individuals with low vision to see, hear and use everything on the computer screen.

The screen magnification tools and ZoomText can be used to enlarge and enhance screen contents. And it also has screen and document reading tools that can be used to hear information spoken aloud. There's also a feature called ZoomText recorder that turns documents, or turns text from documents or web pages into audio recordings that you can then listen to on your computer or another mobile device. We're going to take a quick look at a video demo of ZoomText in action.

Hi, I'm Kimmy Truesdell, and I use ZoomText to navigate on the computer. ZoomText helps low vision users use the computer so that they can see text at larger sizes. Some of the features include cursor and pointer enhancements that change the size and color of the cursor and pointers so that the user can track the items better. Additionally, ZoomText offers a color enhancement feature so that the user can change the text against the background color, so that it is more easily read. Color contrast is a major issue for users with low vision. This site is an example of poor contrast. In the navigation bar, they have white text on an orange background that does not meet sufficient contrast ratios, and is difficult to see for some users. Additionally, once a link is selected, it becomes a yellowish orange color against orange and as difficult to see the selection. In the main content area, there's an orange heading against the white background that also has poor contrast and is difficult for certain users to see. Focus is a major issue for users of low vision. Sometimes it's difficult to track the focus or to see when messages appear on the side. On this login form, we're going to type in an email address and a password and see if we can track where the error message appears. Once we activate the Sign In button, we will scroll around the screen to find visual indication of the error message. This error message disappears fairly quickly and the user does not have time to read the message before it disappears. Horizontal scrolling is another big issue for users with low vision. When the user has to move the horizontal scroll bar to navigate the page, they lose their place when navigating back to the content they were reading. So that was an overview of major issues affecting screen magnification users while using the web.

Okay, so we saw a little bit of ZoomText there as well as some information about accessibility challenges

encountered by ZoomText users as they navigate the web. So ZoomText we've licensed and is available for use on all University computers. The way that we have chosen to deploy it is by encouraging the network administrators and computer lab managers across campus to install ZoomText on every single computer. Our license allows for 15 simultaneous users, so it's available on every computer and up to 15 people across campus can be using it at the same time. We went with that approach because it reflects our philosophy that universal, of universal design. So making everything as accessible as possible from the output rather than accommodations. So I know many of you are in libraries, or going into libraries, or have some connection with libraries, I was a librarian before I joined this team. The library I worked at, you know, had a designated assistive technology station, where if you needed to use the software, it required, you know, identifying yourself to a librarian or staff member and having that person can set up on the machine. We don't want that. We want anyone to be able to use it, and if it will benefit them without having to sort of sit in a special chair or identifying why they might need to use the software. So that's why we've chosen to deploy it in the way that we have. While not exactly used for computer input and output, another important type of assistive technology used in conjunction with the computer is software that supports reading, writing, and learning. And the other software we have license for campus-wide use falls under this category. Texthelp is a company that offers a collection of Mac and PC desktop software, Google Chrome apps and extensions, and iOS and Android apps that support reading, writing, language and STEM subjects. And these tools have been made freely available to all university faculty, staff, on students, and students on both personal and university devices. So you can download and use them, you know, on your laptop or your personal phone just as easily as they can be installed on a computer lab or someone's work computer. We make them available through our Office of Information technology software catalog, which is essentially a web page or website where folks go to download all the software we make available. So Microsoft Office, Adobe Creative Cloud, antivirus software, as well as these tools, which again, you know is there is reflective of our belief that while accessibility and accessibility tools are necessary for some, they're beneficial to everyone. And we

want to offer them alongside everything else without requiring any special sort of request process. So one of the tools, Read&Write, supports reading, writing, language and studying and it offers a simple toolbar at the top of the screen that users can customize to meet their specific needs. It offers support for tasks like reading text out loud, understanding unfamiliar words, researching assignments, and proofing written work. And it's a especially beneficial for students with learning disabilities and English language learners. But again, it has features that are going to help anyone who's doing any kind of reading, writing or research. This toolbar is also available as an addition to desktop software as a Google Chrome extension, and an iPad and Android app. Snapverter is an add on for Read&Write. It's also available as a standalone iOS app that transforms papers and files into readable PDF documents. So after installing the Chrome app or installing the iOS app on your phone, you can take a picture of text in a book, handout or other paper-based item. And Snapverter will convert that image of text, so inaccessible text, into a PDF with actual text using optical character recognition and upload that to your Google Drive. And if you like, you can then use Read&Write to hear text read aloud and other features. So this is the one that I use the most just for me personally, again, I came to this world from the library and I'm thinking about all the times I would help a student locate a research source in a reference book that can't be checked out. You know, they rarely wanted to take the book to the scanner and scan and email themselves a PDF, they would usually snap a picture. And if they had Snapverter on their phone, that picture would be much more useful. It would be a PDF with texts that they could search, copy and paste, or again if they needed to do so, have read aloud. The final piece of the Texthelp suite of tools that we've licensed is called EquatIO, and it supports math and STEM subjects. And it lets you type, handwrite, or speak to create equations, formulas and other math and chemistry expressions. There's also a library of ready-made expressions that you can insert into a document. EquatIO also supports LaTeX, which is a type setting and markup language widely used for mathematic and scientific documents. And our users also have access to the EquatIO math space collaborative workspace and EquatIO mobile, which is depicted on the right side of this slide. It's a mobile companion that lets you use your phone or tablet to draw, dictate or take a

picture of math and add it to a document that's open on your computer or Chromebook. So again, these tools allow folks to focus on the concepts they're trying to learn, you know, what is this molecular structure? Or what is Simpson's Rule of Integration versus how do I type a square root sign? That's our philosophy around that. I didn't pay attention to what time I started talking, I don't want to go over my 30 minutes. So I'm just going to kind of quickly mention some other things and then I'll be following up with Dr. Gibson with some links to things for you to explore them on your own. I just wanted you to be aware that like the Techhelp tools, which are paid, there are quite a few free tools out there that offer some similar functionality. For example, Microsoft learning tools, these are free. And really free. You can use them with Microsoft Office Online at no cost. Or if you've purchased Microsoft Office, they can be used on the desktop. And they also do things like reading text aloud, allow for dictation, allow for highlighting, splitting words into syllables or parts of speech, just different tasks that can support reading, writing and studying. You all have access to the assistive functionality built into the standard operating systems, Windows, Mac, iOS, and Android. In Windows, you'll want to access those through the Ease of Access Center. On a Mac, Mac OS, you can find them by opening the Apple menu in the upper left, then choosing System Preferences and Accessibility. Or you can ask Siri to take you to those. The iOS operating system for iPhone and iPad offers many accessibility features. And since a lot of developers with disabilities personally use iPhones, and since iPads have been widely adopted, in so called special education, there's also a really robust collection of apps in the app store that support accessibility or function as assistive technology. I don't want to give short shrift to Android, I happen to use an Android myself, but there's really not a lot there that hasn't already been mentioned. Similar types of functionality, being able to change font sizes, color contrast, use speech to text and text to speech for, and so on. So again, I'll follow up some links that you can use to explore those more on your own. So in closing, it's my hope that this information will provide you with a better understanding of the hardware and software that people with disabilities use to access, interact with, and use computers and other devices. And that you'll apply that understanding in creating digital content that everyone can access and use. So that's all I have. I look

forward to hearing what the other speaker has to say and having some discussion with you.

Thank you, Melissa.

Sure.

We're just going to take a couple of seconds to get things set up for our next guest speaker. So we want to welcome Jim Tignor. He's a graduate of UNC Chapel Hill from Department of Occupational Science. For 18 years he worked in North Carolina public schools as an occupational therapist and as assistive technology professional. In 2006, he came to Chapel Hill/Carrboro City School District to develop their assistive technology program. Currently, he works as an AAC consultant for Tobii Dynavox. Jim's striving professional goal has been to explore how technology can increase an individual's ability to access their life. Jim is the author of techninja.org, a blog about the intersection of occupational therapy, technology, and education. Welcome.

Thanks so much. So, I'm shifting gears just a little bit because Melissa did an amazing presentation. And I was going to talk about some of the things that she talked about kind of wearing the old hat from one I was in the public school system. She did a really nice job with that. And I'm going to let most of that lie. I may look at some things later on. But what I'm going to do now is I'm going to look at Tobii Dynavox and the things that we're offering to help people access their life. We are initially creators of communication software and hardware. Tobii Dynavox is started in the US, Dynavox did, Tobii is Sweden, we merged in early 2000. We make our own hardware, we make our own software. And I want to kind of look through some of these things. The first thing that I want to talk about is communication disabilities, that there are more than 2 million people in the US with severe communication disorder that impairs their ability to talk, only 5% of these have a speech device. To me, that number is staggering. I have folks out in the field that will ask me who's my competition, who are the other competitors is out there. And my response is that the real competitor is a lack of awareness that people don't know that there are people that don't one, have access to their

voice, and two, that there are solutions for them. So that's the biggest competition that we have. We believe that communication system should increase participation in all environments. And we're going to look at that a little bit later. And I think this is going to be of interest to you guys particularly. So environmental controls, we want to be able to support timely interaction, you shouldn't have to take 20 minutes to carve out a short sentence to somebody. We want to provide meaningful language to the person that's on the hearing end, the recipient. We want to, and this is huge for me coming out of the public school setting, is that we believe that language and literacy development are crucial. So if I set somebody up with a communication system that meets their needs, where they're at now, it doesn't grow with them. that's problematic. So whatever systems that we're putting in place for folks should grow with their needs as they develop skills. Obviously, we want successful day to day interaction. And then we want to be age and level appropriate. I can't tell you how many times I've seen 17 year old young men and women with disabilities being presented with lesson plans that are accessible, maybe from a comprehension level, but are geared towards a four year old or a five year old it's not best practice. So there's a communicate, there the continuum of communication independence, we try to address all of them. We have software for the emergent communicator, we have software all the way for the independent communicator. I break it down into three categories. There's that picture based, emergent communicator, there's symbol-dependant communicators, and then there's text literate communicators. And we're going to look at some of those as we move on. We have two pieces of software that support whatever you're doing, whether it's communication with symbols, or with texts, these will grow regardless, and we're going to look at some of those. Let me actually back out and I'm going to open one of those. So this first one is called Snap + Core First, and where did it go? Here we go. So I want to show this all to you all, because I think one of the things that I've encountered in North Carolina is a lot of different languages in the classroom. So we have kiddos that are coming from all over the place. North Carolina, last time I heard this statistic was a few years ago, but we had one of the fastest growing Spanish speaking populations in the country. So this software, if I, before I even set it up, if I pull

down a menu, I can choose from a variety of different languages. And every few months, we update this, and we put out something new. They don't really tell me what they're working on, it just shows up. But what I'm going to pull down for you guys to see is the bilingual English/Spanish. And then the next step that we do is we create our user and I'm not actually going to log in here, I'm just going to call this UNC test. So I can choose a voice, we have about 40 different roles. When you're online, we have just a handful here, when I'm not. I'm going to go with Josh. I'm going to move forward, you can help improve the software by sending anonymous data, we always like to do that. So some of our communicators are using a single button, we're talking cause and effect. You're going to ask one question, and they're going to have one response. Some of our communicators are using an 8 by 10 grid. If you were to look at the grid set that Dr. Hawkins was using, it probably looked more like this, we're going to have somewhere in the middle for starters, and we'll do a four by four. And then it's going to create my new user. So this is a communication system. Most communication system these days use some form of core language. And that's what you're seeing here on this page. Core language has been decided to be about 700 words, those are words that we all use in any environment. Dr. Karen Erickson here at UNC's been doing a lot of work with that, and helping us kind of understand what those words actually are. So these words can be used pretty much anywhere. Then you've got your fringe vocabulary, those are words that might be important to me, I'm a mountain biker. So I want to talk about my derailleur and my helmet and my handlebars, somebody else here may not be a bicyclist, and those are not your fringe words, you may have a different hobby. But using my core words and my fringe, I can build a sentence. So we'll just go with calling. So I like calling. And then when I hit the button, or up top here. It will speak if I was logged in, I'm not logged in. So normally this would speak out, it would have a nice robust voice, I'll get that working before we're done here. The back button brings me back. Sometimes you don't want to build a sentence, somebody asks you, hey, you want to go to the library. And I'm just going to hit yes. And it just speaks, yes. So we're not building sentences. Underneath that we have topics. And these are pre-loaded topics that will help you in most any environment that you might be in. And I'm realizing that I have this set

up for a tablet, which would mean that I could swipe. And this is not a tablet. So let me go in here and change my access method, which is a good point to say, this software can go on any kind of a tablet and iPad, and, not any kind of iPad or a Windows 10 tablet, it can go on a Windows 10 computer or a Mac Book, it can go on, for somebody that uses switch access, like Melissa was talking about earlier, direct touch, they may have a key guard to help with that direct touch, they don't have the fine motor facility, or Eyegaze and we're going to look at Eyegaze a little bit later. So we're going to call this Gaze interaction for now. Because that brings me up this arrow. So I can now scroll down. So if I were to go into desk work, for example, I really do want to log in, bare with me while I bring up voice. Because I think that that will be important to hear. We're going to adapt...

You can use my hotspot if you want, it's 101.

Is it? You're my hero. It's secured, you want to put your passcode in?

The @, the, capital D, capital C, capital L, 2016.

I think I hit one too many. Saved. All right. The pressure of a ton of eyes. And videotaping. There we go. Thank you. Appreciate that. So, this is a kid's voice.

Is that right?

And I meant to show you guys this, this little Spanish button when I toggle that [in Spanish]. So it switched it over instantly. Now I'm not bilingual, I have been told by a couple of folks that the Spanish grammar is eh, but we're working on it. But it's a pretty amazing thing that that is throughout all of these words. So I'm going to go back to English because I'm not bilingual. So the other thing that we have are a number of supports. So this software we're often using with young kids, maybe kids on the spectrum with autism, maybe it's just a behavior issues, maybe kids that struggle with transitions, staying on task, accessing the curriculum that's being presented to them. So, we like to...And my Eyegaze is turned on, let me turn that off. So if I click on supports on the far, your far right, it brings up a couple of tools. So there used to be, in the school districts, a piece of assistive technology that you could buy from a

company, it was a clock about this big, and I'm looking at you because I know you've seen them, and it looked like this. And it was red and you would tell a child that was struggling with transitions or staying on task, we're going to do this activity for this amount of time, they have to be able to tell time, when the red dot disappeared, they were done. They were about 30 or 40 bucks. So we build this in. So now we have a red bar across the top, the default is five minutes, the kiddo can keep working and communicating with their software while they have this timer. So this is a really nice assistive technology feature. We also have a set of first, thens, so these are all unique for every topic.

 Look at directions on the board and complete the work. > So if I was going to sit down with a kid who has struggled with staying on task, we might do this first. This is laying down the behavior expectations. If I was dealing with a kids that was verbal, I might have them verbalize it. In this case, we're going to have them verbalize it using the software. We also do workflow schedules. So again, kids that struggle, maybe they get anxious when they don't know what's next, maybe they don't know how to sequence things. So we can build these on the fly. Each one of these will talk -- I won't go through each one. But I think you get the gist. A lot of our kiddos needs scripts, they walk into an environment and they don't know how to initiate conversation. So, sorry, let me go back to something that might... We'll go to the playground. So if I go out to the playground.

 We have a playground at school. I like the swing.

 So this is a conversation that a kid might have with another kid if they're not able to initiate on their own. So now they're able to have this interaction. And you can add to this, you can edit it, you can put as much on here as you want. But you can get a nice flow going. The other thing that we use with our kids on the spectrum is a tool called social stories. And these are stories that are pre-written, usually with the child, if they're capable. So they're going to do something maybe on the playground where they are struggling with behavior issues, if you can help them set out what the social expectations are, what the social story is, and then they can read it, or have it read, or use their software.

When I want to go on the swing, I just ask. If other kids are on the swing, I will wait for my turn. I made share the swing is buckled before I go.

So we're taking these strategies that are using a lot of different educational environments, and we're kind of submerging it into the software. So this allows the kiddo to kind of have a handle on their behaviors. Underneath topics, we have a series of keyboards. So the default keyboard matches your grid size. And this is not a very functional keyboard. So usually, the first thing that I do is I go into my edit mode, which is in the top right, and then go down to you no, page set. And then I go to my keyboard page, actually, let me go to page and then grid size. So the overarching page set is a four by four, we don't count the navigation bar. I don't want to match that. I want to change this to a full blown keyboard. And this keyboard is an ABCD keyboard, a lot of kids that are learning and really just starting to explore the alphabet. That's the kind of keyboard that they might benefit from. But some of our kiddos or young adults, they don't need that kind, they need a QWERTY. So I can go into here. And I can change this keyboard. And spell it correctly. So when I come out and then I go back in, did not shift. So this is a software issue that I have to send up to my engineers. But in the Spanish, it does not seem to shift to QWERTY. So we're going to fix that. And I'll show you when it's in the normal form and a little bit. We also have in the blue, this is word prediction. So you can decrease the amount of texts that a kid's doing. So this software, really flexible. When I first started in this field, I remember, probably eight years ago, when the -- when the Obama stimulus funding came out, I got a phone call from my director, and she said I have good news and bad news. The good news is we've got about $750,000 for you to spend. That was on a Wednesday, the bad news is I need a PO on my desk Friday. So I didn't have a chance to do a needs assessment, I didn't have a chance to go talk to teachers and staff and therapists. Me and my team just said, we're making some decisions. So we purchased a couple of devices, this was eight years ago, 10 years ago? Two of the devices, so they were they were similar to my Eyegaze, or rather my tablet right here. Two of them are still in the boxes, because they were so hard to make changes. To edit every time you changed one button, you

would have to pull out a manual, and you'd have to retrain yourself. And I'm telling you that story because what has happened in the last few years with technology is that we're not seeing the same device abandonment. And the device abandonment, and my field is a big deal, because some of my systems costs the price of a gently used Honda Civic. And if they're abandoned because caregivers are overwhelmed by the programming? That's the problem. So I tell families, if you can play Angry Birds, or Words with Friends on your smartphone, I can teach you how to program this software, that's huge. I'm going to minimize out of the Snap + Core first. And the next piece of software that I want to look at is called Snap Scene. And I really like this software, we initially made this for the emergent communicator, for kids. We're finding that we're using it a lot with adults, we're using it with folks with aphasia, we're using the folks maybe with traumatic brain injury. And let me show you kind of what it's about. It's really simple. This blue column is basically books. The orange columns are the pages within the book. So this one says basic concepts. And when I click on that, it brings up some new pages. So these are kind of set up with kids in mind. You click on this little square, I'm referring to the square not the circle, I do know my shades. So, this is easy to make on the fly, these are set up for kids. But if I were to go to the top right, and go into my edit mode, I can make a new notebook. And we're going to give it a picture. Why not? We'll hit check. And now we've got this new page set. So I'm going to go in again. And, let's see, we'll do silly picture will hit check. And here's where this is beautiful. If I go up to this hot spot, now I have a pen. I'm going to hit record. Those are my glasses. Hit done, I hit check. And... I need two pairs. I'm going to come out of edit. And so now I've got this page with these two hotspots. And when I touch this

Those are my glasses.

And when I hit this one, I have to be patient

In need two pairs.

So the functionality of this is that one, it's wicked easy, you can make these really fast. I am seeing the folks at the VA working with vets are taking pictures of the veterans refrigerators, and then circling the things that are

important to the vet. Maybe it's a Coca Cola, maybe it's sandwich meat. So they're able to make choices on their own, without having to assemble core words, without using a keyboard, without having to read, it just look at pictures. And they hit a button and they go, I've seen speech therapists take a picture of maybe four different activities on the desk, circle them, put a name to them, and then let their student pick which one they want. So, similarly, you could let people make choices about movies or books or whatever. Really simple, really easy to use. This software is the free, you can get a free version that lets you make I believe it's seven pages, software itself is $49. So it's really pretty affordable. The other software that I showed you before the Snap + Core First. That was, up until December that was $180, which is about $50 cheaper than my nearest competitor. It's now 4999. And it's going to stay at that price. So for school systems, that's huge for families that maybe don't have good funding insurance, that's huge because they can afford it. The other piece of software that I want to show you guys, so this is called Grid Three. And this has a couple of different functions to it. So the first one is text talker. And I use this particularly when I'm working with well, anybody that can read and write. I use this a lot with adults with ALS. And it's just like the keyboard on your phone. I write a message, I can use word prediction. I can also use sentence prediction up top.

Please don't change the subject.

And it puts the message up in the window. It speaks it out loud. If I like this message. And this is a message that I think I'm going to say a lot. If I come all the way over to the balloons, and I click on that, it brings me into this set of pre-banked phrases. So the advantage of a keyboard is you can be spontaneous, right, you can say what you want to say. The downside is if, I don't care how fast you are, it's a little bit slower. And for some of our folks, it's a lot slower. If you're using Eyegaze, it's challenging. So you want a balance of spontaneous keyboarding, and pre-banked phrases. So the left and the right columns are categories. And when I touch a category, so let's go to medical requests or medical appointments, these phrases change. I'm going to go back to...about info requests. And let's say that I like this sentence up here, this is something that I thought I was gonna have to say a lot, maybe the

people keep changing the subject. So if I go down to the plus, and I want you to envision that I'm doing this with my eyes and not my hands. And we're going to look at that a little bit later. But if I use my eyes to access that button, and I click it, Everything turns green in the middle and I get a new empty box. And when I look at that empty box, it gets filled with that message. So the person that's not able to access by touch or keyboard or switches could use Eyegaze to add their own messages and really take control of their communication. That, to me, is really powerful. So we're going to noodle around with this for a moment and see if I can make this. It'll show up while I do it. And that will be interesting. So I just plugged in. Yup, that's going to work. So this right here is a Tobi Eyegaze, EyeMobile plus. This has got a series of infrared cameras in it. We're the only company that uses what's called light pupil and dark pupil. So some of us that are a certain age, remember that back in the day, people would take a photograph for the flash and everybody would have the red raccoon eyes. So that's the light pupil effect the light is reflecting off the back of your retina. The dark people is when you get a kind of a smart photographer and they might put a light off on the side. And now you no longer get the raccoon look. That's the dark pupil. So we use both of those. And what that does is it means that I can calibrate my Eyegaze in this low lighting down here in the dungeon, I can then go outside to the most beautiful Carolina blue sky. And I don't have to recalibrate. I call this the dungeon. When I was in OT school here, we were not in the new site, the new building, we were in a proper dungeon. Okay, so I think that you're going to be able to see. Yeah, so look up on the screen, and you're going to see an orange line that closes into a circle. That's my eyes engaging with the Eyegaze camera. So we're going to start by going to the trash cans.

I really like being here.

So that's Eyegaze in a nutshell. I'm going to touch like it's a tablet. So I'm going to show you a couple other bells and whistles. We're going to go to Grid Explorer, we're going to do this little game here. Either one of you, who wants to come Eyegaze? So we're going to do, let's see if we can do this without going to the full calibration. So move forward, come back to... Okay, so that's you. And if you move in a little bit, it goes red, which means you're too

close, so move back just a little bit. And if you move back even further, it's going to go red again. But there's a good window that you can move within. When I first started this, we would take a ruler, or measuring tape and we would go from your nose to the screen, you'd be 18 inches away and you couldn't move and we spend about 30-40 minutes calibrating the system and then it may or may not work. We're not even going to calibrate for you. So what I want you to do is look at the start. And take a moment because I have a lot of software open. Right, so you're the bicyclist and you get to perform these different activities like leading a circle. So let's try me jumping the rocks. Want to go? [Game noises] So she's finding that it's not quite going where she wants it to go, so we're going to make it a little bit easier. And we're going to go into settings. And we're going to go into Eyeguess, and we're going to calibrate, you're gonna have five dots. I want you to watch those dots with your eyes. You don't have to stay rigid stock still, just kind of comfortable. So you did a really great job, you got all green, let's say that we weren't happy with just as top left one, let's say you yellow. lick on it again. And you're going to do just that top left one. So we can really calibrate it for a good reading. And now try it. It's going to be easier. [Computer noises] Hit something on the left. That will make that full circle. So using your eyes, I want you to go to the greens circle. Now I want you to go into chat. Let's go to the Zs. Now you can look around without it taken off like a runaway train, okay? So I want you to write a sentence for me. And from about what you just did. So when you're ready, go back to the Z. [Game noises] When you're ready, if you look at this speak button.

Biker biked on a hill.

Fantastic. Didn't she do a great job? So, I show the game, because I think these games are really important. This is not communication. And that's supposed to be a big part of my job. But I know that with young people, I got you to calibrate it, and you did a great job. But some of my young folks, they don't have the attention span or the interest or maybe the comprehension of why they're doing it. But if I can get them playing the game, then we can establish that they have the skill to use Eyegaze. Communication is a whole nother issue, right? But if we can kind of remove the question of access, can they use the system, then that's a huge step. So I think that's really

important. The other piece, I'm going to show you all and so this is computer control. So you notice on the far right, I've got left click, double left click, right, and a keyboard. And so I can use my eyes. And I can also go down to... I don't know if it's going to work because it's calibrated to you, I might have to calibrate it again. So I can bring up my keyboard, I can go back to clicks. Yeah. We're going to calibrate it once more. So if I go up to left click and it takes a little practice. So you get this target that shrinks in, and it's selects it. So my eyes are getting dry already. This is the thing that I tell people. Eyegaze is challenging. It's so much easier than it used to be, tend to get a little dry eye, brand new users will sit down and they will not -- I have adults that I put this in front of. And I tell them, I say you need to take a break after 15 to 20 minutes and I get a phone call later that night, I got a headache and their eyes are sore and... Well, how long did they do the Eyegaze? It's just like the first time you go for a jog around the block if you've not been working out, and everything hurts, we don't use our muscles in that capacity that often. So you have to build up your endurance, but you can. So, the other piece that I want to show you... Let's go back to more and then go into menu, so I'm going to add text communication. So this piece of software, I'm gonna unplug the Eyegaze. This is a little more robust than just the text talker that I showed you. I have a keyboard that I can use in the same capacity. If I go to the home, I have bank messaging that I can use in the same capacity. But I also have the ability to do message banking. So if I was somebody diagnosed with ALS, and I hadn't lost the ability to speak yet, I can record my voice into the software and it will store it. And then when I use the software down the road, when I need it, it'll talk in my voice instead of one of the 40 to 50 computer voices that are out there. So that's built right into the software. We have social media pages... So again, you got to keep in mind, this person is not able to use their hands, they're not able to use the mouse, they're not able to use keyboard, some of my folks will use their eyes to control the cursor, and they may have a switch as a single button. And if they can do that, then they're really in good, a good position because that's really fast. But I really like these interfaces. If I open up Facebook, I get the browser in the middle. And I know you guys are familiar with all of these names, messenger, status, navigation, etc. So that's a really nice tool. If I go up to the Z, the Eyegaze is is put sleep so I can

look around and read and explore and not open up pages inadvertently. Similarly, I gotta un-sleep. We've got a nice interface for YouTube. I can play all my videos in here. Same with Twitter. I think it's funny that they put Twitter on there. We also have the ability to pair your computer with a cell phone. And so think about this, if you're somebody sitting at home, locked in the house, and you're not able to pick up a standard phone and you're not able to pick up your cell phone. If you could do everything with your eyes. You can go to your keypad, you can go to your contacts, you can dial, and then you open up your keyboard and the computer talks for you, you can now make those conversations as phone calls with people without somebody else's assistance. Caveat there Apple still doesn't play nice with others. Even though I'm an Apple fanboy. If you remember how they lock the Feds out of texting, they lock us out too. They lock everybody out. We don't take it personally. But I can pair with any Android phone, most any Android phone. And I can do texting also. So this is huge for people, to be able to have that kind of interaction and have that built in for Eyegaze access. I can pair with email. The other thing I want to show you. So, I don't know if you've noticed some of the terminology on this is a little weird. Service? Evidently, that's what they call infrared in the UK. But if I look at Service and I open it up, I can control my TV, my Direct TV box, my Apple TV, my phone, DVD, stereo, home, answer intercom. I have a guy up in Virginia Beach. He is bed-bound, had a pretty severe accident couple years ago. And he uses Eyegaze to turn his TV on and off, to turn the stereo on, he opens his curtains and closes them with his eyes. He opens his back door to let people in and out. And he also has controls for his hospital bed so he can reposition himself. This is not even that much about communication for him. It's about the whole environmental control. He can get online and surf the web, he can go on Facebook. So this is the guy who's bed-bound, and will be for the rest of his life. And this world is opened up for him. So it's pretty tremendous. I want to be conscious of time. I'm going to shift gears a little bit. And I'm going to just kind of talk about hardware. Just so you have a sense of what we have available. And I didn't bring all of it but I brought a couple of them. So I already showed you this Eyegaze, EyeMobile +. This is USB, you can download various levels of software that will allow you to access your computer. These start at around 850

and then go up to about 1400 depending on the software that you're looking at. That's really pretty good in the scheme of things. We also have a couple of dedicated Eyegaze computer systems. We build most of our own hardware and our own software. So I like to say that we're kind of like Apple in that way. We make this work together. So this is Gorilla Glass, magnesium metal backing, built in speakers, infrared is built into it. Swappable batteries, so I can change out my batteries while the device is still on if I had to. These batteries are usually good for 8-10 hours a day, depending on what I'm doing. And there's a mount on the back. So if you have to mount it to a wheelchair, think Stephen Hawking, you've got the ability to take your device with you wherever you go. You've got front facing camera, back facing camera, three USB ports, HDMI, and that cameras that are here are built into here. The nice thing about this is you don't ever have to readjust, it's all built in together. So these guys, this is the Eye 12 + and then we make an Eye 15 +. So that's the diagonal dimension, Eye 15 is that much bigger. This retails for about 14,000. The Eye 15 is about 16. So how do people get these? Typically, Medicaid, Medicare or private insurance. And we do a lot of work with their speech therapists who has to write a letter of medical necessity. And that allows them to kind of get this stuff funded. We're really lucky in North Carolina, Medicaid does really well by our kiddos. So that's nice. This can come with the Eyegaze, you can also get it without the Eyegaze if you just need the direct touch to the essentiall a giant tablet. And this is the Eye 110. Again, Gorilla Glass, magnesium metal back, metal handle, wheelchair mount, it's been designed to take a five foot drop to the floor direct splash of liquid in any direction. So it's, it's a tank, it's not like an iPad. I see a lot of my kiddos using iPads with software. And that's a great starting point. But the minute you drop an iPad, it's shattered. These guys, if they're funded are about six grand, and they come with it three year warranty. And that three year warranty says basically if you drive over it with your car will fix it or replace it for that three years. All of these are running Windows 10. This has two switch ports. So I know Melissa talked about switches a little bit. If you're a switch accessor and you use scanning you can use this or this, does not have Eyegaze. So this is more of your direct selection or switch. The other thing for you guys to know is that if these devices are paid for by funding, federal

government mandates that they come as a locked and dedicated speech device, which means that you can't access the internet, you can't access Facebook, you can't use the infrared remote, unless you get it unlocked. And the unlock... There's a fee, it's one time only, $25. And seems kind of like a nuisance, but I'll tell you that about four or five years ago that unlock fee was $400. So we're moving in the right direction. $400 is prohibitive for a lot of families. Twenty-five is usually manageable by most families. I thought that it might be interesting if anyone else wanted to try the Eyegaze? Y'all are interested we can set that up? Takers, takers takers? No, ok. We have two other tablets that are based off of an iPad. It's a speech case. And basically an iPad fits right into the body. It's more affordable, but it's also fundable. The case has Bluetooth speakers and switch ports. And if you were to look at it next to this, they look really similar except there's an iPad tucked in there instead of a Windows 10 tablet. Couple of stories I'll tell you. I told you about the fellow in Virginia Beach. The other person I'll tell you about is a woman that when I first started the company, she had already been using a device as a trial. People usually to get the device maybe for a month or so to try it out and make sure that it works. And she had already been doing a program called model talker, which is online. And it's when you still have your voice. So this is a woman with ALS. And she basically sat down in front of the computer with a microphone and she recorded a couple thousand words and phrases. And it was tedious. I'm sure. When I met her she had no voice, so I'd never heard her speak. Worked with her for a little bit. And then her permanent device arrived. And we set it up, we got it all styled out on her wheelchair mount. And then we loaded her voice. And she turned to her husband and the thickest Long Island accent I've ever heard. She told her husband that he was a cutie pie. And I get chills just thinking about it. But I had no idea that she wasn't from North Carolina that she wasn't, she was from Long Island. But that model talker captured her voice and the accent. And her husband turned to me and said that's her voice. That's what she sounded like. So the technology that we're making, that you guys are working with, can provide a lot of modern miracles. And I think it's pretty exciting. Kind of what I have for you today.

Any questions?

May I ask what advice you have for us as graduate students on what we should do if we want to end up like you some day?

So I think if you were to look at, there's about 99 of me across the country. And I am probably one of three occupational therapists. The majority of my colleagues are speech pathologist. There are, there's a couple of folks that come from a sales background. There's a couple of folks that come from technology background. One of my, my actual direct boss was a biomedical engineer. So the point is, is I think if there's not a specific background that you have to have. You have to have a love of technology. And I think you have to have a love of people, and a willingness to spend time with them when they're in hard places, and help them get to a better place. I was with the school system for 18 years. And it was really rewarding. I did not know that I was going to jump ship and get a new job. And this just kind of was serendipity. It fell in my lap. And it's been a really wonderful fit. But I think that we're going to see more and more of this amazing technology. I would not be surprised if in the next five years or so we're going to see more wearable technology that helps our people with disabilities. I get so excited when I see the universal design, Melissa talked about that a little bit. When I think about Dragon Dictate, when I first started 18 years ago, I remember I had 30 psychologists at one of the local public school systems and the district had said we need to get them Dragon Dictate. They're spending too much time typing. So these are folks that are highly educated, skilled adults. Within three months, every one of them came back to that software and said I can't use it. It doesn't work. Now this is 18 years ago, okay, it's come a long ways. But what I really love is that, as Melissa pointed out, there's so much great voice dictation just on our phones and our computers. It's universal design, it's everywhere. And so to me, whatever you guys do, if you're at all involved with moving technology out to the people out to the masses, and making it more accessible. When that happens, the folks with special needs benefits hugely. Because the more common it becomes, the more the prices go down and the more accessible it becomes.

Melissa, if you're unable to unmute your microphone, we'd love to hear your advice as well.

I need to unplug.

Any other questions?

Appreciate y'all's time. I hope this was useful.

Thank you, Jim!
Transcribed by https://otter.ai