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A New Era: From EADLs to Alexa! Recorded February 27, 2020

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- [Fawn] Today's course is "A New Era From EADLs To Alexa." Our presenter today is Michelle Lange. She is an Occupational Therapist with over 30 years of experience and has been in private practice, Access to Independence for over 10 years. She's a well-respected lecturer, both nationally and internationally and has authored numerous texts, chapters and articles. She's the co-editor of "Seating and Wheeled Mobility: A Clinical Resource Guide." Editor of "Fundamentals in Assistive Technology, "Fourth Edition," NRRTS Continuing Education Curriculum Coordinator and Clinical Editor of "NRRTS Directions Magazine." She is a RESNA Fellow and member of the Clinician Task Force. She is also a certified ATP, Certified SMS and is a Senior Disability Analyst of the ABDA. Welcome Michelle, so happy to have you!

- [Michelle] Great, thank you very much Fawn. And thanks everyone for joining us for this course here today talking about this very unique area and very important area of assistive technology. This is an area that I've been teaching on and working with just about my entire career. This came on to my radar very, very early, in about my first year as an occupational therapist. But at that time the technology that was available to us was very, very primitive. We have come such a long way. There's a tremendous crossover now between this area of technology and consumer electronics and that's what we're going to attempt to cover today. Please keep in mind this is rapidly changing and so I'm going to be repeating that several times throughout this course that we certainly have a lot of information to review. However, since things change so quickly a lot of the onus is still on us to make sure we're aware of the most available options at that moment.

So the title of our course is "EADLs To Alexa." Well what are the EADLs? This is an area of assistive technology known as Electronic Aids to Daily Living and has been known by other names as well, primarily environmental control units. These provide an alternative means of controlling devices, usually at home and that often includes things like audiovisual equipment to TV, your cable box, your music, lighting, thermostats,

things like that. But advances in consumer home automation has opened up control not only for the general population where we are controlling devices in a much different way than when I was a kid for example, much of that consumer electronics is also opening up opportunities for people with disabilities. So we have several learning objectives here: This is a CEU approved course. One, describe, the participant will be able to describe the challenges of use of consumer technologies for home control that are faced by people with disabilities. List several consumer products which can be used to control devices in the home environment And finally, list or describe the limitations to consumer technologies and instances where disability-specific solutions are appropriate, because at this point devices like Alexa do not meet 100% of our needs outside of the general population. If someone has specific disabilities, sometimes some of this other specific EADL type technology is still required.

So a lot of people who have disabilities may have difficulty controlling things in the environment and that can be due to physical, visual, or a combination of these and cognitive limitations. So it might be difficult for someone to turn on their television and jump to a channel that they're interested in watching, because perhaps I don't have the motor ability to reach out, grab that remote, push a button. I may not be able to see what's on that remote very well, or it might be hard for me to understand what I need to do to remember a specific sequence of commands. Heck that's hard for a lot of us. We can have some very complex A/V systems in our home, but it might be difficult for me to read or discriminate between a lot of buttons that can be on those remote controls. This control is not just something that just makes our lives easier. For you and I it makes life easier. When remote controls first came out for televisions I didn't have to stand up, get off my couch and go push a button on my TV. Well now it's hard to find the buttons on my TV, I really need to use that remote control. But for people with disabilities, that control becomes very important, it's not simply a convenience, because it can provide independence and it can provide safety and improve overall quality of life and participation. And again, we'll go through that within this course. Now

early ECU, Environmental Control Units became available in about the 1980s. Now remember, consumer technologies were not nearly as advanced then either. The 1980s were a time where VCRs were just coming out. CDs, I think, were just coming out. We certainly didn't have all the consumer options that we have now. The name later changed to Electronic Aids to Daily Living to better define this area of technology and to improve funding. Challenge was, regardless of the name, this area was chronically underfunded and constantly behind consumer technology advancement. When there's not a lot of funding, it's really hard to keep up with those levels of advancement and so this area of technology was not always as advanced as it could've been and often overpriced.

This technology, this area of assistive technology, tends to fall into two main categories: Basic EADLs and multi Function EADLs. So basic EADLs are not used as much as they used to be, because of, again, advances in technology, but still do have a place for the clients we work with, particularly with children and with adults who have significant cognitive limitations. Basic EADLs provide simple switch control of battery-operated devices or simple electrical devices. So for example this stuffed cow that we see here, battery-operated toys, or maybe just a simple single on/off appliance like a light or a fan. This area of technology includes devices such as Switch Latch and Timers that that SLAT over to there where I have my arrow, as well as the PowerLink. It's about our only option out there. It's made from AbleNet that allows switch control of a simple electrical device. Then we have multi-function EADLs and these provide full control of a variety of devices as well as a variety of functions within the home. So now, instead of just that little stuffed battery-operated toy we might have control of an audiovisual system. So now I can control my television, my cable box, my DVD player if I still use one of those, et cetera, as well as all the functions for each of those, because I wanna do a lot more than just turn the power on and off. So there are still some of these devices out there. Unfortunately for what they do they are overpriced, very difficult to get funding for and quite behind oftentimes our consumer electronics. There

are still times these are appropriate and we will review them. The other difference between multi-function EADLs versus our basic EADLs is rather than only offer switch access we can control these devices directly if the client has the ability to reach out and push a button on a display, by switch, or by voice.

There has been an increasing overlap over the years between home automation devices and even robotics with this area called the EADLs and much of this technology is now being replaced by consumer technologies such as Alexa. I'm going to say Alexa a lot during this course. If you happen to have your little friend sitting close by to your computer, you might want to turn that off or tell her not to listen for a little bit so that I'm not just talking to her as well. So again, electronic aids to daily living provide alternative control devices in the environment and that is far more than just your television. This can include an electric hospital bed, nurse call, door openers, telephones, lights, very simple appliances like a fan and heating and air-conditioning systems. So we now have the ability to control a larger number of devices as well as functions for each of those devices. These systems typically use infrared. Infrared is what our typical television remote uses to send signals and also a technology called Insteon and that's used to control things that plug into the wall, uses the wiring within your house. Insteon Technologies has for the most part replaced technology called X10. So X10 has pretty much gone away. Some of these systems use other wired transmission options as well.

Access, again, is direct, switch, or voice and these systems are usually too complex for young children, or people who have cognitive disabilities. These systems often require good vision, not always, and literacy that can also be a limitation for some of our clients. Again, those basic EADLs are gonna provide alternative access to simple devices such as battery-operated devices like a toy, or very simple electrical devices. Now when I say simple electrical devices, I mean that if I turn this device on, there's a knob on it, a mechanical knob that I can say you're on and I plug it into the wall, it's

gonna turn on, like a fan. But some of our devices out there if I plug it in nothing happens, because now I have to push a button that's not some mechanical button or mechanical knob, it's digital, it won't respond to me until it has power. Those cannot be control by this type of technology. So it won't work let's say for a television. And then there are just a few left of basic EADLs that provide very limited control of something that receives those infrared or IR signals. An example of that is this Relax from AbleNet. It will send infrared signals to control something like your television, but our options are limited, so it might include power, volume up, volume down, channel up, channel down. Well these systems work pretty well when we only had five channels to watch, but now we have hundreds. So channel up and down aren't very helpful. It's a lot easier, many of us now have remote controls, perhaps from our cable or satellite provider that let us push a button and talk to the remote. I don't even have to remember what channel Food Network is, I just have to say Food Network and there I go.

So our consumer electronics, again, are quite advanced. These electronics often reflect the fact that they were created when our consumer technologies were not nearly as advanced as they are now. So consumer technologies now provide control of many devices in the environment and they use, they rely on wireless networks. So that means that someone like my mother-in-law who does not have the internet in her home can't use Alexa, because Alexa relies on the internet. She could plug it in, that little light's gonna show up, but she really is not gonna do very much. So you have to have internet within your home, most people do in the United States and it needs to be a wireless network. You know when we first got internet you had to plug in that little phone cable between your computer and the wall and then you could access the internet, now we do so wirelessly. These consumer technologies are also controlled almost exclusively by voice and so the person needs to have a clear voice. Most of these systems will support more than one person talking to them and recognize your voice very readily right out of the box, as opposed to assistive technology where with

voice recognition we often had to spend quite a bit of time training the system to recognize our voice, to recognize what we were saying. So this area of consumer technologies such as Alexa, such as this Google Home, which is pictured here, are an area of technology that are called Intelligent Virtual Assistants. Now a lot of us just say Alexa, but there's not only Alexa. Like I might say, hey do you have any Kleenex, well Kleenex is a brand name for those facial tissues right? I don't usually myself say, do you have a facial tissue? It's the same thing with this area of technology, the formal name for these are intelligent virtual assistants and they can do a lot more than just control devices and features.

So they are capable of controlling specific devices, anything from certain televisions to sockets to place a light bulb in, to an outlet that we can turn on and off to special smart home thermostats, security cameras at our front door et cetera. But in addition to that we can use and our clients can use an intelligent virtual assistant to get information and to provide entertainment. So in my home probably one of our most common questions to Alexa is: What's the weather gonna be like today. Now sometimes she's a little better at telling me what the weather's gonna be like than other times, but it's a great way of getting that information. Or I can ask for a news briefing and get some information. I can ask for certain music that I would like to play. I can ask for a recipe. If this is a type of technology, a virtual assistant that has a screen, I can ask to watch something on there, from a YouTube video to a movie. So lots and lots and lots of features and for a relatively low cost which is really quite amazing how much these systems do for their price. And when you compare that to EADLs, it's really a bargain. There are constant ongoing advances and updates and since these are software-based you don't have to buy the latest virtual assistant, because it's going to update itself. This technology does change rapidly however, and so it might be that in a few years you choose to get a new version.

There are two main categories to these intelligent virtual assistants: The virtual assistant themselves, but there are also apps that we can run on our tablet or a smart phone that also can control things within our environment, provide information, provide entertainment. So what's our dilemma? Consumer electronics are awesome right? They provide inexpensive and pretty reliable home control solutions. Once in a while Alexa doesn't understand or answer me correctly, but overall works pretty well. But there are some challenges for the people that we work with. These are not accessible to all of our clients and we're gonna go into more detail about each of these, these are not always reliable enough. If Alexa or one of these other assistants miss-responds to me I might be frustrated, but my life isn't gonna depend on it and for some of our clients, they have critical commands that they need a reliable response to. This technology at this time may not control all required devices and features for an individual. Again, this changing literally by the hour. And some clients, despite the low cost, may not be able to afford this technology.

So let's go into a little more detail. First, not accessible to all of our clients. Now there are a number of circumstances under which these may not be accessible. First and primary, these are voice-based devices. The client must have a clear and consistent voice in order for the virtual assistant to hear correctly, process and correctly respond to the client. However, these systems do respond extremely well to synthesized voice commands. I work with many nonverbal clients, they use speech generating devices, some type of communication device and these systems do typically respond well to them. The speech generating device is typically funded by payer and then the family simply needs to purchase the virtual assistant, which again, is not nearly as costly. Certainly not as costly as a communication device. Another limitation: There are limited display options on most of these virtual assistants. Most of them do not have a display at all or may simply have some type of color coding; if things are blue we're in good shape the virtual system is active. If the light ring is red there might be a problem. If it's white there might be a notification et cetera. There are starting to become available,

virtual assistants that have a display like this Echo Show shown here. So this is emerging and this does provide visual feedback, so for some of our clients, for some of us, this can be very helpful. Since there may be no display or the display may have limited capabilities, the client must remember commands. That requires some degree of memory and sequencing and that can be challenging for some of our clients. So the client, if they want to adjust their thermostat for example, needs to remember what command to give their virtual assistant. Now there's ways that we can provide perhaps reminders for our client or try to simplify the system for them. There are a lot of our older population who are using these virtual assistants. There's a wonderful commercial going on right now for the, oh I just lost it, Google Home. And it was shown during the 2020 Super Bowl, had a lot of people in tears, but of an older gentleman talking to the Google Home and using it in a very unique way. The manufacturers of these technologies are very aware that we have an older population using this technology and they are anxious to make that easily usable for people who may not be as familiar with technology as someone who's say 15 years old.

Another reason these may not be as accessible as we would like, apps. So in addition to the virtual assistant, we have apps that are available on our phone, on our tablets and these can, like those virtual assistants, provide control. But unlike virtual assistants, these are primarily designed to be used with direct access, you reach out with your finger and you push something on this app. So the client has to have good fine motor control or be able to use some type of alternative access method for the tablet or smart phone. That's hard, because switch access, while available, can be a bit tedious, because these apps might have a large amount of choices on the screen and that's a lot to go through. They're not designed, even though they are accessible, that's not their primary purpose. They weren't designed with that in mind. Also, to use these apps, the client has to have good vision. You and I need to have good vision, there's a lot of information on that phone screen. So the client has to visually scan through all these options to decide what they want to do. They need to also remember

where the commands are within their app, again, requiring some memory and sequencing.

Number two, the dilemma we face for some of our clients in using the EADLs versus consumer electronics is that consumer electronics are not always reliable enough. Again, if something's not reliable enough for me, I might be frustrated, but it's not critical. I've been known to tell Alexa that she's not very smart at times. Voice operated systems may not always recognize a client's voice, even though their voice-recognition is very, very strong. So if we are working with a client who's maybe a bit difficult to understand, but not using a communication device, they may not be successful with some of these technologies, though you certainly can try different kinds to see if one is more successful than the other. Also, if the internet's down, because, remember these systems rely on those wireless networks, the client will lose their control. That can be critical for somebody. And if the power goes out, the client will not have control of anything. Now we don't have anything to control at that point. Anything that's receiving power isn't working, but it's very important that critical systems, such as a door opener allow that client to get out of the home. Because the power can go out in certain emergencies like a fire and that client needs to leave. Now door openers typically have battery backup, but even though it's possible to use a virtual assistant to control a power door opener, this is a reason why I usually use a separate control for a door opener. Because, I want my client to be able to use it if the power goes down, which means the internet's down and the virtual assistant is not working.

Number three, virtual assistants may not control all required devices and features. There might be some features that are better controlled from an EADL. Now there's not too many of these circumstances, but it is something you need to consider. So these consumer-based systems are not designed to control power door openers, nurse calls, hospital bed controls. They're primarily designed for the general population. So there are some creative people out there who've managed to get Alexa or other virtual

assistants to work with a hospital bed, but it's not really readily available yet. It is changing. There are some compatible third-party door openers that will work with this technology. Again, and I can't stress this enough, it is changing rapidly and by the time you listen to this who knows maybe there'll be a hospital bed out there that says, we work with Alexa. But as far as I know as of today that is not the case. So we always need to keep our finger on this pulse.

Another challenge, these systems are not generally allowed to be used in hospitals. Why? Well because they can create interference with other equipment and if you've ever hung out a hospital, now hospitals don't do this as much as possible, but you know we used to see signs all over hospitals saying, don't use your cell phone in here, it will interfere with our sensitive equipment. There are concerns about interference, not as much as there used to be, but there are concerns that this could cause the same problem. Another big issue is privacy, because virtual assistants are always listening. Now you might have a friend who says, I'll never have that in my house, because it's listening to me all the time and they may have concerns about that. You will have your own personal opinion on that. For myself, I don't think I'm talking about anything that's too terribly interesting, but if I walk into my client's hospital room and I'm sharing personal health information that can be a concern, because this assistant is actually on. There are ways around this. We can tell virtual assistant to stop listening, or depending on the virtual assistant, push a button so that it is not listening a while. So for example, on Alexa there's a microphone button on top I can push to say don't listen for a while. Challenges, when that healthcare person leaves the room they might forget to push the button again so it's on and now my client can't control their virtual system. Also on number three, concerns about being able to control everything, some of these apps just like virtual assistants, do not control all the features of the device and the standard remote might still be required for some commands. Again, this is changing. But particularly, some of the early apps that came out for certain cable or satellite providers, or for my television itself control some features, but not all. They're

assuming that you still have your remote handy and that you can reach out and push buttons on just as well. Just like we talked about earlier, these apps also can be a bit challenging visually, a lot of information and may require literacy.

And number four, despite these great prices on this technology some consumers just simply may not be able to afford this and they may not be able to afford having a wireless network in their home. EADLs are not frequently paid for, but sometimes they are. I don't know of a payer that has agreed to pay for a virtual assistant certainly not internet within the home. On the other hand we have these EADLs, they're out there, but most of them are significantly outdated and significantly overpriced. In comparison to consumer electronics, they have less features, outdated features. It's very difficult for these manufacturers to keep up with consumer electronics, especially considering that they rarely get paid.

All right, so we're gonna talk about some consumer home control options. There are a lot of options out there, which is great. These are cloud-based voice services, sometimes called the digital assistant or artificial intelligence, AI. Again, these options are changing rapidly, are not specifically designed for people with disabilities, but can be used by a lot of people. Some of the examples of what's out there right now include Amazon's Alexa, Google Assistant, Apple Siri and Android Google Assistant. Alexa is extremely common, to the point that we tend to use the term Alexa to represent this whole area of technology. Alexa is an intelligent virtual system and it is the virtual assistant behind Amazon's Echo products, so you might hear Echo and Alexa kind of used interchangeably. In a way, Alexa is kinda like the software and the Echo is kinda like the hardware. Their products become something called a smart home hub using, again, the wireless network within our home and many of these include a Zigbee Hub. Zigbee, like Insteon, is a transmission technique that uses the wiring within our home and that's how it controls various smart devices that are plugged into an outlet or a socket like a light bulb, like a thermostat. Echo products right now include an Echo

speaker, a miniature Echo Dot, let me get my arrow here again, here we go, so these taller devices like this include a speaker. The Echo Dot just has a smaller speaker. The Echo Show has a display, including a speaker and a touchscreen. These are all pretty darn easy to set up and the list of skills is growing exponentially. As of the time of this creation of this course there are over 100,000 skills. These are third-party companies that work with Alexa to provide specific skills like Alexa play Pandora. You use a smart phone app to set this up and it's compatible with Apple and with Android. Google Assistant, this is something that a lot of people use as well. Again, an intelligent virtual assistant it powers Google products, such as Google Home. It includes a speaker and there are smart phones that can do the same features running Android that includes the assistant app. There are not as many smart home products available for the Google Home as there are Alexa. I find myself and I've heard from a number of people that Google Home seems to be a little smarter than Alexa in terms of performing a required request. So if I say to Google Home, what's the weather going to be like tomorrow, it might be a little more accurate than Alexa, but that can be subjective right? We then have Apple Siri. This is included on iPhones, iPads and the Apple Watch and you can add something called the Apple Home Kit to provide further home automation capabilities. It does not have a lot of supported devices yet, but Siri actually replies and responds very well to both human speech and synthesized speech from communication devices and can provide quite a bit of information and entertainment. It's an easy way to practice some of these features.

Virtual assistants can do all of the following, and we've touched on some of this: They can provide information such as telling you the weather, the news. They can control home automation devices that you buy that work with them such as a thermostat, such as lighting. They can also play back media and this is something that many, many people do is listen to their favorite music. So instead of trying to control old-school cassette tape players, like I used to do quite a while ago, or try to adapt a CD player, or even an MP4 player, you know, most of us play music now through these virtual

assistants or through our smart phones. And so these are very capable of pulling up all sorts of music services and much, much more. Now virtual assistants are controlled by voice. They do have very strong voice recognition. And I can't emphasize this enough: The early voice recognition systems that came out cost thousands of dollars and took extensive training to achieve a halfway decent voice recognition percentage. These do not require any training and support multiple users. So every member of your family can say, Alexa turn on that light and it will listen to this. Some of the features of that virtual assistant can also be controlled in addition to voice by smart phone, by tablet, or if available, by touchscreen on the virtual assistant itself. Again, this technology responds very well to synthesized speech and that allows someone who's nonverbal, or difficult to understand the option to use this technology. So these change and improve literally on a daily basis. I happen to have an Alexa in my home. I receive emails on a weekly basis that say, here's all the new things you can ask Alexa. Lots and lots of support for that. There are also wonderful supports on the internet. Lots of resources, instructional guides, videos, that can help you decide which of these devices do I wanna get, how do I set it up and how do I use them. So definitely take advantage of those resources. I don't wanna spend a lot of time on that portion of this course today, simply for lack of time, but also to keep this up-to-date, because it does change so very rapidly. Lots of wonderful, wonderful resources.

So that's a lot of information and depending on how familiar you are with this technology, your head might be spinning, or you might be saying, give me more, give me more. It can be very challenging keep up with this, so here's an idea, especially if all this is rather new to you. There's a good chance you own a smart phone. Let's say it happens to be an iPhone, a lot of us have iPhones. Try to use Siri once a day, use it for a while. You can simply say to your phone, hey Siri and then say simple commands. You can get on the internet and say, give me some ideas of things I can tell Siri. Your phone itself can tell you that. But here's a few ideas, you can say: What's the weather today? You can say, read my last text message. You can say, where's the nearest

Starbucks? Just start practicing and before you know it, you'll start using this more and more. I use Siri all the time and part of it's because I try to catch up with some work while I'm driving. I know that sounds terrible, but I wanna stay hands-free. So if I know that someone just sent me a text, I don't wanna read that while I'm driving on the freeway. But if I have my little ear bud in my ear, I can simply say, hey Siri, read me my last text message and she will tell that to me right into my ear. I can keep my eyes on the road. I can also use it to send a reply back to that person and I can do everything with my voice and with my eyes on the road. Android phones have similar applications, including Google Assistant. All right, so with all that said, do clients still need EADLs? Well for now sometimes, not as often as in the past. Those basic EADLs; switch toys, PowerLink, simple appliances, these are still helpful for young children who have limited control needs who probably just aren't gonna be interacting with Alexa very much, also, for people who have significant cognitive deficits who might struggle with a virtual assistant. Multiple function EADLs, rarely, but there may be a few times where these are required, so let's take a peek.

Now those basic EADLs, again, which use a switch, turn on a switch operated toy or simple device. The goal of using this technology is to provide independent play, so perhaps a young child who can't otherwise reach out, acquire, manipulate objects, we can provide alternative play for them. That play can help develop cognitive skills, prepare this client for future assistive technology use that's more sophisticated like a communication device. And psychosocially, this is very important as well, because this helps the child view themselves as a capable person, helps them participate within the family. Access is almost always by switch. So how does it work? Well we either have direct connection switch to toy, or we use some form of intermittent control either for battery-operated devices, simple electrical, or infrared controlled devices. Direct connection only works with battery-operated devices, so we take a switch, we take a battery interrupter, this one is from AbleNet, or we use a pre-adapted toy or device that has a switch jack on it. If it doesn't, we plug the battery interrupter into it, plug the

switch in and as long as the client maintains contact with this switch, that little pink pig is gonna keep walking across the room. Sustained switch control is good for preparing someone to use power mobility, because if this person's gonna use a switch to drive, they need to hold the switch down to continue movement of the chair and they release to stop.

We then have intermittent control and this requires something called a Switch Latch and Timer. In Latch mode, the first activation of the switch will turn the device on, it will keep going until the batteries wear out or until the switch is pressed a second time and that turns it on, or turns it off, forgive me. So that is just like a light switch; first switch activation turns it on, second switch activation turns it off. We can also use this in timed mode where you can set the Switch Latch and Timer for a certain amount of seconds, usually zero to 60 seconds or a certain amount of minutes, often about one to 60 minutes. So depending on what you're turning on, you can choose a certain amount of time. So you can plug in, oh I dunno, lets say a battery-operated fan and the client activates that switch, it stays on for maybe 20 seconds, turns off, the client needs to turn it on again with a subsequent switch activation. So this requires intermittent switch activation and it's great for developing scanning skills. The reason this is good for developing scanning skills is the client is going to anticipate this device is gonna turn off, this toy is almost done running, I have to wait, that's a hard thing to do and then once the toy or device turns off, I need to reach out and accurately activate the switch, meaning that it's the correct time to activate the switch, that starts developing timing. All important skills for developing scanning skills. So again, preparing someone to use more advanced, more sophisticated technologies.

So here's some examples, AbleNet had something called their Big Beamer and their smaller Jelly Beamer. When the client activates one of these switches, it sends a signal to a receiver, it's wireless. That works really great for toys that are moving around, because you can just attach it to that toy and you can use this in Latch or in timed

mode, one to 60 seconds or minutes. It also works in a direct mode. Now it's not directly connected to this toy in this case, but it can require sustained switch contact in direct mode. AbleNet also has a Mini Beamer transmitter and receiver. The top of this switch is actually a proximity sensor, so no force is required. You can, if a difference switch works better for the client plug it into a switch jack on the side. It does provide some auditory and visual feedback in addition to the activated device. So when this surface is activated there's a slight beep and a visual display here, queuing the client that they have successfully activated the switch. These are rechargeable and that is cool, because the other Switch Latch timers out there require batteries and I tell you'll end up going through a lot of expensive triple or AA batteries. This you just plug in a little mini USB like you do similar to your smart phone. Plug it in and you can use it over and over again in timed, Latched, or direct modes. Now we can also provide intermittent control of simple electrical devices, same advantages of battery-operated devices, but we don't have to put batteries in that little battery operated toy. We can use electrical devices and that can be nice. It provides an increased variety of devices, as a result as well and that can be nice for adults and for teens.

Now this will only control electrical devices, as I mentioned before, that turn on and off when they're plugged in or out of an outlet. Now with our changing technologies available to us, there's not as many of these devices out there. Even something like a fan might require me to push a button after it's plugged in, but if you have a fan that has a mechanical dial, knob, a button on it that stays in position when it's unplugged, when you plug that into the wall the fan turns on. Those older devices will work with these basic EADLs. Here are some examples of other devices that are often used with basic EADLs, primarily the PowerLink from AbleNet. So lots of cool devices here that might be engaging for a client. Again, using this technology to help the client develop switch skills, maybe scanning concepts, prepare them for future technologies, allow some simple control for a young child or for a teen or adult who has cognitive limitations that might make using these consumer electronics just a little too complex.

Lots of ideas, if there's other ideas you have that you find are really exciting for your clients, shoot me an email, I'd love to hear. Some of my clients favorites on here include: A lighted mirror, all my gosh, I have clients who love this. Hit the switch, lights on the side of that mirror go on and they love looking at their beautiful face. Some of my clients really love doing some cooking with a blender and helping out with that. Lots and lots of options here.

So again, to provide this intermittent control of a simple electrical device, about our only option on the market right now is from AbleNet, it's the PowerLink 4. It has many modes of control, again, sorry, direct, requires that sustained contact. Latch, like a light switch, one switch activation on, one switch activation off. Or timed, seconds or minutes. There is a unique option where both switches have to be held down to activate. There might be two switches that are connected to this PowerLink. You could use that to work on two-handed control. You can also use that to get two students to work together, that can be fun as well. It does keep track of how often the client is hitting a switch. That can be nice to collect some data, perhaps you work in a school and you're trying to achieve some IEP goals, it's a nice way of keeping track of that. And it can control more than one device, so one switch can control one device, like a fan and another can control a second device, like a blender.

All right, so let's stop for a moment, take a breath from all this nice technical information and talk about a case study of a client who used both of these technologies, EADLs as well as our more current consumer electronics. So McKenzie at the time of this evaluation was four years old, has cerebral palsy and didn't have any ability to play on her own. She wasn't able to reach out, acquire, manipulate toys and that's a very important part of childhood. We know as therapists it's an important part of overall development. She's nonambulatory and nonverbal. We began by determining where she was able to use a switch and what type of switch would work for her. And in her case she was able to actually pull back with her elbow into an AbleNet Jellybean

switch behind her arm and she could use this to consistently activate a switch without becoming stuck on it. We then provided a simple switch toy. She would push the switch, the toy would operate, that allowed her to play and begin seeing herself as a capable person. So we're providing play, providing some independence and starting to develop switch skills, because McKenzie has probably a lot of other assistive technologies in her future, including a power wheelchair, including a communication device. We started increasing a variety of switch toys. This is really important to continue motivation. Most kids don't just play with one toy right? If you own children, you own a lot of toys. We didn't want her to look like she was no longer able to participate in a task or maybe she was just bored. We then added a Switch Latch and Timer. That helped to further develop her motor and cognitive skills, because now instead of only holding down the switch to make the toy go she was starting to hit the switch once, the toy would activate for a set amount of time and then she'd need to hit the switch again. We were trying to develop scanning skills that she would need in preparation to control a speech generating device.

We then added a PowerLink to the mix. So now she could start controlling some electrical devices. This expanded her control opportunities and it was around the holiday time and one of McKenzie's favorite things to do as a family, plug the Christmas tree lights into the PowerLink and she could use the switch to turn them on. So she would turn them on each afternoon and then before bed she would go over and turn them off using Latch. As Mackenzie got older, she did receive a speech generating device and she was able to control that with the switch. She did not have the ability to use eye gaze for that device, partly because she has cortical visual impairment and it was difficult for her to do so as a result, but she could use auditory scanning where she used a single switch and listen to her choices. Not only was she able to use this for communication, but as she gained competence and vocabulary with the device she was also able to use Alexa for other things. Now being that she was still young, maybe late elementary school, she wasn't terribly interested actually in using Alexa to control

the thermostat, or see who was at the door, or turn on lights or appliances, but she loved asking Alexa to tell her jokes, to play music like Taylor Swift and even to read her stories. So this is part of the beauty of these consumer electronics is we're not limited to simply basic control, that while it does improve independence, just may not be that motivating or meaningful for an individual client. We were able to reach her where she was.

What about those multi-function EADLs? I did mention that there are a few circumstances where these may still be required, even in this world of growing advancing consumer technologies. These do provide control of a much greater variety of devices and functions than basic EADLs. Typically these are using infrared and Insteon. This is tricky, infrared technologies are kinda going away. They're getting outdated. These can be controlled direct, switch, voice and many of our speech generating devices and complex rehab power wheelchairs, that's that PWC are capable of sending infrared signals. Unfortunately, they are quickly becoming more outdated as well. These should be more reliable in consumer technologies, but not always are, particularly infrared, it's a little unreliable which is why it's going away. So where is this technology critical? Well it's critical to make sure that any client within their capabilities can make a phone call and exit the home in an emergency even if the power is out. Now phones aren't as big a deal anymore in terms of power. When we had landlines, if the power went out I couldn't make a phone call, but most people have phones that do not rely on power, not everyone. So this is really very, very critical. If there's a fire I need to get out of my home right now. Now that requires a power door opener, it also requires an accessible entrance. I'll make a phone call when I get outside. But let's say my caregiver didn't show up, or I'm having some type of medical emergency, I think someone's trying to break into my home, I need to make a phone call, not open my door. So it's very important, that access to both. So there are some specialty functions EADLs. Sometimes we don't even need to invest in a multi-functioning EADL, but we may need to invest in an adaptive phone or provide a

way for this client to reliably use a smartphone. That might be by voice, it might be by other technologies and I need to provide a door opener that has some type of backup access, not only rely on my consumer technologies, those virtual assistants, but be able to access a switch that will control that door opener and it needs to have battery backup, so if the power goes out the door opener will still work, very, very important.

Now there is a newer resource that I found just recently that I think is amazing it's called Stratus ECS. And ECS stands for Environmental Controls as a Service. Now environmental controls is a more outdated term, but it does refer to this area of EADLs and this is a service that's provided by Broadened Horizons. Broadened Horizons has been around for a little while now, excuse me, and has made EADLs. But they're trying to also recognize the fact that people are starting to use consumer electronics more and more and more. You can find the service at StratusECS.com. They use a combination of consumer technologies and wireless networks, but will help you develop a custom solution that's designed for personalized disabilities. As such, they are often funded. Now you can talk to them about this, but they claim that they are receiving funding often times for the technologies and their services. They are also able to provide upgrades to keep up with consumer technologies. So perfect, let's say this isn't your area of expertise, but you have a client who has really unique needs. You can contact these folks and say, look, can you help me support this person? They do the majority of their work remotely, so you don't have to worry about them being in your area. And they, again, will help you develop a customized solution that might include a virtual assistant. It might include a power door opener. They're going to design a system to best meet that person's needs and continue to meet that person's needs. A very valuable important service.

So what's our take-home message? Well many clients lack independent control of devices within their environment and we know that basic control, particularly phone and door is a very critical safety issue. Independent control is an important therapy

goal. It's a part of what we offer our clients. I wanna thank you very much for joining us for this important topic. I hope it's helpful to you and provide some valuable updates to our more antiquated options in this area of assistive technology. I wanna provide contact information as well for occupationaltherapy.com, they have a host of webinars. Many of them on other assistive technology topics, so I would encourage you to check out, as well as my personal contact information. Thanks again everyone.

- [Fawn] Thank you Michelle for another great talk. I hope everyone enjoyed it today, everyone also has a great rest of the day and you join us again on continued and occupationaltherapy.com. Thanks everyone.