Katie Benton

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Annalies Corbin: [00:00:18] Welcome to Learning Unboxed, a conversation about teaching, learning, and the future of work. This is Annalies Corbin, Chief Goddess of the PAST Foundation and your host. We hear frequently that the global education system is broken. In fact, we spend billions of dollars trying to fix something that’s actually not broken at all, but rather irrelevant. It’s obsolete. A hundred years ago, it functioned fine. So, let’s talk about how we re-imagine, rethink, and redesign our educational system.

Annalies Corbin: [00:00:54] So, for this episode of Learning Unboxed, we're going to talk about a really, really cool, innovative program called BioEYES. For those of you who are serial listeners and we always appreciate that, we actually sort of touched on BioEYES a few episodes ago when we were talking with Jamie Shuda at the University of Pennsylvania. But today, we’re going to get into the nuts and bolts to talk about the program with a teacher and a couple of students who’ve actually lived and experienced BioEYES.

Annalies Corbin: [00:01:21] So, we’re really excited about that. And joining us today is a 20-year veteran teacher, Katie Benton, who is an elementary school teacher at Barrington Elementary School in Upper Arlington, Ohio. And she is involved in a number of different things
within her school and her district, including programs like BioEYES, which she implements in her classroom. So, Katie, thank you for joining us.

**Katie Benton:** [00:01:48] Happy to be here.

**Annalies Corbin:** [00:01:49] And joining Katie is Louise Frederick. And Louise is going to be in the fifth grade next year. She loves to read and draw, including reading graphic novels. Good on you because those are awesome. And she's really excited to talk with us a little bit about the BioEYES program as well. So, Louise, thank you for joining us. And joining Louise is Evren Thompson. Evren is 10 years old, also from Columbus, Ohio, and goes to Upper Arlington Schools and will also be in the fifth grade next year. Evren loves math and he likes to imagine things. And so, that is a perfect opportunity to join this conversation. So, Evren, thank you for joining us.

**Evren Thompson:** [00:02:32] Welcome.

**Annalies Corbin:** [00:02:35] So, I'm very excited to have all of you on the program today. And I would like to start, Katie, with you. Give us the sort of 50,000-foot view of what the heck the BioEYES program is and how, in particular, you got linked up with it because Jamie explained sort of the university's perspective around crafting programming, but we didn't get into the nuts and bolts of what the program is.

**Katie Benton:** [00:03:03] Now, that's a great question. So, we did hear about the program and I have a student in my class, actually, Louise, who is here with us today, and her mom is a professor at Ohio State. And she actually knew about the program. She does some work with Fruit Fly development and she had heard about the program. And so, I have the opportunity to teach my students for two years. I teach them for third and fourth grade in a looping configuration.
Katie Benton: [00:03:27] And so, she had said when we were working during that third-grade year, she said, "I found out about this program. I'm going to see if we can find some funding for it. It's really a fantastic science program with some depth and would be great to try it. It's never been done in the State of Ohio. Would you be willing and would you be interested?" And since we love to try new things all the time and get those authentic experiences, I said, "Absolutely. Let me know what we need to do."

Katie Benton: [00:03:54] And together, we were able to get some funding for the program, but mostly, from Ohio State, some grant funding, as well as through the Upper Arlington Education Foundation for the remainder of the money, and our actual PTO at our building assisted as well. But once we kind of had those things in place, then we got to kind of dive in and find out more about the program and its focus on bringing science into the classroom and hoping for students to have an interest in careers in science as a result, and the ability for them to really get a firsthand experience with genetics at such a young age.

Annalies Corbin: [00:04:29] So, I was completely enthralled with the program when Jamie was sort of sharing it very high level with us. And the thing that I was most intrigued about was that it very, very deliberately put real research in the moment into the classroom. And that is one of those experiences that, oftentimes, we forget how accessible real science in the moment can be if we can figure out how to translate it appropriately into our classrooms.

Annalies Corbin: [00:04:59] And so, Katie, talk with me a little bit about your particular strategy or the applied hands-on PBO sort of strategy that you’re obviously using in your classroom? I’m very familiar with what goes on in Barrington. And so, talk to me a little bit about translating BioEYES into your specific classroom, because oftentimes, that’s the big piece, right? Great programming out there. But as a teacher, you have to make it relevant to the Louises and Evrens of the world or it won't work.
Katie Benton: [00:05:30] Absolutely. So, we really pride ourselves. We work very much with the progressive education philosophy of authentic learning, emergent learning, and all those kinds of things. And so, what was great was that when I taught these students for third grade, life cycles were one of the things that we studied. So, this was a great continuation of what we had done with that and to be able to bring it in and do it in a way that was understandable for kids.

Katie Benton: [00:05:56] And that's what I love about the format of the program. It's really available for everybody. And it also has some differentiation within it because it allows some kids to do some higher-level thinking and to really give a little bit more in terms of their hypothesizing as we do some of these experiments. But every child and we had kids running the gamut of abilities. We did it with 50 kids to start with, with two classes.

Katie Benton: [00:06:24] And it was accessible for everybody, which was really wonderful. And I think the best part, I mean, as you know, with kids, it's that experience, that hands-on, it's that being a part of it themselves. And for the folks who helped us to bring in the zebrafish for us to be able to see the embryos, for us to be cleaning the tanks and all of the things that we did with the Petri dishes, it was just something that I've never experienced in all my years of teaching.

Katie Benton: [00:06:50] And we've done a lot of great hands-on science, but this was really a program that just brought so much, was so well-organized, and was, like I said, accessible for every child in the classroom. And they all left with different feelings about it, and different understandings, and hopefully, different levels of interest in science as they continue in their schooling.

Annalies Corbin: [00:07:11] And that's the joy of those kinds of programs. So, that's awesome. So, Louise, I want to talk a little bit about the actual experience as a student doing
BioEYES. So, from your perspective, what was the best part of this project in Ms. Benton’s class?

**Louise Frederick:** [00:07:30] I really liked doing the hands-on sort of part, and how we got to meet real scientists, and how we got to do it.

**Annalies Corbin:** [00:07:44] What do you think, Louise, was the one thing that you ran home to talk to your family about because it was like just so wickedly cool?

**Louise Frederick:** [00:07:55] I really liked how I got to be first class in Ohio to do BioEYES.

**Annalies Corbin:** [00:08:01] Yeah, that’s awesome. It made you feel very special, huh? Yeah. So, Evren, same question to you, tell me what you liked or what was the most awesome part of the project for you? What did you like?

**Evren Thompson:** [00:08:17] I liked actually being able to have someone bring in real-life, like real, not just studying it, just like actually being able to look at it through a microscope, and it was just really cool doing that.

**Annalies Corbin:** [00:08:38] Yeah. Had you worked with a microscope and real samples before or just seen it in a book?

**Evren Thompson:** [00:08:44] I’ve just seen it in a book?

**Annalies Corbin:** [00:08:47] Yeah. So, that’s pretty cool, huh?

**Evren Thompson:** [00:08:50] Mm-hmm.

**Annalies Corbin:** [00:08:50] Yeah. So-

**Katie Benton:** [00:08:52] Well, and I-
Annalies Corbin: [00:08:52] Go ahead, Katie.

Katie Benton: [00:08:53] Okay.

Annalies Corbin: [00:08:53] Yeah, absolutely. I was just going to say that one of the amazing parts about this was that we have some microscopes at school and we use them for different things, but they're not very fancy in any stretch. And they brought in the high-powered microscopes that allowed us to look at things in ways that we've never seen anything, as well as we're looking at live samples. We've never looked at anything live under a microscope before at school.

Annalies Corbin: [00:09:18] So, I think I remember taking some photographs during the project and the facial expressions on the kids, that look of wonder, that look of amazement, that really is what stuck with me about the impacts that this kind of program could have. And I know that Evren and Louise, one of the things that the kids all loved at the beginning was, they were scooping the fish out. They were getting the male and the female, and they had to set up the tanks, and they had to put them in there.

Annalies Corbin: [00:09:45] And then, they got to do some observations and they learned lots of different things about the zebrafish. And of course, these are real-life specimens with all permissions for us to have them there. So, we worked with those Ohio State professors to be allowed to do what we did at school because there are lots of stringent rules and things for working with research animals and research fish. So, that was another just real fabulous opportunity for the kids that is not something that, I think, happens every day.

Annalies Corbin: [00:10:13] Yeah. So, Louise, did you realize before you did this project that you can't just grab some fish and play with them, that there are rules about it? Because I think
that is a really, really good point that Ms. Benton brought up. Most kiddos have no idea about that. Did you know about that?

Louise Frederick: [00:10:31] No.

Annalies Corbin: [00:10:32] Yeah. And so, when you worked with the fish, and then you got to observe them in the tanks, and then be able to use the microscopes with the project, so what did you see when you looked through the scopes?

Louise Frederick: [00:10:47] I got to see the development of the embryos and how they grow.

Annalies Corbin: [00:10:54] That's awesome. And were the embryos wiggling or were they still?

Louise Frederick: [00:10:58] The embryos were still, but the larvae were swimming around with it.

Annalies Corbin: [00:11:05] Perfect. Excellent. Yeah. How fun was that. So, Evren, when you had the chance to do the same thing and you got to look at the embryos and the larvae through the microscope, what were some of the things that you were thinking about when you were looking at that?

Evren Thompson: [00:11:25] I was just trying to imagine, I was kind of surprised that they are that little and they grow to be like not that big, but-


Evren Thompson: [00:11:39] Yeah.
Annalies Corbin: [00:11:44] Well, let me jump back a bit. So, when you are doing the BioEYES project, how did that project feel different to you from when you do your regular science? Now granted, and I’m not being fair to Ms. Benton because I suspect Ms. Benton’s class is rocking and rolling all the time because you have a pretty darn cool teacher anyway, but what made the BioEYES a little bit different for you than your everyday science and classroom?

Evren Thompson: [00:12:15] Again, it was just the experience of actually being able to see real-life zebrafish and-

Annalies Corbin: [00:12:23] Yeah. And Louise, the same thing for you. Do you think that if you got the chance to do that kind of project again, whether it was with the zebrafish or it was something else that was pretty similar, would you be up for that?

Louise Frederick: [00:12:36] Yeah, I would.

Annalies Corbin: [00:12:37] Yeah. Do you think that it would be cool if you could do that kind of science all the time?

Louise Frederick: [00:12:46] Well, yeah because it was really fun when we--.

Annalies Corbin: [00:12:49] Yeah, it was really fun. So, Katie, and I didn’t mean to put you on the spot, but now, you’re going to have to have real-life critters in your classroom all the time because you’ve just heard it, they like that.

Katie Benton: [00:13:03] Well, and I wanted to say, when they were talking about the microscope and I know that Louise was talking about watching the development, I think one of the key things and kind of one of those aha moments was, we were actually able to see the heartbeat, and to be able to point that out, and they could see the blood flow and everything
under these high-power microscopes. And that was just something that you rarely ever get to see. So, that experience alone.

**Katie Benton:** [00:13:29] But the other thing that the kids, really, what they were able to learn and to connect to all of this was that we learned that zebrafish is 75% to 80% like humans in terms of their systems and the way that the diseases that they can have, which is why they’re so great for research. But I think these kids, and I was included in the group looking and saying, wow, these tiny little fish, how can they be so close to us genetically and how can they deal with some of the same diseases such as diabetes and things like that, which was really fascinating for us to kind of take it to that level and understand that we, as giants compared to these tiny fish, have so much in common.

**Annalies Corbin:** [00:14:14] Yeah. And what an amazing way to get to experience and understand that. And that had to be pretty cool, Louise, I mean, seeing their heartbeats and their blood flow through them, did that make you think about what that might look like in people or were you just really sort of narrowed in on the fish?

**Louise Frederick:** [00:14:34] Well, I could imagine what it would be like to look at a human, but it would probably be a lot bigger, and more like faster because we have a bigger body.

**Annalies Corbin:** [00:14:49] Yeah. Yeah. Those are good observations. And I hope one day, you get the chance to sort of test that out and see if that’s the case, you might be surprised. That’s awesome. So, Evren, do you think that some of the things that you got to experience through the BioEYES project are things that you will be able to use in the future? Like did you burn some stuff there that you can use in fifth grade, or sixth grade, or even high school, which I know is a million years from now for you? But I’m really curious about sort of the things that you learned there and where you think you’ll be able to utilize some of that stuff.
Evren Thompson: [00:15:31] I learned a lot of things that, well, I think I'll be able to use them for fifth grade because we have an animal project then. And probably, if we're studying—yeah, probably just fifth grade.

Annalies Corbin: [00:15:49] Probably just fifth grade. Okay. I think that's a good observation. What about you, Louise? Do you think you're going to be able to use any of those amazing skills? I bet you now have wicked microscopes skills, huh, or fish-catching skills. Do you think that translates into things that you may be able to be able to do in the fifth grade, or sixth grade, or college? We'll add college.

Louise Frederick: [00:16:10] I think we will do it in fifth grade since we're doing the animal project, like Evren said. If we're to study something really similar to them, like I see something, it would be more easy.

Katie Benton: [00:16:28] Well, I was thinking, Louise and Evren, too, like you guys had to do a lot of observations. You had to make some predictions. You had to have a hypothesis. And then, you learn a lot about comparing and contrasting humans to zebrafish. So, I'm hoping some of those skills are what you will continue to take along with you as you learn how to research and answer questions that you have. And certainly, making observations is something that you will be doing in science for years to come.

Katie Benton: [00:16:57] And also, guys, I really do hope that this allows a lot of the students that were able to participate with us to have an interest in careers in science. So, working with real scientists and learning about some careers in science that maybe we weren't even familiar with is another kind of career-development opportunity or making you guys aware of a lot of things that could be out there that might be a part of your future.
Annalies Corbin: [00:17:23] Absolutely, yeah. So, if you think about it then, as Ms. Benton’s talking about careers, in addition to just being a scientist, I suspect for the BioEYES project, you actually got to experience pieces of a number of different kinds of careers. So, did they talk in the project about the different kinds of things that you could use those skills for? Is that one of the conversations you guys had? And either Louise or Evren, whoever wants to answer my question.

Katie Benton: [00:17:58] What were some of the jobs that maybe they talked about in science that you guys thought about from doing BioEYES stuff? Do you remember any of them? Remember, they talked about you could become a doctor, you could be a researcher, you could be a science engineer, some of those kinds of things, working with the environment. Louise, you have a great interest in science, too. What are some of your interests in science?

Louise Frederick: [00:18:22] I like to study a particular thing, not a specific thing.

Annalies Corbin: [00:18:32] Okay. Very good. So, lots of different ways for you guys to go with this. And I know I put you on the spot, you had to think about it, but there’s so many different possibilities when you start really digging into all that fun stuff. So, yes, Evren, did you think of one?

Evren Thompson: [00:18:48] You could become a vet because you’re taking care of the zebrafish. So then, you’d be able to think about it and you know how to take care of an animal the right way.

Annalies Corbin: [00:19:04] Yeah. That would be a really, really good one. Absolutely. And did you know that in Ohio, here in Central Ohio, we have a zoo school? When you’re in high school, you can opt into, working with all kinds of animals, including the fish, and the manatees, and all that sort of stuff there at the Columbus Zoo. So, that’s kind of a cool way to
think about some of those pieces. So, Katie, I want to talk a little bit about the opportunities that a project like this has to target in on individualized sort of student learning and instruction, that massive differentiation that some schools really, really struggle with. How do you ensure that all the students, you mentioned 50 kiddos have this opportunity, how do you ensure in a program like this that all the kiddos get what they need out of it?

**Katie Benton:** [00:19:55] So, we worked with our regular class size, so we’ve got 25 kids in each group at a time, which was great. And the program itself offers some great differentiation and really opportunities for kids to do different tasks. So, each and every day through the week-long process, the kids came in and there were different things that they were expected to do. So, every day, there were observations, and some kids want to make more observations than others, and can be a little more detailed than others, which was great.

**Katie Benton:** [00:20:25] And they had the opportunities to do that. We had various opportunities to share out what they were seeing and doing and let kids share as much or as little as they wanted to. And they each had different jobs as well. So, they would go and get the tank, or they would go and get the fish, or they were in charge of assisting each other in some actual physical tasks as well. And one of them was that they would actually clean out the Petri dishes with the embryos and they had to dispose of the embryos that were not growing and were not thriving.

**Katie Benton:** [00:20:56] And they had to make sure that they got other things out of these Petri dishes, a piece of dust had fallen and/or things like that. And that was very intense for them, and really, was serious. And they had to use a lot of their skills and teamwork to be able to do that, to identify and actually use the pipettes to be able to do that. Additionally, we did a lot of instruction in terms of the characteristics of the zebrafish, as well as those of a human,
and how we breed differently, and how that worked, but also about how they have a digestive system, and so do we, and how their heart works very similar to ours.

**Katie Benton:** [00:21:32] And then, looking into what kinds of things that our scientific researchers look at and the diseases that they study, and learning how the zebrafish help with that. So, understanding that the way that they can reproduce so quickly and they grow so quickly, that allows for the scientists to be able to gather a lot of information, and to do a lot of different kinds of studies to then take that, and help and see how what they’ve learned might have an impact on humans. But I think really just being able to have kids, there were various questions, and there were some extending questions, and some extending sort of activities, and being able to spend more time under the microscope, and things like that as we were able to work through different parts of the process on the project.

**Katie Benton:** [00:22:15] But there really was something for everyone, which was great. But additionally, we have some kids, who, if the writing was a little bit of a struggle, we have to give them some assistance, or they could record, or things like that. And we were able to use our iPads to take some photos, and some videos, and things. So, if kids didn’t have a chance to complete all of what they were supposed to during that time, they could finish it at a later time, but still have some of the resources and be able to continue their observations with some of those photos, or videos, or things as well.

**Annalies Corbin:** [00:22:43] That’s excellent. That’s excellent. Louise, if you had the chance to do the program again, is there anything that you would suggest that Ms. Benton or the program do differently?

**Louise Frederick:** [00:22:57] No.
Annalies Corbin: [00:22:59] No, not a thing? That’s pretty impressive. How about you, Evren? Same question to you. Is there something that you would like to see done differently with the program if it happens again?

Evren Thompson: [00:23:11] I think it is done well.

Katie Benton: [00:23:14] I do know that they would probably all agree that they had hoped we could have the zebrafish for longer or we could keep some in our classroom for an extended period of time, and certainly, with those microscopes as well. So, of course, there's some limitations in terms of how long the scientists can stay with us, and all of their equipment, and the rules about the research fish, and things like that. I know we would have loved to, maybe I would say, extend it or have it be even longer, but really, just the opportunity to be the first school to do it and have all of the experiences that we did and the access to the hands-on, real-life science was really wonderful.

Annalies Corbin: [00:23:55] So, Katie, and so, this was third and fourth graders that you-

Katie Benton: [00:24:01] We did it with all fourth graders, but I taught these same students last year for third grade.

Annalies Corbin: [00:24:07] Okay. So, fourth graders. So, do you think that if given the opportunity—it's a theoretical question, but I'm asking for a real reason. We have all kinds of calls that come in to me, and so, every once in a while, there's this great opportunity to make some connections. And so, do you think that provided the opportunity to take a project similar to BioEYES, and do you think that your fourth graders could be a scientific research team and that you guys could research something over the course of a year effectively, all the way through data analysis?
Katie Benton: [00:24:46] I do. I always say never underestimate the power of eight, nine-year-olds because I’ve lived it for about 20 years. I’m always amazed when you give them the opportunity, and you put it in front of them, and you allow them to have that exploration, and you have that curiosity. They really can wow and amaze you with what they’re able to do. And the depth of their observations as we continued throughout the week became much more detailed, and much more thoughtful, and the questioning that they were able to do as we continued and truly, this was only a little more than a week that we did it. So, yeah, I do really think that there would be a great opportunity for a longer kind of drawn-out opportunity to do consistent research over a period of time, where they could dig a little deeper. And if they did it over a period of time too, they probably would have the opportunity to have very different observations and see something change in a much deeper way.

Annalies Corbin: [00:25:45] So, the reason I ask the question is that because like you, I believe fully without any reservations whatsoever that kids are capable of so much more than we often give them credit for, right? And I do believe I’ve seen kids do absolutely amazing things. And I think that Evren and Louise, you guys are awesome kids who I can only imagine, I can see your little heads down, and you’re digging in into the project and really kind of loving it.

Annalies Corbin: [00:26:15] So, I want to, as we go through and sort of wrap up our conversation, ask each of you, though, about as you get ready for fifth grade, I do want to ask you, what is the thing, Louise, that you love the most about school, about learning? You’ve had two great years with Ms. Benton and you’re getting to go off to the fifth grade, which will be a whole new thing. What are you looking forward to? What is it that you love about school, Louise?

Louise Frederick: [00:26:46] I love my teachers, and I also love how they teach, and-
Annalies Corbin: [00:26:50] Yeah. You love your teachers. Well, that’s pretty darn special.
Yeah. The teachers are pretty lucky to have you, I suspect. Evren, how about you? What is it that you love about school? What do you like the most? What are you looking forward to for fifth grade?

Evren Thompson: [00:27:10] I hope I have a really good teacher like Mrs. Benton and I hope we don’t have—what we did in Mrs. Benson’s class is we’re able to like have the privilege to not have a science seats and just being able to sit down.

Annalies Corbin: [00:27:32] Yeah, but that’s okay, you like that? That autonomy was awesome, huh? Yeah.

Katie Benton: [00:27:37] We always say with great power comes great responsibility. So, they earned that and they know that, but I know Louise touched on, she said she likes the way that we teach, and I do feel like we work very hard to have that authentic hands-on, which is why this fell perfectly into the philosophy that we have for as much authentic learning as we can have in ways where kids really can take ownership, and use their creativity, and kind of follow their interests and their passions as well.

Annalies Corbin: [00:28:06] Yeah. And that’s one of the things that we certainly, at PAST Foundation, believe so adamantly, that we have this amazing opportunity with these kiddos from our pre-K through 12. We have these years about 13. And not only do we have this great obligation to teach them a lot of stuff, my hope is, and I see this all the time in really fabulous classrooms, that teachers that help these kids find their passion along the way and to identify the thing or those sorts of things that they love, love, love, and can help them see that there is the potential that they can, in fact, become a career, that’s a game changer for many kids. So, I’m just thrilled and appreciate your thinking around that so very much. So, last question as we get ready to wrap up. So, Louise, if you meet a friend on the street or somebody from another
Louise Frederick: [00:29:13] I'd tell them that it's about science and it helps you want a career in science.

Annalies Corbin: [00:29:23] That's very cool. That's a great endorsement. How about you, Evren? What would you tell somebody if they said, "Hey, this thing called BioEYES is coming, should I do it?"

Evren Thompson: [00:29:31] Yes. I'd say yes, definitely.

Annalies Corbin: [00:29:35] Yes, definitely. And Katie, same question back to you as our folks are sitting around in all parts of the world because we have listeners from all over the globe, they're like, wow, maybe I could do that, too, as a teacher, any pieces of advice if an opportunity like that shows up on a teacher's door in terms of how they think about it?

Katie Benton: [00:29:55] I think that embracing anything that is possible and available is great. It is something that is worth doing some grant-writing for, which we did, and investigating any options to bring such a program because it has such a deep impact on the students and their learning. And as I said, their facial expressions, just their willingness to talk about it for the next several weeks to share it with other students and their families, and we ended up putting together a little compilation video in the eyes of kind of a Bill-Nye-type thing, but it was a great way to share their learning and they loved it, to be able to say, here's all the things that we didn't know before, and to share their new knowledge, and really, that interest in science.

Katie Benton: [00:30:40] I do feel like that sometimes, that's harder for kids to get and to experience as much at the lower levels. And so, to allow them just that chance to be the scientists, to learn from scientists, and they really were scientists. That was a lot of how we
viewed this of, they came in, and they were doing the scientific inquiry, and they were doing the process, and they were doing the experiments and the research, and making those observations, and drawing those conclusions. And those are things that I think experiencing in that authentic way mean all the world in having them want that future careers in science, and engineering, and technology, and all of those possibilities, which are endless.

**Annalies Corbin:** [00:31:22] Absolutely endless. And thank you so much to the three of you for taking time out of your afternoon to have this conversation with us. I really appreciate it. It was nice to meet you all.

**Katie Benton:** [00:31:34] Thank you so much.

**Evren Thompson:** [00:31:36] Thank you.

**Louise Frederick:** [00:31:36] Thank you.

**Annalies Corbin:** [00:31:39] Thank you for joining us for Learning Unboxed, a conversation about teaching, learning, and the future of work. I want to thank my guests and encourage you all to be part of the conversation. Meet me on social media @AnnaliesCorbin and join me next time as we stand up, step back, and lean in to re-imagine education.