

# Tap Wearable Keyboard Training Transcript

AT Advocates June Meeting

**Date:** Thursday, June 13th, 2019

**Presented by:** Dovid Schick, Founder of Tap

**>>DOVID SCHICK:**  Alright, so, I don’t know um, if any of you are actually familiar with this device. Uh, it’s actually been on the market for about eighteen months. Um, and what it is, uh essentially is a wearable device, uh that allows you to create text. Um and control any digital device that has Bluetooth, um by touching your fingers on any surface. Um, this is a fairly radical technology from a interaction and input standpoint. Um, and I’m going to try to give you a feel for how it works, how it can be helpful, um for various, you know populations. It might be good to just kind of take a step back and explain um, sort of you know, where this came from and why this exists. Um but, I guess before I do that, um, let me see if I can, I can get my video going so that I can actually show it to you in action as that will give you a better idea about what we’re going, um be talking about.

Alright great. So um, hi everybody!

**>>** Hi!

**>>DOVID SCHICK:** So I, I’m wearing this device here. I’m sorry, I’m having a little bit of trouble with my, um. So I assume you can all see and still hear me, hopefully. Um, so you know I’m wearing a Tap device. I’m actually wearing it on my right hand. Um, and it consists of these five rings that are connected by bungee cords. Um, and they have sensors in them, which allow, um me to, you know. It allows the device to know what your fingertips are doing. So this can be used for a variety of things, and I’m going to show you how it operates as a keyboard. Um so, uh, you know. The, one of the things about it is that it's a pretty generic technology from a input standpoint. So in other words, it, it’s a Bluetooth keyboard to the outside world.

Alright, so this is paired to my, uh, to my tablet. And hopefully you can see both my hand and the tablet. So I’m going to say, um “This is a demo of the tap, um keyboard”. Um, so what I’m doing here is I’m touching this table, and each time I touch, it’s kind of like playing a chord on a piano. In fact, this is called a chorded keyboard. Um I’ll put it back up here. And, and um. So just like when you play a piano, you’re your fingers, you know, shape a certain chord, and that will play a certain note or certain tone. Um, here. You know, each, each uh set of fingers that you touch will create a certain letter of the alphabet. Uh, and I’ll go into how this works and how, it’s you know, how it’s learned and so on and so forth.

So as I said, you know it’s a Bluetooth device and it emulates a keyboard, as I’ve just shown you. So um, now before I actually talk about this, on this slide it’s going to explain, um, how you actually acquire the skill of doing this. Uh, I want, I want to explain a little bit about, about you know, sort of why this is and kind of who we are and you know, why we’re doing this. Um so, um so I’m an electrical engineer and I’ve worked um for the last, you know 27 years or so us, as an inventor and an entrepreneur. Um, and I’ve started a number of companies that…my previous company, they um…it I invented the first mobile system, it’s a system for dentists to take uh, x-rays. And so, this is back in the 1990s. Um, I’m kind of a over-the-hill inventor, as you were, as you would. Um, but uh back then you know, it was all done with film, and if you went to the dentists office, um, they’d put a film in your mouth and give you a relatively high dose of radiation, and then they’d have to go develop it. And all you’d have is really tiny film to see what the diagnosis was. And you know, I just developed a digital way of doing it which was instant, used about 1/10th of the radiation, and uh, it gave you an instant result that you could um, you know, display on a computer and be able to see things a little bit better. So, um let’s…I’m actually uh sold that company in 2005 and I had a, a very pleasant uh retirement for awhile. Uh, and then, uh you know, some years later, you know, my kids sort of uh grew up and moved out of the house, and I ended up with too much time on my hands.

And. Now this was, this was coincident with when the first really wearable screens were coming out. By wearable screens, I mean like smart watches, not the things like Google Glass, uh which allowed you to uh, see things, but did not have an actual keyboard. And I became very interested in the problem of how we were going to interact with these technologies as they became more popular and we rely on them to do more of our computing work, um, without a keyboard. So of course with voice, and there are other kind of gesture systems, but they all have their limitations and can’t be used in many of the environments that we’d want to use them. So, um, I developed a couple of different ideas. And tapping, uh came out of sort of a thought experiment in which, you know, imagine if you actually had to rely on what’s a wearable screen to do some serious computing work. What would you like to do? And um, I tried a lot of different things, and tapping, um is a fairly natural motion…as I’ll explain, it can be done extremely quickly and it’s very learnable. It’s like a very human thing. And it’s very very comfortable, uh, to do it. Um, you know, nobody has to kind of learn, you know, a new motion to just tap on an object. So, uh, the more I developed it, the more excited I became about it because it just became clear to me, and you know, if any of you ever get a chance to try it, you’ll see that um, when you try it, you know, you’ll…it, it really does feel like the way that we should be inputting into our devices, or at least should in the future. And I, I really do believe that it’s an exciting technology which will have an important place, in, you know, machine interaction or digital interaction in the future. Um, and so, you know, that was enough to kind of get me our of retirement, and, and motivate me to do this, um. But when I started it, I really didn’t know anything about the AT market at all. Um, it happens that, um, you know, my wife has a very close friend, she actually was part of a very close-knit mommy and me group, um, when her first daughter um was born, which would be you know, 26 years ago. And um, and one of the girls in this group, um, is blind. And um, we had been lifelong friends with her and very close friends with her family. Uh, and she is an incredible incredible woman, and you know, she skies and she, she’s in law school now, and uh, she’s just an amazing woman. Uh, and so, they were over here when we were just beginning to, you know, kind of crystalize the idea. I should explain that my, my wife is a very very competent inventor in her own right. She’s Sabrina Kemeny, and she’s my co-founder and president, and she uh, is the co-developer of a technology that’s inside every one of your, uh, cell phone cameras. She developed the, the active pixel, CMOS Image Sensor. It’s kind of a long, long name for a very special technology. But it’s what enables you know, low-cost and low-power, and tiny tiny cameras of very high quality. So she, she’s a very accomplished inventor in her own right. And we were talking to Kiera, and she, she was um, you know, she said to us you know, there would be some really interesting uses here for blind people and for AT. And that started us down the trajectory of…of um exploring how to make this technology inclusive and how to, you know, how to see whether it really could be applicable to the people who might use it. So huh, that’s kind of the background of this, um. And I’ll explain a little bit more about it as I go on.

But let me, let me just take um, take this one step at a time. So, so in order to um, and I will try to put some caveats in here as I go. Um, you know, you need to learn um, well said, and this is how to tap the alphabet. Now it turns out that it’s a very very simple process. And we have some very powerful apps that gamify and make it very very quick and easy. We developed them actually with a cognitive learning group at Stanford University, and it’s a very clever and actually very enjoyable game. But, um, bottom line is that you can learn the entire thing in about two hours, that’s to learn the alphabet. And then, to develop the muscle memory, or what you know, the scientists call habit forming memory, um takes another, let’s say three to five hours before you’re, you know, as proficient as you would be with a standard keyboard. Um, so it, it’s pretty quick. I’ll just say we have, um, you know, several apps that do this. One is just focused on cognitive learning, one is just focused on habit forming memory, that’s Tap Academy. One of them is, is specifically uh tailored for people who um, have visual disabilities and cannot see um, you know, a mobile screen well enough to be able to, to utilize it. Um, and it’s so easy to learn because unlike a keyboard there is no spatial information that you need to be, need to memorize. So, um, so, all you need to do is know which fingers you have to touch and you can actually group those in a very logical ways. So there’s actually only eight groups of taps that you have to learn in order to do this. Um, and for the same reason, it’s extremely fast. You know, all you need to do is a little up and down motion, you don’t need to move laterally at all, your fingers don’t have to kind of extend and stretch, and because of that, even with one hand, we have users who are now, um, tapping at speeds of more than seventy words per minute. Um, so um, it’s a, it’s very easy to learn, and it’s um quite enjoyable as well. And um, you can do it quite quickly.

Okay, and just some overview about what the product is. Um, so it’s um, you know, as I said. It’s this, uh this series of rings…it’s actually very comfortable and they are quite adjustable, so there’s only two sizes, and that’s, those two sizes span everything from children, of about seven or eight years old, um, and let’s say, that’s the small size. It goes up to people with medium sized hands. And then it’s on medium sized hands to very very large hands, uh is the large size. And, it uh, they’re adjustable little bungees that, um, that you know, will you know, extend and compress the rings. Um, they’re split rings, so they basically uh, you know…I’ll, if we get more time, we can learn more about how to adjust them. Um, it, the battery lasts for eight hours and then it comes in this charging case which actually has a built-in battery, you just charge it by putting it in the case. Um, it’s compatible with anything with Bluetooth, which is basically any mobile device, laptop, and most of the desktop, uh, systems that people use. Um, and a bunch of other, you know, kind of wacko devices like smart TVs and virtual reality systems and things like that. Um, and it’s programmable. I’ll go back to this a little, uh, because it’s important from an AT standpoint. And so, now what that means is that you can actually repurpose these, these different chords and certain taps, um, for things that you want to do. Um, and it’s just an interactive tool that we have, it’s very easy to do. Um, the uh, the retail price for this is $199 and it comes with a one-year warranty. Alright so, the way the company is organized is essentially around three market segments. I’m just giving you this information so you can kind of figure, you know, get a better feel for you know, sort of who we are and what we’re trying to do. Um, you know, the first segment is Consumer & Ergonomics. So this is the biggest part of our market, and these people are using it just as a keyboard um you know, for various applications. Either because it’s more mobile, it’s more comfortable, um, it can help you avoid posture problems and uh sight problems, etc. etc. So that’s, you know, still our biggest segment. Um, the second segment is Virtual and Augmented Reality. As you can imagine, um, if, if you’re wearing your display, then you know, you don’t really want to carry your keyboard. And this also crosses over to enterprise, so there’s a lot of businesses that are using it um in this segment as well. Uh, it’s a pretty fast-growing segment for us. And then finally, and I’ll elaborate on this quite a bit, um accessibility. So, this device is inherently vision free. You know, it’s a tactile system, you, you always know what your fingertips are doing. Um, and, it can be done with one hand. Um, and it doesn’t require any lateral motion. So this, this makes it an alternative and I, I’m gonna kind of encourage you to think of it that way. I mean, whatever it is or isn’t, you know, it’s just an alternative. And um, so, for people who have difficulty using a standard keyboard, it’s just another alternative that may or may not be suitable and helpful for a certain, you know, individual.

Um, okay, so um, the biggest segment for us so far in the AT market, um, are people who have visual disabilities. Um, and uh, as I said, you know, this is where, you know, they don’t have a tactile…so, so the most common use, uh, among the blind and uh low-vision population is when they’re mobile. You know, so when they’re at their desk, they have a tactile keyboard, right? And they generally can you know, do do fine. Um, but if they’re using a mobile device, um then they are limited to the on screen, um, methods for entering text and information and navigating. Um, and that generally slows them down quite a bit. So, so Tap is an alternative that um can accelerate that process and make it a little bit faster. Um, in addition, um, we, we have a library of taps uh, that uh mimic um, the Voice Over commands that, that Apple has developed for iOS. So, uh, I don’t know how many of you are familiar with Voice Over, but it’s a screen reader, but also a screen control methodology where you can basically do anything, uh, just with certain screen gestures, even if you can’t see what you’re doing. And it’s very very powerful. Problem is though that you have to hold your phone in one hand and, and do the gestures with the other. And, if you’re blind, you generally need your hands, especially when you’re, you know, on the go. And this allows you to, to not have to hold your phone, it can actually just be in your pocket and can do all of the same things, navigating to an application, opening it up, you know, and manipulating it. And then, um, you know, and then, all of, you can do all of this just by tapping your fingers. So that’s another reason why it’s popular among that, that population. Alright, so so, beyond, and we, when we’ve started um selling this, and it’s been on the market now for about eighteen months. So when we started selling it, um, we really weren’t aware of, of all the applications in AT and we are not. And uh, people are proposing new, new use cases, and um, and and uh, it’s being evaluated. And we’re certainly very, you know, interested in learning. With, just last week, Elizabeth and I were in Connecticut, um, addressing a fairly large group of professionals, and they, they had ideas about you know, that hadn’t occurred to either of us. So it’s, this is a learning process for everybody. Um so as I said, you know, it it’s a solution where an alternative, where a standard keyboard is not ideal for that particular individual. Um and this can, this can be people who can only keyboard with one hand, or have spinal instabilities, um, or have um mobility issues which, which prevent them from really moving their hand. Um so, there is a lot of other use cases like this. Um, I will say the following, as an important caveat which I’m sure you all were thinking, which is that in order to use it as a full blown keyboard to be able to do the entire alphabet, um and you know replace, let’s say an on screen keyboard, um or physical keyboard, um the um, the user does need to have a certain amount of cognitive, uh ability. So, so um you know, the the learning curves that I put up, you know, are based on quite a large population size, but you know, it’s a it does depend on cognitive ability of the user. So, it’s something just to realize. Okay, so. So some people are using it as a full blown keyboard for AT. Um, particularly with blind people or with one handed use. Um however, um, what we’re finding now is that it’s being used also as a controller. So um, so let’s say somebody cannot, you know, kind of tap the alphabet. Um, this can still be interesting, because it’s a wearable device that can essentially be programmed um, to control switches. You know, Bluetooth switches. So um, so whatever the ability, um of the, um, of the individual is, um, you can customize it so that you can trigger and activate whatever switches you want. Let’s say somebody can only tap you know, let’s say their thumb and then the other part of their hand. Uh as, as an example, well you could give them two switches, and it’s a wearable, so you know, they don’t have to sort of, aim for for where the switch is. You can give them a surface and that can be helpful for a, for a certain population as well. Um, and you know, and there’s a lot of other things that people are uh, beginning to work with it. Well so for example, um as a communication tool, this is the last example that I’ll give, and then I’ll open it up for questions. Um, so the, the um so people are using it for communications, either as, you know, like a speech driven AAC system, um or just, just in terms of taps, so that if you program just, just five finger taps, um you know. So one of them says water and one of them is food and you know, um, and so forth. Um, you can uh allow somebody to communicate, uh, just by tapping their fingers in that manner. Because you can program this also to trigger, you know, macros, you know, and strings and things like that, so. Um, so that’s another things that’s been…that people are beginning to work with. You know, I guess I will say like, we are, you know, we do consider ourselves kind of like newcomers on the market, and um, and we don’t have a lot of you know, highly developed case studies and things like that. It’s you know, we’re working on, with uh the various groups that are trying it. Um so, you know, we are extremely, um you know, uh interested in working with uh you guys and really with, with uh, with the community in general, in terms of, you know, seeing what works and trying to see, you know, see what we can do to, you know, to really just help people who could benefit from this. Um, so uh that, that’s it for…oh, one thing that I forgot to say is that it is also a mouse. So it has a mouse built into the core…this isn’t necessarily that applicable for AT, but essentially when you put your hand down, it turns into a mouse and you just, you know, slide your hand around to control the mouse, and when you pick it up, it turns back into a keyboard. Um and there’s many other little factoids that I guess I won’t, um, try to cover. So let me just open it up to questions and see if uh there’s any other information that I can provide.

**>> JOE ESCALANTE:** Uh hi, this is Joe from San Jose. Could you talk about the keyboard again, a little bit? How you customize, or how the keyboard is different than a regular QWERTY keyboard?

**>> DOVID SCHICK:** Yeah so um, it, the best thing to do is to just forget everything that you know about a keyboard. We almost hate calling it a keyboard, because there’s no keys and there’s no board. Um, but it can accomplish the same thing that a keyboard can. Um, it works on on the principal of forming chords with your fingers. And, and um what I can do actually is just share my screen again, and um, just show you a little bit. Sooo… Okay. So, um, alright so, let me just show you a couple of things. So going back to that word document. Okay. Yeah, so, I I don’t know if you’ll be able to see what I’m writing so much, but um, but so when I say chords, it means I select one, two three, or four fingers at a certain time to form a letter. So, for example, the vowels are, you know, A is always my thumb, regardless of where I touch. It’s printing A, I don’t know if you can see, but it’s always printing A. And perhaps this isn’t working, so I’ll just explain it, um, verbally. So, um, so in order for you to let’s say print A, I would just touch my, my thumb to something. I can touch it to my arm or my, you know table, really anything. Um, that’s an example of a one-finger tap. Uh, and example of a two-finger tap would be, let’s say T, the letter T, um is my index and middle fingers. And I just touch that to anything and that would form the letter T, and so on and so forth. So um, so that’s how the alphabet is formed. Did, did that make sense? Uh, that uh explanation?

**>> JOE ESCALANTE:** Basically it’s the number of taps that designate, the number of taps and sequence and which fingers is what determines the letter.

**>> DOVID SCHICK:** Uh no no, there, there is no um, there is no number of taps. In other words, you only tap once for each letter. Um, uh…it it happens that with five fingers, there’s actually 31 unique taps that you can do. So, um, so we, so you know, um, so it’s only one tap to do a letter. There are multiple taps if you want to do punctuation and special functions and all kinds of things like that, but but just to do the alphabet, it’s just one tap. And all you need to know is which fingers you have to actually make contact with when you, when you try, you know, trying to type that letter.

**>> JOE ESCALANTE:** Well, you only have five fingers. And, you’re going to need to have multiple taps in order for you to make, you know, more than five letters.

**>> DOVID SCHICK:** Right, but that’s not, that’s not really the, the way it works. You know, because you can actually touch more than one finger at a time. Right? So, so let’s say. So yes, you have only, if you were only going to touch one finger at a time, then you could only do five letters. But if you can touch two fingers at a time, or three fingers at a time, or four fingers at a time, then you’ll start…like, like I’m saying. Like let’s say you want to type the letter T. You actually touch two fingers simultaneously. You know, the index and middle fingers.

**>> ELIZABETH ROSE:** David, it’s Elizabeth. Can I jump in here?

**>> DOVID SCHICK:** Sure, please.

**>> ELIZABETH ROSE:** Um, just for. I’m not the techie or the genius that um, I’m like a normal person. And what there, is really great about this, is, you can’t really see it right now, but there are these terrific gaming apps. And the first one is called Tap Genius. So when you go on Tap Genius, it shows you AEIOU, and then it gives you, it throws back at you um, an A. Drop an A, and then you hit your thumb. And then it hits an E, and you hit your index finger, and an I and you hit your middle finger. And then so on. And then the…so you practice that for a while, and you get through that. And then you, the next game…the next one comes up, and it teaches you the most common consonants, which are NTLS. And N is your thumb and index finger tapped together. T is what he said, the index finger and the middle finger. L is the middle finger and the fourth finger. And S is the fourth finger and the fifth finger. And so on, and you get…you get to play as you learn it. And I went through, um, you know, the muscle part, uh, two hours and so on. And I kept growing so that I have some cognitive ability at this point. Then when you’ve finished going through all of those groups of letters, you go to the next game which is called Tap Academy. And then it starts, you start to improve your speed, um, ironically by learning how to slow down, [Laughter]. And then you just really get better and better at it, and so it’s…it’s, kind of a brilliant system for learning and we’re, if you had it in your hands right now, you would, you would catch on really quickly, to certainly the first vowels.

**>> MEGAN COWDELL:** Thank you, this is Megan. We have a few questions in the chat that I’m going to start reading. Uh, we have one from Antonio, who wants to know “If it’s compatible with Samsung and other Android devices, or is it just with iOS?”

**>> DOVID SCHICK:** Um, it’s compatible with anything that has Bluetooth, which includes you know, Android devices, iOS devices, OSX devices, Windows devices, etc. Um, the learning systems are available both for Android and iOS.

**>> MEGAN COWDELL:** Great, thank you. And our next one comes from Vincent, uh he wants to know if you have heard of anybody getting this covered by insurance or the Department of Rehabilitation?

**>> DOVID SCHICK:** No, I actually have nott, and um as I mentioned we’re sort of early in on this, but we would love to know how to do that, if that could happen. I don’t know of anybody who has.

 **>> MEGAN COWDELL:** Great, thank you. And Vincent also asked, “Have you tried this on new learners, who don’t uh have any keyboard experience, perhaps kids?”

**>> DOVID SCHICK:** Yeah, kids love this. Um that’s a great question. Um, you know. Kids, um, uh, you know, they get this very quickly. And and uh, learn it very quickly and uh, get very dexterous at it very quickly. So, that is a, um, you know, interesting, um, group for us. We’re actually working with, the uh, the New York City Department of Education, you know, Elizabeth is actually very close with them. Um, we’re working with both of the, you know, their special ed, um department, and also a little bit now in the classroom. So, so yeah. That was an interesting group for us. And I guess I’d say like, you know, we recommend it really for kids who are eight years old and up. You know, less than that they don’t really have the fine motor to, to do this that accurately.

**>> MEGAN COWDELL:** Great, and we have a few more minutes left, so if anybody has questions, please send them in the chat, or you can unmute yourself. Um, we have a question from Marisol who says “We want to get one for our library, uh, their device lending library. The criteria is that we have to have two vendors to put on our purchase list. Can we still get it if it only has one vendor?” So you guys are the only people making this product, it sounds like that’s her question.

**>> DOVID SCHICK:** Huh, yes. We’re the only ones who make it, and and um, what people have done is um, you know well, we, I mean I don’t know if this works, but you can, you know, you can sort of price it through Amazon or through uh, our direct portal. Um, I actually don’t know all the criteria that you have to meet, so it, it’s hard for me to say. Or people uh, I think maybe this is a good one for Elizabeth to help you with. Um, offline.

**>> ELIZABETH ROSE:** Yeah and, with the New York City Department of Education, um, it’s a grand bureaucracy, and they let you, um, come in as a sole vendor. I don’t know what California does, but I’ll be happy to follow-up on that. So you need two bids, in California, is that correct? Marisol?

**>> MEGAN COWDELL:** Hi, this is Megan, it sounds like yes, that is what we need but…

**>> ELIZABETH ROSE:** Okay.

**>> MEGAN COWDELL:** We’ll follow-up on it.

**>> ELIZABETH ROSE:** Okay, great! Thanks.

**>> MEGAN COWDELL:** And Dovid, we have a few people asking if they can see the device again, would you mind uh screensharing and maybe doing a closer up with your hand?

**>> ELIZABETH ROSE:** I also want to just say to everybody that, there are beautiful videos on the website, which is tapwithus.com [Laughter] and it will answer a lot of your visual questions.

**>> DOVID SCHICK:** Um okay, so let me up, let me start with…now, the device when it’s not being worn, uh consists of these five rings. And I’ve opened them, so that, they’re kind of wide open. Um, then to put it on, you slip it onto your fingertips. Uh, and then, to wear it properly, you then want to push it up so that it’s all the way up where you would wear a ring. Okay? Um, once in place, you tighten it you tighten it using the bungees on the bottom. So that’s what I’m doing right now. And basically you pinch them so that the rings close. Uh, you turn it on with the button and off switch. No sorry, your thumb. And I’ll just kind of show you, you can see it there, there’s a little protrusion on the thumb, that’s the mouse. Um, so to mouse, as I said, you kind of just put your hand down and it’s a little bit like, holding an invisible mouse. Um, when you pick it up, it’s a keyboard. Um, and I see that, you know, Microsoft Word just crashed, I adjusted the fonts in my… notes, so maybe I can show you this. So. [Clears throat] I understand that it’s a little bit difficult to grasp what, what this is, so hopefully you can see this. Um so, so as I was saying, like a one finger tap, like you want to do A, is just my thumb. Now in fact the, the vowels are you know, one finger taps. A E I O U, just going sequentially my thumb through my, my pinky. Um, but then there are two finger taps. So T for example, are these two fingers, touching anywhere. So that’s always going to be T, no matter where I type. Okay? Um, and then there are three finger taps. So you know, this is always going to be the letter F. These three fingers. Um, so. And then I can, you know, I can also do numbers, I can do directional keys, I can do hot keys. Uh, for example, I want to go to the home screen, I can do that. And uh it’s it’s you know, basically anything that you can do with a keyboard, uh you can, you can do with this. Um, and then again. If you’re going to work with people directly, I just explain you can take it off, you know, loosen the bungees, put to the middle to open and then slide it off. That’s the, that’s the full demo. Uh thank for asking that question.