Dr. Alex Bandar

Annalies Corbin: [00:00:00] So, welcome to this episode of Learning Unboxed. I'm very excited today, actually, to have with us our guest. It's Dr. Alex Bandar. I am truly, truly honored and thrilled, actually, for him to be here because Alex is, first and foremost, an awful lot of fun and one of the most brilliant folks that I've had the privilege to both meet and work with.

Annalies Corbin: [00:00:24] Just a little bit of background for Alex, he is the Founder - and my favorite part of this - the Chief Mischief Maker at the Columbus Idea Foundry. And Alex is an engineer by training, serial entrepreneur, a startup guy, general roll up your sleeves and solve the world's problems entirely tied to this crazy idea he had a bunch of years ago around let's help people make things and inspire the world. I think that's the best part of the endeavor. So, I'm really excited to have you here. So, welcome.

Dr. Alex Bandar: [00:01:05] Thank you very much. And a bald man has a lot of face to blush. So, thank you for making me blush with that.

Annalies Corbin: [00:01:10] All the way to the tips, that's what we aim for here. So, one of the reasons I was so excited to have Alex with us today is because there is so much chatter, so much chatter in the world about what we should really be doing as we think about the next generation of teaching, and learning, and the whole idea about work, and what work is. There's so many different ways we could go with that.

Annalies Corbin: [00:01:36] And what really intrigues me and is exciting about this is that there is also been, over the last 10 years, but, really, I would say the last five, in particular, in the world of education, folks got enamored with this idea of making and being makers, and that we should have makerspaces in our schools. And I really want to dig into that because I have some pretty strong opinions about this, and I know that Alex does too.

Annalies Corbin: [00:02:06] So, before we moved to the big, giant endeavor that is maybe the world's biggest makerspace, let's talk about the smaller versions of it that actually lead to the next conversation about the community version, which is really where I want to get. But let's talk about this idea of informal makerspaces in traditional education settings. There are some intriguing pitfalls in that space. And I know you've seen a number of them and got to live with them over the years in your own work. So, let's talk a little bit about that. So, when schools have this notion that we need to have

this thing, because everybody else has this thing, this giant makerspace, what do you think about that as somebody who lives makerspace?

Dr. Alex Bandar: [00:02:51] Yeah. I think they're right. I think people owe it to themselves to learn a little bit about - I'm preaching to the choir - project-based learning, critical skills, being empowered to realize your own ideas, whether it's an art project, a retail product, or an innovation. And I was struck when I was in engineering school. We, often, had a lab or an engineering exercise, which was designed to replicate an outline on a piece of paper that someone had done before and before them. And it was pretty dry. And for someone who has even the slightest bit of creativity, being empowered to have a few tools and a few rules, and then being shown how to use them and how to break them is a whole lot more fun.

Dr. Alex Bandar: [00:03:33] So, after I graduated college, it occurred to me that there might be a more fun way to learn technology, and I really wanted to see if it was possible to trick kids into learning tech through hands-on functional artistic projects, things like kinetic sculpture that moves and interacts, so you learn a little bit about sensors, and motors, and programming, and fabrication.

Dr. Alex Bandar: [00:03:55] And, actually, my turn to embarrass you now, Annalies. When I first started, I thought this would be a great way to teach students, K12 groups, how to engage with the democratized culture of the maker movement. And so, I rented a small garage. And I thought maybe we could be - You know where I'm going with this - the center of a ring of schools that all wanted their own makerspaces and fab labs but couldn't necessarily afford them or didn't want to manage the people, or the equipment, or the liability. And so, I thought, "Hey, wouldn't it be a great partnership if the schools taught design to the kids, and the kids brought their designs on a flash drive, hopped on a bus, came to our shop, and we build their parts for them."

Dr. Alex Bandar: [00:04:37] And you were one of the first persons that was recommended to me to reach out to. And I brought you in proudly to this 2000-square foot, dusty, dark, humid place with broken glass, and a milk crate, and extension cords. And I said, "This is the future of STEM education." And you said, "No way in heck. We can't bring kids here."

Annalies Corbin: [00:04:55] I remember that. I do remember that.

Dr. Alex Bandar: [00:04:58] Yeah, and that was, honestly, a really important lesson for me. Friends tell you what you want to hear. Good friends tell you what you don't want to hear. So, that was -- I think, that laid bare the challenge that I had, which was there are these amazing resources in YouTube, in open source software, and cheap, powerful 3D printers, but a chasm to cross to be able to apply that to the institutional needs of core curricula of actually making sure students are learning something of value. And I think that's what you've been nailing for the last 20 years. So, glad to be part of this conversation.

Annalies Corbin: [00:05:37] Yeah. No, absolutely. And I do remember, vividly remember the first time I visited with you in the original Idea factory. And that was exactly I remember saying, "Schools will never come here."

Dr. Alex Bandar: [00:05:51] Yes. I think, I actually toned down your language for radio.

Annalies Corbin: [00:05:56] Oh my goodness. But that does -- It's a great place for us to circle back around because although many schools wouldn't come there, sort of the next kind of iteration in the journey on the way to the big, giant endeavor that you're living right now is that we did, however, see a spark ignited locally and regionally because of the work that you were doing around just really trying

to get kids, and families, and community engaged to the opportunity to be creative and just think very, very differently.

Annalies Corbin: [00:06:35] And so, one of the initial responses to all of that, especially as funding was changing a little bit at that time -- I mean, Ohio is, of course, now, changed again but it's power for the course -- was the schools started to imagine makerspaces of their own to sort of bridge that gap, not on the same level of sophistication. And so, what we saw, which became somewhat of a national movement and to some success but, also, to some mishap in the sense that what happens is that teachers will come along and want to have this great makerspace. And to your point earlier, not always going to have a massive amount of skills, certainly not across a full spectrum of the ability to make. And then, that teacher leaves. And then what happens?

Annalies Corbin: [00:07:20] And these fabulous makerspaces, oftentimes, never find their way into the culture of an institution in schools. And not that we're advocating, by any stretch, the imagination not to have fab labs and makerspaces in schools. They're really, really wonderful, but they have to be deliberate, and they have to be part of the core rather than just an add-on.

Annalies Corbin: [00:07:41] And so, then, that gets me sort of back full circle to if you make the choice either to do it on a small scale or to not do it at all in your school, but rather do it in the community, that is truly where I see the amazing opportunity because what happened at the Columbus Idea Foundry is an entire ecosystem. So, share with us just a little bit about -- So, the version now of Columbus Idea Foundry, let's talk about what that thing is and can do.

Dr. Alex Bandar: [00:08:12] Sure. Well, so after that very important lesson about 10 years ago, I was glad to pivot a little bit, especially since, as you pointed out, the community actually raised their hand. The community largely of adult artists, creatives, entrepreneurs, and techies, they said, "Hey, we want a clubhouse. We want a place to learn and work." And so, I did tack a little bit and became a facility to help, like I said, folks who might have a day job but wanted to tinker with a 3D printer in the evening, or someone who is aspiring to quit their career, or a recent college graduate who didn't want to buy their own tools or have their own wood shop.

Dr. Alex Bandar: [00:08:49] So, we became a center for creative and techie adults. And that has resonated, I think, with the techie and creative community in Central Ohio largely because we used to teach wood shop, and machine shop, and metal shop in our high schools. So, now, you have a generation of people like myself who have no less desire to create than we did since we emerged as people on this planet but don't have the native language for design, fabrication, innovation.

Dr. Alex Bandar: [00:09:17] So, a lot of what we do isn't really class-based education. We're certainly not providing certifications. We're giving exposure to people about these cool tools. And then, we're serving as digital Sherpas to point the way where they can learn more online. And that has served us well for 10 years. We've grown, moved a couple of times, bought a nice, large warehouse in the emerging neighborhood of Franklinton. And so, by multiple metrics, we're one of the largest and most active makerspaces in the world. Almost 70,000 square feet, 800 members, about 400 small businesses.

Dr. Alex Bandar: [00:09:51] And because this culture is so fun, learn welding in three hours, learn woodworking in the weekend, digitally sculpt something in virtual reality, and then print it a couple hours later, that, I think, does appeal to institutional educators who want to bring that culture to their students. And now that we do have a safe, hazard-free, air-conditioned event space and classroom space-

Annalies Corbin: [00:10:15] Completely OSHA-compliant.

Dr. Alex Bandar: [00:10:16] Exactly, right. Thank God. The educational phone is ringing again. So, we're bringing people in. And that's been a whole lot of fun.

Annalies Corbin: [00:10:25] It really is. And I do think that that's a key element because the other thing that we see frequently in the work that we do, sort of, flip side of what's happening at the Idea Foundry, to your point, we're out there actually in the schools working with folks, trying to help them. And we, often, will bump up to the conversation. Especially schools that are working on federal or state grants have this great opportunity. We're allowed to buy some stuff. This is a conversation that we hear from schools and teachers all the time, "We really want a 3D printer. We really want to do the scanning. We want to do video game design."

Annalies Corbin: [00:10:59] And all of those things are wonderful things to do with your kids for a thousand different reasons, but if you can't put them into some type of tangible context, it's just playing with the thing. And so, that's one of the things that I love about the work that you're doing now is that we, now, have a place to send folks and to say, "If you want to do a makerspace, then great. You need not only to learn how to use the tools, but you need to learn to think about the different ways you could incorporate it across everything that you are and that you do in your school." And folks can learn that at the Idea Foundry. And so, that's pretty powerful opportunity for folks.

Annalies Corbin: [00:11:36] The other thing - and this is one of the things that I like about this version of the Idea Foundry - is you can actually go there and learn a whole lot of stuff that's not specific to making because of the environment that you created. Again, that gets to that sort of community space that's happening there. You go there for the folks that haven't been there yet, and we will provide some links, so you can see it online. But, certainly, encourage folks if you're in Columbus, it's someplace you should go see. It's a unique experience. It's a beautiful space, but it's the most collaborative space I've seen in a really long time.

Annalies Corbin: [00:12:10] So, talk about the way that the folks in that space interact in those very unintentional moments but very meaningful moments because that's one of the things that I see happening there all the time. And when you talk with the folks that are living there because they have memberships there, they're going there to be an artist in that moment after their 9:00 to 5:00, and they show up there, they all have a story about the way they've interacted with others there that's really, really meaningful. Do you have one of those stories where those, sort of, synergies happen that you think is pivotal?

Dr. Alex Bandar: [00:12:41] Oh sure. And I think you've touched on one of my favorite aspects of the Idea Foundry, which is the interaction among members who really wouldn't have met otherwise. And some of my favorite quotes, I had one friend who was in the National Guard, local Ohio boy, boy or man, but he said, "Hey, I'm friends with-" let's say, the eccentric glass art lady or the 3D printing geek. Like "I love it. We work together, and I never would've met them any other way." And he had an invention that everyone collaborated on.

Dr. Alex Bandar: [00:13:13] And I think you don't learn anything by surrounding yourself with people who are just like you. And as knowledge becomes more niche or even if we get science fiction about it as AI and software becomes capable of doing rote knowledge-based work, I think, the real innovation will be at the overlapping edges between different fields that, otherwise, wouldn't have bumped against each other.

Dr. Alex Bandar: [00:13:37] And so, having a place which attracts artists, and entrepreneurs, techies, and then the people who make it succeed, marketing people, web development people, business development people, you show them how to use the tools, and then you get out of their

way, that, of course, is a recipe for awesomeness. And I think one of the metrics that demonstrates this is that a few years ago, Make Magazine, which coined the phrase "Maker Movement." They licensed maker fairs. I think they coined the phrase "makerspace." They hosted a few competitions to see which city around the world can bring the most people together to do things like 3D printing, and electronics, and robotics. And about 300 cities competed in these international competitions from New York, to Singapore, London, San Francisco.

Dr. Alex Bandar: [00:14:21] For giggles, we tossed our hat in the ring on behalf of Columbus, and nobody was more surprised than I was when we came in first in the world in most of these competitions. In fact, I think, they stopped hosting them because we kept sweeping them. And our robotics team came in first in the world out of 3000 schools. So, I think, at first, I was flattered to think that Columbus has the best makers in the world. Really, I think we just had a four or five-year head start of raising our flag and attracting those optimistic, hardworking people who think they can learn a new skill, be a better person, a better maker tomorrow than they are today. And by having that head start and putting everyone under one roof, really fun things happen.

Annalies Corbin: [00:14:59] And I think that putting everybody under one roof might actually be sort of a secret in that sauce to some extent because the other thing that I really love about what happens there is it is all about startup mentality in so many ways. So, you got raving entrepreneurs there, folks that are serial idea generators, and a lot of other folks that are all about, "How do I take that idea and turn it into something else?" and everything in between.

Annalies Corbin: [00:15:29] And because you have that environment, it doesn't shock me at all that Columbus would be seen that way in that space because there are very other few spaces, both literally and figuratively, that I think functions like that. And part of that is that culture that is calmness. We live in a really dynamic community where lots of things are possible.

Annalies Corbin: [00:15:53] I, often, joke, people ask me all the time why is the PAST Foundation in Columbus, Ohio. And I used to laugh and say, "Well, we have an airport." But that is not truly the essence of it. That's a means to an end. But the reason that we're in Columbus, and we've decided to build the innovation lab there, is because this is a city that's all about trying new things. It's part of the fabric of who we are. And we see that in the Idea Foundry as well. So, let's talk a little bit about - So, this past summer, we went on a journey together, another journey together after all of those years of me maybe not being very nice to you.

Dr. Alex Bandar: [00:16:26] I didn't say that. It was the most helpful lesson I've had, I think, in those 10 years.

Annalies Corbin: [00:16:31] That is a very generous way to say that. But we went on a journey again together. And I think maybe this sort of ties those components back together as we, in our work, are thinking about how do we help kids find their passion. One of the things that we know, we often talk to teachers in schools when they're struggling with implementing or shifting to a problem, or inquiry, or a project-based environment, we ask the question, "What are you passionate about? If you could do anything and teach anything, what would it be?" And we're always - And I do mean always - shocked by what we discover of people's passions. And that same principle applies to kids. So, we sent kids for several weeks this summer to the Idea Foundry. So, tell us a little bit about that experience, and sort of what you learned from them, and how does that then inform what you might be thinking about next.

Dr. Alex Bandar: [00:17:28] Yeah. That was one of my favorite things I've ever done is to work with the students who sent us. And I'm also someone who likes to have boots on the ground, and to be surprised by the devil's in the details. It's easy to design a curriculum, and then hand it to someone

else, and say, "Okay, go teach this." And I learned a lot working with your kids. And I loved the phrase "Find your passion" because, I think, if you can help people find what they love, what they're good at early on in life, then they can take a deep dive and really become an expert at something, make a career for themselves, or a hobby they love, and it's fun the whole time.

Dr. Alex Bandar: [00:18:04] I have to chase down this quote, but I heard once that people who are typically referred to as geniuses, early on in their careers, didn't produce on average better work. They just produced more of it. And by producing so much, you throw everything at the wall, and see what sticks, you find what you're really good at, you find what resonates with either the market, or the scientific community, or society. And then, you jumped on that. So, imagine if you can do that at 15 instead of 50, that's a heck of an advantage.

Dr. Alex Bandar: [00:18:30] So, by teaching what we call Theory-Light and Practice-Heavy Classes, I hesitate to even call our three-hour welding experience a class because, yes, you learn how to weld. Rather, you weld. It's hard to say -- Like I said, we're not certifying folks. You'd be hard pressed to boast that someone could then weld anything they wanted after just three hours. But it is enough time to say, "Do I have any talent or aptitude at all for this? Did I like it? Did I like being confined in the helmet? Did I like putting the jacket on? Did I like trying to balance my hand above the sheet of metal to get that perfect bead?" And if, so great. And we can point you to avenues to continue that. If not, that's a valuable lesson too. Now, maybe you enjoy virtual design more or creating music.

[00:19:19] So, by having a week or two where you can learn 5 to 10 new things in a one-hour, two-hour exposure, and then pointing people to where they can take a deeper dive - Thanks again to information online, much of it free - then that gives kids and adults a big advantage.

Annalies Corbin: [00:19:38] Absolutely. And the kids, the kids love going there. I mean, that was the highlight of their experience. We heard about it every time they came back in terms of the things that they were working on and they were doing. And I think that, to your point, the thing that resonated the most with them was the fact that it was in small, doable chunks, and that they always had an opportunity to try, to fail, to try again, but to also, again, have that opportunity just to say, "I don't really think that that's such a great thing for me," or "I really love this thing over here." And so, the kids were pretty funny as it relates to the opportunity.

Annalies Corbin: [00:20:18] The other thing that we heard repeatedly from the kids -- And just for the sake of our listeners, this is a group of kids in urban settings. In this case, kids in the foster care system. So, their lives were somewhat hectic. I think, it's a fair way to put it. Lots of challenges but incredibly resilient folks. Wonderful group of students that we had to spend our time with. And they love the chance to make something. They love the opportunity to sit down and do something to completion.

Annalies Corbin: [00:20:54] And when we really started to dig into that, one of the things that the kids made reference to is, "I don't always get to finish things that I start because circumstances may come along, and I'm not even going to be able to finish." So, that was pretty powerful. What do you think, were there lessons that came from the kids that translate directly into the way you will either do programming differently or the way you think about what Idea Foundry does?

Dr. Alex Bandar: [00:21:19] Sure. So, you mentioned that the students enjoyed the small, bite=sized experiences. And that is born from both necessity. Frankly, from our business model, like we don't provide one or two-year long programs. We're not a community college. We're not really a school. I joke, we've invented a school where the answer to every question is Google it. And it is that presumption that knowledge is out there, and that education is no longer about information transmission from one teacher's head to 5, or 10, or 50 students. Instead, it's providing a survey of

the landscape, letting people get their hands or their brains dirty, and then allowing the students to find what they like, what they're good at, and pursue that further.

Dr. Alex Bandar: [00:22:00] So, I think, this does reflect an evolution in how the nature of knowledge and education has changed in the last 10-20 years, markedly from -- Who was the first Director of the Department of Education for the US? And I think you had a quote like, "We need to produce students like a factory makes nails." Just all the same, all to the right specs, and as quickly. That might have worked in the Industrial Age and the Manufacturing Era. Now, we need people who can think of things and do things that robots and software aren't great at. And that is innovating. That is thinkers that do, doers that think.

Dr. Alex Bandar: [00:22:39] So, by providing the tools, letting people play with them, and then going home with something, I think, it gives you a sense of agency in the world. And that's one difference maybe between entrepreneurs and folks who pursue more career-based or corporate-based jobs is that entrepreneurs look at the world, and I'll say, innovators look at the world as malleable, shapable, that they can influence it. They're not just an actor constrained to the guardrails, but they can think of a new road. They can think of a new way to do things.

Dr. Alex Bandar: [00:23:09] And, certainly, one of my favorite learning moments was when I wanted to teach 3d design. So, sculpting with a laptop using this free program called Sculptris. And you could, then, take that design, and 3D print it or machine it. And I picked this really cool -- You can't see my air quotes -- really cool dragon head that I thought, "Who wouldn't like to sculpt and paint this dragon head?" Turns out none of them did. And so, they're kind of bored with it.

Dr. Alex Bandar: [00:23:34] But most of the kids had smartphones, and I downloaded a free smartphone case that you could include in the sculpting software, and then personalize. You could carve your name, you could put your favorite celebrity's face on it, you could do this or that. And this one student really took to it. And then, once you had that 3D file, I showed that you could bring it to a website called Shapeways, upload it, and in an instant, get a quote for how much it would cost to print, and have it mailed to your place. So, you can actually realize these things even if you don't have a 3D printer yourself and shape ways that it would cost $18 for this one student's 3D printed case.

Dr. Alex Bandar: [00:24:14] And a light bulb went off, and he said, "I'm going to ask my friends if I can do custom designs for their phone cases. And then, if Shapeways says it will cost $18, I'll ask them for $28." And that's still in the mid-range of a smartphone case at Target or what have you, but I'm pretty sure that guy a week earlier didn't think, "I'd like to start my own custom 3D phone case printing company."

Annalies Corbin: [00:24:34] Whoa. And that student was so intrigued by that idea that that student asked me if I needed a new phone case. So, that idea resonated clearly. It clearly resonated. But I think that you sort of hit on what I think is probably one of the most tangible issues that as we think about the future of education that if we don't get this piece of it right in the next iteration that we're going to find ourselves in lots of trouble.

Annalies Corbin: [00:25:00] And that was the whole idea of learning and willingness to learn. I have a great colleague, Heather McGowan, who spends a lot of time talking about learning, and relearning, and the willingness to learn, that the true next iteration of the future of work is, in fact, learning that no longer can we just re-skill ourselves and retool for the next job because of everything that's happening in a technology-driven world, that we really have to be that thinker, and willing to learn so many new things rapidly, and be able to apply them. And I think that, at the end of the day, that's going to be a really big thing. And it's easier to learn to learn by doing.

Dr. Alex Bandar: [00:25:44] Sure.

Annalies Corbin: [00:25:45] So, I think that there's a lot of application there. So, as you sort of think about what this looks like, and you're having conversations around helping other communities create Idea Foundries, so what does that process look like? And I'm not talking about the nuts and bolts but, at the end of the day, the fabric of the community and the collector of users is highly essential, as well as all the lessons learned that you've been able to accumulate over the last few years. So, what does that conversation look like if a community wants to do something along those lines in terms of -- There's a lot of landmines there. There are a lot of attempts at this that have failed. Why is the Columbus Idea Foundry, Alex Bandar's version of this movement, why does this one work?

Dr. Alex Bandar: [00:26:34] That's an interesting question. And I think one pivotal decision 10 years back was our business model. Originally, I wanted to start an educational 501(c))(3) that taught students technology. And I remember mentioning this to my old commercial landlord, Marvin Katz, and I explained what I wanted to do, and he looked at me, and he said, "What's wrong with making a buck?" And I thought, "You know what, nothing, especially if you're effecting a socially-forward mission in an economically sustainable way, then you've won."

Dr. Alex Bandar: [00:27:06] So, I think, our feet have always been held to the fire at the Idea Foundry in terms of providing value that people are willing to pay for. So, that has kept us very agile, very lean, very responsive to what the market wants. And by market, I mean, creatives, techies, and entrepreneurs. So, that has kept us very tightly tied to our community.

Dr. Alex Bandar: [00:27:31] And, also, because this is an awkward business to start with high capital costs, and high insurance, facility costs, it really started as a volunteer program. So, we had lots of people who really feel like they have ownership over the culture, and they do, and because that has resonated with the community of Columbus. And I think you're right, it is a startup town, it is an innovative space, very diverse, lots of tech, lots of education, lots of retail, a very good mix. I think it's allowed us to grow in a market where -- I have friends who run makerspaces in San Francisco and Boston. Real estate prices are different that's another reason Columbus is a good place to be located.

Dr. Alex Bandar: [00:28:12] So, there are a number of, I would say, lucky happenstances of perfect storm. Our recipe is, maybe, imprescriptible. So, people come to me and say, "Hey, Alex. I'd like to make a makerspace like you did." I say, "No, no, no. You want to do it a lot smarter than we did. We did lucky." So, when we worked with folks, to your point earlier about what is the broader ecosystem, or community, or mission instead of the nuts and bolts, why does a neighborhood need a makerspace or a culture of creation?

Dr. Alex Bandar: [00:28:41] And I love Professor David Staley at OSU. He likes to say that, "Columbus, rather than aspiring to be like our other peer cities like Pittsburgh, or Portland, or Austin," he'll say, "We'll never be more Portland than Portland, so don't even try. Instead, our aspirational cities should be Renaissance Era, Florence, Italy where you have the town square where you've got artists, and guilds people, and apprentices, and merchants all working together, all collaborating, sometimes accidentally."

Dr. Alex Bandar: [00:29:09] And I love that vision of an intentional neighborhood where you've self-selected people who are those artists, those creators, those entrepreneurs. And so, if you do have a makerspace as the anchor, you have coffee shops and restaurants that people want to hang out in, you've got residential spaces, that, I think, is an innovation neighborhood. And, I think, it's also a lifelong learning neighborhood. So, it's not just a place where people go to school, they get their degree, they pick their career, and they do that for 40 years. I think, as you said, that's probably done.

Annalies Corbin: [00:29:39] It's over.

Dr. Alex Bandar: [00:29:41] Yeah, yeah. So, instead of taking the heavy lift and asking yourself every few years, "Do I go back to school? Do I get a certificate at a community college? Do I try to struggle with an online course in my living room?" Well, now, there's actually this entire community of people who subscribe to and embrace this culture of solo learning or, rather, continued lifelong learning. And it's actually social and fun too. So, that's what I'm trying to see spread to other communities that want the same thing.

Annalies Corbin: [00:30:10] Yeah, absolutely. And I think that one of the other really sort of intriguing components of all of this, and I hesitate to say opportunity, but, I think, at the end of the day, it probably is that sort of opportunity space. Let's circle back around to how we started this conversation as it relates to makerspaces in schools because it's still a point of great conversation about putting these creative places, whether they're innovation labs - there's a lot of conversation around that - makerspaces, fab labs. It's a return in many ways.

Annalies Corbin: [00:30:47] So, in the late '90s, early 2000s, we started taking shop classes out of schools all across the country and around the world in favor of CAD labs and things like that to be more modern. And I think that what we're finding collectively is two things. The first one is that we created an entire generation of folks who can't build anything - great designers, architects, engineers -- who industry certainly tells me frequently, "But these folks don't understand why it can't be built the way they designed it." It's never actually built. So, I would argue that that is a key foundational component that anybody looking to change what's happening in modern education, it should be a foundational piece. If you can imagine it, take it all the way to build. I can advocate for that.

Annalies Corbin: [00:31:39] The other piece of it -- And so, this is really where I'm hoping that you have some great insights for us is that, again, we build these spaces, but that great teacher that loved the thing, who was the builder, who was the idea generator either stays, and lives out their career, and it's a wonderful experience, but there's no one to come in and take their place, or they leave for variety reasons, change their profession or career, or they're recruited by other schools that recognize great teaching. And so, they don't stay in these places. These spaces become stagnant because they're not part of the fabric. So, we have to find a way to not only engage our students but engage our teachers and our community to live those spaces in a traditional education setting. So, what are your thoughts on that, Alex?

Dr. Alex Bandar: [00:32:29] Yeah. Well, this is where I was really grateful to partner with you and the PAST Foundation on this foster student camp over the summer because you're right, a few schools will get a grant from wherever, and they say, "We've got the money. What tools should we buy?" And you have to say, "Well, let's take a big step back. What's the purpose of the space? What's the programming and overlay on top of it?"

Annalies Corbin: [00:32:52] Exactly.

Dr. Alex Bandar: [00:32:52] Because there have been, for a hundred years, textbooks on Algebra, and Chemistry, and Grammar. I don't think there's a textbook on 3D printing yet. There isn't a commoditized or productized curriculum, at least, as far as I'm concerned or aware of. You probably have a better sense of the landscape where if you have this space and these tools, this is the programming you should teach in there. And it is very case-by-case and passion-driven by the person who has a stake in it.

Dr. Alex Bandar: [00:33:21] And I think we're really at the spirit tip here in terms of I might have a sense at the Idea Foundry of what the tools can do, and what our adult community like. You certainly

have a sense of what the schools need, what value the students need to be able to walk away with. And this is - I say this affectionately - the Wild West now in terms of opportunity and a frontier to really make an impact.

Dr. Alex Bandar: [00:33:44] And so, when we chat with other schools that want fab labs, or innovation labs, or makerspaces, often now, I have mixed emotions about this replacing their library. Then, we have this, "Well, let's take a step back and ask what it's for." And with respect to your comment about the workshops being replaced with computer labs or CAD labs, I recognize that. And there's a great book, Shop Class as Soulcraft by Matt Crawford, who talks about this. And, in fact, an incentivized phenomenon to get them out faster because it's actually cheaper than a machine shop.

Dr. Alex Bandar: [00:34:18] I think you need both. Of course, you need the designers and engineers, but, I think, progress happens like the pendulum swings too far one way, and we're feeling it's swinging back now. So, I think, with a little bit of hindsight, we can see where, institutionally, we might have missteps, and, looking around the corner, what value we need to bring to students now and the future. And, I think, that's an exciting opportunity for the next 10 years to work together.

Annalies Corbin: [00:34:46] It is, absolutely. And I think that to sort of go along with that sort of trend in thinking about space as that mechanism for how we imagine teaching, learning, and work, in my mind, certainly. And I know this is me preaching to the choir, so to speak, is that the schools should be a place of community. We need to stop building schools for the sake of building schools. That's part of my mantra, I guess, my soapbox because that's not the real world any longer. We don't have that sort of isolated opportunity that business and industry makers, artists, entrepreneurs, startup folks, all living in that space with us makes the best opportunity to learn. No question asked. So, I think that there is great opportunity in that sort of Wild, Wild West sort of space.

Annalies Corbin: [00:35:36] So, for folks who are contemplating sort of the next piece of their journey, and many of our listeners are going to be folks that are intrigued in redesigning community, which includes school and includes a lot of workforce development, there's lots and lots of conversation about that, what might your parting shot to them be as they stand on the precipice and say, "I think we should do X"?

Dr. Alex Bandar: [00:36:04] Well, I can say one thing we're doing is reaching out to industry proper, and asking them, rather than guessing what I think they want and say, "Hey, what skill set do you want your graduates to have when they walk in the door?" And, sometimes, that's much too specific. And that's what trade school is for. That's what a certificate program is for. But, I think, simply undergoing the process of making something from mental image to sketched-out concept, to CAD model, and then assembling the materials, and building the thing, and maybe having to do these two or three times. I don't know the name for the lessons you learn other than grit, and stick to it, and not being able to predict the problems that will emerge.

Dr. Alex Bandar: [00:36:48] It is easy to 3d design something, and then just assume a 3D printer will make it. And there are even things you can design that a 3D printer can't make right now. Well, thickness, these are too thin or materials not strong enough. So, the lesson you get from building something and watching it fail. And it's becoming cliché to say, fail faster, fail better, don't be afraid to fail. That's the truth. And I wish there were a word - maybe you can think of it right now - where the emphasis is on the experience you've derived from the unexpected problems that come from taking something from concept to execution.

Dr. Alex Bandar: [00:37:23] And we don't just call it failure. Call it the delighted surprise of those unexpected problems and how you worked around them. So, having them, a number of projects. This is why I have the natural intuition of somebody asks me to make something, I immediately double the

budget and triple the talk just because I know it's not going to go the way you think. And I think that's the real value people get from making stuff.

Annalies Corbin: [00:37:47] Yes. So, absolutely. And I think that as we step back and think about failure, it's really that success for the next opportunity, right?

Dr. Alex Bandar: [00:37:53] I like that.

Annalies Corbin: [00:37:55] Yeah, absolutely. So, thank you very much, Alex, for joining us today and for being a chief mischief maker. We greatly appreciate you in the community of Columbus but, also, appreciate the work that you've put into getting folks to think about making very differently. So, thank you.

Dr. Alex Bandar: [00:38:15] Well, my great pleasure, and flattered, and honored to be on your podcast.