

3Play Marketing | WBNR 11-07-2019 Cyberlearning

SAMANTHA SAULD: Thanks for joining this webinar entitled *Designing Accessible Cyberlearning Recommendations and Lessons Learned*. I'm Samantha Sauld from 3Play Media, and I'll be moderating today. I'm joined by Cheryl Burgstahler, founder and director of DO-IT Center and the UW Access Technology Center at the University of Washington. And with that, I'll hand it off to Cheryl, who has a wonderful presentation prepared for you.

CHERYL My name's Cheryl Burgstahler, and I'm from the University of Washington. And I'm going to tell

BURGSTAHLER: you about some of our outcomes from our projects that can be beneficial to other people interested in accessible cyberlearning. So I want to share recommendations and lessons learned from that project.

Cyberlearning is a terminology that the National Science Foundation uses. This is an NSF grant. And I would say it's equivalent to whenever we're talking about digital learning. So anytime we have the intersection of learning and technology, that could be digital learning or cyberlearning.

I have a reference book for many of the concepts I'm going to be talking about today. *Universal Design in Higher Education From Principles to Practice*. And this publication talks about universal design in all its many forms, applying to post-secondary education. And I edited the book, but my claim to fame is really getting 40 authors and co-authors that are experts in the field to write the chapters. So it was peer-reviewed.

And if you want to join our discussion list about this topic, you can just send email to me personally or to [doit-- D O I T-- at UW dot edu](mailto:doit@uw.edu) to join our UDHE-- Universal Design in Higher Education community of practice. And we talk about all aspects of universal design applications, including to the physical environments, to technology, to instruction, to student services, and so forth.

So my units at the UW, one of them is the IT accessibility team. This is part of Accessible Technology Services. And this team is funded by the University of Washington. And its purpose is to make sure that the IT that we procure, develop, and use here at the university is accessible to people with disabilities. And we've been doing efforts since 1984 under a different title to make technology more accessible. And every year, it gets more complicated, with all the new technologies we have and the proliferation of things like PDF files and videos and so forth.

But then I also direct the DO-IT Center, and this is where access cyberlearning was funded. So these are projects in the United States starting in 1992 with a grant from the National

Science Foundation. And ever since then, we've been funded with federal, state, corporate, and private funds.

We even have a DO-IT Japan starting in 2007, and are about to begin a DO-IT in South Korea. And we've had some efforts in Singapore and Malaysia as well. We also support the Center On the Universal Design of Education, which started in 1999 with a grant from the US Department of Education.

So we do a lot of different things, but you could classify them in the following way. We're working with students a lot-- students with disabilities. They tend to be close to graduation, at least within a few years from high school graduation. And individuals who are in college, graduate school, and they move on to careers.

The thing that we focus on the most is self-determination skills. Basically, the skill set, including self-advocacy, that you need to be successful in education and careers. So here, we're working directly with students with disabilities, so they know how to ask for accommodation and generally be successful in college, including using assistive technology.

But then we're working with institutions. And that's what we're talking about today, in that category. Where we help institutions apply universal design to create inclusive instruction, services, physical spaces, technology, employment, and so forth.

And so in that category, we either work with computer companies to help them make their products more accessible to people with disabilities. Sometimes there are products that we're using here at the university, like Canvas. And we want to be assured that that product is as accessible as it can be. And so we just kind of get in the middle of things, there, to make that happen along with partners around the country.

So AccessCyberlearning is a project-- actually, it is two projects funded by the National Science Foundation to make cyberlearning or digital learning tools in the next generation more inclusive of people with disabilities. And so that's the tools themselves.

So in that design-type category, but then also in research. Researching what are effective practices for cyberlearning, including pedagogy that teachers might use. And then the technology itself, and how it is actually used.

So the report that we came up with-- we have one year to create a report-- is called *Accessible Cyberlearning A Community Report of the Current State and Recommendations for the*

Future. And so this is a report that you can access the URLs on the screen. These PowerPoints will be shared.

And so the whole idea of writing this report was to inform the National Science Foundation and anyone else who cares to listen on where are we, as far as accessible IT when it comes to cyberlearning. And where do we need to go? And who needs to do what?

It was one of nine papers that were funded. And each of us, in these papers, we collected a group of people-- ideally with diverse perspectives. And then together, we collaborated to develop this report.

But other reports on things like maker spaces. What is the current state and the future of maker spaces? So ours was the only one that was focused specifically on disability and access issues of that type.

So we start in our paper and our communications with our on-site meeting and our online community, what does it really mean to be inclusive? And it means just that everybody is let in who meets the requirements, with or without accommodation. So in the case of an online learning course, everyone who's qualified to be in it-- maybe a school's offering it, but there's a prerequisite.

So anyone that's met the prerequisite should be able to get in that course and participate, even if they need accommodations. But the course also makes everyone feel welcome. So it's not like just an awkward entry, as sometimes it is for a student with a disability because so many accommodations need to be made. And that engages everyone. And that engagement implies that things are accessible to everyone.

So that's a very simple look at what it means. The need for such projects-- we talked about this with our collaborative team. Why do we need a project like Access Cyberlearning and our other projects, like Access Stem and Access Computing? We have a lot of different grants with those similar titles.

Well, there's a demand for innovators in this country, particularly in the sciences. There is an under-representation of people with disabilities. So they could meet some of this demand for innovators. And people with disabilities often have a depth of expertise on problem-solving around their issues regarding their disability, and working around inaccessible products and environments through their own creativity. That can't always be the case, but sometimes.

So the potential of individuals with disabilities actually includes that. And we can see, then, that the design informed by a diverse audience is a better design. And so people with disabilities and others can build in accessible features within a product that may even make it more marketable, translating it into dollars for the company that makes it.

And there are legal issues. There is Americans with Disabilities Act, for instance. And section 504 of the Rehabilitation Act of 1973. Both of them require that we make whatever we offer in a post-secondary institution and other educational environments inclusive of people with disabilities. And so they have a right to be in our online courses and otherwise engage with whatever we're offering.

So there's one more reason-- that is the need to increase knowledge and resources of the instructors, the researchers, the employers. Because it's not enough just to say this is a really good thing to do to make things accessible. We have to help the stakeholders learn how to do that. Because many of them haven't thought about this before.

So we have a basis for our paper and for the research we did in this project. Theoretical and conceptual frameworks that include the social justice model of disability, where we look first to the environment and see if the environment is causing it to be not accessible for a person with a disability. Why? Because of social justice.

A person with a disability simply has a right to participate in activities that are offered to other people. And so that's the social justice model of disability. That you look first to the environment and see what barriers are in the environment, instead of looking at it from a medical or a deficit model point of view where-- well, what is the deficit this person has? And how can we fix that? Or, how can we work around that? So that's one theoretical or even conceptual framework that we have.

Then we look at disability as a diversity issue, not just as a separate issue that requires that we've brought accommodations. And much of the research in the disability community or diversity community can actually be borrowed from as we develop interventions for people with disabilities. And then instead of an accommodations approach, we apply the universal design framework, which we'll talk about today.

And the framework that we use actually includes accommodations. But again, it's consistent with this social model where you look to the environment. And you ask yourself, how can we

design this better so a person with disability can engage in this activity?

The most commonly applied design feature that's universal design are the curb cuts on sidewalks, so that people with wheelchairs can use those sidewalks. But now that we have a proliferation of these curb cuts, we find that people with baby strollers and delivery carts by far use those curb cuts more than people who happen to be using a wheelchair. So we'll look at that universal design framework and what implications there are for applying it.

And then we use a student-centered community building project framework. And I'll just share an image of that because I think it's a good way to look at who we need to talk to and what issues there are as far as the success of students with disabilities. So this is more of a broad question than our Access Cyberlearning project.

But we look to this model, where in the center we have the success of people with disabilities in higher education and careers. Could be even in a specific field, like STEM, which was a focus of Cyberlearning. So then we take a look at all the stakeholders that impact that success.

The person with the disability themselves. I mentioned we have projects for them, pushing self-determination, but also knowledge, so that self-determination can be effective. Their family members-- we have a support group for parents who have children with disabilities to help their child get ready for independent living as they become adults.

We have peers and near-peers and adult mentors and other allies. And we have an online community in that case, where these different groups are all represented. And they provide peer connections, but also near-peers. Some are just a little older than, let's say, the high school students. And then we have older adult mentors that are in employment. And so those people play a role.

And then community groups and service providers and K12 teachers. And then post-secondary educators and employers and technology vendors, legislators, policymakers, who can provide the money. And then funding agencies-- will they fund projects that will increase the success of people with disabilities?

So that's the model with students. But we're mainly talking about institutional things today. But we encourage people to think about ability on a continuum, rather than a diagnosis. So moving away from the medical model, but just looking at what their ability is and perhaps lack of ability

or lower-than-average ability in various ways.

And so some of the dimensions are the ability to see or hear or walk. The ability to read print, to write with a pen or pencil, to communicate verbally, tune out distraction, learn management of physical and mental health. All of these things and many, many more-- you could rate each one of us on this call in any environment on where we stand, as far as not being able to do that thing to being very able.

For instance, if you take a look at the ability to see, some people are born without sight or limited sight. And some acquire a visual impairment over time. Particularly elderly people-- we find many have significant visual impairment. And so they're kind of slipping down to the left. But it's not just a cut and dry issue-- do you have a disability or not?

And if we think of these terms-- you can imagine having a cyberlearning class, for instance. It would tell you, just assume that there are some people that are in the class now or will be who do not have average ability to see. So what decisions can you make now in designing your class so that your class will be accessible to someone who's blind or has low vision?

So what this image leads to is those types of questions about your course. You don't have to survey your course and see what the abilities are in the class. You just assume that there's a great diversity in ability in that class. And if not there, in the next one.

So today, I'm talking a little bit about a framework. Because we came up with a framework in our cyberlearning project for providing access. What does it look like? What are the pieces of a framework? Rather than just kind of willy nilly going out and trying to make things accessible.

And so we used this format, essentially, that there's a scope of work and a definition. And then there are principles and guidelines and practices and processes for applying universal design. So I'll just jump in and go through these various pieces of this scope.

So let's first take a look at what accommodation means-- if you have an accommodation-focused framework. So an accommodation is an adjustment to an existing product or environment for a specific person. So adjusting something for that person. And it's after the fact, after the student usually is in the course or shortly before, they get an accommodation.

So what accommodations are used in digital learning or cyberlearning? There are two that are clearly the most expensive, here and at just about any school I've worked with. It's remediating inaccessible documents, primarily PDFs. And that would be for people who are blind and

people who have dyslexia and other reading-related disabilities.

And both of those groups need to have access to the text. And many PDFs, for instance, are just scanned-in images. And so their screen readers can't access the text in them to read it aloud, which benefits, of course, a person who's blind because they can't see the screen. But it benefits students with reading-related disabilities because they tend to be slow readers. And their comprehension is often affected. But if they hear the words as well as see the words, then for many of them, their comprehension and their speed will increase dramatically.

So that's a big one. And most of those inaccessible documents are scanned-in PDFs. And so if we could just tackle that problem, solve that problem, and have faculty members use accessible PDFs or use Word or other products where it's a little easier to make them fully accessible, that would be a big benefit to people with disabilities.

I think we are on a campus where they remediate about 30,000 pages every quarter. And our quarters are 10 weeks long. That's a lot of pages. A lot of student helpers sometimes using electronic tools, but getting documents remediated for a particular course.

And then the other one is captioning videos. Even when people caption videos, often they use the captioning capabilities of YouTube. And we've all seen YouTube videos where it's quite humorous to see the captions that the computer came up with.

But what many people don't know is those captions are really just meant to be drafts. And if you own a video-- in other words, you posted it-- you can get in, and you can edit those captions. Putting some punctuation, correct spelling errors, and errors where the whole word was just totally misunderstood. And so if we could just get people at YouTube to make their captions more accurate, we'd be a long way toward accessibility. So those are the two big things as far as cost of accommodations.

But instead of just looking at accommodations, we should look at the design of the class or other IT environment and reconsider the design. This is a pretty dramatic example, with a coffee pot with the spout and handle on the same side. It's called the "Coffee Pot for Masochists," out of the *Catalog of Unfindable Objects*. And this was published in 1988. I think it's out of print now.

But anyway, to me, it's a good example, a good image, of a product that is clearly designed wrong. It's not designed to be very usable by people who want to serve coffee. And so

therefore, it's not a very good design. And it's not universally designed because there are a lot of people who wouldn't be able to use that pot.

So that's what we're talking about with inclusive or universal design. We're talking about fixing the product or designing it to be accessible in the first place. So what does universal design mean? We need a definition. That was part of the scope that I had up there a minute ago.

So here's our definition. "The design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design." And that's directly from the Center for Universal Design at North Carolina State University, which has been around for quite a while.

But notice, it doesn't mention disability. It just talks about all people. And so we might be talking about making something more usable by who happens to be an English-language learner. Who, by the way, benefits from captions to videos, but they don't have a disability.

So we're talking about things that benefit other people. People from a different cultural background, things like that, get included. Or people that are very large or very small.

My husband has a very difficult time driving my Mazda Miata because he's 6 foot 5. But I have no problem in using it at all. And they may not have been able to modify that but if they could just get the seat to scoot back a little bit, he claims he would be much better at driving that car.

So there are other proactive design approaches. So I'm just going to give a quick definition of these terms. Kind of my definitions because they're not always used the way that I use them. But I'm talking today, so I guess to use my definitions.

So accessible design-- sometimes they use it as a synonym with universal design, but it really isn't. Accessible design is about people with disabilities. If you're saying you're using accessible design practices, what you generally mean is that you're designing your products to be accessible to people with disabilities.

Whereas universal design does include accessible design, but much more, as it deals with English language learners and people from cultural backgrounds and even differences in the design for girls versus boys. You know, there's a lot of cyberlearning design that is in games. And we've gone past the age when they were just designed for boys, really. There are characteristics where there's more sensitivity to how you can make a particular product more

inclusive of girls, if that's what you're choosing to do.

Then there's usable design. And that means you can actually use it. Someone on my staff, who happens to be blind, and he tells me about products where in order to make it accessible, the developers just designed the product the way they wanted to. And then after the fact, came up with shortcuts-- shortcut combinations, keyboard combinations-- for a person who's using a screen reader, like him.

Well, this one product he was telling me about, there are like a hundred of these shortcuts. And so what was he going to do, have a Braille copy of it right next to his computer so that he'd know what to type in? Or somehow have his speech synthesizer read it to him? It's not usable. That would be technically accessible, but not usable.

And then there's inclusive design. And that is in contrast to design that is not inclusive, where you might have a totally separate product for someone who has a disability. That could be software or hardware. And that wouldn't be inclusive, then.

So we're always shooting for inclusive design when we talk about universal design. So universal design has those first three characteristics. So a universally designed product is going to be accessible, usable, and inclusive of everyone.

Now, there's barrier-free design. And sometimes that's used as a synonym with accessible design. And sometimes it's just used to talk about the physical environment. And making buildings and sidewalks successful, and that sort of thing.

Then there's design for all. And in all of the occurrences I've seen it used, it's been a synonym for universal design. So that's the same thing.

And user-centered design is proactive, but often, it focuses on the needs of one user or a small group of users. And so it's not as universally designed as the focused universal design product. And there are other terms you'll run into, too.

The reason I'm pointing this out is sometimes people just sort of get paralyzed by inaccurate terminology or argue over that. I like universal design, but I'm not wedded to it. I actually liked, in the early days, inclusive design better. But I kind of backed off on that when we were talking about college and, more broadly, other products that are available to the public.

Because K12 has kind of adopted the word inclusion or inclusive to mean something different.

It is about students with disabilities, but in the K12 environment, it builds on the fact that we provide a free, appropriate education for all children in this country. So a student with a disability might have their curriculum totally adapted for them, so that it isn't even close to what other students are doing. That's not what we do in higher education or in adult-learning situations. So that's why I go with universal design more than accessible design.

The idea about being inclusive is really important. On the screen, you can see an entrance to a building, where we have two steps going in. And then on the side, we have a ramp. And from the looks of it, it's ADA compliant. Has the handrails on both sides. It looks pretty shallow. So it's probably long enough to be compliant.

But what it's missing, as far as universal design, is inclusiveness. Because if I go in that building, I would walk up the stairs, while my companion using a wheelchair would go on the ramp, I would guess. It's kind of awkward to do it any other way. But on the right-hand side, we see a picture of a gradual, sloping, very wide entry. No steps into this building. And it's wide enough that I could walk side by side with that companion using a wheelchair. And we would both use the same entrance.

And so it kind of makes you think a little bit about separate is not equal. And that, if possible, you want to make an environment inclusive besides accessible and usable. Sometimes it's not possible, but that's what you should be shooting for. And that's what universal design is all about-- figuring out what your priorities are and how you're trying to make things more inclusive.

Now, on a post-secondary campus, or on an online learning program, here's the impact of taking more of a universal design approach to things, which is the second circle, here. And the first one is if you have a more accommodation-focused. And so if you primarily have an accommodation-focused world that you're living in, universal design for higher education would be the big circle. But accommodations would be a really big part of that.

As I said, accommodations are part of universal design because we can't create perfect designs. But in this model, it has the lion's share of things that you'd be doing on a campus. If you take a universal design approach, then the accommodations you provide should be a smaller subset of your universal design practices.

For example, I mentioned that PDFs are often inaccessible. And that's one of the most expensive things we mediate on our campuses. What if you imagine that everybody used

accessible PDFs or no PDFs at all? What if all their documents were accessible? Well, you'd never have to provide an accommodation again for that particular thing because it's just built into the environment.

So in talking about inclusion and universal design for individuals and students and classes, I like this quote from a Vietnamese Buddhist monk. "When you plant lettuce, if it does not grow well, you don't blame the lettuce. You look for reasons it's not doing well. It may be the fertilizer, may be the water, may be the sun." And so forth.

So just like universal design, you're looking first to the environment. And then you decide if some of the access issues reside within, in this case, the lettuce itself. A certain type of lettuce or whatever doesn't work well there. But anyway, it's not the fault of the lettuce.

And it's not always the fault of students if they're not doing well in the class. It might be their fault. They're not showing up for the classes. They're not doing their homework. They're not reading the textbook. Obviously, a lot of making a course accessible has to do with what the student does. But it might be some things are just not designed very well for them.

So one of the things on the framework is principles. After definition, it's like what principles are you resting on for what you're trying to do? And in this case, making online learning or other cyberlearning, digital learning, accessible to people with disabilities.

Sometimes people look just for UDL, the Universal Design for Learning. I like to think of three sets of principles that are important in this domain. And the first one is the original principles for universal design. They go along with the definition that I presented a few slides ago.

And so this came from the Center on Universal Design. They came up with a definition, and then these principles. And each one has guidelines associated with it that I don't have time to present today. But I'll give you a few examples along the way. But these are the principles-- seven principles of universal design. That there's equitable use. And so you can see, it's a goal that everyone would be able to use it equally. They'd be able to do the same things with it, like if it's a software product.

Flexibility in use. It's flexible, so I can use it from using a screen reader. I can use it just with a standard keyboard. I can use it with other adaptive technology-- maybe alternative keyboards to access it.

Simple and intuitive use. That you don't make things exceptionally difficult, unless it's difficulty that you're trying to teach them to overcome. But sometimes-- we've all faced this-- where the tool that's being used in a course, or you're even using, can dominate the time. We spend a lot of time teaching the students how to use it. And it gets complicated. And their stress level's up. So whatever we're using should be simple and intuitive.

There's perceivable information with a screen reader or on the screen or in the document, for example. A tolerance for error-- so the student makes a mistake, for example. It's clear what they can do next to correct the mistake or go on to the next item or whatever.

There's low physical effort, unless it's body building or something. And size and space for approach and use. This would be, maybe, in a science lab, where people are equally comfortable using their left or right hand. Things like that. OK, so that's the first set of principles.

The second set I point to is the Universal Design for Learning. Because we are talking about educational applications and academic work. And so this is particularly useful, this set of principles, for the actual curriculum and the pedagogy that's in a course.

So what Universal Design for Learning is about-- and this is from the Center for Applied Special Technology, or CAST-- is you provide multiple means of representation and multiple means of engagement for the students. And multiple means of action and expression. I kind of like to think of it as you're providing the students with multiple ways to gain knowledge-- what they're trying to learn.

How are they doing it? Can they gain it through a video? Or they could do written material? Is part of the knowledge gained through a discussion list?

And then you have multiple ways for them to demonstrate their knowledge. So how are you determining their grade, essentially? Is it all multiple-choice tests, or do you have some projects and other assignments? And maybe for one of those projects, the student can actually choose what they want to do so they can really shine where they're most comfortable.

And then multiple means of interacting with each other. And letting the student choose is an important part. I teach several online courses. And in my syllabus, I tell the students they can arrange a one-on-one meeting with me any time they'd like. And we can use Zoom. Or we can use email or another conferencing system. And I tell them they can choose. And so that way, I

don't have to worry if Zoom is totally accessible to them because I'm not requiring they use Zoom. I'd prefer to use Zoom, but it's not about me. It's about them.

So how can we give them choices? And someone who maybe has a visual impairment or maybe has a hearing impairment or learning disability or they're an English-language learner might be more comfortable, for instance, with email. So they can compose their thoughts, and it might just simply be more accessible. They don't need to ask for an accommodation. They just make a different choice. And you've given them those choices.

And then the third set of principles to underpin this universal design framework are the principles that underpin the universal design of information technology called the Web Content Accessibility Guidelines. And so those get more into the details of how you create websites and documents and videos and other materials to be perceivable, so people can access the information. Operable, so you can operate it using assistive technology. Understandable and robust.

In the operable category, when you have a student with maybe all types of different assistive technologies, like that replace the keyboard, so that they can speak to their computer using dictation. Or they have a keyboard that is very small or very large. Or they can sip and puff in Morse code, or whatever.

And it's really interesting to look at all these technologies, but you don't need to know how to use a lot of them. You just need to know some basic principles. And the main one there to know is there are tons of ways to access what you [AUDIO OUT] access with a keyboard. They will fully emulate that keyboard. You can assume that. But they will not necessarily emulate the mouse.

And so someone developing software or a website needs to be aware that they may need to make whatever it is they're creating operable without the mouse. So, operable with a keyboard alone. And that person then will likely use arrow keys to do what others might do with a mouse.

It's not terribly difficult to use, but most designers don't even think about it. And so they create an inaccessible product. That's an important feature, by the way, for people who are blind, too. They can see the mouse. They can operate the mouse. But that's not very effective if they can't see it moving around the screen. So different access issue, but same solution.

Like IT that's universally designed in any way, there are a lot of beneficiaries, not just people with disabilities. As an example, when we caption videos, they benefit someone who's unable to hear the audio, maybe because they're deaf, or maybe because they're in a noisy environment. It might be English-language users. They might be in a noise-less environment, like babysitting a baby that's close by. You don't want to wake them up.

Using a slow internet connection-- maybe they don't want to access the images because it's too slow. And so they can look at the text and the captions. Or they might want to know what the spelling of words are if there's a large word being used in a chemistry lecture, for instance.

And then if they want to find content quickly. On our website, you can search through the content of all of our videos and find certain content. So you can search through-- we probably have about 70 videos up right now-- and search through and find every video that uses the word blind. And then it would also allow you to go to those specific points in a video where that word is used. So there are a lot of beneficiaries, here, of captions.

When we're looking at IT in general, there are really two approaches. One is it builds on accessibility features. Builds in accessibility features, like your smartphone. Where you can change the background color and text color, text size, and so forth, right into the system, so everybody can use it.

But then it also ensures compatibility with assistive technology. Like, if it's a computer, for instance, you want to be able to use Braille translation software for a document you develop on that computer and send it to a Braille printer, an embosser, so that someone who's blind can get hard copy. So that compatibility is important. It's nice to have accessibility features built in, but you don't always have that option.

So each universal design strategy is provided proactively. That's key. Makes instruction and other things welcoming to all potential students. It's accessible, usable, and inclusive. And so it's offered to all students in an integrated setting. So that's kind of what universal design is about.

Now I'll jump to a related topic. You might look at all these schools that I have on the screen right now-- University of Cincinnati, MIT, Florida State, Harvard. And there's a dot, dot, dot. There are hundreds of them, actually, that have something in common. And I'd ask for ideas if we were in a different setting.

But what they have in common is they received a civil rights complaint about the inaccessibility of their IT. Many of them, it was from the National Federation of the Blind, along with one or more blind students on their campuses. So that group faces a lot of accessibility issues. Although Harvard and MIT had a complaint about the inaccessibility of their videos because of lack of captioning.

So anyway, when it happens, it goes to the Office of Civil Rights or the Department of Justice. And then they've worked with the school. And they'll come up with a resolution. And so all of these schools have [AUDIO OUT] to agree with the Office of Civil Rights or Department of Justice on what they're going to do to remediate their inaccessible products and make sure, in the future, that [AUDIO OUT] IT that's procured, developed, and used at that school is fully accessible.

So it's kind of expensive. So you don't want that to happen on your campus. Although, if you're trying to get more accessibility efforts, that's one way to get it because the school has to really pay attention.

But what is the legal basis? Some people ask me that-- quite often, actually. And the legal basis that they point to in these resolutions is section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 and its 2008 amendments. Both of those came about before there was even a World Wide Web, for instance.

But they don't even mention technology. Because they're civil rights laws. They're talking about people with disabilities have a right to things that you make available to the public or some other group that they actually are part of, but they happen to have a disability as well.

And so some people are frustrated by that. They'd like the standard [AUDIO OUT] right in the laws. Actually, I feel opposite. Because I think the technology is changing so fast that they'd never be able to keep up with it. So it sets the stage for requiring that IT be accessible to your students, faculty staff, and disabilities, including in online courses.

Within those resolutions, they actually use a definition of what it means to be accessible. I shared the universal design definition, which is more general. But this one's talking about accessible to people with disabilities.

So what it means-- and just for IT-- it [AUDIO OUT] "a person with a disability is afforded the opportunity to acquire the same information, engage in the same interactions, and enjoy the

same services as a person without a disability in an equally effective and equally integrated manner, with substantially equivalent ease of use. The person with a disability must be able to obtain the information as fully, equally, and independent as a person without a disability."

So it really makes it clear. They're just supposed to be able to do what other people are doing with that technology. I actually taught the first online course here at the University of Washington. It was in 1995. I taught it with Dr. Norm Coombs, who happens to be blind himself.

We didn't have the world wide web. We had email a [AUDIO OUT] discussion list, a gopher server, a Telnet file transfer protocol. A lot of technology tools that we had to actually teach because people didn't know them.

And we had e-mailed VHS copies of videos. And those were captioned and audio-described because they were doing publications. But the issues then are the same as the issues now. It's just that we have more technologies where we have to make them accessible.

So I developed, a while back, some guidelines for teachers on making online courses accessible. It's called 20 Tips for Teaching an Accessible Online Course. Got the URL, here, if you to look at that later when you look at the PowerPoints. So I'll just give some of them-- not all 20, but half of them I'll say.

You know, as far as websites and documents, structure of your headings-- restructure your headings, like using the styles feature in Word, for example. People who use screen readers can skip from heading to heading and see what the structure of a paper is. So it's easier for them to read it. And also, go to the places they are interested in.

Similarly, for hyperlinks, to have descriptive wording. So you don't have click here, click here, click here on your website. Because a person who is blind can skip from each one of those hyperlinks and read the text that describes it. And so they can go through your whole page and see what's on there.

If you don't describe the links, then I'll have to read that whole page, look at the text that's surrounding those [AUDIO OUT] links. So that can be a real pain. So an example would be you'd say, for more information, go to the DO-IT website. Well, the DO-IT website is the part that's underlined, so you know where you're going. Rather than, for more information, click here.

Avoid PDFs, but particularly, avoid scanned images. And include text descriptions of the content in any images. For a presentation like I'm giving today and the pages in your online course, using large, bold fonts, uncluttered pages, plain backgrounds, as I've done. Content and navigation accessible using the keyboard alone, which I mentioned. And captioning videos.

And then there are the instructional methods. A wide range of technology skills, which we assume. So what I do in my classes is I say, if this is the first class you've taken-- in that case, it's using Blackboard-- here's a good place to get started in learning how to use it.

Content is presented in multiple ways. Acronyms and jargon is spelled out and defined as necessary. Instructions and expectations are real clear. You give feedback on parts of assignments, so students can correct themselves midstream. Options for communicating and collaborating, like I mentioned in our online meetings. And options for demonstrating their learning through different projects, through participation in discussion lists, through other assignments.

So what we did in AccessCyberlearning-- I'm just about finished, here. But we made some recommendations, and so I'm going to share those rather quickly. But you can look at the document to see what other things we said.

We encourage our cyberlearning researchers to learn and apply universal design, universal design for learning, and WCAG to the design of their tools and their pedagogy. Explore how cyberlearning practices supported by the science of learning can be overlaid with universal design for learning and WCAG. Invite someone who has IT accessibility knowledge to join your research teams.

Consider a broad range of disability types during all phases of a project. You might, at each phase, think about a short list of people with disabilities that might be using the tool or whatever you're designing. And think, will this be accessible to a person who is blind? Or a person with a visual impairment that is not blind? Or a person who's deaf? Or a person who can't use their hands? And so forth.

Analyze the experience of participants with disabilities in the research reports. And so that means they test their products and they report limitations of their studies, as far as making them accessible to people with disabilities. Contribute to the development and sharing of

guidelines for accessible design of different types of tools. And if the instructor guidelines are created, make sure that they share information about accessibility issues for students with disabilities.

Other stakeholders need to be considered, similar to that image I showed at the beginning. But certainly, disability services staff, funding agencies, technology companies, and so forth.

So that's a really quick summary of what we did in our Access Cyberlearning project. And again, the resources are online. I have the URL on the screen again. So that is the end of my formal presentation, here. So I will just open it up to questions.

SAMANTHA

Thank you so much, Cheryl. I'll take over the screen, now.

SAULD:

Before we start the Q&A, I want to quickly mention some company updates. We're rolling out a certification course this winter on video accessibility. It's designed with exclusive content to help you become an accessibility expert at your organization. And for more info, you can visit 3playmedia.com/certification. So now we can begin the Q&A.

So the first question is, "What is an accessible alternative to a PDF?"

CHERYL

Good question. An accessible alternative to PDF. I'll just give a quick example. Often, faculty

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members will post their syllabus in a PDF format. That is basically an image, and so the student doesn't have access to the text.

My guess is that faculty member probably created that original document in maybe Word, probably is the most common thing that they use. Word is easier to make accessible. You basically just-- the headings, make sure the headings are in a hierarchical system using styles, rather than just selecting text and making it bold.

And if there's an image, it needs to be described. And there's some other issues if you have tables, and so forth. But generally, a Word document then is fully accessible. And so that would be one alternative to using a PDF.

Another way, if you're using an online learning system, you can copy the text and put it right in the window of each page that's in your learning management system. And there, you then would use the hierarchical structure of the headings provided within the learning management system. It'd be a little bit different than Word. But then, you make those accessible.

So that would be the easiest-- those two things would be the easiest way to not have an accessible PDF. But you can go through the instructions that make a PDF accessible. It is very complicated to remediate it if it's not fully accessible, though. That's something to be cautious about.

SAMANTHA

Great, thanks. The next question is, "Is there a cyberlearning tool that is accessible and

SAULD:

affordable that includes the capability to include accessible videos and an accessible testing mechanism for an organization that uses educational tools as an adjunct, as opposed to its primary tool?"

CHERYL

Wow. I think there are a few things mixed in there. I'll start with one. I don't know of one tool

BURGSTAHLER:

that can do all those things. But as far as making your videos accessible, like I said, if you use YouTube and then edit the captions, that's one way.

Our videos on campus, often we use 3PlayMedia because we have a contract with them. And so we do a lot of it that way.

There are tools out there. For instance, there's Amara. it's one of several tools, where you can take a video that is not your own, that's commercially available, let's say, and it's not captioned. Well, you could put some captions on it. You can even have different languages.

Was there another part of that question that I should answer?

SAMANTHA

"It uses educational tools as an adjunct as opposed to its primary tool."

SAULD:

CHERYL

Educational tools-- I'm not sure what we're talking about. I know people will go outside of their

BURGSTAHLER:

learning management system and like use Google Docs, which has become pretty accessible. That used to be quite inaccessible. But usually, your learning management system is a good place to make your materials accessible.

Every learning management system I am aware of today has addressed accessibility in at least one way or another, to the point where most of the accessibility you can take control of as a faculty member by the way you do things.

SAMANTHA

So the same person asked, "What mechanism can I use for testing?"

SAULD:

CHERYL For what?

BURGSTAHLER:

SAMANTHA For testing.

SAULD:

CHERYL Oh, for testing. That can be a little challenging. I would look first to the testing option provided
BURGSTAHLER: with your learning management system. I'd go there, first.

And I might Google whether it's accessible, how accessible it is or is not. Because some of them are not. I'm not, currently, on my online courses, using a testing tool. But I believe you'll find in a learning management system, there are ways to make your testing accessible to students with disabilities. So I'm sorry I don't have the specifics.

SAMANTHA Great, thanks. The next question is, "I like how you presented accessibility as a diversity equity
SAULD: issue. If a campus culture really doesn't view it that way, but is very focused on other issues of diversity and equity, do you have suggestions on how to shift the culture such that the experiences of students with disabilities becomes part of the diversity and equity conversation?"

CHERYL Yeah, I'd approach it from all angles. That's what we've done on our campus. For just a simple
BURGSTAHLER: example, we used to have a vice provost of Minority Affairs. And minority was not included broadly. Because you could say that people with disabilities are a minority. And I actually made that case at the time.

And then there was a time when we went from one vice provost of minority affairs, a new one came in. That's a good time, when a new person comes into that position, to see if you can promote a little bit more inclusive definition of diversity.

And that person was very interested. And we-- not just me, but a group of us-- worked with her to get disability on the diversity radar screen. So we kind went a little further. We ended up coming up with an advisory board that would advise the vice provost in that area. OK? So that was useful.

Then that person left. And the next person, we tried to ratchet it up a little notch, there. And we tried to get the title of the person changed from the vice provost or whatever it was of minority affairs to the vice provost of diversity. We even used a word, then, and then we could define it broadly.

We were not successful in doing that. And the reason was it was kind of a political issue. The people that were used to being served from that office might feel that they're not getting enough attention if other diversity efforts were considered. So vice provost of diversity wasn't the title, but they added it to the vice provost of minority affairs and diversity.

And then a couple of years ago, they actually took out the minority affairs in the title. So it was a very gradual thing. And there were a lot of actions that contributed to that, too. But I would say, just continually bringing it up.

I write a lot of grant proposals. And I often will be-- my staff and I will be writing a grant proposal to an organization supporting diversity in STEM, or something. STEM being Science, Technology, Engineering, and Mathematics. And they may not mention people with disabilities.

But in our first paragraph in our proposal, we will really present the idea of disability being a diversity issue. And that's been very effective at times because it was-- like funding agency hadn't heard of that before or been looking at it that way. But they liked it, and so they funded our project. And then more and more just have sort of accepted that.

But it's a tough sell for a lot of people. It's actually harder than I thought it would be. And it's something that's very slow-moving. So I don't have a great answer for you, except to just keep doing it. And if you're on a post-secondary campus, to bug people by making sure that if there's a diversity statement, it includes people with disabilities and so forth. So it's an ongoing challenge.

SAMANTHA

Thanks. The next question is, "I'm working with a faculty member on developing an online

SAULD:

anatomy and physiology course. Many of the learning outcomes are based on identifying images from slides or models. I'm pretty much stumped on how to make this accessible to a person with low vision or blindness. Any thoughts?"

CHERYL

Low vision-- often, the student will have a tool-- or it might even be in their operating system--

BURGSTAHLER:

where they can do the magnification of those images. So if they're in electronic form, then they can magnify them. They don't maybe get all the image on the screen, but these individuals will probably be using a very large screen. And they might have to move around to look through the image.

As far as for students who are blind, that's a tougher issue. And I'm assuming-- I mean, the

short answer is, for the images, you could provide alternative text that describes those images. But I would guess that the images are quite complex. That would be their first thing, is to look through all of them and say, could I do this as a description?

And what I would encourage you to do is pretend you're on the telephone. Could you describe that image to the person on the other end of that line, that student who's asking for your help by phone, and they don't have access to the image? Could you describe it enough so that they would get what the concepts are?

My guess is there are several of those images where that's the case. And some, maybe, are going to require that they get some external tactile versions of it. Could be a tactile image using something as simple as bubble paint. Or more complex-- there are printers now that can print images, like a Tiger Printer that allows you to create embossed images.

Now, if it's a totally online course, and the person isn't local, that would require probably some materials going back and forth in the mail. But that would be something I would think of doing. If they are on-site, then it's easier to use a Tiger system or whatever.

And I guess what I'm kind of concluding, too, is if you're the faculty member or the designer, I think, in this case, you can do your best with alternative text. But maybe you can't do all of it. And so that is where you might have to rely on accommodation if a person who is blind takes that class. Like I said, I think you can deal with low vision, but maybe not blindness.

But do try to make it as accessible as possible without someone needing an accommodation. Particularly in the first week or so of the class. Because if that student needs accommodations, there might be a time element where they can't do them as quickly as you might need.

So don't create an inaccessible syllabus, for instance. Get that accessible, and the first few lessons, and do these descriptions. And then evaluate where that student is. And the Disability Services Office then can get involved in that process.

SAMANTHA

Great. So we only have time for one more question. The last question is, "Do you know of any educational or course tools that is accessible for animations or for a resource on how to make a course accessible that was previously flash-based?"

SAULD:

CHERYL

Flash is not very accessible. It's a primary reason it's not used much for home pages and so

BURGSTAHLER:

forth anymore. So that's a tough one. And the answer to it is no, I don't know of any specific tools that can help you with that.

I would suggest that you Google, of course. But also, there's a group that I belong to that is exactly the group you'd want to post that question to. It's called ATHEN. It's-- I don't know what ATHEN stands for. But it's Accessible Technology in Education. Is that right? All right.

It's for people that support accessible technology on campuses around the country. And so a lot of these people are doing some pretty high-level technical things themselves. But they're also dealing with these complex accessibility matters. And an animation would be one in that category.

And so if you can find a way to join ATHEN-- you could actually email me, and I can show you where the website is. But it's ATHEN. And join that list. And then pose a question. And I bet you'll get three or four really good answers from people who have actually done what you're talking about.

SAMANTHA Great, thank you. So that's all we have for today, everyone. Thank you for joining and thank

SAULD: you, Cheryl, for a great presentation. Keep it [INAUDIBLE].

CHERYL You're welcome. That was fun. Have a good day, everybody.

BURGSTAHLER: