

TRANSCRIPT

Learning Unboxed



Episode #311

Michael Finnegan

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You gotta take just passively accepting information out of the equation, and you gotta put the student in the driver's seat towards building up their own information.

Annalies Corbin:

Welcome to Learning Unboxed, a conversation about teaching, learning, and the future of work. I'm your host and chief goddess of the PAST Foundation, Annalies Corbin. We know the current model for education is obsolete. It was designed to create fleets of assembly line workers, not the thinkers and problem solvers needed today. We've seen the innovations that are possible within education, and it's our goal to leave the box behind and reimagine what education can look like in your own backyard.

Annalies Corbin:

Welcome to today's episode of Learning Unboxed. As always, I'm super excited to talk with another great innovator in the transformative education space. And joining us today is Michael Finnegan, co-founder and CEO of Quantum Courses. So, Michael, welcome to Learning Unboxed.

Michael Finnegan:

Thank you, Annalies. Thank you for having me. Excited to be here.

Annalies Corbin:

Yeah, absolutely. And before we set some context for our listeners, we're really gonna be talking about two things here. So, one of them is around micro schools or micro learning environments, whatever phrase that you want. We're gonna really talk about everything from that lens. But Michael's work in Quantum Courses, just to set some context for our listeners, is a self-paced science lab courses taught through the lens of history. So, I particularly love that. Thank you for that.

They ship a supply box students log in, and then off and running with 50 hands-on experiments per academic year while following in the footsteps of the greatest thinkers and scientists in history. And the result is more labs, less prep for teachers, and students who see themselves not as passive consumers of old scientific ideas,

but as the actual authors of the next chapter of discovery. That alone, take that and internalize it, love the way it feels and let's kinda go from there.

So, Michael, also note that you're a co-founder. My listeners know I love to talk to founders, and I always ask them, the first question is: what were you thinking? Because founding anything is really hard. So, let us start with the, sort of, why this thing and why now?

Michael Finnegan:

Yeah, great question. I did not enter into Quantum Courses intentionally or with a grand plan a long time ago. I was actually a... I started out as a public school teacher. I had a graduate degree in science, and then just happenstance began teaching at the public schools in Oakland, California. And I saw how dysfunctional the system was. And I'm a scientist, and I was pretty good with kids. But there was these infrastructural barriers to me, who knows what good science is, delivering this good stuff to these interested, curious kids in front of me. Testing equipment limitations, time limitations.

So, I left that position, and then I got a job at a Montessori school. And this was really the inflection point in the thinking and what would end up as Quantum Courses because I was sent, thankfully, to Ohio at one of the national Montessori centers for a month, just immersed in Montessori, Maria Montessori pedagogy and her writings and her thinking. And I was like, "I found the answer." I was so enthralled with just learning that there's this amazing lineage in the history of our profession, the education profession, where there are thinkers and there's these thinkers believe that all children can enjoy and have fun and be stimulated, and there's purpose and meaning to learning.

So, I just internalized that whole Maria Montessori's whole ethic. I've since realized that there's other thinkers and philosophers of teaching. And then, continuing to teach, I just saw that these beautiful, wonderful ideas of these thinkers are just... it was such a contrast between that and what happens in most schools especially... and I have this background in science, like I said, especially in science. Science should be just fun, like just wall-to-wall fun. It should just be explosions and Matchbox cars and throwing things, and it wasn't like that. So, how could I make science exciting like it actually is and pull in all of these great theories of learning?

Just one other thing. The first avenue to do that was summer camps because there's no regulatory bodies. You can do anything you want pretty much. And that's when I realized, "Okay, there's legs to these ideas," like sort of the synthesis of these ideas. And I knew it because I was like, "Oh, let's just do something crazy." And that's why I designed a course on quantum physics, of all things, for middle schoolers.

And all I did was walk them through the history of the experiments that were done in the 1800s, and these are simple experiments you can do in your garage. And this is all that Niels Bohr and Albert Einstein had to go on to build up what we now see as the planet, what everybody knows as the sort of planetary model of the atom. They just guessed. There's a series of experiments that our kids did. And on the last day of that summer camp, these thirteen-year-olds, just regular thirteen-year-olds like, "Michael, does this mean the atom looks like this? Does this mean electrons do this but not this?" And they didn't know... none of these kids knew who Niels Bohr was. They would just look at their data, and the data says, "Here's what has to happen." So, that was, sort of, the seed of the idea of quantum courses.

Annalies Corbin:

And I really love that. And it's really interesting because also as a founder, right? And same thing, you start with those simple things. You start with the things you know, right? So, I'm an archeologist. My listeners know that, my background and training. And so, the first things I'm gonna do, the first things that I'm gonna teach are gonna be based on that. We're gonna do a dig. We're gonna do a dig in a box. We're gonna go down to the local community. We're gonna... whatever it happens to be.

And so, we have this tendency to start with those things, and it's perfect, right? Because it's (A), what we know, but more importantly, we also tend to do it in that sort of out of school space time, that space that's unstructured, that's unregulated, that allows us to go and actually try the thing, so that we can see is there any merit whatsoever to the experiment.

And so, I'm actually not surprised to see that you're thinking about it like that and that's how it progressed because it makes total sense to me that that's exactly what would happen. So, I appreciate that.

So, let's take that then and pivot and help me, from your perspective, understand what is this whole concept or this idea around micro schooling or micro learning environments, and why is it so important to you?

Michael Finnegan:

I realized once I then took these summer camp experiences and figured out how to literally bottle them up and empower others to do the same thing, and even more importantly, non-experts to deliver science to their students or at their schools or where I work with a lot of homeschoolers as well. So, I was able to figure out how to bottle up this summer camp experience essentially. And so, you introduced the idea of quantum courses as we send physical kits to families and schools.

And then, I saw that the only sort of institution or group of people that would be interested or could institutionally use this were folks in a permissionless school environment 'cause they weren't designed around a sterilized set of standards. They were designed around what good science should and can be. And micro schools just beautifully, most micro schools, and certainly all home schoolers, have the freedom to just choose what the best product is or the best curriculum is, not encumbered by, a sterilized set of checkboxes that kids have to go through in a sort of a meaningless way.

So, it just fit with the ethos of micro schools, where the idea is like, let's do what is best for the kids. And micro schools have what I call institutional flexibility to be able to do that; where most public schools and even many of your elite private schools, they have what I call institutional inertia. They can't just pivot and do what's better. They have their way, they have their rules.

Annalies Corbin:

Bureaucracy's tough to overcome, even in a small environment, right? If you've got a lot of structure, it can be really, really difficult. That inertia, it's powerful.

Michael Finnegan:

Yeah, that's right. And I think that's probably the key advantage of micro schools is that's the whole point of a micro school is this agility to take in any student from the neighborhood and design, design a learning experience for that student. So, with this flexibility, it was just a natural fit between like what I had to offer and what they need. So, that was the entryway into the micro school world.

Annalies Corbin:

Yeah. And I think that one of the things that I was really intrigued by in the materials that you sent over ahead of our conversation was the fact that you said that you often think about how the micro school movement can mature and become more durable. And I really wanna dig in on that because I appreciated that statement more than you could possibly know, right?

So, let's talk about what does it mean. What does it mean for this micro learning environment? I'm gonna make this shift away from micro school to more micro learning environment just because it more generalized for our conversation. It's more encompassing of lots and lots of different sorts of types of models, and I want all of our listeners to feel like it applies to them. And so, what do you think it means for that ecosystem of learning to become more mature and durable over time? What does that mean to you, and what's it gonna take to get us there?

Michael Finnegan:

Yeah. So, I've thought a lot about this. And I don't run a micro school. I work with and support hundreds of micro schools. And I've supported public charter schools, and I do work with a couple public schools and lots of home schools. So, I see all these different faces of the American education world. And so, yeah. So, like I was saying before, micro schools have this flexibility to do what is best for their kids.

So, yeah, so to your question, the real answer to your question after looking at these multiple faces of the education world is there's a risk. There's still a risk. Even though the micro school and home school learning environments are growing, there's still a risk, a social risk for parents to say, "I'm gonna pull my kid out of the public school or this private school and send them to a room in like a retail, a micro school in a retail shop or some house that, a mom or dad runs a micro school up the street." There's a risk in pulling your kid out of these traditional institutions.

If they don't do well there, that's the system's fault, it's not the parent's fault. But if they don't do well at a micro school down the street, the parent made this deliberate choice. And so, the parent has that social risk of choosing a micro school that, to date, hasn't been... It's growing, it's not gonna stop, but it's sort of relative to the other options out there, it's still a fledgling system, and it's not fully rooted yet, ready yet.

So, how do you de-risk this? One way is to have academics that have been proven, kids are engaged, there's ways to show that they're learning. And so, you basically de-risk the choice parents make. This, for many parents, is a radical choice to say, "I'm gonna homeschool my kids. I'm gonna take my kids out of the system that's been around for a century or more." That's a radical step for many parents to take. How do you de-risk that? Well, you gotta provide and outfit micro schools with the core sort of curriculum infrastructure that they can run, programs that are proven effective. So, parents can say, "Yeah, at least I know my math and science are covered over at this micro school. In fact, they're probably gonna be a lot better than what the public school might offer them." So, that's the idea. It's basically a de-risk. How do you de-risk this choice for parents?

Annalies Corbin:

Well, and I think that ultimately there's always risk. There's risk in all things, right? And so, we can't eliminate risk but to your point, we can lessen some of that risk. Let's talk a little bit now about, sort of, the philosophical standpoint. As you were pulling together what became Quantum Courses, you made some interesting strategic decisions, right? Because you could have offered science curriculum in a box, so to speak, in a very traditional sense, and yet you made a pretty substantial pivot to do it

differently. So, talk to us a little bit about the sort of why you made the choices that you made, and then we'll talk about what it all is.

Michael Finnegan:

So, that came out of the fact that I had good grades in math and science in high school and even college, but when I left college, I realized I didn't really know calculus or deep science even though I did well. So, it's almost an obedience which led to doing okay in school. But then, in my twenties basically, I dove into the history of science and history of math, and I saw how all these ideas that seemed so abstract to me, I saw how they started from basically nothing.

And so, really, the approach is it's really a radical first principles approach. How do you build up ideas from nothing? In science, it's just really the window or that what I did is I just stole from history. I just researched how scientists organically and authentically build up ideas from nothing but their lab work and data and observations alone. And that's the essence of the pedagogical approach is what if kids had the same experience where, 'cause basically, third, fourth, fifth, sixth, seventh graders, relatively speaking, they don't know too much in science, but they too could just do one experiment.

That's one piece of information. Then, there's another experiment that was done in history that our students could do, and that's two pieces of information. And the idea is they literally build up the canon of modern science through their own lab work. And so, that's the origin or the philosophy. And of course, we see it just activates all kinds of modes of thinking, of memory recall, synthesis. It's important for students to collaborate, engage in social interaction. What's your data say? Here's my theory. That theory doesn't seem correct. What about this theory?

So, just without much effort, it pulls kids into precisely what scientific thinking is. So that was the base of the... the origin of the idea of the pedagogical approach. Really, it's a radical first principles approach.

Annalies Corbin:

Why do you think that pedagogical approach works better for most learners?

Michael Finnegan:

Most learners, even more today, but I actually believe this is always true, can't listen to a teacher at a whiteboard for more than a few minutes.

Annalies Corbin:

None of us can, even adults, right?

Michael Finnegan:

That's what I'm saying. I think the phone or, mobile technology has made that worse, but I can make the case that it's never been that... there's never been, like, a long attention span at 11:30 in the morning for any kid to be looking at a whiteboard watching it... hearing a teacher talk about density or balancing chemical reactions. You hear those two words and you're almost bored.

But as soon as you activate... as soon as you get the hands going, and of course it's designed to follow the arc of history. But of course, the first few experiments of every sort of module are exciting. And there's this universal appeal to fire or an explosion or things moving or things popping, especially for third, fourth, fifth, sixth, seventh graders.

So, that was my thinking around why it works. You gotta take just passively accepting information out of the equation, and you gotta put the student in the driver's seat towards building up their own information. And then, they have agency, they have autonomy, they build up a sense of competence. And so, all these things that actually go into intrinsic motivation, which is really what the holy grail of education is. How can you get kids to want to do something? Put them in the middle of a story that is suspenseful, and they wanna know what happens next. Empower them to be competent, empower them to lead, and then learning then just happens in an unfettered, continual way. And so, you're not forcing kids. It's not like science time, it's not like science class, it's not like lecture. That's the theory of why this works with kids.

Annalies Corbin:

Yeah. So, I'm super curious. You know, I get that this was tailored specifically to those micro-learning environments, home schools, that sort of space. But I can't imagine that you don't hear from schools, from more formalized programs that are also interested in this pedagogical shift, especially to your point, in those earlier grades where there is the flexibility and opportunity to build on this sort of growing scaffolded knowledge. Because at the end of the day, that's a lot of what you're talking about, right? Is by getting these kids curious and intrigued and really loving this early on then, even as they get to the drier moments later, which we still hope aren't truly dry moments, right? But we also know that's the reality sometimes. But they have the persistence, the desire to persist through that moment because they love science so much. So, do you hear from more formal or traditional environments talking to you about what's going on with Quantum Courses?

Michael Finnegan:

Yeah, that's a great question. Sort of the next thing or, we talk about the different faces of the education world that I will engage in is the charter schools. So, they're

one step more flexible than your large district schools. There's slightly less of a committee mentality. There's slightly more institutional flexibility.

And the one big thing, and then so this is the next project for Quantum Courses, and of course, my hope is to serve all kids in charters, public schools, micro-learning environments, of course. So, the next project is to map... They just need content that's standards-based. And so, Quantum Courses does hit all the standards, just in a different way that would be unrecognizable to a local charter school science teacher or just a regular generalist teacher.

And so, the next project is to basically map the standards, NGSS, Next Generation Science Standards, onto Quantum Courses, so that charter schools can be confident that, yes, they are standards-based. And it would just be a rearranging of stuff because the standards do cover all of the things kids should know just in a, sort of, sterilized meaningless way, I'd say.

Annalies Corbin:

Well, that's because we believe it has to be linear, and what you and I know is that is not the case at all, right? All those standards, they're great. It's fine. It's all the stuff you wanna know. The order doesn't matter typically, right? And so, we can bunch them, and regroup them, and regroup them again. And typically, in less linear learning environments, what we find is if you really map standards across a collective set of experiences tied to a topic or a theme that we're working on, those students are actually going to experience, learn, touch that standard more times in a non-traditional pedagogical approach than they will in the linear or traditional pedagogical approach.

And so instead of experiencing that standard one time, I might get it three or four times. And by the time I get to the end, not only do I understand it, but I can apply it to something completely different now.

Michael Finnegan:

So true. NGSS, the Next Generation Science Standards, is way better than the standards they replaced in, this is like 2013 or '14. There's a set of what's called SEPs, the Science Engineering Practice, which are all really good. So, NGSS kinda gets that. The problem is... - And these, these science engineering practices are like, building theories from data, asking questions, mathematically modeling experiments.

So, they get it all, but the issue is, if you look at the NGSS, like if they get actual book, it's like a thousand pages. So, no teacher already sweating it out every day in, day out can be like, "Okay, I'm just gonna take a few minutes and read this thousand page." So, the issue is it drowns teachers in so much information that I think it's hard to

deliver with fidelity. So, yeah, so we kind of-- Once we map it all to that, teachers will be... especially, public charter, school teachers can be confident like, "Hey, we're covering this standard, we're covering this standard, we're covering this standard." So, to your earlier question, that's the next thing for Quantum Courses is to reach out to charter schools and say, "Hey this could work for your kids too."

Annalies Corbin:

And the reality is crosswalking is not really hard, right? And to your point, that's definitely something you can institutionally do. You can do it really quickly anymore. AI helps us do that. Next Gen Science Standards, they're already preloaded in, right? Makes it super simple. It's honest to goodness. This is not an epic lift, but it will overcome a barrier that you identified, which is a very true barrier. So, thank you for raising that up.

Let's talk a little bit then about the way you've broken Quantum Courses up, because I found that to be pretty intriguing too, right? As an anthropologist and social scientist, by training, I'm very familiar with the collective set of standards across all of that and the way that it's traditionally bucketed all together. So, you broke it out a little bit differently. So, talk really briefly, if you would, about how you've broken the sort of sets of themes out.

Michael Finnegan:

Yeah. So, these are fairly intensive production efforts to build one full-year course that has all the proper scientific equipment, the beakers, glassware, electrical equipment measuring devices that's safe. And I even have a couple parameters for every single experiment like a couple like design parameters. So, they gotta be relatively safe. The results have to come within a minute. You can't be waiting around like twenty-four hours for some interesting thing to happen. It has to be meaningful, so it has to flow within the scope of the curriculum.

And so, designing all these experiments is an intensive process. And so, to date, there are two full quantum courses that are available in the market. One is called The Story of Chemistry, and one is The Story of Physics. The Story of Life on Earth is coming out next. These are all middle school courses. Eventually, we'll build down to third or fourth grade and then up through high school. All the content exists. It's just, again, bottling this into a series of experiments that can be run easily in micro-learning environments in charter schools, public schools.

So, those are the two courses right now. The Story of Chemistry, which walks kids basically from before chemistry was even a word, the 1600s, up until basically the late 1800s. And it's just basically up past the periodic table of the elements, which is, in my

opinion, the greatest achievement in all of... top five scientific achievements in all of science, maybe the number one in chemistry. All the matter in the universe just put on one piece of paper that makes scientific sense is remarkable.

So, kids walk up-- and actually, by the way, deviating from your question, but the beauty of this is like most kids walk into like high school or even a middle school chemistry course and see the periodic table of elements, and that's where the course starts. So, teachers basically steal all of the history of chemistry. The periodic table is, like, basically not where chemistry ends, but it's the culmination of two or three centuries of work. So, we build up to that. And then all of chemistry is, again, it just empowers the student to be like, "Okay, all of chemistry is mine now. I'm the author. I can apply it and use it, and I can have fun with it."

The other one is the Story of Physics, which starts with Galileo. He was, really, one of the first, certainly in terms of intensive documentation to systematically run experiments on physics ideas. So, it starts with Galileo, of course, goes through Newton, and ends with something I was talking about earlier, ends with the ideas of none other than Albert Einstein and Niels Bohr in our conception of the atom. So, that's the Story of Physics. Again, just beyond riveting.

So, even if you just don't do the experiments, it's just a fascinating story of human struggle, human debate, drama, intrigue, even just... Or in the chemistry course, we meander and... but in the physics too, we meander into politics. Benjamin Franklin was a scientist. Joseph Priestley was this treasonous Englishman who supported the American Revolution, even though he was from England, was run out of England by a drunken mob because he supported the English crown... I mean, because he supported the American Revolution. So, these stories are all just part of the experience of the story of, of these courses.

So, yeah. So right now, the Story of Chemistry, Story of Physics, Story of Earth and Life is coming out soon. Those will be the three middle school courses. Then, we'll build down to elementary and up through high school.

Annalies Corbin:

I love the narrative meandering right as part of this, and the opportunity for students to really figure out that, hey, I can explore and study science, and I may be truly intrigued by science, but I may be some of that other stuff that intrigues me even more. And because it's built into it, I get the opportunity to even contemplate, think about that, spend a little time noodling on that, which oftentimes gets completely, to your point, separated out.

And so, I appreciate that so much. That is the beauty, that is the beauty of transdisciplinary learning. And so I love that you've rolled those pieces and parts together. It's so much more authentic for the student because the reality is science never, ever happens in isolation.

Michael Finnegan:

That's right. And the lives of these scientists were, oftentimes, tragic. There's a great story in one of the chemistry labs, she was a female basically a maid of a scientist in Sweden who when the scientist – his name was Jons Berzelius – would leave, she would voraciously subversively read all the materials in the lab. And she in her own right became just as amazing and good as a scientist as he was. And eventually they started working together, and there was a little bit of soap opera drama there too, which we touch on in an appropriate way.

But yeah, there's these great stories of these individuals who had no chance of ever... who had limited opportunities, but figured out a way to make some great contributions. So, there's, yes, a lot of inspirational stories in there as well.

Annalies Corbin:

I love it very much, and that's exactly how learning should be. So, Michael, I wanna thank you very much for taking time out of your day to chat with us, to talk to us about your work, about Quantum Courses, about the way you think about micro-learning environments, and the power and value of really spending deep, thoughtful time exploring stuff.

And I love that you've made the work of science for middle school students, in particular, so inclusive and all-encompassing because we lose a lot of kids in that middle school space, right? They decide, "This is not for me. I'm not a math person. I'm not a science person," whatever that happens to be. And the reality is all students can be all things, right? And we just need to figure out where their interests, their passions lie, but they cannot do that if they can't spend time exploring.

So, thank you very much for what you do and joining us today, and we will make sure that contact information turns up in the show notes. So, listeners, if you're intrigued by what you heard from Michael please reach out. And Michael, thank you so much for being here today.

Michael Finnegan:

Thank you for the opportunity, Annalies. I really appreciate it. Enjoyed it.

Annalies Corbin:

Yeah. Thank you.

Annalies Corbin:

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