

“Tech Talk” TV Show

“Accessibility Online” Episode

While music plays, various devices that aid accessibility are shown and finally a computerized voice says, "Tech Talk."

Tech Talk intro plays.

Susan: Hello and welcome to Tech Talk; your source of information on the technology that surrounds us, from the University of Minnesota. I'm your host, Susan McKinnell. Today we're going to talk about accessibility. This program will deal with innovations that have touched the workplace and have allowed every person watching me right now; that's every person, even if you are no longer that limber and lithe twenty-year-old, access to your computer and other devices you may use daily. Some of the terms you'll hear today include: adaptive technology, speech recognition and screen reader. Joining me today is Dave Fuecker, he is the associate director of the University's Disabilities Services Department a position he has held for eight years. Most of his professional life he has worked in the area of vocational rehabilitation and he holds a degree in rehabilitation counseling. Dave, nice to have you with us.

Dave: Thanks, Susan.

Susan: Now, I know that accessibility is a term that a lot of people are familiar with, but what we're talking about more today is adaptive technology. What exactly is that?

Dave: Well, in the employment setting adaptive technology is any high-tech or low-tech piece of equipment that allows access to one's job. It could be expanded out beyond employment to include any aspect of one's life.

Susan: I know that with "accessibility" people tend to think about disabilities, but adaptive technology sometimes goes beyond that-not just people who legally fall under the category of having a disability, but people who need any sort of assistance?

Dave: That's correct. I think that in today's workforce, well, I know we have an aging workforce and we also have people who have different preferences how a job gets done. Adaptive technology is simply a way to do it differently. A way to achieve the same ends by using different means.

Susan: Okay. What are some examples of adaptive technologies that are in use on campus?

Dave: Well, you'll see with Phil, shortly, you'll see a number of the access to information technology tools that have been used, we also expand that to include ergonomic analysis and ergonomic adjustments as well as material handling adjustments and mechanizing,

perhaps, various material-handling tasks and activities and again, reaching the same outcome and perhaps and most likely, increasing efficiency.

Susan: In some jobs we have issues where people...repetitive stress injury I think is one of the most common on-the-job injury that happens.

Dave: Mm. Hmm.

Susan: So some of the adaptive technologies that we have are to accommodate for that or to prevent them in the first place?

Dave: That's correct. We use a lot of ergonomic adjustments to address the onset of an injury as well as to prevent.

Susan: Mm. Hmm.

Dave: Many of the adaptive technologies overlap with ergonomic principles.

Susan: Okay. A lot of those we can imagine and I know that with Phil we're going to talk about some things, you know, accessing computers and so forth, but sometimes these things are not for...I know a lot of people are familiar with ergonomic chairs and so forth but are there perhaps more industrial jobs or things like that on campus? I think we had a little discussion before the show about, say, janitors and who might need things.

Dave: Sure. The low-tech adaptive technology will include extensions for an implement or a tool for janitors as well as moving into some more high-tech. At the University, were like a little city, we have some harder industries.

Susan: Mm. Hmm. We do a little bit of everything.

Dave: Correct. So we do have printing services, as an example, where there is a lot of material handling and with an aging workforce we have to be aware of the progression of illness, the onset of illness as the workforce ages the amount of chronic illness will increase. We want to be able to obtain and maintain qualified employees. It's much more cost effective to keep people employed than it is to replace.

Susan: Yeah. That's one of big the issues, I know that with all of these adaptive technologies and with the ergonomic chairs and what not, a lot of this equipment is really expensive. And I think a lot of us look at this and say, well, is it... we have a lot of laws- we've got state laws and Federal laws to prevent discrimination against folks with disabilities but is it cost effective in any way to purchase all of this equipment and so forth to keep these people in jobs?

Dave: I think if you look at it from the law; beyond the law...first of all, yes. We do have laws. We have disabilities laws to prevent that will account for equal access to employment. What we like to do is go beyond that and look at the benefit of maintaining

employees and hiring qualified employees and making sure that those qualified employees have access to those positions. When you talk about cost for an employee, the cost of providing an accommodation or an adjustment--an ergonomic adjustment or adjustment to how the job gets done in a technical stance--a technical point of view--that cost is significantly less than the direct and indirect cost of losing that employee. Either to disability benefit insurance and as I said, the indirect cost of replacement and training and loss of efficiencies there. So we maintain that the work retention and return to work function of our office is there for that reason. So we go beyond the law and look at that as sort of our corner stone.

Susan: It's absolutely worthwhile to keep people who have been in a job for twenty years and know how to do it really well.

Dave: That's correct.

Susan: Rather than hiring new people and all the cost involved with that.

Dave: Mm. Hmm.

Susan: Well, great. Thank you so much for being with us today, David.

Dave: Thank you.

Susan: The things Dave and I were talking about were really the end of the story; getting there is a story all by itself.

There have been tremendous advances in technologies relating to accessibility some of which you're already familiar with like closed captioning on your TV set. Some you may not know about include the FM system. A speaker uses a microphone which amplifies his voice only through the headphones worn by the listener. Then there's the TTY; a small typewriter device that allows those with a major hearing loss to use the telephone to converse with others. For those whose eyesight is not as good as it once was, there are programs that magnify the screen view and provide other features to make the computer display more visually accessible. There is also something called CCTV, or closed circuit television. It's a monitor and camera system that increases the size, contrast and brightness of print materials. For those more visually challenged, one of the most versatile ways to access print is with a scanner, a computer and a computer program called optical character recognition or OCR. The scanner copies a page of information, sends it to the computer's OCR program which then turns the information into a word processor file. From there the file can be made into large print copy or the written words can be transformed into Braille copy or it can be read aloud by computer software known as the Screen Reader or it can be downloaded into a portable reading device called a Road Runner. There is even something called a tactile image enhancer that produces raised line diagrams for those doing design or science projects. Computer accessibility for some physically challenged can be as simple as the track ball; an upside-down mouse

or typing using a natural keyboard; one that's split and gently sloped to allow for natural hand, wrist and forearm positioning. Various supportive devices can provide total support to the arms wrists and palms of computer users. For those with even more limited motor movement, there is voice recognition software. It allows the user to speak into a microphone to execute commands or to vocally type text into the computer.

These types of adaptive technology are making it possible for all people to have the same access to information whether it be educational, entertaining or interpersonal.

Susan: What you have just seen is the beginning of the accessibility story. Phil Kragnes is here to complete that story. Since 1998 Phil has directed the computer accommodations program at the U of M. The program assists students, staff and faculty with disabilities in accessing computers and information through the use of adaptive technology. Phil has a bachelor's degree from Carnegie-Mellon University and a Master's degree from the University of New Mexico.

Phil, it's nice to have you with us.

Phil: Good to be here, Susan.

Susan: We've got a lot of stuff here. What are some of the disabilities that some of the adaptive technology can help with?

Phil: Well, a whole range of disabilities and combination of disabilities can be helped through the use of adaptive technology. Everything from visual impairment, to complete vision loss, to low vision. Persons with physical and mobility impairments, people with hearing [disabilities] both deaf and hard-of-hearing and people with learning disabilities.

Susan: Mm. Hmm. Quite a range! Can we start out with visual impairment; low vision and so forth? What are some of the adaptations that we can do for them?

Phil: Well, the computer has really leveled the playing field for people with visual impairments in the last decade or so. Technology is advancing at an amazing rate. Speech synthesis, that is the ability of electronics and software to generate speech, really was a great boon to persons with visual impairments and their ability to independently access information.

Susan: Mm. Hmm.

Phil: In recent months, even, we've had the advent of digital PDAs, or Personal Data Assistants that talk, such as the Pac Mate here in front of me.

Susan: You've got...it's just kind of like a keyboard but this is actually a PDA?

Phil: Yeah. It actually runs on the Windows CE or "Pocket Windows" operating system. It contains calendar, mail utilities, almost anything that you'd find on the average PDA.

Susan: You said that this has some speech capabilities. Can you show us how that works?

Phil: Well, it has speech output, so as a blind person, I can look at my today list.

Phil's PDA's electronic voice says, "Friday, April 6th, 2004. Tech Talk Taping. 1:00pm-4:00pm Rarig Center dot dot dot. 9:15am-10:15am no unread messages. One active task. Battery 98%"

Susan: You don't need a screen at all; you've got it all right there.

Phil: Yep. And what's nice about the PDA too, Microsoft has actually developed a very basic speech recognition system. And for a blind person it makes looking up information much quicker rather than having to enter key strokes. All I have to do is ask the PDA what I want to know. For instance, I can find out what my appointments for today are.

Phil pushes a button on his PDA and asks, "What are my appointments for today?" The PDA replies, "Today: one item. Started at 1:00pm Tech Talk taping, location: Rarig Center, Studio E."

Susan: That's marvelous. It makes it almost seem like the PDA has a personality there.

Phil: Yeah. It's like growing up I was always the Star Trek fan.

Susan: Exactly.

Phil: It's like, "Wow, I'd really like to be able to just ask my computer something and have it respond and now it's possible."

Susan: That's wonderful. And now we have similar speech recognition capability, I know that Macintosh has been developing something, as well, along those lines.

Phil: They've been trying to. (laughs) There is a speech recognition package for Windows that is, well actually two primary packages; one is Dragon Naturally Speaking and one is Via Voice. The one we do support here at the University is Dragon Naturally Speaking. It is a much more robust package, you can write macros so that given one voice command it can carry out many different functions.

Susan: This sort of technology wasn't really specifically developed for people with visual impairment was it?

Phil: No and that is the interesting thing about technology or adaptive technology is many times it starts out as a business productivity tool. So speech recognition, for instance, was

never developed for persons with disabilities. It was originally developed to prevent the need for transcribers.

Susan: Mm. Hmm. So we all didn't have to type so much.

Phil: Yeah. I mean if you can dictate at 160 words a minute, there aren't too many people who can type quite that quickly.

Susan: Exactly.

Phil: Not to mention preventing injury. And so now with speech output is you think about safety consequences or options that speech output provides your driving down the road at 55-60 miles an hour, you don't want to take your eyes off of the car in front of you to find out who is calling you on your cell phone.

Susan: Absolutely not.

Phil: So we are going from developed...equipment and technology developed for office use to use by persons with disabilities back into the average consumer market.

Susan: And things get perfected. They go back. That's great. Now, for visual impairment. There are some simple things for people with low vision that is already built in to, say, Windows or Macintosh isn't there, that they can do just to read the screen a little easier?

Phil: Yes. Both operating systems, the Windows and Mac operating systems, contain magnifiers. Windows XP, in particular, has a pretty good magnifier built into it as well as a screen reader. The Macintosh also has what it calls Close View and is basically an electronic magnifier that not only enlarges the text on the screen, but you can also have black text on a white background, or white text on a black background depending on if the reverse...

Susan: Sometimes it could make it a lot easier to read than all that colored stuff.

Phil: Yeah. The high contrast.

Susan: Now, you've got a scanner over here, and that is also for folks with visual impairment. It's just a little bit to your left. I'm reaching over for it here. And what can you tell me about this guy here?

Phil: Well, a scanner can be used in many different ways. This is a portable scanner; very light, one point three inches thick.

Susan: This is tiny.

Phil: Fits in most of your laptop cases, this will fit right in. A person with a visual impairment could use this type of technology to scan printed material and have the computer read it to them.

Susan: Mm. Hmm.

Phil: Or let's say someone with a learning disability such as dyslexia, where processing text-based information can be quite difficult. That person can scan the text in and the computer will not only speak it to them but it will track the word being spoken using a highlighted color or something of that nature so they get a multi-modal input both auditory and visual.

Susan: So some of these technologies kind of bridge different disabilities.

Phil: Oh, certainly. Yeah, we can go again, from visual impairments having something read, that benefits a person with a learning disability as well. The same thing could be said about books on tape or talking books as they are sometimes called. We can also go then from...we were talking about speech recognition...well, people often think okay, speech recognition allows me to dictate documents to my computer, do command and control, that is operate different functions on the computer just by speaking them; great for someone with a physical impairment who can't use a keyboard or can't do it for prolonged periods.

Susan: Exactly.

Phil: Well, what about the person with dyslexia or a learning disability who has tremendous ideas but trying to get the ideas from thought to fingers in typing or hand writing they lose...you know, they have four great ideas but by the time they write the first one, the other three are gone. Well, hey if you can speak at 160 words a minute...

Susan: You can get it all out.

Phil: Exactly.

Susan: That's fabulous. I think that as a society we tend to think that if someone can't read something clearly then they may not have a valuable thing to communicate, which, I think, is such a limiting view of the world.

Phil: Well, unfortunately when we hear learning disability we think intellectual disability and that is not at all the case.

Susan: Exactly.

Phil: These people have normal IQs, it's just that the mechanism of getting the thought onto paper or transmitting it in some way; spoken or written, there is some kind of barrier

there or there is a barrier getting the information in but once it's in, they have normal intellectual capabilities and processing.

Susan: Absolutely.

Phil: So we are just giving them the tools to release those ideas; make them more productive.

Susan: Absolutely. What about some issues with mobility impairment?

Phil: Well, mobility impairments can span a wide range. Everything from something as simple as carpal tunnel syndrome or a damaged rotor cuff where a person has trouble with upper arm movement, right down to quadriplegia or paraplegia.

Susan: Mm. Hmm.

Phil: We've already talked about voice recognition allowing a person to type.

Susan: Absolutely.

Phil: Some impairments are much more severe than that. Someone may have back and shoulder problems where supporting themselves at a keyboard for a long period of time is difficult.

Susan: Mm. Hmm.

Phil: So we may use something like the wrist wizard here.

Susan: That's a fun-looking device there.

Phil: This is a very low-cost adaptive technology. It runs about 50 dollars and it allows the person...it supports the person's arms for them. So that there is no use of the shoulder and neck muscles or back muscles.

Susan: So it keeps the strain off of that. I know that I've had neck strain just from looking slightly sideways to a monitor and so I suppose that would just help a lot with that.

Phil: Exactly. It can also be used for simple things like needlepoint too, anything where you have to have your arms out for an extended period of time.

Susan: That's marvelous. I know that, yeah, a lot of people have issues with needlepoint, knitting and so forth.

Phil: Exactly. Now for other basic issues like carpal tunnel where flexing of the hand, rotating of the arm, flexing of the hand, maybe it's nerve damage, something of that nature, we have a variety of mice or alternative pointing devices.

Susan: We have a whole bunch of them out here, don't we?

Phil: Yeah. When people think about computer mice, they think about grabbing a small rectangular box and sliding it around on a mat.

Susan: Absolutely.

Phil: Well, again we talked before about a lot of technology was developed for productivity not necessarily disability; track balls are another good example of that.

Susan: And I've got a couple right here, it looks like there's a big square one, and then one that's a little more oval-looking.

Phil: Contoured?

Susan: Contoured, yeah, that's a nice word for it.

Phil: This is a five-button Kensington expert mouse and then we also have the Kensington Turbo Ball which is a very simple, basic...

Susan: What's the advantage of having a track ball?

Phil: Well, the advantage of a track ball is that it requires no upper arm movement. So anyone with shoulder or back problems, again, I mentioned rotor cuff injury where moving the arm back and forth, side-to-side et cetera, this is going to allow the person to keep their arm stationary.

Susan: And just move the fingers.

Phil: Just move the fingers or if they do want to use the arm, they can just roll the ball with the palm and prevent a grasping motion which can be problematic for certain people with nerve damage in their hands.

Susan: Great.

Phil: But as I was about to say was, the track ball was invented because people didn't have enough room on their desk to move their mouse around.

Susan: So, again, it was a different reason that it was invented but it's very useful for adaptive technology. I see one here that looks like a joy stick. What's the deal with this one?

Phil: That is a 3M Renaissance mouse made right here in Minnesota and again, in carpal tunnel and many muscular and skeletal disorders, rotating the arm is an unnatural thing to

do. When we are sitting at a desk, you'll notice that your hands don't lay flat. The thumb side of your hands are usually in a higher position.

Susan: I never even thought about that, but yes they are, aren't they?

Phil: And so the natural position, is to have you hand upright and this allows a person to use a mouse without doing that flexion.

Susan: So I can just move the mouse across the table like this; there is no bending going on.

Phil: Exactly. And you don't have to move your fingers to do the key clicks. It's all done with the thumb on the top of the joystick.

Susan: Great. Now what about this one actually looks like a visor. I'm going to hand this over to you, Phil.

Phil: Now this is a gyroscopic head mouse.

Susan: Mm. Hmm.

Phil: This would be used for someone who has no use of their upper extremities.

Susan: Mm. Hmm.

Phil: It is worn much like a visor.

Susan: Looks like a little hat.

Phil: It is going to slide down now, there is a little band that would hold it in place normally. When the person tilts their head, up, down, sideways whatever, basically wherever they're looking at the computer monitor, that's where the mouse is going to move.

Susan: Mm. Hmm.

Phil: So it requires no arm movement. We use this in conjunction with what we call dwell software. That's D-W-E-L-L. All the person has to do is look at an icon for a fraction of a second which--that delay period can be changed within the software--but when they hold the pointer on the icon for that period of time it will actually perform the mouse click for them. Usually there is a bar at the top of the screen if they want to right mouse click, they would look up to the bar, select right mouse, look down to the icon again and it would perform a right click.

Susan: So they can do absolutely everything that you would do with a standard mouse.

Phil: Yeah.

Susan: Now, we're getting low on time here Phil, I do want to touch base on a couple of other things. I guess the main issue, though, is where can people go for more information and help on issues of adaptive technology?

Phil: Well for information and funding resources; a funding catalog and all of that. One of the best resources for Minnesotans is the Minnesota Star program, that's System of Technology to Achieve Results and it's part of the Department of Administration. You can visit their website at <http://www.admin.state.mn.us/assistivetechology>.

Susan: Great. And we will have that link on our web site as well. Thank you so much for being with us today, Phil.

Phil: Well, thank you for having me.

Susan: Well, that's our program on accessibility and adaptive technology. We covered a lot of important points, but some special ones we've selected For Your Files.

David Fuecker from the University's Disability Services department said using adaptive technology to keep a disabled employee makes good financial sense.

David: ...The cost for providing an accommodation or an adjustment--an ergonomic adjustment or adjustment to how the job gets done in a technical stand--a technical point of view that cost is significantly less than the direct and indirect cost of losing that employee. Either to disability benefit insurance and as I said, the indirect cost including replacement and training and loss of efficiencies there.

The U's computer accommodation director, Phil Kragnes, said adaptive technology has interesting roots.

Phil: many times it starts out simply as a business productivity tool. So speech recognition, for instance, was never developed for persons with disabilities. It was originally developed to prevent the need for transcribers...the track ball was invented because people didn't have enough room on their desk to move their mouse around.

Phil said computers in the past decade have leveled the playing field for the visually impaired.

Phil: Speech synthesis, that is the ability of electronics and software to generate speech, really was a great boon to persons with visual impairments and their ability to independently access information.

Phil says that the best resource for more information on assistive technology is the Minnesota Star program. You can find them online at <http://www.admin.state.mn.us/assistivetechology>.

If you missed any portion of this program or want to see it all again, stop by our website. All of the programs we've done so far including this one are right there for your viewing. Our address is techtalk.umn.edu. And if you have any questions about the adaptive technology that you've seen today, just post it on our website and we'll have one of our specialists answer it. Next week, it's a how-to show. If you've ever surfed the web you've come across a number of exciting websites. If you've ever wanted to create a website for yourself, you'll want the rules on what to include and what not to. It's next week on Tech Talk. Join us! Thanks for watching. I'm Susan McKinnell.

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