

Article 19 Podcast Transcript – Echolocation with Daniel Kish and Derrick Twene

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Intro:

Expression is one of the most powerful tools we have. A voice, a pen, a keyboard. “The real change which must give to people throughout the world their human rights, must come about in the hearts of people. We must want our fellow human beings to have rights and freedoms which give them dignity.” Article 19 is the voice in the room.

00:00:25

Kristen:

Hello everyone, and welcome to Article 19. I’m Kristen Witucki; content creator, accessibility specialist, and lifelong learner. I am also the host of our conversation today. We are going to talk about an aspect of blindness and low vision, and maybe even life, that we don’t always get to talk about; orientation and mobility. Essentially, movement. And this conversation will cover so much beyond that. Basically, the idea of freedom for everyone to move in their physical spaces, and to really understand the world around them through a tool called echolocation. We’ll talk with Daniel Kish, an expert in echolocation, and his friend and former student Derrick Twene, who has benefited from adapting to the use of echolocating later in his life. This conversation will cover the anthropology of echolocation, and shattering societal expectations.

Article 19 is a call for others to join us in a bigger conversation around the ADA, digital accessibility, and access to information. At Tamman, we’re working to build the inclusive web every day, and to do that we need all of us, all of you, working together and learning together. Thanks for listening to Article 19, and let’s get this conversation started.

So now, let me formally bring in our guests. Daniel Kish, echolocation expert and President of World Access for the Blind, and his friend and former student, Derrick Twene. Hello both of you, and welcome to the show.

Daniel:
Thanks for having us.

Derrick:
Thank you for having us.

Kristen:
We're so honored to have both of you here today, and you both have such fascinating and unique stories. Let's just take a few minutes, and if you could each introduce yourselves more fully and talk about your background, that would really help listeners to understand where we're coming from.

00:02:23

Daniel:
Thanks again for having us. I'm Daniel Kish. I guess I'm renowned as an echolocation expert just because I've made the most noise about it. I am also a certified orientation and mobility specialist. I'm the first totally blind person known to be certified as an orientation and mobility specialist. I was certified back in 1996, I think, the end of '96. I received my mobility credential from Cal State Los Angeles. I have two master's, one in developmental psychology and one in special education; the latter one is from Cal State Los Angeles. And so, I've been teaching avidly ever since. I've had in excess of 3,000 students; I stopped counting at 3,000. I've spent at least 30,000 hours in direct service in the field, but I also author articles and papers, and I have authored a textbook on FlashSonar and echolocation. So most of my writing occurs during transportation between students, actually. I have students all over the world; I've been to over 40 countries. Teaching my brand, if you will, of orientation and mobility is really more about freedom, so I don't

really think of myself as a mobility specialist as much as I think of myself as a freedom facilitator, and echolocation of course is a part of that. But we'll get more into that. I will turn it over to Derrick.

Derrick:

Hi, my name is Derrick Twene. I'm a British national currently residing in the Netherlands. I used to be a global industry manager, like a director, managing multiple businesses around the world; Asia, Europe, and North America. But after losing my vision, which I lost five years ago, I'm now what is known as in a pre-pension stage. So five years, lost my vision, and I'm no longer able to work because my vision is so low. However, I still consult, literally in the same area as I was doing before, and I'm very happy to join this conversation and see if I can help move things forward for people who are blind or visually impaired.

Daniel:

I'm going to offer a clarification on behalf of Derrick here. When he says he's no longer able to work, he was essentially removed from his position by European standards. If he were in the US, he would still be doing the job he was doing. I have very, very little doubt about that, and in fact as a consultant he's doing the job he was doing. He was removed from his position in Europe due to optics. The company didn't want to be seen having a blind person hold the position he was holding.

Kristen:

Just from an irony standpoint, I love your use of the word "optics" there.

Daniel:

Yeah. [laughter] Yes.

Kristen:

How would you define echolocation to those who have no knowledge of it or those who have a very basic understanding?

Daniel:

Well, most people have a knowledge of bats, and most people are aware that bats, at least certain species of bats, navigate largely due to their hearing, due to their echolocation. So, that's sonar. That echolocation is a pretty common thing. Dolphins; we all know that dolphins use echolocation. Basically, echolocation is the use of sound to be aware of what's around you, so in active echolocation in nature, you make a sound—a click or a chirp, or some kind of signal—that goes out into the environment, bounces off of surfaces all around you in the environment, and then returns to you, and then you're able to extract patterns from that reflected information about what is around you; position, layout, contours, depth of structure—which would include density and texture. If you're a bat, you can determine what kind of insect you're chasing, and you can chase that insect right through foliage and still catch that insect. The dolphins, you can determine what kind of fish you're about to eat, whether it's edible or not. So that basically is sonar, and I regard sonar as a close cousin to vision in that both use reflected energy to allow us to interact with the environment, to allow us to know what's around us, where to go, how to get there, and what to do.

00:06:26

Kristen:

So if you're inside a building, of course you'd hear where the walls and the doorways are, and the shapes of things, but maybe with echolocation you'd also hear the heights or how the walls are constructed, things like that?

Daniel:

Yeah, so the spatial topography is fairly easy to teach and to learn, so where walls are, what their configuration is, what shape rooms are, how large they are, where hallways are, doorways. If you're in a larger space like an airport or a transit station, you can use that information to determine where concourses are, where the primary paths of travel are. But to a higher level, it can allow you to determine where clear paths are, so if you're walking

among people or if you're walking among furniture, you can use echolocation to gauge where your lines of reference are, so you can aggregate furniture, for example, into a single line of reference, and then use that to direct your course of travel. You can tell where pillars and columns are, you can tell where kiosks are; various kind of furniture that you find in shopping malls and shopping centers. In an outdoor setting, you can tell where street furniture is, you can identify landscapes, you can recognize the difference between one tree and the next, or one type of building and the next. So it depends on how much detail you want, and how much experience and practice and attention you devote to learning that level of detail.

Kristen:

What does anthropology suggest about the history of echolocating and how it has changed over the millennia?

00:08:02

Daniel:

Yeah, there are suggestions there. First of all, it's kind of interesting from an anthropological perspective. I first got drawn into the field of anthropology through a professor at Macquarie University in Sydney named Dr. Greg Downey, and he wrote an article called "Getting Around by Sound," and in that article he points out that there are cultural imperatives around echolocation specifically, and freedom for blind people in general. If you look at bat culture, for example, or dolphin culture, it's just assumed that every member in bat culture—and I'm using bat very, very generally, because not all species of bats echolocate—but in bat culture, you're just going to learn to echolocate. You just learn it. You learn it the way you learn language, you learn it the way you learn mating; you just are going to learn echolocation. Same with toothed whales; they all learn echolocation. You don't forage very well if you don't echolocate. You don't navigate very well if you don't echolocate. You're not included in bat society or dolphin society, toothed whale society if you don't echolocate. Yet somehow among humans, despite the fact that echolocation,

quite frankly, has similar utility, it's just not expected. Not only is it not expected; it is in some ways discouraged to learn to echolocate as a blind human, and indeed to learn as a blind human the same appreciation for one's personal freedom—I call it self-determined freedom of achievement—and personal dignity and personal agency. None of those things are expected of blind people in human culture, in human society—pretty much any society you care to look at—in the same way that these things are expected of members of bat society or toothed whale societies. So that's sort of the modern look at anthropology.

If you go back, well, it's a little bit of a different story, because tens of thousands of years ago and hundreds of thousands of years ago, humans were not predators the way we are today; we were prey or, if anything, we were fighting hard for the same rights to freedom and survival, and we had to use our hearing, because you can't see what you can hear in the jungle, and you can't see what you can hear in caves, where we spent much of our time. Especially before we invented artificial lighting, if you want to call fire artificial lighting. We didn't always have fire; we didn't always have torches. We didn't always have a way to make our own light, and yet we had to survive; we had to manage. And so for likely millions of years, certainly hundreds of thousands of years, humans were using staves—i.e. the white cane, if you will—and their hearing, which most certainly would have included echolocation to survive, as an instrumental aspect of their survival. If anyone's ever been in a cave, it's dark in there; like, totally dark, and rather dangerous. I mean, there really are caves where you'd have drop-offs that go into, for all practical purposes, infinite space, and you had to be able to navigate that. So there's a lot of precedent to all of this, and it factors into modern practices of teaching because, quite frankly, it isn't actually that difficult to teach echolocation to humans, and it isn't that difficult to teach self-determined freedom of achievement to blind individuals, which suggests to me that the hardware is there; it just needs to be activated, and you know a bit of software uploaded into the process.

Kristen:

I love that. I can imagine that freedom. In society we don't need light, because light's designed everywhere, so we as blind people essentially need to take the sound cues we get and use our brains to create the same

thing.

Daniel:

Yes. Basically, the answer for sighted people to getting around in the dark was to make light everywhere. It wasn't to develop strategies for getting around in the dark; although there are some cultures who do, even today. Our answer was to just make light everywhere, so that's what we've done.

00:12:05

Kristen:

How do brain scans suggest the role echolocation plays in independent travel?

Daniel:

Well, what the brain scans tell us are a couple of things. For one, it tells us that it is a learnable skill that has its representation in neuroplasticity, so pre- and post-training regimens show a decided change in neurology between, you know, pre-training and post-training, and it's not only specific, but it's also anatomical; it's global across the brain. So, your brain—not surprisingly, really—adapts and adjusts and grows and changes when you feed it instruction and experiences in self-determined freedom of achievement, and particularly around echolocation, as that plays in. So yeah, that's part of it, and the other part of it is that when you start looking at the specifics around brain development and neuroplasticity around echolocation, it is a whole brain aspect, so when you shove blind people into an MRI scanner who are proficient echolocators, and they are played various scenarios using 3D sound imaging, where echolocation is an integral part of those audio recordings, you get visual brain

activation. You get global brain activations —the whole brain is involved—but you most particularly get visual brain activations, so the calcarine cortex, V1 areas of the visual cortex are very, very, very much active in processing the echo signals and responses, in much the same way, in a way very much analogous to the way sighted people process visual responses. So, you have the same areas of the visual cortex processing things like shape and contour, environmental layout, movement, angular resolution—so positioning where things are in space. They've done lots and lots now with fMRI imaging of various different kinds of tasks. We've gotten quite creative in being able to represent various kinds of tasks through 3D recordings, and what we're finding is that the visual cortex doesn't seem to care that much whether the information is coming to it from the ears or from the eyes. It just has to learn how to make those connections.

Kristen:

Yeah, that's fascinating. I mean, as you pointed out in one of those documentaries, babies aren't born seeing fully; they take about eight to 12 months, I think, to really develop that, and society has ways to reinforce what they're putting together visually.

00:14:32

Daniel:

Full of ways that they learn it, and actually the visual system in humans is under development for about the first 21 years, so seeing is a learned process, and seeing is a process of neural development. Now, of course we're predisposed to that biologically, so yeah, it happens, but it does have to be a learned process. And the other thing is that many of the ways in which sighted children are stimulated to learn to see, which seem to come more or less naturally to sighted society and culture and to sighted parents, are often withheld from blind children, or at least are not conveyed in the same way. So the whole process of, for example, gradual decrease and shifting of support in young,

sighted children, the kind of scaffolding that parents use and that society uses by way of expecting sighted children to become industrious, to become creative, to become self-managing, that's not happening for blind kids, right? So they're just not even exposed to the same processes of learning self-determination, learning freedom of achievement, learning personal agency and dignity. It's not that blind children cannot learn those things; it's that we are withholding the opportunities for them to learn those things.

But before we go down that road, let's step back a little bit, because when it comes to this teaching of, and activating and stimulating the nervous system to learn echolocation, I think Derrick would have some insight into that, because for me, I've just always done it. I mean, I don't remember really learning echolocation. I've just always been an echolocator, and time and experience have made that better and better and better, and more and more proficient, but we have sitting next to me someone who actually did have to learn how to do it, how to use it, and went through the process of training his visual system from someone who once saw visually, to someone who now echolocates primarily to navigate.

Kristen:

So Daniel, really quickly, before we get to Derrick's story—which I love—can you define scaffolding for us in terms of education?

Daniel:

So just a little bit about scaffolding; it's an easy concept. When we think of scaffolding in the physical world, we think of using scaffolding to brace something, to hold something up, to facilitate access to something, right? So when you see construction scaffolding, that's exactly what it's doing; it's supporting something that's being worked on. It's allowing people up to the thing that they're working on. Scaffolding in a learning context is the same thing; it's various ways of supporting someone to learn a concept. It's various ways of maybe ensuring security and safety, so that the emphasis in the learner can be more on

learning the thing and less on, “Am I going to fall? Am I going to stumble? Am I going to run into something? Am I going to encounter difficulties that could be comprising?” And so a good pedagogy, a good instructional method will include some kind of scaffolding to help learners learn whatever it is they’re learning. So with children, an example of learning to walk, so you’re walking towards someone, but there’s someone who’s kind of available to catch you if you fall, so that you feel secure. We clear the way so there’s not stuff you can trip over. We baby proof an environment so that the baby won’t get into things that could harm them. Those kinds of things.

00:18:05

Kristen:

Derrick, you lost your remaining vision about five years ago. Can you give us a sense of what that process was like, that journey and how it felt, but also how you had to teach your brain to process everything in an entirely new way?

Derrick:

I’ll take it back so the listeners can understand as to what level of vision I actually have now. I lost my vision about 30 years ago in my right eye due to a mistake in an operation that I had at the hospital, so then I was down to one eye. Now, normally you would do something, but I decided, no, it’s fine, I still have one eye, and I’m very grateful for the hospital for trying to save my vision in that eye. Now, with the function that I have, basically the amount of stress I put on myself—which, I have to be honest, I didn’t find my work at all stressful; I actually loved it, but the hidden stress is what in the end caused my vision to drop. So when I went blind five years ago, my vision was at 8% in my left eye, from which I was seeing, say, out of, if you look at the clock, you can say from 12 to all the way around anticlockwise, going to, say, 4:00 was very clear, and I could see out of that part. Now, what

happened over time with additional stress and just basically just living, the field of view dropped, so now I'm down to seeing out of a pizza slice between, say, nine and 10, of which I can only see out of the peripheral. So I don't have clear vision, it's completely foggy, but I do have, say, light perception, so I can see a little bit of dark and light, so that's very helpful.

So, five years ago I was actually going to go back to work, and my company decided to put me through a program, along with the government and my doctors, where I was going to be retrained. So, they send you to a campus, so you're living on a campus, they assess you, and they look to see what do you need to live and function in a visual world. So, my program was for one year and three months, and from there I was supposed to learn how to function as a blind person, so basically if I'm working, how can I make my presentations, pivot tables in Excel, Word documents, read emails, all that kind of lovely stuff, nonvisual? So effectively you've got to completely retrain yourself. In addition to that they said, well, to complement that, then, you need to learn Braille so that you can be faster at doing your work, so editing, basically. And then they teach you how to move around, so how to use a cane properly, and also then how to sort of dress yourself, how to cook; all the things that I used to take for granted as a sighted person has to be sort of retrained to you. And then just one week before I was about to start was when my company decided that optically it wouldn't be very good, so they decided to push me down the path of a pre-pension, and just go away and just be quiet, and be a good little blind person.

Daniel:
Basically retiring him.

00:20:58

Derrick:
Yeah. I say that, to "be a good little blind person," because the systems that we do have where I am in Europe, so in northern Europe, are pretty good, so they do take care of you. So, if you

choose, you can effectively just sit back and just do nothing, have everybody do everything for you, which is something I did not want to do. Now, with my vision dropping like a stone, I was struggling to navigate myself at nighttime. Because I only have a very slight light perception, as soon as it goes dark, even with the cane, even with the techniques that they taught me, I was still struggling to move. You're moving very, very, very slowly, you're not aware of your environment; your field of view basically is like 30 centimeters in front of you. That's how you navigate; 30 centimeters, 30 centimeters, 30 centimeters. And I knew that I wanted to live a full life. I wanted to be as I am now, as I was before I was blind, where I used to travel by plane, by train, go to restaurants, go to concerts, and that was completely limited for me. So I did ask the mobility specialist there, "I think I've heard something about somebody riding a bike around New York making a sound. Can I not learn that?" And the answer was, "You have to be born blind to learn that, and there is absolutely no way that that can be taught to somebody who is an adult and visually impaired or blind." So I finished my program, and then I decided to do my own due diligence and start to look into this a little bit more, because now I had some skills; I can now access the internet, I can now do the searches, and I came across World Access for the Blind and Daniel Kish, so I decided to contact Daniel. That was in late 2020, I believe, or 2021?

Daniel:

2020, yeah. It was early 2020. It was actually right before the pandemic took hold. I think the email actually came through in February 2020.

Derrick:

Yeah, so pandemic takes hold, and I had a few discussions with Daniel; I read his book.

Daniel:

Echolocation and FlashSonar.

Derrick:

Yeah, so I read that book [inaudible 00:22:53] then we had a discussion over the book, and how I can start to apply some of the principles in his book to my daily life. Daniel teaches echolocation, but he doesn't only teach echolocation; he teaches, like, the whole package on how to be as self-determined as possible. So, one of the first things that he started to teach me was better cane technique. Maybe you need to have a more sensitive cane so that you can move a lot more fluid within your environment; so, I started to adapt that.

Daniel:

He replaced his cane, basically. So, the cane that he was given was sort of standard issue, ball tip, heavy cane, sternum length, and that's not the cane that I use or teach, so the first thing we did, actually, was get his cane replaced to a longer, lighter, more sensitive cane.

00:23:39

Derrick:

Yeah, that was a start, and that made a significant difference to my mobility because these large, heavy canes, you effectively get repetitive strain injury, and I like to walk a lot, so I like to be physically fit, I like to go for long walks, and these heavy canes, they just don't have the tactile depth that I was looking for, and the cane that Daniel recommended gave me already some more freedom. Now, from the freedom you become more confident; from being more confident, you're not scared to try. And that's one of the things that I noticed from a lot of people who were at the institute with me; they became scared to try, because effectively you make us scared by giving us, say, insufficient tools. Although the technique is there, you struggle with these tools, so you dared not try or fail, because you're scared, you're going to have an accident which is going to be potentially fatal; for example, if you're crossing the road and you trip because your cane hasn't picked up a hole that's in the middle of the road. So,

a lot of my people that I trained with are scared to actually step out their door or have that self-determination that I've got.

So I found Daniel, and Daniel then put me in touch with one of his trainers in Austria, a man named Juan Ruiz, and I spent a week with him, intensive training. So the point that I landed I went into total blindness, so I covered all my eyes, and then with the new cane I was trying to navigate myself around Vienna; getting on buses, getting off the bus onto trams, down into the underground system, off the underground system, walking around the streets. Now, if you've never done this before in your life and you're beginning to echolocate, this is quite a frightening process, I have to say. And there was one point where I wasn't sure that Juan was totally blind, because you do this training, how to cross roads safely, and the way to cross the road safely is that you align yourself, so if there's a building across the road from you, you click, the echo comes back from that building, so you've aligned yourself. Now, this is a massive junction, say, with three lanes of traffic on either side. So if Juan aligned me, like "Derrick, it's now time to cross." The button goes—beep, beep, beep, beep, beep; I start to cross over the road. Now, for some reason I seem to have a little bit of a bias to my right leg, and I started to swerve off into the central reservation part, and all of a sudden, I hear Juan saying, "Derrick, you are going into the central reservation," and I'm like, "No, I'm not," because I've turned myself sideways to where the sound was coming from, and of course I've aligned myself up with the building again. I said, "No, I'm not," and I carried on walking. All of a sudden, I hear Juan running up behind me, grabs the back of my shirt, and drags me out of oncoming traffic, pulls me over to the side and sort of says to me, "My God, what are you doing there?"

Obviously, I've got these goggles on, and at this point I had 5% vision in my left eye, so I took my goggles off and I thought to myself, "He can't be blind, because how did he manage to find me in the middle of the central reservation, then grab me, and then drag me across to safety?" So what I did was, like, started waving my hands in front of his eyes, making funny faces at him,

and he didn't flinch. It was at that point I said to myself, my God, this echolocation and FlashSonar really, really works, and can be used to save my life in very difficult situations and circumstances. So that's what convinced me about echolocation as being a methodology and a tool to be used by visually impaired and blind people to navigate their visual world, basically.

00:27:00

Kristen:

Yeah, that's incredible.

Daniel:

Yeah, and then after that, he engaged in his own homework.

Derrick:

Yes. So once I finished the weeks training with Juan, I could barely locate a tree, because it's like learning a language from scratch. You know, you're learning Spanish, Italian, whatever language you're gonna learn; you have to practice and build up. So I could barely locate a tree, so I used to spend two to three hours every day going out for walks, putting my goggles on, walking around and trying to locate trees and poles, or locate the middle of, say, rugby posts or a football field. Where can I find the center by clicking left, right? Can I locate the post and can I put myself in the center? How to walk along the pavement with the cars on either side, how to find the gaps in the cars—because being tall, one of the problems that you have when you're crossing the road to be safe, and me being quite tall, is that when I click I tend to click over the cars, so then trying to find the gaps is quite difficult for me to do, so then you have to naturally just begin to get it into your muscle memory that you have to click a little bit lower when you're crossing the roads, so you can find the gap between two cars, so you can get through. Now, mobility trainers, standard, don't teach you that. They teach you to go further along the road, find an open space, and then cross over the road. A sighted person won't do that. They will just say, oh, I see a gap here, I see a gap across the other side of the road, and

then you just cross, so I was being taught by Daniel and Juan how to do that better.

And after a certain period of time, as my vision started to drop to where it is

now, naturally used FlashSonar on a daily basis, so what it was doing for me was that I was seeing something out of my very poor, half a percent, quarter percent vision, and then I would click, and then what was happening is that click was hitting an object and then my brain was saying, "Oh yes, that is definitely a lamppost," "Oh, that is definitely a car," or that's a wall or a tree, and then the image would become more firmed up, so it would become as I could see it when I had had full vision. So—and that's what's happened to me now, so during the daytime the echoes help me firm up the position, and at nighttime, then it just helps me navigate totally, because then the light is gone, I can't see, and then the visual cortex then relies only on, solely on the echoes, because the natural light that comes from city streetlights, from the sodium lamps, is not enough for me to use the remaining vision that I've got to actually navigate, so then I do require the echoes to give me an image of where I am; my position in space and time, effectively.

Daniel:

That was back in the summer of 2020, so since then Derrick was out here in the spring of 2021, the fall of 2022—or early winter—and now here, 2023, he's been here for about a month, and I've made some trips over to Europe and we've worked a bit in Europe as well. In fact, we just got back from Grand Prairie, Alberta, Canada, where he and I tag-teamed working with a 10-year-old boy there, so Derrick has aspirations not only to master these skills for himself, but also to teach in developing countries; particularly developing Africa.

00:30:07

Derrick:

Yeah, cause as you can imagine, in the developing world the facilities, or the canes that some of these people have, children or adults, are going to be extremely poor, maybe like a stick of bamboo, or if at all. And what happens is that in most of these—because it's cultural as well—these children are left in the corner to just sit there, so they don't get the opportunity to be children, or adults don't get opportunity to be adults and do the same work that I'm doing, or navigate the same way that I'm doing. So my idea is by that if I can then start to teach the children out there, or the adults, or teach the trainers FlashSonar and echolocation, they can then become the best that they can be. They can become children. We might have the next Elon Musk out there who happens to be visually impaired, for all I know, but because of the fact that they are being kept small by the fact that they cannot become confident and independent themselves, because everybody wants to help them, you know they suffer, and I just want to see what I can do now to help those people be the best that they can be, so that's where I'm actually focusing my attention and time at the moment.

Kristen:

That's such a wonderful aspiration. It's not easy to come into a culture with significant differences with an idea like that, but it's so powerful.

Derrick:

Absolutely. It's early days yet, so we shall see how far we get, but you have to try. You've got to start somewhere, so I'm really hopeful that things will start to move. And as you said, the more that we talk about them, FlashSonar and echolocation, the more it gets out there and then the easier it's going to become to get the acceptance—I hope—in the world. I have to say, people do look at me very—well, I feel they look at me very strangely when I started the echolocation journey in the Netherlands where I live, but I think a lot of them have started to see works that Daniel has done, or read a few articles, and then they're absolutely fascinated that I can move around so easily without a dog—

because they'll always ask you the first one [question] "Why don't you have a dog?" and I say, "Well, it doesn't actually fit my lifestyle." If I'm traveling, I'll be lecturing, I'm going on planes, I'm going on trains, on boats, you name it, and I'm in restaurants and everywhere, then having a dog doesn't really fit my profile. Although I'm still on the waiting list for a dog, but they can't find one because they said we do need to find one which is going to be incredibly intelligent, and they're struggling to find one. So I said, well, discussion with the family, we don't really need one because I'm—

Daniel:
But you guys have cats, now.

Derrick:
We have cats indeed.

Daniel:
They've got two cats. [laughter]

Derrick:
My wife said, "Your self-determination and your ability to do everything around what you need to do is not hindered in any way, shape, or form, so what advantage would having a guide dog have for you?" So I said, OK, fine, we'll just leave it there then.

Kristen:
Can one or both of you explain or demonstrate the clicks you use to build up imagery?

00:32:45

Daniel:
Hmmm so, Derrick and I use the same type of click. Basically, most echolocators use a pretty consistent click. In fact, it's very consistent. The research shows that it's extremely consistent for each echolocator. Although different echolocators will use different clicks, they all tend to have the same qualities of

brightness, sharpness, and variability; not in consistency, but amplitude. So we tend to be able to produce clicks at very low amplitudes or very high amplitudes, but they nonetheless maintain the same qualities pretty consistently for each echolocator. There are rare exceptions of echolocators who will use multiple different kinds of clicks for different circumstances, that have to do with usually changing amplitudes as well. So if you're in an area that you're familiar with or if you're in a tightly congested area, or you're in a quiet area such as a library or classroom type situation, you're more likely to use quieter clicks, lower amplitude clicks, and if you're querying the environment—I think of echolocation as a conversation with your environment; you're querying your environment for information. If you want more detail, then you'll probably use more frequent clicks to paint an object, kind of, with your clicks, and then you get more information about the object.

Bats will do the same thing, by the way. As they approach an object and as they are seeking more detail about the object, they ramp up their chirp repetition. They also ramp up the mean frequency of their chirp, so they're chirping at much higher frequencies for more detail. Humans can't really do that so much, so well, but we can increase the repetition rate of our clicks. Also, if you're moving at speed, so if you are bicycling or running or, I mean, maybe you're in a hurry, or maybe the environment around you is moving quickly because you're in an airport where people are moving around, or you're in a train station where people are moving around, and maybe you're traveling without an assistant, maybe you don't have a guide—maybe you were having a horrible time with your guide or whatever, and you left him. Whatever the reason, you're traveling on your own, and you'll be clicking more rapidly to maintain the spatial updating you need as the space around you changes.

So then if you're in an outdoor environment or if you're in a noisy environment, or you're clicking for distance—maybe you're in a parking lot or carpark, and you're trying to get to a particular building that's far away from you, then you're clicking much

louder, much more loudly to get a reflection from that building, or you might even clap your hands to get a reflection from that building. Or maybe you're on a school playground and your friends have all run off and left you, as can happen, and you need to make your way back, then you might be clicking or clapping your hands for a building that might be across a field. Or if you're in a noisy environment such as maybe a construction area, or city travel can be quite noisy, some people will say, "Well, that's the problem with echolocation; you can't use it in noisy environments." You really can. You just ramp up the amplitude of your signals, and you ramp it up enough to penetrate the noise, and you use head scanning as well to direct your signal where it needs to go, to get the information you need for the images that you need to navigate by.

As for pauses, I mean, you don't necessarily have to pause to form an image. The image is constantly forming as you're signaling the environment for information. The pause can happen—so if I walk into an environment for the first time, like a hotel lobby, maybe, or I've just entered a shopping mall, or whatever it is, or I step into the airport—I've left the Uber and I find the door, and I step into the airport. I might pause for a moment just to take stock of the environment, so maybe a few clicks, listening, listening for people. It's a holistic process, right, so you're listening for all the different cues that furnish you with information about what's around you. And inform your decisions about where to go next. Again, if you don't have an assistant or anyone with you to facilitate that process, you're gathering information to figure out where and how to navigate, and then you go, and you use information along the way to help you manage where to go and how to get there in an efficient and safe manner.

00:37:01

Kristen:

I remember that idea from one of the documentaries, that you

sometimes have to pause, especially if you're newer at echolocation, to take stock of a situation.

Daniel:

Sometimes you have to stop to strategize. Maybe you feel disoriented; maybe you're confused. I mean, if you're confused, if you're really confused, it's a good thing to stop and take stock of your situation, and come up with a strategy about how to unconfuse yourself. I use the Daniel Boone philosophy; I've never been lost, just momentarily confused. And so, you may spend a bit of time—and sometimes a lot of time. Sometimes we'll let students spend minutes—five, 10 minutes, 15 minutes—just kind of working out where I am and how do I get myself back on track, and how do I get myself knowing where to go? I'll give students lots and lots of time to figure that out. I might drop a few hints if they're open to hints; a lot of my students really want me to shut up and let them figure it out for themselves. Those are, I would call them scaffolding pauses, because you're giving students time and space for them to activate their own brain. My process of instruction is much less feeding into the brain and much more drawing out of the brain about how to work out a problem; how to problem solve, how to discovery.

If I could rename the mobility profession, I'd rename it "discovery and recovery," D and R, because that's really what the process is all about. It's about discovering where you are, what's around you, where you want to go, how you want to get there. And even if you're using assistance, sometimes it's finding assistance. Sometimes it's, how do I get assistance? Or if I have an assistant, I still have to be in control of that process. An assistant is a facilitator. I often use the term navigator and captain, so even if you would have an assistant helping you to navigate, you're still the captain of that team, and how you work with your assistant must be by mutual agreement; it's not that the assistant takes over the process. So you're still discovering your way, and when it goes wrong—which it always does, or often does; I mean, even you know the best of us take a wrong turn, or we enter a place we now don't know where to go next—you

have to recover. You have to recover your course of travel. You have to recover a sense of, OK, where am I trying to get to, and how do I go about getting there? So discovery and recovery are both massive, huge areas of attention that I give when instructing people.

00:39:20

Kristen:

Challenges people encounter echolocating, is it mostly perceptions, societal perceptions, or other challenges? And what are the joys?

Daniel:

Well, I was heard to say perceptions about blindness are much more challenging or compromising for blind people than blindness itself. When people say, "What are the biggest challenges about blindness?" I go immediately to perceptions. I go immediately to people, right? People. I've even heard other students say it, when they've lost their vision, and for them the biggest challenge isn't really the physical challenges of, "Oh, am I going to run into something? Oh, am I going to stumble over something or get lost?" It's about people's perceptions. It's about how people treat them differently. And the challenges really seem to fall into two categories; concerns about getting lost and concerns about feeling foolish. And everything seems to resolve pretty much into those two things. Yeah, there are areas about feeling insecure when you're in a situation maybe with traffic, or high-speed situations or whatever, and those need to be addressed, but again, a lot of that's about, "How do I look to others? How are others regarding me? How are others treating me?" and "Do I feel secure about where I am? Am I lost? Do I know where I'm going?" Even that tends to boil down to feeling foolish, because if you feel lost, you probably look lost, and if you look lost, right, then what do people think of you?

Now, in terms of more functional challenges, noisy environments are harder, so the noisier the environment, the more you have to

concentrate. Cluttered, high-speed environments or activities are harder; you have to concentrate more. You have to use more strategy, I guess, finding—the closer objects are to the ground. Larger objects tend to swallow up smaller objects with echolocation, so if a smaller object is near a larger object, it will tend to kind of be overshadowed by that larger object, and so consequently, the closer things get to the ground, the harder they are to pick up, and so you either have to have a really good strategy for picking those things up, or you have to have enough energy reflecting from those objects low to the ground that you can pick them up; or of course you have your cane with you, and it's going to pick up those objects that are close to the ground.

Derrick:

Or your knee will pick up the object that's close to the ground—

Kristen: Right.

Derrick:

Which happens to me quite regularly, I have to say.

Kristen:

Yeah, the shin bruise, right?

00:41:41

Derrick:

Yeah, shin bruises, yeah. That's mainly not because of a poor technique; it's that it comes down to your swing of your cane may be on the other side. So then it's past the object and you're moving forward with, say, your right leg, and your cane's on the left side, and then you have a little bit of a collision. But mainly, yeah, on the lower—because being tall, lower objects are my nemesis, so I have to have very good cane technique, hence the reason why having a good light cane means I can increase the frequency going backwards and forwards, you know, like a windscreen wiper, to make sure that I can, in those environments, I can catch the objects which are low to the ground, because you're also traveling through the environment,

and you're using echoes to find out where the doors are or where the pillars are, so then if you're clicking up and down, up and down, up and down, it gets a little bit tricky, so then a good cane technique, you have a light cane swinging beautifully backwards and forwards, or even a short cane swinging backwards and forwards just in front of you, is enough to allow you to focus on your environment using the echoes on a high level.

Daniel:

And that's another area where our brand of instruction differs from what I would say are more traditional types of instruction, is I regard the cane as an extension of perception, and the way humans perceive is we adapt our perception to environment and circumstance; we do it visually, we do it auditorily, we do it tactilely. We basically modify or modulate the way we use our perceptual systems depending on where we are and what we're doing, and what the determinants of where we are and what we're doing are. So, in the case of a cane, having a cane that is light enough and flexible enough and adaptable enough to be varied in terms of its length, so the canes that we use come up to somewhere between our chin and our nose—nose to toes, as we like to say, in terms of length. And you can make a long cane as short as you like, but you can't make a cane that's too short any longer, so we often reduce the length of our cane by moving our cane further down the shaft. You don't always need to use your cane at full extension; you can reduce the length of your cane. There is a traditional technique called congested technique, where it essentially teaches you to do that; you can shorten the length of your cane. But if your cane is already too short, you know, it can only go so long, and there are situations where you want a longer cane. Maybe you're approaching the edge of a railroad platform, or maybe you're just in an environment you're not familiar with, and you want a greater sense of security about traveling through that environment.

Also, arc width. So, arc width is not set in stone. We don't do a regimented arc width. The arc width is going to vary also depending on your circumstances. So for example, in crossing a

road, with a lot of my students, especially students who have alignment problems, I really, really instruct them to widen their arc as wide as they are comfortable, to extend their cane, their full-length cane out as far as it'll go, to increase the likelihood that they're gonna pick up a median strip or a curb on the other side, or what have you. And in the UK, you often have these lay-by situations where the pavement just disappears, and you're angling across some just uncharted space, really. You're crossing this lay-by and you just have to somehow pick up the other side. So there are lots of situations where you want to increase your arc width or reduce your arc width; increase your cane length or reduce your cane length. And also use your cane in different ways to find your shorelines and things like that. Or if you're in a really rugged situation like a hiking situation or a rough pavement situation, or you've just walked into your brother's house and his kids have left toys all over the floor, you need to be able to use your cane in a deft, sensitive, delicate sort of way. I regard the cane as a delicate instrument of perception, and if your cane has a great big heavy ball on the end, and if the cane shaft itself is heavy, you're using your cane more like a club and less like a fencing foil.

00:45:27

Kristen:

What are the challenges that come up when you teach kids versus when you teach adults, and what are the joys of working with each of these groups?

Daniel:

Yeah. I mean, highly individual. Highly individual. I would say—maybe Derrick would agree that—or disagree—that echolocation seems to be easier to learn than a musical instrument or a foreign language, although the process of learning it is quite similar. You have to put in the practice, you have to challenge yourself, and you have to be motivated. Those are the three determinants, really, of learning it. It doesn't matter what age you are, it doesn't matter what background you are. If you're

motivated, if you have opportunity for practice, and if you challenge yourself—you practice under challenging circumstances—those are the three things that you need. Those are the—yeah, those are the ingredients. Also, if you have a support system that facilitates your developing freedom, your autonomy, that facilitates your autonomy as a person, that's a big plus, and children are more dependent on that, in a way, than adults. In a way, because adults have support systems, too, and they may have spouses and they may have families who may or may not be supported, but children are just sort of under the auspices of adults, and they tend to rise to the standards adult set for them, and they tend to be quite susceptible and vulnerable if those standards are low. And many blind children are indeed in those situations where standards are quite low. So, the potential is there for children to learn very quickly. The brain is neuroplastic all through our lives to the end, much more so than we ever thought historically. The brain remains neuroplastic. It goes without saying that a child's brain is more neuroplastic, so they are more flexible, they are more adaptable. They carry less baggage than adults that has to be kind of undone. A lot of training adults is about unlearning as much as it is learning, and arguably less so for children. So you have a lot of opportunity for very, very rapid neuroplasticity in children. The difficulty you might have with children would be the circumstances surrounding the child by virtue of their support system.

So, we just came back from a situation in Grand Prairie where the boy there had essentially been infantilized to the point of just not doing anything for himself. He was in a regular school; he was in a mainstream school. He's very bright, actually; quite bright. He's in a fifth-grade classroom, but he's receiving no mobility services due to his community not providing them, and his family just relegated him to receiving rather than sharing; receiving rather than participating. So people would get things for him, people would dress him, people would—not necessarily spoon feed him, exactly, but they only feed him [inaudible sounds like: fing 00:48:11] foods and things like that. So there was a lot to do and undo there. Now, in the spirit of many children, he was extremely

responsive. They're not always extremely responsive; sometimes they'll cling to the status quo. But because the family seemed responsive, he was really responsive, and he had the mental fortitude and wherewithal to really, really step up to the plate. He responded very, very well to everything we tried to teach him, all the activities we involved him in. So it can be difficult, because children aren't necessarily making the choice here. If we get a referral, it's usually the family or parents referring the child to us. The child may not choose to be there with us. And although a big part of our training is sort of, you know, wooing the child and kind of developing a rapport with the child so that everything we do is OK and well-received, it's not the child's first choice, usually. There have been exceptions, where children have referred themselves to us. They still need the parents', you know, blessing to go ahead with the service, right? So many times, the children have to be convinced. And adults, they refer themselves to you. Derrick chased me, you know? He stalked me until I could give him time.

00:49:20

Kristen: Right.

Daniel:

Right, so adults don't usually have to be convinced to participate in the service. They might have to be convinced, in a way, as Derrick told earlier; they may have to be convinced as to the utility of the service, the utility of what we're learning. And once convinced, then there's much higher motivation, but they're self-referred. So children sometimes do have to be convinced, and sometimes they don't want to. They just don't want to. They don't want to let go of someone's hand. They don't want to let go of the idea that "Someone can keep me safe, and someone can make sure that I know where I'm going, and make sure that I know what I'm doing, and make sure that I don't look funny in front of the other kids," or whatever. And that's understandable. It totally makes sense. So you really have to enter into a kind of agreement with a child as to what they're going to learn, how

they're going to learn, and how they're comfortable being taught, or you're just not going to make any headway, really.

Kristen:

Yeah, no, that's so true.

Daniel:

It's sort of a myth that you can force a child to drink. You know, you can lead a horse to water but you can't make them drink. You can't really make a child drink, either. You can hold their head under the water, I guess, you know, but those kinds of power plays do not work in the long-term.

Kristen:

Well, I have a cosmic question for the end. I'm really curious about the whole parallel universe that you brought up a couple of times in different documentaries.

Daniel:

[laughter] Oh, there are many Daniel Kish's doing many different things in many parallel universes.

Kristen:

I I love that. I mean, imagining that, and in one of the documentaries which we will share a link to in the show notes, you know, you're singing the song about freedom, which is so powerful. But yeah, I mean, you know, what do you imagine about that? What are your beliefs about humanity and how they coincide with that?

00:51:03

Daniel:

For myself, it's hard for me to not imagine other versions of Daniel Kish doing other things. What would have happened if I had become a musician instead of a mobility specialist? Where would I be? What would I be doing? Music was a passion of mine. Still is, but for the first half of my life it was just a massive, massive motivator and passion. I could easily have imagined

being a stage performer or being an album producer. And one can't help but imagine, what would my life be like if I were sighted instead of blind? Or what would my life be like if my mom hadn't left my, you know, alcoholic, abusive dad when I was six? What would my life be like then? So. What would life be like if I was raised by my grandma—loved her dearly and bless her—as opposed to my mom? All of those things would have generated very, very different versions of Daniel Kish. Similar personality, I guess. You know, similar basic personality structure, but doing very different things. I could've imagined myself as a sighted person being some sort of world class athlete, because I was always very physical and I was always very good at being physical. I was always very fast; I was always very strong for my size—which many people think I'm taller than I actually am. I'm only about 5'7", but for some reason people just think tall. So yeah, I'm not a world class athlete—much harder if you're blind to compete with other sighted people; that's a tough go. You can certainly compete in some things, but not all things. And as far as musicianship goes, I just never felt lucky. I never really felt like I had the X factor, so I didn't really go into music. Yeah, there are maybe other versions of Daniel Kish doing other things out there. Some more successfully, some less successfully.

Kristen:

Derrick, what advice would you give people who are blind or low vision who are just starting out on the echolocation and orientation and mobility journey?

Derrick:

I've summed it up in a couple of sentences. I would say, like, life is truly for living. That's one thing that I'd lost when I lost my sight. And there are no limits, and don't let others tell you otherwise. That's what I would say, because it speaks for itself. You feel so small. You feel like you've lost everything. You feel less valued than other people, so then you stop living. But life is truly for living, and there are no limits. Once you get over your fear and you start to learn echolocation and you start to become more self-determined, more confident, there are no limits, and

the most important thing is, don't let other people tell you otherwise. That's the biggest problem that we have as visually impaired and blind people, other people telling you, "You cannot do that. No, that's not safe." "Oh my gosh," when they go to the gym, or "Oh my gosh, you're climbing the stairs." Or, particularly in my experience, when I was reconnecting my satellite TV, and the whole neighborhood was looking at me from the back of my house, and afterwards gave me hell for climbing up a ladder. There is no problems; I am perfectly safe up a ladder, but other people will tell you "You're not safe," or they close their eyes and they sort of sympathize with you being blind and they think, "You cannot do anything at all." So, don't let others tell you otherwise.

00:54:02

Kristen:

Well, this has been great. It's as always happens with great conversations, we've covered so much and there's so much that we haven't been able to cover, which is one of the joys and tragedies of these things, and we hope maybe you'll come back again or the connection will be there in some other way. We really appreciate you both taking the time to be with us.

Daniel:

Let us know if there are other areas. Technology is another huge aspect of what we cover. There's a massive area. Basically, I use what I call an ACTS framework, which covers—it's kind of the four pillars of self-determination. Adaptations, capacity, technology, and support systems; supports and social engagement. So, the acronym is ACTS, A-C-T-S. Technology is a huge part of it, especially these days. I mean, I'm never without my VoiceVista, I'm never without Microsoft Seeing AI. VoiceVista is the resurrection of Soundscape. There have been several resurrections, but that's the one that I'm recommending right now. It seems to be the one that's furthest ahead.

Kristen:

How about BlindSquare?

Daniel:

BlindSquare has its place. Yeah, this is for another podcast, I guess. If you give VoiceVista a try, I think you'll drop BlindSquare.

Kristen:

Oh, surely. Yeah, yeah. I loved Soundscape the most, so.

Daniel:

I mean, I was a BlindSquare user. Don't get me wrong. I used BlindSquare. I used ViaOpta Nav. I used Sendero GPS. GoodMaps Outdoors and GoodMaps Explore, those are great. We use those; those are terrific. Lazarillo; fantastic. But VoiceVista is always at the top of my list. And just the good old traditional compass. I mean, I had a compass in my hand when I was 10 years old. 10-year-old boy, I got a Braille compass for my birthday, and I've had that in my pocket ever since. And then Be My Eyes, especially the new Be My AI; almost a day doesn't go by that I don't pull up the Be My AI feature.

Kristen: Me, too.

Daniel:

For one thing—exactly, for one thing or another. So yeah, technology and how technology has really the potential to enhance daily living is huge. I mean, the ground is opening on that. It's huge. And the sky is opening. It's huge.

Kristen:

Well, if and when you have time, we will always have time for a part two, and technology is our passion, so we're happy to have you come back to talk about it, so.

Daniel: Sure. Sure.

Kristen:

We would love that.

Daniel: Very well.

Kristen:

Well, thank you both so much for coming and spending some time with

us, and we will call you back whenever you would like to come back.

Derrick:

Thank you very much for having us. I really appreciate it.

00:56:24

Kristen:

Our guests today are Daniel Kish and Derrick Twene. Our producers are Markus Goldman and Harper Yatvin, and I am our host, Kristen Witucki. If you like what you heard today, and want to explore more about digital accessibility, technology, our company culture, or really anything else, just schedule a time to meet with us. You can find the whole Tamman team at tammaninc.com. That's T-A-M-M-A-N I-N-C dot com. Don't forget to sign up for our newsletter so you never miss an event or an insight from us. Be sure to rate our podcast five stars on Spotify, Apple Podcasts, or wherever you hear us; it really helps us grow and reach new audiences. And make sure to follow us, hit that bell icon so you never miss an episode. If social media is more your style, you can follow us @tammaninc on LinkedIn, Twitter/X—whatever that's called now—Instagram, or Facebook, and share our podcast on your favorite platform. Until next time, thank you so much for listening and being a part of Article 19. Take care.

Show Notes

- [Daniel Kish's article on FlashSonar](#)
- [Dr. Greg Downey's Article "Getting Around by Sound"](#)
- [Scaffolding in a learning context](#)
- [A written copy of the book "Echolocation and FlashSonar" by Daniel Kish](#)
- [A braille-friendly download of the book "Echolocation and FlashSonar" by Daniel Kish](#)
- [Profile of Juan Ruiz, Derrick's Trainer in Austria](#)
- [BlindSquare](#)
- [VoiceVista](#)
- [SoundScape](#)
- [ViaOpta Nav](#)
- [Sendero GPS](#)
- [GoodMaps Outdoors](#)
- [GoodMaps Explore](#)
- [Be My Eyes](#)
- [Be My AI](#)
- [Tamman's Article 19 mini-pod on Be My Eyes](#)