EPISODE 1402

[INTRODUCTION]

[00:00:00] KP: TechLit Africa is a nonprofit on a mission to lessen African poverty by leveraging the Internet. Rural Africans lack both digital skills and computers, and therefore, can't really participate in the digital economy even though developing countries have plenty of used computers. That's where TechLit Africa comes in. They accept used computers, refurbish them with custom classroom software, ship them to Africa and establish relationships with schools that provide space for the labs they create. In this episode, I interview Nelly Cheboi, one of the founders of TechLit Africa.

[INTERVIEW]

[00:00:36] KP: Nelly, welcome back to Software Engineering Daily.

[00:00:40] NC: Thank you.

[00:00:41] KP: When you last spoke with Jeff, I think it's been about two years now. During that interview, you were in your apartment or house, you had just quit your job, you had 30 computers in your home, and you needed a way to get them to Africa. How'd that all pan out?

[00:00:56] NC: It was great. It was a great learning experience. We got to Kenya, and our idea was to work with the adults, because quickest win was to get the adults to start using, just start making money online. We just figured that if we spent a few months with them, teaching them WordPress and teaching them, I don't know, all these things, then maybe they can start making money online on either Fiverr or Upwork. Or if we could get someone in Chicago to hire them for website building, and then it was just really hard to get them to show up. It was really hard to get them to commit. We quickly realized that life was getting in the way, it was really hard to get someone who has never used a computer before, to show up at a classroom in a school and expect them to spend six hours a day just trying to learn stuff online.

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Meanwhile, we had kids just hanging out, just trying to see a computer, trying to see what the deal was and after a month of trying to get the adults. Initially, we just wanted to grow the impact, right? We just need three people. If we can get three people to come in, daily recurring user come back every day, then maybe we can do for the week after and five the week after. But to like retain them and even get them to come back, it was almost impossible. So with a heavy heart, we switch to kids. I mean, not because it felt like if we could get the adults making money online immediately to be such a good one, but we couldn't. So we switch to kids, because kids was just there at the school, just wanting to see a computer. When we switch to kids, we had 60 kids the first day. The first day and then the next week it was 120. Getting those like small growth numbers from the adults. Do I need to provide any context or –

[00:02:56]KP: Well, let's get into that too. Maybe we should start at the top level with what is TechLit Africa.

[00:03:02] NC: Okay, right. TechLit Africa is a nonprofit organization that my co-founder, Tyler and I started in 2018. Starting TechLit Africa came from my own experience growing up in Kenya. I grew up in poverty and I've always been motivated to tackle poverty. I drew most of my experiences from watching my mom really struggle to put us through school. There's four of us. We have four girls. I saw education as the easiest way out of poverty. Studied really hard and got a scholarship to come to America. When I got to America in 2012, that's really the first time I ever used a computer. Growing up in rural Kenya, I'd seen computers around, but I'd never really used one.

I later discovered computer science as a junior in college, which is much, much later because I only had one year left of my degree. I quickly switched my major to computer science, and got a degree in computer science. But in that computer science class, I was so far behind. I did not know what a terminal was. I did not know what even like looking stuff up in the Internet was. I don't even know typing. While I type, I'll try to look at the keys on the keyboard. I felt so insufficient in that computer class. It constantly reminded me of no matter how hard working I was as a person, no matter how – I was really hard working. But still, just because I grew up in rural Kenya, just because of that, I'm already behind, even though I worked so hard, I read all the books, I'm still behind. I kept thinking about my community back home, how they're not

growing up with computers and how – just like computers are driving the economy right now. Everything is online. Billions and billions of dollars are just moving around on the Internet.

For an entire community and entire generation to be left behind was just not fair. I built a school with the idea of trying to see if I can incorporate computer science as part of kids' curriculum growing up. The school when I built in 2015, the school did really well, I just had $3,000. I built a simple building like ECD center. Then the following year, we had like – like the first week, we had 15 kids. We opened in 2016 January. We had 15 kids the first week. Then at the end of the year, we had about 100 kids. The program was doing really well. But then I realized that, building school is really hard and it's going to be really hard to impact as many people as I can building schools, because it's so hard to fundraise, it takes a lot of money.

But what instead I could do is that I could take these computers that are going to waste and try to incorporate some kind of curriculum, some kind of training into existing schools. That's how the organization started. In 2018, we had just collected some computers, and we were flying to Kenya to start a program. Initially, we wanted to get the adults, so get the adults into schools to start using computers and learning programming. Then we quickly realize that actually, kids is where we have traction and kids is where we can have the most impact. I think that kind of gives you the overarching goal of what we're doing.

[00:03:02] KP: Absolutely. Why I grew up in the United States, and I have a very American centric understanding of education. Here, we have public schools and some private schools. I guess there are things you can go to after school or on the weekends to get supplemental materials. What is the typical experience for a young Kenyan going through the education system, and where did your schools fit in?

[00:06:51] NC: Okay. It's pretty similar. We have schools, we have public schools and we have private schools. But most of the schools are just a room, like a room, nothing else in the room. Sometimes we have like stickers on the wall, but it's not as colorful as what I've seen American classrooms are. There's a PowerPoint presentation, these blocks over here. It's very – the American classrooms are very immersive. Then if you look at the schools in Kenya, it's just a desk, a blackboard. And then a teacher comes in and just copy the notes from the textbook to the blackboard. The students copy from the blackboard, to the notebook and then memorize it.

Right? I think the reason it's like that is because it's under resourced. I don't think it's anything particular about the culture, is really about – if you don't have those resources, if you don't have computers, if you don't have enough textbooks, if you don't have all this toys you can use to teach in an unplugged way, all you're left with is a textbook and notes.

[00:07:54] KP: Yeah. I think most listeners know the term digital divide, but maybe not the specifics of it. Can you share or contrast some of the major differences between growing up in Kenya and what you had access to, to what typical or not typical, but I guess, there's no typical American. But maybe on average, what a person from the United States has access to.

[00:08:14] NC: Yeah. I think – so what I've – what I've seen here is that you actually – when you go through school here, you have touch typing classes at fifth grade, right, You start having touch typing classes at fifth grade, right? We start having touch typing classes – I mean, I did not –

[00:08:29] KP: Pretty early, yeah.

[00:08:30] NC: Yeah. You're learning how to touch type, and then you also have presentation, like you, you make PowerPoint presentation, sometimes you do documents. Then you have a computer lab that you go to. I know not most all schools have coding, which is a newer thing. But in terms of just using computers and the elements of you using computers for research, using computer for creating a portfolio, you already have that as part of your learning from what I assume. I didn't go to school, I wouldn't know.

But in Kenya, especially in rural Kenya, all you have is just a textbook, and sometimes it's a professor's textbook, a teacher's textbook. That's all you have, you have a textbook and the professor comes into the room and just take some notes, just notes on the board. You copy that and then you have an exam, right? It's not practical, you're not making presentations, so you're just learning basic sciences, English, Math and then Kiswahili. In terms of – you really don't have – it's just a textbook. That's how far we have gotten, is just a textbook. That's our efforts with TechLit Africa, to bring computers into the lab. I mean, to bring computers into the school. It's so important because, again, the reason it's like that is because we don't have – we don't have the resources, nothing. Nothing specific about that.

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What we are doing is that we are bringing computers and with computers, you can actually have all these resources, you can have – you can even go as far as having VR, and you can do simulation for what what you need. It's such an easy resource to redistribute, and kind of covers like 90% of what you will need in a class. Let's say you want to learn about pollination, you can find a video on a computer and watch that. You want to learn about – you can do unplugged activities with block-based programming on a computer. You can see how to make videos, and design and PowerPoints on a computer. It's almost brings the class to life when you have a computer, even though you don't have all the other resources that I see American schools have.

[00:10:43] KP: What about Internet connectivity? What's the infrastructure like?

[00:10:46] NC: That's a really good question. I think imagine that, instead of having Internet all the time with you, imagine you had at 7:00 pm every day, you could get 500MB of data for $1. You're going about your day, doing something, no Internet whatsoever. Then at 7:00 Pm to 8:00 Pm, you have 500MB. That's really – people know the value of the Internet. They have it, but they don't have it on their hand all the time. What it looks like is that, at the end of the day, after doing your job, maybe it's construction, maybe it's kind of a techy service. At the end of the day is like watching the news, you're unwinding on the Internet. So you spend $1, you only have one hour with 500MB. Then most of the time, that 500MB, you're just going to use it to watch – catch up on social media and I don't know what else. Just be on social media, or TikTok or Facebook Lite.

Most people, they get the Internet through their mobile phones, it costs about $1 for a GB, but it's only – it's not unlimited, right? It's $1 and it's only for a period. You can get $1 for 24 hours, right, but it's going to expire. Or you can get 2GB for one hour, and it's going to expire. What that actually means is that, it's really hard to use the Internet to produce. It's really hard to use the Internet to learn. Let's say you want to learn guitar lessons, for example, or you want to learn programming, 500MB is only what? Two YouTube tutorials. It's really hard. Then imagine downloading NPM and all these things. Most people are mostly using the Internet for just social media, right? Then what we are trying to do is that we are trying to provide people the means of production. So that learning how to build a brand, building websites, social media marketing, we

are trying to provide people with these skills that they all need, so that they can justify spending 10 times that they're spending on the Internet, because they're going to make as much.

Most of the time, it's just mobile data like you would have on your phone. No one has home Wi-Fi, but it's slowly starting to pop up that people having home Wi-Fi. But mostly, it's just mobile data, and it's limited in terms of time and are limited in terms of the bundles, like 500MB or 1GB of data.

[00:13:22] KP: Then how do you contend with that in the classroom? Do you have connectivity there or do you face similar issues?

[00:13:27] NC: I can paint a picture of how we do it. What we do is we go into schools, into existing schools, and we tell the teachers or the schools to give us a room. They give us a room, and the room already has electricity wired up, sometimes you bring in the furniture, there's already security and we bring our own computers. Our computers already have – already have its own operating system. This is a modified Linux version. We have modified our Linux desktop to be more intuitive for the kids, and then we have our curriculum in it. We don't use the Internet because it's very expensive. What we do instead is that we curate the data that we serve in the computer room.

In the computer lab, all the computers are networked. We have a server, and then the server contains all the lessons that that we need. What we are teaching the kids is, we are teaching them the skills that they will need to be productive online. We don't need the Internet to teach them about touch typing. We just build a React app that they can learn touch typing from that. We don't need [inaudible 00:14:38] them about coding. We have Scratch and we have other block-based programming. We have some videos that we downloaded from the Internet that they're using. Most of our skills go around. It's mostly self-efficacy, motivating the kids to learn about – just be motivated to learn on your own and then also using the skills, using the programs and the apps that we're putting together in our operating system.

Like one of them is another React app that we call Social. The main thing of the React app is to get them to learn how to represent themselves online. Think of MySpace, you're building kind of like your profile, and you can modify your profile with HTML, you can chat with other people.

Our program is mostly really on the skills as opposed to the Internet itself. We just create our own data and our own lessons.

[00:15:33] KP: The classroom experience you described earlier, where the textbook is the whole of the technology, you present it, take a quiz. It's quite different than to sit in front of a computer. How do the children take to it?

[00:15:44] NC: Oh, they love it. They really love it, because it has everything in it. The coolest thing is that, we do start with – most of the kids we were working with have never seen a computer before. So we just start with the basics, they're just learning how to use a mouse. Then the next thing that we do is that we have a multiplayer, supertax game, which is like Mario Kart and the game is networked, so they're able to race with each other, create server, some of them joining as client, and they're able to chat. Like on the lobby, they're chatting with each other. To them, this is the most exciting thing of their day, they love it.

When they come to this room, they're in charge of their own learning. We're not lecturing them, like what they used to in the class. They're coming in and they're just playing a game. That's very early in the beginning, they're just playing a game with their friends and learning about chatting and typing. Then even when we go on to touch typing on our React app, the reason we built our own application is because we want to keep iterating on it. We want to see what's working, what is not working. Even the React app is gamified, and so we have leaderboards, we have different badges, and then they can also compete with each other. We're leveraging – when they're coming in, they're coming in as a group, so 20 kids into a room. Then we're just leveraging the social aspect of it, so they are all coming in, and they're all having so much fun together. They're all competing with each other. It's their favorite thing of the day. Most of the schools that we have gone to have increased attendance tenfold, like most kids sometimes will miss school. But ever since we – if we come in and build a computer lab, and we run our computer lab, they just come to school every day.

[00:17:31] KP: So you guys are a nonprofit, and a lot of nonprofits try and quantify. Do you have any metrics along these lines? It seems like a small investment of giving a computer has this, I don't know, tenfold or x-fold improvement in educational experiences? How do you measure the efficacy of the project?

[00:17:49] NC: Both myself and my co-founder, Tyler are both software engineers. We have the opportunity – our operating system, we are building it. It's Linux, yes, but we are building it. We have logins. We can track – I mean, without identifying the kids, we can track what games they're playing, what they're struggling with, how much progress they are making on touch typing. Also, the coolest thing on top of that is that we have our own teachers. We opted to get community members from the area, people who just graduated high school or graduated college, and we train them intensively how to run these classes. They're going through the process of learning touch typing, learning whatever, like 3D modeling from Blender. And they're the ones who are in the class every day with the kids, seeing the impact, seeing how the product is working. Then at the end of the day, when we have stand up, they're able to give feedback and we're able to iterate on the product.

We are spending time with the kids every single day from 8:00 AM to 4:00 PM, and every two days, we are seeing the entire school. It's really easy to track. Is our touch-typing application working? How many kids are learning to touch type? How many kids have made past the home row? How many kids are using their pinkies? How many of them are comfortable using a computer? And then when we go on to do coding, how many kids are able to – how long does it take for a kid to build an application and also play that game? In terms of impact, we have worked with 4,000 kids so far. We have been to 10 schools. Then those 4,000 kids can comfortably type and they can comfortably build an application on Scratch. Right now, we're trying to explore 3D modeling.

[00:19:40] KP: Where do you source the machines from?

[00:19:43] NC: Normally, we work with companies. I started with asking my previous college, Augustana College. I started asking them to donate some computers. They had some, and they donated it to us. My previous employer too donated a few. It's mostly just asking people around, mostly IT people, what they do with their own equipment. Then when we take the computers, we go through – we have partners where ITAD businesses, and then other ones, sometimes we go through the process of wiping the data, or they do wipe the data. Most of the times, we're mostly asking corporations and IT individuals in those corporations what they're doing with their old equipment. Then it turns out, on average, most companies upgrade their computers around

every three years. We're just building partnerships and telling them that instead of your computers going to waste, if you give it to us, we can extend its lifetime over in Kenya.

[00:20:44] KP: Yeah. I know a lot of companies – I don't have any stats on this. But as far as I can tell, the biggest categories to label the old machine is E waste, and it's actually a problem. How can we turn that problem into an opportunity?

[00:20:57] NC: I mean, I think it's really sad. I mean, sometimes it's just easier because you have all this equipment, you don't know what to do with it. Most of the companies are scared of their data on the hard drive. So they just get a company to come over and take it. They pay some money, have a company takeover and then some of those companies may – I don't know how they work. But I think we're only recycling 11% of – last I checked, 11% of E waste. It's a really big problem. It's a really big problem environmentally. If we can be able to extend the lives of those computers, and some of them are like computer from three years ago is not bad. It's actually really good.

[00:21:34] KP: It really is, yeah. I know, there are a lot of IT people listening, maybe some of the decision makers or people that report to them. A concern I'm imagining for if, you know, I went to a boss and said, "Hey! I think we should give our computers to this organization" is, like you say, well, we've got the data on there, how can I trust it's going to get wiped, and we're going to protect our customers privacy and all that." How can you set somebody's mind at ease in that regard?

[00:22:01] NC: I think it depends on the level they're coming in at. ITAD businesses, which stands for –it's slipping my mind, what it stands for. I think it's IT Asset Disposal or management, or distribution, something like that. Then what they do is actually, they are audited, right? They have their own track, they come in, and they pick up the computers and then they already have all the compliance certificates. And they go in and they actually wipe the data, using some – you can use Shred, you can use different things how to wipe the data. These companies already have the compliance. Most companies, if they're worried about that they could contract one of our partner, ITAD businesses to come in and do that. But that comes in at a cost, because this ITAD business are doing that for you. Some companies, fairly most IT companies, they actually okay doing their own data destruction, which is just running Shred commands and writing

random bytes on a [inaudible 00:23:00] four times, five times. That is good, actually. I think that's good.

Most of the companies that we've gotten computers from, they've actually opted to do their own data destruction. Some other companies, they just take the hard drives, and then they give us the machine without the hard drives. It just depends on what their biggest concern is, and what level they're coming in at. Some companies, we have done the destruction ourselves. Did the destruction ourselves. It just depends on what level of comfort or level of assurance they need, but it is a problem though.

[00:23:35] KP: Earlier, we'd said three years ago was not an old machine. I have to confess the one I'm currently using is about eight years old after a newer MacBook failed. I had to go back to an older MacBook.

[00:23:45] NC: Oh, I see.

[00:23:47] KP: Yeah. I had somebody in the new – we had three of the new ones fail, so I rolled back to my own. It seems like there's a range of technology you could accept and still make use of. Is there a minimum people should consider? What's the minimum viable machine, they might want to pass your way?

[00:24:01] NC: I think we don't have that yet. Because as part of this, we also want to be good citizens. Because we are in the in the sector, and we know how to recycle machines, and we know how to – like who partner with. We take all the equipment really, and then we go through and try to see which ones we can use and which ones we can recycle. Then for the recycled ones, we just find some recycling firms who would do the recycling for those that we cannot reuse. I think it's enough to worry about if you have a computer, let us know. Like just reach out, let us know and we will know where to put them.

[00:24:35] KP: Do you face any challenges amongst the variety of machines? You might get different CPUs, different hard drives memory. There's so much options and seems like there's lots of things that could come your way. Does that pose any challenge for your software?

[00:24:50] NC: No, because it's Linux. I feel like Linux is very accommodating. And then it's just depending on what applications that we are running. We have some really old machines, like some from 2005 that are still in our computer labs, and they're just working fine. For those machines, we know what applications not to run, or we just encourage the kids not to open like three applications at once.

[00:25:15] KP: Makes sense, yeah. Can you talk a little bit about the supply chain challenges? Once you've got these machines donated, there's a lot of steps before they're there in the schools helping students?

[00:25:26] NC: Oh my God. Well, first off, when we started, we used to put all the computers in our bags. We will just put all the computers in our luggage and ship it over to Kenya. Every time, we'll try to call all the airlines and be like, "Hey, how much? What is your lithium restriction? How can we –" That was quite a challenge. Then we went on to try to import the computers ourselves. We found a freight forwarder go through the import process. That was really expensive, because Kenya has 25% charge on used computers, because they want to reduce, they want to discourage people bringing in all the equipment, and then dumping them there. We have tried to really get a waiver because we are nonprofit, but it's really hard. It's understandable why they have that charge, because we don't want to get all the US in the country.

Our biggest efforts, really, when we are fundraising, it really goes towards just getting the computers to Kenya. We're not even fundraising really for a salary or for – it just really – like our biggest expense, almost like 80% of our cost is just importing the computers over there. The biggest challenge is that, most donors don't understand that, right? They'll be like, "Well, we're giving you this much money, so go pay the Kenyan government to help their kids." And you'll try to explain to them, it's not really the Kenyan government, it's really just the system that we don't want to have US in the country. And it really makes sense to have that ruling in place. That continues to be our biggest challenge.

Recently, we found a company that actually handles all the inputs, and all the inputs, and the logistics, and all we have to do is ship them, let's say, the laptop to their office in Texas, and then they get it over to Kenya within nine days, which is pretty neat. If you are listening, and you

have some computers, you can actually – if you're going to get them over to Kenya, you can just ship into our consolidator in Texas, and then within nine days, we can get it to Kenya. The cost for that is about $50 a laptop, because they charge per pound. For every two pound, it's $12 dollars. That's the one we're going to work with. But then if you're looking at 2,000 laptops, then it ends up being about 100k. It still also adds up. The biggest challenges has always been getting the computers there. Even if we were to get the computers in the country, get the computers in Kenya, the cost is really high, because these computers are being imported anyway, so someone else – you're covering for someone else import cost.

[00:28:09] KP: Right. Yeah. I mean, these are some big challenges. I hope you have success with that exemption you'd mentioned. That sounds like a very well-intentioned law for which you should be an exception.

[00:28:19] NC: I know. Right. Yeah. It's just hard. It's hard to – because they don't really actually make any exceptions. We have really tried. I think there's one time where the government tried to import tablets for the offices. But even the government couldn't get an exemption. We're not too optimistic there.

[00:28:41] KP: When you look at your roadmap, I assume maybe growth is where you want to go, you have a nice system that could be scaled up. What are some of the barriers along the way that you're facing?

[00:28:50] NC: What I'm really proud of right now, is that we have really talented people on the ground. We have 20 teachers right now who are showing up every day in the classrooms and helping the computer labs run. I think one of our biggest challenge really is adaption, which will be surprised. Because most of the schools, they don't understand what the value of the computers are, right? Most of them say, 'Oh! It would be nice for kids know how to use the computer." To them, it's really hard to describe that it is such an amazing resource. This is a resource that can actually help flip the whole community out of poverty, because someone just started making $8 an hour on the Internet, instead of making $4 a day is such a really awesome wage in their community and most of them don't believe us.

I mean, I don't know. It's just really hard to get some – they don't have a mental model to map this too, right? Because the job they're used to is – if you're really successful, you're a doctor, or a teacher or something like that. To tell them that these kids can, when they grow up, they can start creating value and they can start producing value from the Internet. They don't get it. When we go into schools and we try to work with them, it takes a lot of convincing to get them to do it. That's one challenge that we're constantly trying to find ways to overcome. Another challenge is that, for every school we go into, we are adding two teachers. We're adding two teachers that we are training. If we're looking at 100 labs next year, then we are looking at about 200 teachers. With every headcount, there's always a lot of challenges. I have really appreciated HR recently, I mean, I really see their value now. I mean, it's just – you never realize just how much work it is to handle that many people. If we're going to 10x our growth, it's going to be really understanding how – I don't know, it's seems like a lot of work.

[00:30:55] KP: Is that the goal? I mean, sometimes you just want to have good value help you provide to one community and that's exactly what an organization should pursue. What's the appetite?

[00:31:04] NC: I'm really ambitious. This work is very stressful. This is my life's work, and it's my life's work, I want to complete my mission when I'm still alive. If I just get one community to start making money online, that doesn't fix the systemic issue that we have in the continent. When I look at all the systemic issues that we have. Poverty, for example, I grew up in poverty and I know how undignifying it is. I cannot stand the idea that, even though my community is fine, there are thousands of communities out there in the continent that are still suffering. I've seen that computers, technology is just an easiest – because when I think about systemic poverty, and that's what we really have in the continent, I really think that the reason is like that is because of the systems that we have.

If we look at banking infrastructure, for example, if you want to get a loan to improve your business, you are looking at that 10% interest rate. That is with only one month grace period. That is insane. No one is going to get a loan for that. Then if you say you have a small business selling tomatoes, and you want to distribute your tomatoes to other markets and other people, then we have really bad roads, and you can't guarantee that your tomato is going to get to the market. Then let's say you make some profits from your small tomato business. You're just a

woman in the village selling tomatoes and you want to start growing, you're rich. Any profit you make, there's a whole community waiting for your money. Someone got sick, you need to help with that. Your kid needs to go to school, you're helping with that. There's a funeral fundraiser over here, you need to help with that.

It's really hard to even grow as a business, and I think that what makes communities thrive is having this middle-class level, right? Most people who are not entrepreneurs being able to work and earn a living and sustain their families. If you look at most of the companies in Kenya, it's mostly – really so many small businesses, like really, really small, like almost like a lemonade stand kind of small and then big companies. There isn't as many middle-sized businesses. It's really hard to overcome the systemic changes, because systemic issues that are keeping most of the communities poor. To fix that, we need to have better banking system, we need to have better infrastructure, we need to have Internet connectivity. That is a lot of work. That is so hard to do. That requires a lot of investments. But on the other hand, if we look at computers, all you need is just a computer with some connectivity and you can start making money online. You can start accessing all these companies that are online. There are so many companies online that you could work for than there are jobs in a specific place. Even San Francisco, I'm sure there are so many jobs online and there are jobs in San Francisco.

The good thing with this is that anyone can take part of it, anyone can do this. It doesn't make sense to me to spend all these efforts, very stressful work to just get my community to be able to do this. But I can get all the communities in Africa to do it. What are really trying to do is that how can we scale as fast as possible so we can rewrite stories of kids who are growing up the way I did? How can we rewrite our story? Then also, how can we make sure that my story and my generation was the last, that we are not going to be the continent that is always the last. If you look at vaccine, we're the last. If you look at [inaudible 00:34:47], we're the last. If you look at something else, we're the last. It can't keep going on. I see this right here, distribution of tech is such an easy solution to address all these systemic issues. I won't sleep at night knowing that I'm only doing this for one community. I might as well just – I don't know. Just don't do it.

[00:35:11] KP: Yeah. Well, the lack of middle-tier companies, and the lack of a good banking investment scheme seems like another area to tackle this. If it's your lifelong mission, will you

eventually need to open a bank? Or can technology be a way to cut around the bank and plug directly into the global economy?

[00:35:29] NC: Yeah. That's the goal, is that it's going to be really hard to open a bank and to start giving people easier loans. Because then, you have to think about the credit system that – it's all really hard. But then, really, all you need – I think, all you need is a computer, right? I am a software engineer, and I can work from [inaudible 00:35:48] or I can work from Chicago. I can work from in rural Kenya or I can work anywhere in the world. The other thing that we are doing is that we are working with these kids, it's part of their lives. We're not talking prior that it's only showing up in the summer, or once a month, or something like that. When these kids go to school, every single day, they're learning something that's going to help them in their tech career. Be it programming, collaborative learning, building a brand. They are learning all these things. So imagine that, when they are graduating high school, we want them to be able to get a job as a software engineer at Google, or as a designer on Netflix. Because we are getting the chance – because they are learning this all their lives, and they are getting the best learning experience and it's something that they're growing up with.

I think that if you graduate high school over there in Kenya, and you get a job at Netflix as an engineer, making even, if it's 70k a year, that is a lot of money and that goes a long way. Then maybe you can make a lot of money and can become an angel investor there. That is a different problem. The whole idea is that people who get a chance to start working, especially on the philanthropy space, they already have all their issues in their life not covered but in a comfortable place. It's going to be really hard to get a Kenyan who's just struggling to make food at night to start thinking about helping their community or tackling financial infrastructure there. But if you're working at Netflix from [00:37:23] in Kenya, and you're making enough money, and you're comfortable, you have some savings, then maybe you can tackle a different problem.

If you can get past the basic poverty, the poverty that is actually affecting people's way of living, then maybe you can have more people fighting different problems, different issues in the economy. For me, it looks like such an easy investment to make, so that the next generation of people in the continent don't need aid. They can go on to work on other global issues. Climate change, whatever and all these other things that we have.

[00:38:01] KP: Well, to hear that there are people who would take $4 a day as wages. It's kind of unsettling to me. It's not a world I'm familiar with.

[00:38:10] NC: That's actually on the high end. Some people just make a dollar. Some people don't even make any money.

[00:38:15] KP: Wow!

[00:38:16] NC: Yeah.

[00:38:16] KP: But then with sites like Fiverr, that you mentioned and Upwork. I mean, Fiverr gets its name from a $5 task. I use Fiverr a lot, and I wouldn't pay five for anything. I got to pay at least $10 or I assume it's not good. For one task, I can give you 10 days wages, it's easy for me to be the backseat driver and say, "Well, like sure, this is a great idea. Let's do it." Why isn't that someone who would take $1 a day, it seems like the Internet or a site like Fiverr could be totally transformative for them? What are the blockers stopping them?

[00:38:48] NC: They don't have the skills. Remember, most of the people in my community and communities like mine have never used a computer before. Because they're not digital natives because they grew up in a system where they're just using textbooks, learning about all these things from textbooks. Graduate high school, cannot maybe go to college, use a computer a little bit to type of an assignment, and then that's it. Then they go back to being farmers or go back to being a taxi driver. The issue is that they don't have the skills for them to be on Fiverr, because on Fiverr, you need someone to help you with email marketing, SEO marketing, social media or even a website. They don't have those skills.

Even in the beginning, when we tried to kind of just get the youth who are just being taxi drivers in the area, get them to start building websites, we couldn't get them to do it, because there's a lot of – if you've never seen a computer before, or if you've never worked on a computer, it's really hard for you to go from never using a computer before to start making money online within a month. And then also, having to worry about what you're going to eat that night or your family's going to eat that night. That's why when we go to kids, and we focus on kids, is that we

have their own lifetime. Like from when they're seven years old when they're 18 to just kind of make them digital native, teach them all these skills that don't exist in the area.

[00:40:14] KP: When students come to the classroom for the first time, how many of them has their first interaction with a computer?

[00:40:20] NC: 99%. It's so hard to paint that picture. There isn't any. Even when we talk to the high school, the teachers in the schools, when we talk to them and tell them about the value of the computers, they don't believe us, because there is no mental model. There's nothing they could map into like, "Oh! This is what they could do." Even when we were working with adults, and trying to get them to, yes, trying to get them to build a website, WordPress website, we just – we then pay a programming with them, and we're telling them. All they kept saying is that, nobody works for the Internet. For them, the Internet's the employer, nobody works for them. They just did not believe us. It didn't matter what we said, they just did not believe us.

It takes a lot of education, it takes a lot of patience, it takes a lot of trial and error to show that this is possible. But there really isn't – it's not – I don't even – imagine like no experience whatsoever, and then the people who have the Internet. They spend most of the time, you have to pay for. It's very expensive, because you're paying per MB or per GB and then you only have it for one hour. You're only using it for social media, mostly and then you're done. You won't be using the Internet to learn a skill or try to produce something.

[00:41:41] KP: That makes a lot of sense. That time pressure is something I fortunately never had to face with my Internet access. Well, that's not totally true, not for many, many years.

[00:41:51] NC: Right. But I mean, even back then, when data was really slow, no one was really learning. Right now, you can just learn everything, and you can learn anything and start producing and make money online.

[00:42:01] KP: Absolutely. Well, let's talk about different ways people can help. We've touched on one and that's giving machines. Can you share some more explicit instructions? If I'm an IT manager with a warehouse full of things I'd like to get rid of, how do I get in touch with you?

[00:42:14] NC: You can reach out to me or my co-founder, Tyler from our website. From my website, my email is on there or you can reach out to me on LinkedIn, I'm very active on LinkedIn. We're very responsive too, so if you reach out, we can figure something out how to get the computers over either to Texas, or to us in Chicago or straight to Kenya. That's one way people can help with computers.

Another way people can help, especially the listeners is that, if they can make an investment monthly. So for example, if they can donate $50 a month, so we have – on our website, we have an option to donate monthly, so it's part of a group called the network. That kind of investments and just make sure that the teachers that we have on the ground are getting paid, because we pay them a good wage to be able to teach the kids and be able to focus on just providing the best education for kids. Also. we pay for them to be trained. If you're making a donation of $50 a month or $100 a month, you're guaranteeing that one school is getting TechLit access a month. Or if you make a donation for one year, you can see that one school is getting TechLit access for one year, and you're impacting about a thousand kids. It's really, really, really big impact.

Then also, most people are not ready to come in at a monthly donation, make a onetime donation. Most of that money either goes towards running the operations on the ground, which is the teachers, make sure that the teachers are able to get paid and run the computers every day, run the classes every day. Or it means getting the computers over to Kenya so that we can get the programs running. We also accept crypto donations. That's something that we are currently supporting.

[00:43:55] KP: Is there a third option? You mentioned describing like the React game you'd built to teach children how to type. Is there enough opportunity for a software engineer to volunteer their time and help with your Linux stack and all the software that goes out?

[00:44:08] NC: Oh, yes, yes. Yeah, definitely.

[00:44:12] KP: How would someone reach out?

[00:44:14] NC: I think, obviously, just through emailing and just communication, because we have different things going on. We have LDAP for our login system and the Internet server. We

have some different React applications to run in the in the rooms. We have our website that you see, our TechLit website that is mostly React and Rails. Then we also have a donation management system. So just depending on what excites you, we have projects for everything.

[00:44:44] KP: Very cool. Nelly, I really like what you're doing. I support the project. I wish you the best of luck and want to continue seeing what you do. Let's talk again at some point on Software Engineering Daily.

[00:44:55] NC: Sounds good. Thank you, Kyle.

[END]