The IMPACT Center Podcast – Full Episode Transcript
ImpacTech Episode 28 - Exploring the Future of Blindness Tech: Insights from Brandon Biggs and John McInerney (Part 1)

SPEAKERS
Dr. Mary Goldberg, Josh Anderson, Brandon Biggs, John McInerney

Mary Goldberg 0:04

The IMPACT Center at the University of Pittsburgh, supported by the National Institute of disability Independent Living and Rehabilitation Research proudly presents ImpacTech. Welcome to Episode 28 of the ImpacTech Podcast. On today's first ever crossover episode, we had the honor of collaborating with the AT Update podcast hosted by Josh Anderson, and got to catch up with our former IMPACT trainee Brandon Biggs on his audio product recorded remotely from my soundproof bedroom closet in Pittsburgh, PA, this is your host, Dr. Mary Goldberg.

Josh Anderson 0:50

Welcome listeners to a very special crossover episode of assistive technology update today, not only are we joined by Brandon Biggs and Jon McInerney to talk about the amazing technology called Audio. But we're also joined by the brains behind the ImpacTech podcast, which is part of the IMPACT Center at the University of Pittsburgh Department of Rehabilitation Science and Technology. So we're going to get right into talking about the amazing ImpacTech podcast and partnering with them, and then we'll get into talking to our other guests. Well, everybody, welcome to the show.

Brandon Biggs 1:26

Thank you for having me.

Mary Goldberg 1:27

Thank you so much. Josh, excited to be here.

Josh Anderson 1:31

thank you all so much for for joining. And I guess Mary, let's, let's just start with you. Can you tell us just a little bit about the IMPACT Center and the ImpacTech podcast?

Mary Goldberg 1:41

Yes, I'd be happy to thank you so much. So the IMPACT Center is funded by the National Institute for Disability Independent Living and Rehab Research, and we're a Technical Assistance Center to help support getting assistive technologies from the quote lab to market and the products to the intended users. We support, both small businesses and the small businesses would typically be recipients of NIDILRR, that's that long acronym, Small Business Innovation Research grants and the universities that we support, where the innovators are within academia are typically recipients of other funding mechanisms within NIDILRR, including larger research centers that would have multiple sub projects, about half of which, maybe around two to three would be product development oriented, again, all assistive technology. They also have a field initiated project which would just be a typically, a single project focused on a single product. And so what impact does is work with the innovators across the small businesses and universities to help them get their products translated to the intended users and help them to figure out which pathway is best. And we found through ImpacTech, so the podcast arm, we like to break it down in plain language and talk to innovators, particularly those that have been successful, but of course, have encountered challenges and barriers along the way, to help save innovators in the future in terms of time and money, and help them kind of identify facilitators that would help them get over the barriers. So that's who we are and and why.

Josh Anderson 3:54

Awesome, awesome. We're so happy to be able to partner with you on this Jon Brandon, whoever wants to go first, can you tell the listeners just a little bit about yourselves.

John McInerney 4:04

I can jump in right now. Hi. My name is John McInerney. I am blind. I have retinitis pigmentosa. I lost most of my functional vision in my early 40s. I have an engineering background and with assistive technology, I was able to complete a very successful engineering career. Once I completed that career, I got involved with the IMPACT center and with some other nonprofits in the state of Pennsylvania, and spent two years as the CEO of the Pennsylvania Association for the Blind. Today, I continue to interface with the IMPACT center and with nonprofit that serves visually impaired individuals in both the Pittsburgh. In the Philadelphia area. So I had the opportunity to do some evaluation of Brandon's audio, and I would say that it's, it's a very successful and accessible software package for reading thermastic maps. Did I say that right? Brandon? I'm not sure I got it right. But anyway, I appreciate the opportunity to participate in the crossover podcast today, and with that, I'll turn it over to Brandon.

Brandon Biggs 5:41

Thank you. Yeah. My name is Brandon Biggs, and I am the CEO of XR Navigation. I am also an engineer at the Smith Kettlewell Eye Research Institute and a PhD candidate at the Georgia Institute of Technology. The work that I do centers around creating digital technology that enables blind people to fully access spatial diagrams or geographic maps. And I'm also totally blind myself, and that's really one the main inspiration for me to do this is because I can't access geographic maps now, and I really want to be able to, and I also, you know, can't access anything around building floor plans or architectural diagrams. Say, if I wanted to build my own house like my brother's doing right now, I wouldn't be able to preview and approve those floor plans. And so it's really important that I am able to, you know, access this information. And so that's, that's what inspired me to really start working on this project.

Josh Anderson 6:46

Awesome, Mary, since your podcast usually kind of focuses on the the why and the how in at development, why don't you start us off?

Mary Goldberg 6:54

Sure, I would be happy to so. Brandon, I guess the we, we understand the why, I think you know, motivated by the inaccessibility of what's out there already, but maybe you could talk to us a little bit about the how, what, what gave you the kind of seed funding to kick this off, and what kind of infrastructure did you have access to?

Brandon Biggs 7:17

The primary project started in when I was getting my master's degree in inclusive design from the Ontario College of Art and Design University, and my master's advisor, when I came into the program, asked, What are the biggest graphical, you know, what are the the the biggest barriers to accessing graphics currently, especially data representation graphics, because that's what was his primary focus. And coming into the program I had been working my first company was providing teachers of the blind to visually impaired, orientation, mobility specialists and material preparation to K 12 schools around the US. And it was just a little bit scary how much money some of these k 12 institutions were spending on creating accessible materials. And the sad thing was, is that they would create them once, and then they would be kind of disposable, and they were only accessible and only usable to those blind students. And so there was just very little efficiencies in this whole entire process. And so when I came into my Inclusive Design program, I said, there must be a better way to create tools that are usable by everyone or as many people as possible. And so coming into that program, my advisor said, what you know, what are the biggest challenges here? Can you make me a graph? I said, Sure, I make you an accessible sonification graph. And then he's like, make me a sinky diagram. And I was like, what's that? He's like, Well, it's a graph on top of a map. I was like, Oh, wow. Okay, that's that might be a little more difficult. So that was my first introduction to maps and representing maps digitally. So we built the Napoleon's March of 1812 which is a really famous diagram for the input in the infographics community. And that's where it began, and we realized that

digital maps have had little to no research in the academic community. But because I am totally blind myself and grew up, am congenitally blind. So I was born blind, I knew that there were these things called Audio games, which are games that can be played completely using audio that are often made by and for blind people. And they have maps, lots of maps, really complicated ones that allow you to move troops around different types of terrains allow you to move around a post apocalyptic, zombie apocalypse. Landscape through abandoned stores, navigate through mazes and dungeons and all that kind of stuff. So maps had been a part of my life growing up digital map exploration, but I never was able to access the real world just these fantasy landscapes. And so I said, Let's take that idea and transfer it to to real world maps. And so that's basically the what was the inspiration for how we created the project that we're doing now. So very briefly, the audio experience is like a video game where users hear the name and sound of objects as they move a character over them with their arrow keys, touch screen or other controller, and an audio map can be accessed through a web browser on any device. And so it's a you don't have to install a single thing. And we also add on what are called spatial audio sounds as kind of ear candy, where you can hear this, these looping sounds of objects around you, and you can rotate your character and turn towards them to find them. And so that's kind of the how of you know, how we actually ended up getting the inspiration for the interface, and then how the interface basically works,

Mary Goldberg 11:21

Got it and so student project turned more full time job for you. How? How did that all occur?

Brandon Biggs 11:31

When I graduated from my master's program, the Smith Kettlewell Eye Research Institute offered me a position to continue doing the research that I was doing on Audiom. And as part of that, we got a diversity supplement from the National Institutes of Health, and that was during COVID. And we ended up getting some COVID supplements from some NIH National Institutes of Health grants to continue funding audiom. So we built the first real accessible COVID statistic map, and we have that on our website right now. And we also built a neighborhood exploration tool that allows you to kind of pre trip plan before you step out. So we have an Open Street Map integration. And so that was a National Institutes of Health grant, and that really spurred created the groundwork and infrastructure for what we've done going forward. We also ended up getting on a few of these NIDILRR grants, the big rerc project that the Smith kettle eye research institute is on, has a few aspects of audio in there. So we in this current one, we have one where we're building out the touch screen experience of audio. And so we also started a company to commercialize this product, and began, we filed a patent, and we also got an SBIR from the National Institutes of Health as well. So that's kind of the the primary funding mechanism that we've we've received. We've also participated in the IMPACT center boot camp, and that we got through all through all three phases of the IMPACT center programs. And also participated in the remarkable accelerator, and a few other accelerators at Georgia Tech and mass challenge. And so we've done a few accelerators which have also provided some funding. And then the National Federation of the Blind also invested in our company as well, through the smart jobs project or company, I'm not sure what the organization.

Mary Goldberg 13:43

Thanks Brandon. So for the listeners that don't know, the SBIR mechanism, or like I defined it before, the Small Business Innovation Research grant is awarded to businesses. So being that the Smith Kettlewell Institute and your undergrad institution would be nonprofits, right? So how? How did you make that division, or choose to separate or choose to create your own company to be able to be eligible for those different funding sources?

Brandon Biggs 14:19

The nonprofits don't do any kind of money making activity, necessarily. They're not really set up for that. So say, for example, I wanted to bill for example. This is a good a good example. We are going to be attending this CSU and assistive technology conference, and we are the official map provider for that conference in a couple weeks in Anaheim, California, and in order for us to be a, you know, bill for that and actually create the map, and create all the infrastructure for creating those maps in a systematic way, we need to have a company in order to do that. That, because neither universities or nonprofits are really set up for that. You can set up a nonprofit to do that, but Smith Kettlewell is not really set up for that. So we, we created our company because this is it needs to be in the marketplace. People need to be able to get these maps in their hands, and there needs to be a place for government agencies or institutions with maps to go to in order to make their maps usable. And so that's why we created the company, because a research institution just doesn't have the just doesn't have the infrastructure or or desire, really, to become a private company, um, doing commercial deliverable work.

Mary Goldberg 15:48

Yeah, got it. That makes sense. Thank you. And so your current role, then are you split between um Smith Kettlewell as a researcher, and then you also have the business on the side.

Brandon Biggs 16:02

Exactly, yes. So we have an agreement between the Smith Kettlewell Eye Research Institute and XR Navigation to split IP, and in future IP, they own a part of XR Navigation and and so that's how we are creating that. That's how we kind of agreed to to handle that, that process of, you know, we continue doing work at Smith ketterwell. We also are doing work at XR Navigation. And if we didn't have this agreement in place, it'd be a little bit messy. And so my PhD institution, I do no development work under that institution. I only do research evaluating the existing interface. So basically, I'm very, very careful not to do any, you know, any, any work that would be construed as creating IP at my PhD institution.

Mary Goldberg 17:00

It's wonderful that they're understanding, though, and really such a nice, nice launch pad for you Brandon to have some experience as both an entrepreneur and a researcher within a larger institution, I would think good for you as a future innovator to have some options, and great for the users too, to hopefully have quicker access to your product. Yeah, thanks so much for sharing the backstory. That's great, absolutely. Yeah.

Josh Anderson 17:29

Brandon, I wanted to ask because you mentioned that you were making the maps for CSUN here coming up very soon. I guess. What does that process look like without getting too code specific, or anything like that. But what does the process look like from you? Maybe receiving the maps of what they you know, visually might look like, or just, how does that all all happen?

Brandon Biggs 17:50

There are three steps to get a map into audio. So first, a customer will give us any kind of geographic data they already have for conferences. This is typically a PDF floor plan for other bigger like cities, for example. This might be access to their ESRI database. Or, you know, for other types of institutions. This might be a mixture of both a some kind of geographic information in a database and a PDF. And so what we'll then do is step two is we'll process that data into something audio can use. So if it's already in a geographic information system format, then we just make sure that that is, that that is in a, what's called a vector format, which is a computer readable, you know, geographic information format. If it's a PDF, I have a cartographer who then manually goes through and redraws that PDF, they sketch over at the top of it, and turn it into vector data, and then we put that information into audio, and then provide the customer. The third step is we provide the customer a link that they can embed or link to on their website that has the full inclusive map.

Mary Goldberg 19:13

Are there other audio maps out there that offer a comparable product? And if so, what differentiates your product from theirs?

Brandon Biggs 19:25

There are no existing tools out there that really provide a similar experience. There are definitely some that are sort of similar. So I would say the biggest similar experience you can get are actually not really a product, per se. It's just more of a technique of creating detailed alt text, and you typically need to create a like an 80,000 word document that details every single feature on that map, its shape, size, orientation, General. Out and make sure

you're hitting every feature on that map. And there's a project called the unit describe project that creates National Park maps, and I'm working with them right now to kind of systematize this process and making sure that you are really getting equal access when they create these text descriptions, because it's possible. It just needs to have a really clear index strategy, and it really clear, you know, system for creating these you can't just say I was, I'm trying to provide public feedback right now to a park in my neighborhood. They're proposing some new changes. So I asked, I gave them. I wrote a tutorial on how to create these detailed text descriptions. They tried to follow it, but they're amateurs at it. That's the first one that they're doing. And so they they say stuff like this. This map shows increased seating areas around this, around the park, and that's just not enough information. I can't give you any feedback on that seating arrangement or provide any feedback whatsoever. I just know that, you know, the park needs more seating. But here are the areas, you know, by the farmers market that I need seeding by, because that's a place that we always end up sitting on rocks by. You know, to eat our breakfast when we go to the farmers market. So, you know, those are, those are things that are local, you know, civic participation that I need an access to. But you can't just create a text description without being very systematic about it, because you're going to miss information. And so what audio does is makes the exact information that the sighted people are using fully usable in the non visual format. And so if the sighted people are missing some information, then also the blind people are missing the information. And so it's equal access, and it's easier to kind of create visually this data than it is to create a text description, because text description does create a a separate but equal solution, and it's often out of date, sometimes if the map is dynamic, for example. So there's a lot of issues with text descriptions, but as it relates to dynamic maps, there's nothing out there for blind people right now.

Josh Anderson 22:20

Brandon, I guess, as we kind of talk about this, and we talk about all the information that you can get, what all kinds of information can be relayed by audio, pretty much anything that's out there. Are there limits? Or have you even found those yet.

Brandon Biggs 22:34

We can show any type of map. The question is, how much work is it going to be for us, just, you know, to kind of update the interface. And for some places, it might be more expensive than they can handle right now, and that's just because we haven't optimized for that particular type of map. We are really good at exhibit halls and buildings and campuses. Anything beyond that. It's, it's more expensive for us. We can definitely do it. It's just going to, you know, take us a little bit more effort and time to do, and so it's just kind of a matter of building out the user experience to make sure that's a really good default experience for the user when they get that map. So that's kind of where we're at right now. So right now we're optimizing for how do we how do we facilitate making more of these maps? But yeah, that's kind of, that's kind of the long winded answer for that question. Did I answer it?

Josh Anderson 23:25

Yeah, most definitely. Most definitely.

John McInerney 23:28

So Brandon, I kind of have a practical question. So being an individual that's that's blind, that uses a cane, and uses some smartphone apps if I was going to see some, how would I use your audio map to prepare myself, first, for the venue and secondly, can I use it as I travel through the venue?

Brandon Biggs 24:02

So I am definitely somebody who prefers using my keyboard and computer. So this is how I would do it, and how I've done it. I go onto the CSUN map on my computer, and I will activate the map and explore around the hotel, because you start, you start at the door to the hotel, and you can go explore around, learn where the infused bar is, which is just the south of the door. And then you can go through the hallways, and it'll say, you know that you're in the hallway, and go learn where the different meeting rooms are. So you're kind of moving your character around to simulate walking through the space. And so you're using your arrow keys to move around the map. And if you do know, say, for example, you need to go to platinum AB or something like that, you can use a search box or a. You and find platinum, maybe, and give directions to that, virtual directions to that location. And you can, kind of, you know, look, look where the doors are. You want to make sure that you're going through the doors and not through the walls when you're you're going into those rooms. And so you can kind of learn where you need to be trailing along with your cane or your hand to find the doors, and, you know, you can count them and stuff like that. So that's kind of how you would really basically go through. You can use your phone as well to navigate around. So, similarly to the computer there, there's a panel of buttons that show up on your touch screen, and you can double tap on, you know, the left button to move left one meter, or double tap and hold to repeatedly move around like one meter in one direction. But it does not sync with your current location indoors. It'll do it. It'll sync with your location outdoors. But GPS doesn't really work inside. And GPS is the only real free method for us to use if you do want to have audio sync with an indoor experience, you need to ask a place like good maps to, you know, sync with the audio experience. And that's they do have a good maps version that you can use to, you know, navigate around the hotel with computer vision, and so something like that could allow you to sync your location to audio, but they haven't. They haven't integrated with us yet. They need more people to ask for it. So that's kind of the if we want to be able to do that, that's the next, you know, the next step there,

Josh Anderson 26:36

Listeners, that is all the time we have for this week. So make sure to come back next week.

Mary Goldberg 26:43

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