EPISODE 877

[INTRODUCTION]

[0:00:00.3] JM: In the developed world, it is easy to take for granted that we grew up with computers. Technology is so pervasive in the United States that we have debates about how early in child development a human should be given a smartphone. Across much of Africa, there's a shortage of access to computers.

Children grow up without much exposure to computers at all. Smartphones are starting to proliferate the continent, but the bandwidth limitations prevent the unrestricted mobile internet usage that many of us have in the West.

Tyler Cinnamon is a software engineer and the Co-Founder of TechLit Africa, an organization dedicated to improving technology literacy and reducing poverty in Africa. TechLit Africa takes old computers from the United States which are no longer in use and repurposes those computers with educational software and a downloaded subset of the internet. Then, TechLit Africa takes those computers to Africa and sets them up in computer labs.

Tyler joins the show to talk through the technical and cultural challenges of building TechLit Africa.

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[0:01:15.1] JM: You probably do not enjoy searching for a job. Engineers don't like sacrificing their time to do phone screens and we don't like doing whiteboard problems and working on tedious take-home projects. Everyone knows the software hiring process is not perfect, but what's the alternative? Triplebyte is the alternative. Triplebyte is a platform for finding a great software job faster.

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quiz, you get interviewed by Triplebyte if you pass that quiz. If you pass that interview, you make it straight to multiple on-site interviews. If you take a job, you get an additional $1,000 signing bonus from Triplebyte, because you used the link triplebyte.com/sedaily.

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Triplebyte does not look at candidates' backgrounds, like resumes and where they've worked and where they went to school. Triplebyte only cares about whether someone can code. I'm a huge fan of that aspect of their model. This means that they work with lots of people from non-traditional and unusual backgrounds.

To get started, just go to triplebyte.com/sedaily and take a quiz to get started. There's very little risk and you might find yourself in a great position getting multiple on-site interviews from just one quiz and a Triplebyte interview. Go to triplebyte.com/sedaily to try it out. Thank you to Triplebyte.

[INTERVIEW]

[0:03:34.6] JM: Tyler Cinnamon, welcome to Software Engineering Daily.

[0:03:37.4] TC: Thanks. It's great to be here.

[0:03:40.0] JM: You work on TechLit Africa. Describe what TechLit Africa is.

[0:03:47.1] TC: TechLit Africa is a nonprofit that I started with Nelly Cheboi last year. We take used computers from the United States and we repurpose them in communities in Africa for them to better their lives. Well, Nelly has lived through this. She is a native Kenyan. Where she grew up, they don't have many resources, at least not like what I had when I grew up.

If you grew up in a community like mine, you had resources all around you. When I was growing up I learned to program just by using a computer. I had a old Pentium 2, or Pentium 4 when I was growing up and I learned that I could mod games.

I was working on some scripts when I was very young and it was so natural. Then that continued for the rest of my life. That's just one career. I mean, any career you can imagine, there are resources and they're endless here and we've had them for generations. Nelly's experience growing up was the opposite, where you know some careers exist. There are things you can do with your life, but it's pretty limited.

Kids think, "I want to be a doctor. I want to be a pilot. I want to be a teacher." They just think of the things they see right in front of them. Then because they don't know most of those people with the exception of teachers, their horizons are so narrow. They're stuck in their village. What we're doing with TechLit Africa is we're downloading the best parts of the internet and we're putting them into schools in Africa using all of this surplus technology we have in the United States.

[0:05:27.6] JM: This experience of growing up without frequent computer use, I think that even many people in the West can relate to it on some level. There are a lot of people that listen to this podcast that feel an ongoing sense of something that is often called impostor syndrome, where they look at somebody, probably somebody like you who started coding pretty early in your life and they find out about software engineering maybe when they're 21, or 35, or 48, or at whatever age. Then they just look at somebody who has been doing it since they were eight-years-old and they say, "I'm just never going to catch up to this person."

It's a isolating feeling. It can put a barrier between you and success. Many people have overcome that barrier. Many people that go to coding boot camps, etc. Here, we're talking about a more extreme form of a lack of access to technology, because even somebody like me, I started coding when I was 20 or 21.

I had no idea about software engineering before then. I had no perspective on even a HelloWorld application. I just remember sitting down for my first introductory computer science class surrounded by freshmen and I was a junior, or senior and just thinking, "Oh, my gosh. I'm

way too late to the game." Of course, I was very wrong. It took me a long time to shake that feeling.

We can map that to Africa and think about the fact that many of these people don't even grow up interface with an e-mail client. They don't even grow up interfacing with a keyboard, and so there is so much ground to cover in terms of giving people earlier access to computer resources.

[0:07:17.5] TC: Yeah. We were talking to another Kenyan who is working as a cybersecurity. He's doing something in cybersecurity in England. We were talking to him a week ago and he was saying something similar. He was saying that there's a lot of ground to cover. Basically, table stakes for today's workforce is you need to have experience with office products, like Microsoft Word, you need to be able to edit documents, you need Excel, you got to be able to use spreadsheets. You need to know at least how to receive and send e-mails, right? There's some formality to these things.

Even today, if you're going to be in software, I think you probably need to have some experience with LinkedIn, or building up a presence online. These are all kinds of things that we plan on building curriculum for this year. I don't know if you know about our crowd source curriculum plans. Have you heard about that?

[0:08:15.8] JM: No. Tell me more.

[0:08:17.7] TC: One of the projects that we're working on this year is we're calling it lessons. It's TechLit lessons. Our plan is to build an app online, so it's just angular on top of Rails, where you can enter in simple lessons. We put a WYSIWYG in it and then you can upload different resources via, say you want to write a lesson for how to write a document maybe, you want to write a resume. We could write a lesson for how do I write a resume, which should be very beneficial for people to get into today's workforce.

You put this lesson into our TechLit lessons platform. Then what we can do is that, because of the way we're designing this, we can then export all the data from the backend into our local intranet. Hopefully, we can build this in a way that anyone could do that. All of these lessons are

then exportable, that although it's built to work on the internet in general, it also works locally on a local internet server.

[0:09:17.7] JM: This gets it, one of the topics that Nelly and I discussed in the previous episode about TechLit Africa, which was called Emerging Markets Kenya, if people want to look up that episode, there is a lack of widespread internet access in many places in Africa. There is this model, this model that Nelly developed. I guess, maybe you developed with Nelly, of setting up computer labs and setting up an intranet on in that computer lab, so it gives a sense of being on the internet, but you don't necessarily need to be hardwired to the whatever, the Comcast equivalent is in Africa. Describe the first computer lab that you and Nelly set up in Africa.

[0:10:13.9] TC: Sure. I think to describe it, I'm going to take one step back and take you to our apartment the week before we went to build that first lab. Sound reasonable?

[0:10:26.5] JM: Sure. Yeah.

[0:10:28.1] TC: We're a week away and we have identified 10 laptops. We had maybe 50 computer donations. We picked 10 of the best ones. We're thinking, “Okay, we're going to take all 10 of these. We're going to pack them in our bags and then we're going to set up a computer lab.” This is something we have never done before. We didn't want to pay for Windows images for each of them, so we decided we're going to use Linux. It's something I had a lot of experience in.

We started putting – we put Elementary OS on each one. We burnt a thumb drive. We did just a standard installation, the username was awadiprep. The whole thing was very hacky and hopefully we can nail it down this year. Once we had all of those images on all the machines, it was time to install a bunch more content. Eventually, we realized that the amount of installation for each machine that we needed was too much to do by hand.

We should have used some configuration tool, like Puppet or Chef at that point. Instead, what we did is we set up NGINX on a local router and then we just curled a script from that local router and ran it on the machine. I think it was at that point that we realized, this local router that we have in our home and the server we have running on it would be good enough to serve

anything. At that point, we identified the most robust machine. We plugged a massive hard drive into it; it was a 3 terabyte hard drive. Then we just started pulling down everything we could.

You can download Wikipedia, you can download Stack Exchange, like Stack Overflow and we also pulled down a bunch of Khan Academy videos, videos for kids, because a lot of the kids in the school were primary school students. We had this pile of scripts. I actually abstracted some of it away into this Ruby thing. We had this disgusting text file that was – It would have a route that you should curl and then it would have a type on the end. It would be google.com.link, or something like that. Then the Ruby script would understand and have link on the end, I do this and this with it.

This script was running, downloading these things for days. I remember at the end of it, we had a bunch of tasks that had to get done. Wikipedia's happening over here, we're downloading Khan Academy over here, you're trying to pull down a Ruby Gems mirror, we are trying to pull down an NPM mirror. Each of these things, like I'd look at each one and think this one's going to take 24 hours, this one's going to take two days, this one's going to take three. We started cutting corners here and there, just to get this stuff in in time.

It's time for us to get on our flight and things are still downloading. I just unplugged everything. We just had to cut – and we packed all this stuff into our bag. Then by the time we get there, there's some internet here and there, but you can't download Wikipedia. You can't download gigs of things. You can download a driver, or a patch for this or that. We were pretty much stuck with what we had once we got there.

After that, it was pretty simple. We left some instructions to set up the server. It's as easy as you plug in the hard drive. There are some manual steps; you have to mount the hard drive, but then NGINX starts on boot and then it's as easy as that. Elementary will connect to the Wi-Fi, which we have over a home router. You open up the browser and go to some IP address and that's your internet in a box, version 0.1.

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[0:14:07.6] JM: Buildkite is a CICD platform for running scalable and secure continuous integration pipelines. Buildkite helps you keep your builds fast and reliable, even as they grow large. Buildkite's web UI and APIs are fully managed, well-documented and backed by great support and SLAs.

Teams can easily set up and maintain their own build pipelines and get help directly from Buildkite support. Build configurations are checked into source control and it works with github and github enterprise, GitLab and Slack workflows. There's also support for Webhooks, GraphQL and plugins, letting you extend Buildkite in new ways.

The Buildkite agent is open source, written in Go and you run it within your infrastructure. It's under your control, so you can be sure that the source code and the secrets don't leave your infrastructure. There's an AWS cloud formation stack to get you started and it auto scales from zero to hundreds of agents. Or you can deploy it to a Kubernetes cluster, a cloud provider, bare metal hardware, or a cluster of Mac OS machines.

Visit buildkite.com/sedaily to learn more and see how Shopify used Buildkite as they scaled from 300 to 1,200 engineers. They migrated between cloud providers and they kept their build times under 5 minutes. Check it out at buildkite.com/sedaily.

Thanks to Buildkite for being a new sponsor of Software Engineering Daily. It's always nice to see new CICD platforms, such as Buildkite.

[INTERVIEW CONTINUED]

[0:16:04.5] JM: It's hilarious. It reminds me of when I'm about to board a plane and I'm aggressively downloading as many podcasts as I can before –

[0:16:15.0] TC: That is exactly what happened.

[0:16:16.7] JM: Before the plane takes off. A bit of a bigger scale. What is the experience of a student who sits down at this computer lab, with this intranet that you've downloaded and stood up for people to use?

[0:16:38.7] TC: There are a few different experiences. Also, there's a difference between the experience we have right now and the experience we're aiming for. I'm going to explain each of those. The first one is there's the experience of the primary school students. These are kids, they're six to 10-years-old, maybe even younger. They're using this during the day as a part of their school routine.

The teachers will send them into the room and then this is their computer hour. What they do is they choose a game to play. We have a lot of games from, I think it's KDE education. It comes bundled with Edubuntu, I believe, a Linux distribution. We have a bunch of games, educational games from there. The kids will open one of them up, say it's – I think it's TuxType, or it could be Potato Guy, or any of the other games we have on there.

Then those games, they've got a lot of loud music and they've got a lot of flashing colors. The kids then learn to type, they learn some English words, they learn to use the mouse, like basic computer skills, the most basic things. That's the first group. Hopefully, we can get that in the future more educational, I would say.

Kids pick up the keyboard and kids pick up how to use interface as much quicker than adults do. I don't think it's necessary for them to really go through that training. Hopefully, we can make it like reinforcement learning in the future.

[0:18:12.4] JM: Really? Wait, so kids just pick up how to type? They figure it out?

[0:18:16.7] TC: Well, they don't pick up touch typing, but they know what to do when they get to the computer. When an adult gets there, they struggle a bit more. Kids will have it figured out in a few minutes. Nelly's niece, we didn't even teach her how to do any of this stuff. We didn't teach her a single thing. She was just watching us do some stuff here and there. We're setting up the lab and she's watching us. We haven't taught her anything at this point and she brings four of her friends into the lab, like we just set it up. We haven't shown it to anyone.

She brings in four friends and she says, "Here, look at all the content we have." She opens up the browser. She goes to 192.168.0.1 and she starts showing them all the content. That's not

something that we showed her. She hadn't really used a keyboard, she hadn't used a browser, but she knew how to do all of that. What's what I mean, kids pick the stuff up way faster.

[0:19:06.6] JM: That's remarkable. When I talked to Nelly, the thing that really stood out to me about this this project as being intimidating is the supply chain of computers. The way that you get computers is people donate them. Everybody's got some old desktop machine that's sitting in their closet. The idea of that machine being wiped and reused and set up in Africa for an intranet that allows kids to learn everything about the world, that's pretty invigorating and it gets people motivated to get that thing out of the closet, blow the dust off of it and figure out how to get it to you. Then you have to fit – what's that?

[0:19:56.1] TC: It definitely does. We've seen that a lot. Yeah.

[0:19:58.1] JM: Then you have to figure out how to get it to Africa. You got to get it into a warehouse. I mean, luckily it's not like you're sending the newest MacBook Pro. I don't think these things are too vulnerable to theft. Probably, I don't think people look at the – maybe they're somewhat vulnerable.

Anyway, so you got to figure out the supply chain and then you got to figure out how to get them to computer labs, because you want to scale this thing up. I mean, you want to get computer labs everywhere in Africa. Tell me about the supply chain of computers as it stands today, and then maybe your vision for how to scale it.

[0:20:33.6] TC: We've been listening to a lot of Y Combinator lately. For anyone who doesn't know, Y Combinator is a startup, an accelerator in Silicon Valley and they'll – if you have a good business idea that you send to them, they will give you some seed funding. I don't know if it's technically seed funding, but they'll give you some seed funding so you can start your company and then will give you three months of advice and a good network.

We've been watching a series on YouTube, which is their startup school 2018 series. It's great, if you ever want to start a company. Between that series and Nelly reading all of Paul Graham's essays, we're thinking now that to grow this, to make sure that we have the biggest impact, all we need to worry about is having a few people at a time be successful on our platform.

Beyond that, most of the problems are something that we're going to take care of when we get to them. Because we wouldn't want to over optimize for certain things before we get there. It's a lot like an engineering problem really. Sorry that I just avoided that question.

[0:21:38.4] JM: No, it's totally fair. Well, I mean, I was spitballing with some ideas on the last episode. There's tons of interesting ideas. You get Uber drivers, or Postmates people to help you with the transportation of these computers from point A to point B. There's just tons of ideas.

[0:21:54.7] TC: We were saying that it would be difficult to get people to trust this service, right?

[0:21:59.9] JM: Well, I thought the bottleneck would be – this is totally biased towards my personal experience. I thought the bottleneck would be people want their computers totally wiped before they donate them.

I have probably two or three computers in my closet and I'm just – I don't know if they've been wiped. I don't really want to take the time to wipe them. It's not worth it for me to get the $20, or $40, or the spiritual invigoration of donating them to somebody else. All those things would be great, but I'm too scared that there's going to be some bit of data left on there that somebody can repurpose to launch an attack against me.

[0:22:40.6] TC: We haven't seen much of that, but we see something similar. Almost every individual donor we talk to has something on their old devices. They don't know what, but they know that they want it. I've even talked to a couple of –

[0:22:54.3] JM: That's an opportunity.

[0:22:55.6] TC: Yeah, a couple people have said and I started asking like, “Would you pay $25? What about fifth –”

[0:23:00.7] JM: Ooh. Oh, my goodness.

[0:23:03.2] TC: 25. Yeah. 25 a machine, I would do that. We are going to try with a few people, we will help you get your stuff off of there, if you pay –

[0:23:12.6] JM: Oh, my God. That's brilliant. That is brilliant. I will absolutely be – I would love to be a customer. Wait, so just to be clear. I'm sorry. Sorry to interrupt you, but this is so exciting to me. Just to be clear, somebody shows up in my apartment, they – I'm like, "Hey, there's the machine over there. You could do your thing." They're like, 20 minutes later, "Okay, I've added every file from your computer into Dropbox and the thing is totally wiped. You can check it for yourself. That will be $25, please."

[0:23:43.4] TC: Wow. Well, when you put it like that, why don't we just write some script that pulls off unique files, right? If you could identify a file that's truly unique, versus a file that's just you installed Adobe and this thing's here now. That's not a bad idea.

[0:24:00.2] JM: Yeah. Oh, I said different than what you had in mind?

[0:24:02.9] TC: Honestly, the only thing I'm thinking about right now is building intranet version 1.0.

[0:24:09.6] JM: Fair enough. Okay.
[0:24:11.3] TC: That's 50% of what I'm doing and that's it.

[0:24:14.8] JM: Well, let's talk about that more. Actually, no, no. While we're on the topic of supply chain, where are you in terms of expansion right now? How many computer labs are set up and how many are you trying to set up right now?

[0:24:27.1] TC: The challenge with this is that we are here in the United States fund raising. As soon as we're done with this, we'll be over there setting them up. We're not over there now, so we're still at one computer lab. We have enough computers now, we're calling them workstations, because it gets a little more complicated, like a tablet is one workstation, or a tower, plus monitor, keyboard, mice, power cable is a workstation.

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We have enough workstations for 10 labs, assuming that we do 10 machines per lab. That gives us a wiggle room too, so that we can image things from a distance. It gives us some liquidity with the machines. We have enough for 10 labs. Nelly is working on shipping right now. Our plan this year is to do all 10 of those labs. We're going to be careful with the schools we pick, so that we know we have partners that we can collaborate with and iterate with. Hopefully, by the end of this year 2019, in the next six months or so, we'll have all 10 labs done, the next 10. Your question is about growth, right? How are we –

[0:25:29.1] JM: Well, I'm just wondering where you're at in terms of thinking about expansion. You have this first lab setup, are you just thinking about improving the software that's in that lab, or are you scoping out the location of the next lab?

[0:25:43.4] TC: It seems like there's a demand for this. We're not going to worry about finding more schools really. We're going to try to keep it in the same area, because driving time is pretty extreme with some of the infrastructure in Kenya. For instance, to go from that first lab towards the city might take six hours, but to go the other direction, like the same distance would take a day kind of thing. We're going to try to keep the labs local geographically. Otherwise, we're not going to worry too much about finding schools yet.

We're more focused, at least I am more focused on getting the image that we put on the machines, cleaned up and declarative and getting it online and versioned and everything. Getting the intranet system a little more a declarative and getting that hosted online too. The largest goal for me with this whole project, TechLit Africa is to take this intranet concept, which I don't know if you know, but other people have done a similar workflow before, or a similar architecture before where they set up a local intranet.

The issue is they hold it as intellectual property. Most of those organizations, although they are nonprofits, or they're doing it in some charitable sense, they're holding that as their own property and they don't share it. My biggest goal is to take that same thing and open source. Just get it online, so that someone in these villages, someone who helps around the school or someone nearby, could set up this entire thing, for as cheap as these old machines are, they should be able to pull all this content down and just put it on the machine. It's not much work. All this stuff

is free online anyway, it just needs to be packaged that way. That's what I'm focused on over this year and the next year.

[0:27:34.9] JM: Would you be opposed to these people having some franchise system, where they pay some money and they get some computers that they can set up and then they can set up a computer lab that they charge people in the village, like $1 a year to use, or $5 a year to use, I don't know whatever the economics would be.

This is the conversation I'm having with Nelly is not to put the cynical capitalist economic bent on it, but if there was a franchise model, you might get the entrepreneurial mentality to come out of people and start driving the creation of these things themselves.

[0:28:13.7] TC: Yeah. I have a few thoughts on that. I absolutely don't mind people doing that. That would be fantastic. The point is that he means of production, when it's free to copy it, it's just bits, there is no reason that that's not free. You can sell other services, that's fine with me, but the library of the world is free and it belongs to the people of the world. I stole that quote from someone else, but there's no reason that we can't just package this up. Another thought I have on that, so you've mentioned something. I think this a lot too and I think it's faulty reasoning. I think it's not xenophobic, but it's an elitist thinking, that –

[0:28:55.6] JM: Patrimonialism?

[0:28:57.6] TC: Maybe. That we want to inspire entrepreneurship.

[0:29:01.6] JM: Or paternalism. That's the term. Oh, okay. Oh, oh, sure, sure. Okay, sorry.
[0:29:07.2] TC: The policy or practice on the part of people in positions of authority of restricting the freedom and responsibilities, no, not quite.

[0:29:14.6] JM: Imperial entrepreneurial.

[0:29:16.1] TC: Probably. Yeah.

[0:29:19.9] JM: Entrepreneurial imperialism. What do you mean?

[0:29:21.9] TC: We can find a word eventually. The idea that we want to inspire this, or inspire that in people is faulty. We see people in poor circumstances, right? I've been thinking about this ever since I was there. When I showed up in Mogotio – let me tell the story about this. When I showed up in Magotio, the night sky is beautiful. Every night, I would get stuck outside looking up at the night sky. I'm from an area around Chicago, we can see the stars, but not very well. In Magotio, you see everything. You can see the Milky Way. The colors and the stars are so bright.

I'm out there looking up at the sky and then I see the moon. I've been interested in biology and chemistry lately, so I'm wondering what's the moon made up. Then I do what I always do, I pull out my phone, I open up Google, or it may have been DuckDuckGo at the time, but I open up the search engine and I ask what is the moon made of? At that time and this happens often, the mobile network was down. Sometimes it's down for hours at a time. That was devastating for me.

I know that it's a trivial question, right? What's the moon made of? It's that curious lightbulb in me, the curiosity that I have just died out for the rest of the night. It may as well been made of cheese. Like I said, that's trivial for me. For a child, or for someone growing up in these communities, that curiosity is crucial. Here and in places where you have endless resources like we do, that curiosity never dies out. You get your answers on the spot all the time.

Today's age, being able to get those answers and being able to be curious and teach yourself new things are critical. I don't think that the reason areas of the world, like Africa, or different areas in South America, or Southeast Asia, there are a lot of areas that are poor economically and I don't think that it's because of a lack of entrepreneurship, or certain thinking. I don't think that's necessarily it. I think it stems from a lack of resources.

Many of those countries don't – European countries will have first right of refusal on their resources and those kinds of power dynamics keep them suppressed and they're never going to get their resources. Right now with TechLit Africa, we have an opportunity to take some of the most powerful and magnifying resources that have ever existed and we have the opportunity to give those resources to them. We are leveling the playing field.

[SPONSOR MESSAGE]

[0:32:22.0] JM: ExpressVPN is a popular virtual private network. ExpressVPN is useful for getting a private, secure, anonymous connection for your internet browsing. It encrypts your data and it hides your public IP address. You've got easy to use apps that run seamlessly in the background on your computer, or your phone, or your tablet and turning on the ExpressVPN protection only takes a single click.

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[INTERVIEW CONTINUED]

[0:34:01.5] JM: Is there any sense in which – I've seen videos of in African villages where there's solar panels built nearby, and people in the village will go and destroy the solar panels, because they're like, “What is this thing? I don't want this thing. It's new and different. Get this out of here.” I mean, we even see this in America, whenever there's a new technology that is somewhat disruptive, there's always people who it makes them so uncomfortable at a very deep level that they just want to bad-mouth it and destroy it.

[0:34:40.0] TC: Yeah. Why are you guys looking at your phones all the time? These phones, they're just real –

[0:34:43.9] JM: Yeah. Does that impulse exists at all in any of the communities you've engaged with?

[0:34:50.1] TC: Absolutely. I haven't seen it in a hostile sense, but I've seen it in a much more docile way. We heard a story recently from a couple who used to volunteer in Ghana. They would set up computer labs, almost the same way we do. They were in the same town, almost their entire time there. They saw some engineers, I think from Minnesota.

There were some engineers from Minnesota that show up in this small Ghanaian village, and these engineers developed this new oven for the villagers. I forget what the oven was for. Maybe it was for making charcoal. They developed this oven that was 10 times more efficient than the older method of doing it.

For the few weeks that they're there, the villagers are using this new oven and it's great, like outputs way up. They have more charcoal than they know what to do with. Then as soon as the engineers leave, the next day the people go back to doing it the old way. This couple that Nelly and I were talking to, they went and asked the people using the oven why did you go back to doing it the old way? They said, our neighbors were something like – the other people doing this no longer have a job. They were thinking like, “This is bad for the community,” or like you said, it's disruptive.

Yeah, it's that same mentality where change is bad, or it's like you're hurting other people, right? When it's really just a new friction in the job market. I think there are a lot of problems here. I'm not sure if I'm going in a useful direction.

[0:36:30.1] JM: Yeah. Well, I mean, I think whatever the problems there, you have no choice but to contend with them. I'm sure the contention will be overcome eventually, it sounds like. Let's talk a little bit about how the communities and the adoption of the computer – how many computer labs have you set up at this point? Just one?

[0:36:48.9] TC: Just that first one. Yeah.

[0:36:51.7] JM: Yeah. How was the usage of that computer lab?

[0:36:55.5] TC: This is something else that we that we need to work on. We've found that people like videos more than they like text and that makes sense. The usage has gone down since we left. We don't have exact numbers. That's something that we're hoping to solve this year. We want to get better metrics, even when we're not around, to know what are people using, what are they getting benefit from and how are they using it.

I think one of the things that we're going to track, like our North Star, I think is what we're calling it, our North Star, is going to be something like, weekly active users. If someone is learning to be a web developer, so they're coming to our lab to study web development. As long as they're coming back every week, we're considering that our weekly active user. That is the most important customer to us.

We want people that are coming in and they're learning a new skill and they're able to use the lab repeatedly every week. That's something that we're going to be working towards this year and next year. We want to develop that North Star, so we know that the lab is being used and people are getting benefit from it. That's what we plan to grow is the weekly active use.

Right now, I think our weekly active use would be zero. It may be misleading, but the local high school kids will come in and they'll watch videos sometimes. They'll read some things, like supplementary studies. The kids in primary school will use it every other day maybe. That's a part of their curriculum. They're forced to. I think almost every metric that we have right now is misleading around that. Hopefully, we can get our North Star tuned coming up.

[0:38:39.4] JM: Why would the metric be zero today, if there's people that are using the lab?

[0:38:42.9] TC: Because they don't come back every week.

[0:38:44.6] JM: I see. I see.
[0:38:45.9] TC: Yeah, it'll be fashionable this week, not next week, or maybe they're having a hard time today, or whatever it is.

[0:38:54.0] JM: Why is that? I mean, when I first got a computer I was like, “Well, this is just the thing that I'm going to spend all of my time on from now on.”

[0:39:01.6] TC: Yeah. You just reminded me of – I forget the name of this program. There is this old program I got a lot of hype around 2000, I think, where this guy developed a new machine, a new laptop. It had a crank on it originally.

[0:39:16.4] JM: Right. I remember that.

[0:39:18.5] TC: Awesome. Do you remember the name?

[0:39:20.4] JM: I don't remember the name.

[0:39:22.5] TC: Oh, darn. Okay, the theory was if this machine is your personal machine, then you get more value from it, or you're more motivated to maintain it and to use it, right? I think that was his theory. That may be tied to this. Our lab is –

[0:39:39.9] JM: I've looked it up. This is the OLPC XO, is what it appears to be.

[0:39:45.6] TC: Exactly.

[0:39:46.3] JM: The XO was developed by Nicholas Negroponte, a Co-Founder of MIT Media Lab.

[0:39:50.8] TC: Yes, absolutely. I hear that it's still going actually, that they have a small user group and they're very content with the people that are using their machines. We'll probably get in touch at some point.

[0:40:01.9] JM: I'm sorry to interrupt you. Okay, so continue. Why does this remind you of the crank book?

[0:40:07.2] TC: Because he had some motivation, that if people own their machines, then if they own them and it's their personal property, then they're more motivated to use them and to maintain. That's something that we lack with our program. Ours are community-owned.

[0:40:23.3] JM: I see. I see. Yeah, that's a good point. I mean, I was never really motivated to go to the library and mess with the computer at the library. Okay, well so you've said you're focused on figuring out the greatest curriculum possible. What's your sense for what you're going to need? I guess, first of all, why is that your focus? Why is the improvement of the curriculum, or the improvement of what you're actually going to install on these computers, why is that so important to you?

[0:40:56.6] TC: Our goal is to level the playing field and in a sense, to lift these communities out of poverty. If someone in these communities – we're thinking that the most effective way to do that is to get these people one of two things, either remote work, because those salaries can be relatively very high, or if not remote work, getting these technologies adopted in their communities, be it in business and education, or in government.

Using these machines to train up the skills needed for remote work, or using these machines to foster and cultivate the adoption of technology, we believe is the most effective way to lift these communities out of poverty and ultimately, to level the playing field for them. That's why I think that building up the curriculum and the content we have on the machines is the most important thing.

[0:42:01.0] JM: Once you get that curriculum improved, how are you going to deploy it and get people to start learning to code, for example? What's the road map to getting people to explore these machines in a way that's productive to them?

[0:42:20.5] TC: Okay, so we have a plan and of course, this will fall apart the moment we start using it.

[0:42:27.0] JM: That's okay.

[0:42:28.2] TC: Our plan is we use this new TechLit lessons platform. The very first step is someone comes to the lab and they're smacked in the face with a list of different careers. They're given a bunch of inspiration. It's something like, here's how biology works and you can

be a biologist, or here's how mechanical engineering works and you can do this, or here's how software engineering works and you can do this.

They're hit with these lessons that are like, here's the awesome life you can have. Then at the very end of each lesson, it's a router to the rest of our content. It says, “Here are the 10 books that you can read, or the 10 video series that you can watch to learn how to be a software engineer.”

Our plan is to use that platform as a router to the rest of our content. Then, also to put some other inspirational stuff in there, like TED Talks, any videos that would keep you going. For me, there's this one synthetic biology video I always watch, where the guy from MIT, I think his name is Chris Boyd. He talks about how you can program e-coli cells and how they packed – they packed the programming of these cells into a programming language.

I could write the code and then I could send it off to be encoded into – sequenced into DNA and then I could have my own e-coli cells programmed for my machines. Videos like that, really inspiring things that you can do, I think those – that's our plan in a nutshell is to get people inspired, to show them the different directions they could take this. Then to point them towards content that would help.

[0:44:07.3] JM: That sounds like it would work. What more specifically are the updates to the curriculum? You've got this this lessons platform. Is there a certain coverage of ideas? Have you already laid out the schema, or the outline of ideas that you're going to be exploring in this updated curriculum?

[0:44:28.0] TC: We haven't yet. This is going to sound awful. My plan at this point is to find other places on the internet with open licenses with this thing and just scrape them. The first prototype is just, “Hey, is that useful to you?” Then if it is, we can start tailoring it. If it's not, we pivot a little bit. Otherwise, so we've got that lessons platform. We have yet to bake that into our image. We'll need to run that Rails app and compile the angular during our image build and get that packed onto our little USB drive.

There's still some work yet on our end to get that Rails app and the angular app to run in local mode, instead of internet mode. Aside from technical things, we could put those things off and just hack this thing together. My instincts tell me that that will be a crucial piece of infrastructure for us moving forward. I'm motivated to get those things together early.

[0:45:29.2] JM: Let's imagine there are people listening who – actually, we don't have to imagine. I'm quite confident there are people listening who would want to help in some way. What are the ways that people can help you, either financially, or otherwise?

[0:45:45.4] TC: Okay, so right now the biggest way people can help us is financially. I think that's the easiest for us and probably for them too. There are other ways also. Unfortunately, I haven't put in the effort yet. I should say we, because Nelly hasn't either. I can blame her.

We haven't done any effort yet to properly share the source of our image and our apps. I mean, it's all up on GitLab, but it's a pile of scripts. I would hate to put that on someone else without some documentation, but we'll work on open sourcing our tech stuff at some point this year, and then people can help with that.

In the meantime, we had an evangelist. I should give him a shout out. We had an evangelist from Vancouver, who out of the blue, he heard your episode and he got in touch with Nelly and said, “I'm giving a talk in San Diego next week. I'm printing this shirt that says ‘TechLit Africa’ and I'm going to be promoting you during my book signing in my talk.” That evangelism, if you're so inspired, would be super helpful.

[0:46:58.6] JM: Have you set up like a Shopify? You could set up like a Shopify, so that people could buy those kinds of shirts.

[0:47:05.5] TC: Do you think people would buy the shirts?

[0:47:07.5] JM: I think so. I mean, that guy was inspired to set up a shirt himself. That's a pretty easy – What's that?

[0:47:16.6] TC: He just on his own called us and said, “I'm printing it.”

[0:47:21.0] JM: Right, right. I mean, if somebody is – I mean, I don't I don't imagine he has a t-shirt printer in his house that's really easy to just set up. He probably went on to one of these Vistaprint, or something and printed his own t-shirt. You can set up Shopify. It's pretty easy.

You just upload a JPEG and people pay you $25 for a shirt and it's a really expensive t-shirt, because they printed on demand, but you don't have to hold any inventory. That might work. That could work. I don't know. I don't know if it would be profitable. Shopify is a 100 bucks a year, or something like that, or maybe more.

[0:47:59.6] TC: Well, so like I said, we've been fundraising a lot. That avenue seems like a good long-term approach actually. Some merchandise that people could wear to evangelize what we're doing. That does seem like a good long-term approach. We've been getting a lot of individual donations. If you have deep pockets and you'd like to help, we'd love to talk to you.

We've also gotten a few recurring donations from engineers. Maybe they have $20 a month or $10 a month, but that goes a long way for us. That would cover our DigitalOcean bill, or it would cover our cost of storage, or even our cost of living, which we haven't even come close to touching. We haven't even started. There's certainly a lot more fundraising to be done.

[0:48:43.0] JM: I think those cloud providers, I mean, depending on how much – I'm sure you've sure you got a lot to work on, but I think there's cloud providers do have some deals for nonprofits. It could be wrong.

[0:48:52.4] TC: I've been reaching out to DigitalOcean.

[0:48:55.3] JM: Yeah. How does your experience working on tech – By the way, so this is full-time for you? You're doing this full-time?

[0:49:03.0] TC: Full-time for both of us. Yeah. We decided at the point where our apartment was full of computers, we had to sell and moving furniture. We literally took furniture out and just left it in the alley, because we didn't have room, because there were too any computers in our apartment. That's when we decided to do it full-time.

[0:49:21.1] JM: How does your experience working on TechLit Africa compare to your work as a software engineer for a company?

[0:49:28.5] TC: Oh. Well, it's certainly a lot more motivating. As an engineer, I was writing closure for a financial company called op loans in Chicago. The culture there is fantastic. I could not imagine a better engineering culture there. The company was very supportive, it was pretty lax. I guess, I could imagine a more, a better engineering culture maybe that was a little more motivated. Everyone there is pretty relaxed.

Corporate jobs, like corporate software jobs are pretty cushy. The money is great, but there's no raw motivation. This is so motivating, to work on something like this, where it feels you're attacking one of the world's big problems and there's nothing quite like it. I really recommend this work. If you can find it, this work is the best.

[0:50:18.9] JM: Well Tyler, it's been really fun talking to you. Do you have anything else to add about TechLit Africa, or your mission?

[0:50:27.4] TC: Definitely check out our website. That would be techlitafrica.org. Techlitafrica.org. You can follow us on all of the social medias, like Facebook, or Twitter, or LinkedIn. Yeah, I think that's about it.

[0:50:42.9] JM: Okay, Tyler. Well, thanks for coming on the show. Great talking.

[0:50:45.3] TC: Thanks for having me, Jeff.

[END OF INTERVIEW]

[0:50:50.2] JM: Commercial open source software businesses build their business model around an open source software project. Software businesses built around open source software operate differently than those built around proprietary software.

The Open Core Summit is a conference for commercial open source software. If you are building a business around open source software, check out the Open Core Summit, September 19th and 20th at The Palace of Fine Arts in San Francisco. Go to opencoresummit.com to register.

At Open Core Summit, we'll discuss the engineering, business strategy and investment landscape of commercial open source software businesses. Speakers will include people from HashiCorp, GitLab, Confluent, MongoDB and Docker. I will be emceeing the event and I'm hoping to do some onstage podcast-styled dialogues.

I am excited about the Open Core Summit, because open source software is the future. Most businesses don't gain that much by having their software be proprietary. As it becomes easier to build secure software, there will be even fewer reasons not to open source your code.

I love commercial open source businesses, because there are so many interesting technical problems. You've got governance issues. You got a strange business model. I'm looking forward to exploring these curiosities at the Open Core Summit and I hope to see you there. If you want to attend, check out opencoresummit.com. The conference is September 19th and 20th in San Francisco.

Open source is changing the world of software and it's changing the world that we live in. Check out the Open Core Summit by going to opencoresummit.com.

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