

**Annalies Corbin:** [00:00:00] Welcome to Learning Unboxed. Today's episode is all about design challenges. And I am so very excited to have with me two amazing ladies that I have been very fortunate over many years to have the privilege of working with, planning with, collaborating with, brainstorming with, getting in trouble with a little bit around the edges. And I think maybe that's actually the best part.

**Annalies Corbin:** [00:00:24] So, with us today are Heather Sherman and Jeanne Gogolski. And, again, we're going to talk about design challenges, a bit of context here. So, Heather is the Director of Ohio's STEM Learning Network and Stem Relationship Manager for Battelle Education. She has a long background and history in education, a lot of work in early college, a lot of work in STEM. And we're excited to have Heather here with us today.

**Heather Sherman:** [00:00:51] Thank you very much.

**Annalies Corbin:** [00:00:52] Joining Heather and myself is Jeanne Gogolski, Founding Partner of [educationprojects.org](http://educationprojects.org). And secret about Jeannie, she is really into agriculture. I have never met anybody that can do a better job explaining why soybeans are so important, why corn is so important, why biofuels are so important, and gets jazzed about that. And so, we're really, really excited to have Jeanne with us as well. So, thank you for joining us.

**Jeanne Gogolski:** [00:01:21] Thank you so much for having me.

**Annalies Corbin:** [00:01:22] So, I want to start very quickly with each of you, just give us the 70,000-foot view of your organization, and what you do because that really gets to the heart of what you guys do together, which is the exciting part of the conversation. So, Heather, how about we start with you? So, just what's the overview of the OSLN and/or Battelle STEM Education Initiative.

**Heather Sherman:** [00:01:48] Great. So, Battelle is the country's largest research and development institute. And so, we do a ton of research and development. And we want to make sure that we have a strong pipeline of future scientists. And so, we started investing in STEM education and have stood up three different stem education networks. We've got the Ohio STEM Learning Network, the Tennessee STEM

Education Network or Innovation Network, and also STEMx, which is our national network of STEM networks. And we really want to connect people who care about STEM education to one another. And so, that is the big picture view of what we do.

**Annalies Corbin:** [00:02:27] And at the end of the day, an industry saying, "Enough is enough, we need folks," and we have a lot of knowledge around what it's going to take to prepare people to really be high functioning in STEM and STEAM in the world that we live in today.

**Heather Sherman:** [00:02:39] Yes, absolutely.

**Annalies Corbin:** [00:02:40] Awesome. We're thrilled to have you here. And so, Jeanne, you play a really, sort of, connecting role amongst a number of different organizations. So, it was hard to choose which of Jeanne's hats. So, I'm going to let you choose which of Jeannie's hats that you, sort of, want to tell us about as it relates to this conversation today.

**Jeanne Gogolski:** [00:03:01] Great. Well, Education Projects is really a group of teachers, and design people, and communications people who really love teaching and learning. And agriculture happens to be our biggest and most interesting - as you mentioned, I'm really jazzed about it - client.

**Annalies Corbin:** [00:03:19] Absolutely.

**Jeanne Gogolski:** [00:03:19] So, we work with Ohio Corn and Wheat. We work with the Soybean Council. We've worked with National and Ohio 4-H. So, those organizations, there's lots of them that we have. And our goal, really, is to make that connection, you mentioned that, to make learning relevant in the classroom and help teachers understand a little bit more -- they, really, are focused teachers, help teachers understand a little bit more, so they can communicate to students about food production, where their food comes from.

**Jeanne Gogolski:** [00:03:51] And our goal, just like you mentioned, Heather, that one of our goals for agriculture is to fill the talent gap. About 20,000 jobs a year go unfilled in agriculture around the country. And as we watch, millennials only have about 6% of

interest in agriculture. So, we're going to need people to - nine billion people plus on the planet - figure out ways to feed them. And STEM is going to be critical in that.

**Annalies Corbin:** [00:04:22] Right. And so, let's actually lead with that real quick because this problem in agriculture, about the number of jobs that are available, the number of folks available to fill those jobs currently that are qualified, trained, ready to just opt in immediately into work. That same scenario, that same issue, we can translate, quite frankly, across many, many, many industries, careers options, not just in the US but around the world. We have a massive global shortage of folks ready to opt in to some of our most critical fields of study.

**Annalies Corbin:** [00:04:56] And so, part of the problem is perception. So, I've had the same conversation as it relates to manufacturing. And ag is, I think, a perfect classic example. So, certainly, in the US, when we think of ag, we think of that traditional farmer, just a dirt farmer. But the reality is, man, ag is one of the most amazing, innovative, high-tech, seriously out on that edge tech industries.

**Annalies Corbin:** [00:05:26] And to your point, Jeanne, it's only going to be more and more of that as we have more and more people that we have to figure out how to take care of and feed in our planet, which gets us back around to why we should utilize ag and opportunities in ag both as ways to sort of teach students interested but, also, to help try to solve global problems.

**Annalies Corbin:** [00:05:48] So, Heather, explain to us a little bit about the premise of the way Battelle thinks about design challenge, and what you guys have been doing with that, so that we can come back to Jeanne in this ag problem.

**Heather Sherman:** [00:06:01] Awesome, yeah. So, we believe that teaching students how to solve real-world problems and giving them experience to solve real-world problems is critical to their development to become future problem solvers. And so, about three years ago, we started hosting statewide design challenges in Ohio. The first year, we asked students to come up with solutions to the opioid crisis, which was no small feat. Last year, we asked students to develop ideas about how to make their communities more heart healthy. And this year, we partnered with Education Projects,

and Ohio Corn and Wheat, and the Ohio Soybean Council to ask students to tackle the problem of food insecurity.

**Heather Sherman:** [00:06:47] And after working with Jeanne through a number of projects, every time I'm with Jeanne, she teaches me something new and exciting about ag, and I started to realize, "Well, there is something to this and we need our students to know (1), as you said, all the opportunities that there are in ag; and (2), about how food and agriculture really impact our lives, especially living in Ohio.

**Heather Sherman:** [00:07:10] So, we partnered together and decided to make this year's food challenge be about food insecurity, so that students have the opportunity to study more about ag, but then also about the real issue about making sure that we have enough food to feed people.

**Annalies Corbin:** [00:07:26] Right. And a great case study and absolutely relevant. So, Jeanne, what does it mean food insecurity?

**Jeanne Gogolski:** [00:07:32] Food insecurity is typically defined as having access to safe, abundant, nutritious food. So, if you start thinking about it like that, it's very broad. It's huge.

**Annalies Corbin:** [00:07:45] It is, yeah.

**Jeanne Gogolski:** [00:07:45] And for us, the connection to agriculture can be around food waste. It could be around technology. You mentioned drones, and unmanned vehicles, and all the things that -- GPS, the technology, all the things that go with agriculture. It could be biotech. It could be biofuels. There's a huge bio economy. It could be food waste. Everybody eats.

**Annalies Corbin:** [00:08:11] Absolutely.

**Jeanne Gogolski:** [00:08:13] And because everybody eats, the issues, and problems, and potential things that you could work on are endless for students. And part of our goal in being a part of this - Heather and I talked about this this summer and got all excited about it - is that students in any area - chemistry, physics, environmental

science, biology, general science, anything, social studies - they all can have an interest, a topic that they could study around this idea of food insecurity.

**Annalies Corbin:** [00:08:46] Excellent. And so, as we think about this notion of design challenge, and part of the purpose of Learning Unboxed is to provide case studies of really amazing things that are happening out in the world associated with teaching, and learning, and work. And to give folks those, sort of, ins and outs of how to take those great things that are happening and possibly apply them to my own work. We know we don't all have endless resources. We can't all just you know pull it all apart and, on a moment, redo it, but we can slowly change the paradigm by pulling in the best things that are out there into our everyday practice in our classrooms, our schools, and in our communities.

**Annalies Corbin:** [00:09:28] So, Heather, how does the design challenge structure itself work? So, I'm a teacher. I raise my hand. I've heard about this thing, design challenge. I'd really like to bring it to my community. What's the structure, so that I can get to the point where I can go sell the idea, so to speak?

**Heather Sherman:** [00:09:49] Yes. We leave it really open. There are a ton of resources online about how to run a design challenge, but we ask schools to use the engineering design process or design cycle where you identify a problem, start to do some research, come up with ideas for a solution to the problem, make a prototype of your solution, and then evaluate your solution. And that's what we want students to do. We want them to have the opportunity to work that process, to have some practice at coming up with an idea, seeing if it works, seeing if it resonates with other people, getting some feedback, making adjustments because that's how problem solving works.

**Heather Sherman:** [00:10:31] And so, we leave the frame really open. This year's constraints are that the students need to work together in a team because we really think that learning how to work together in a team is an important skill. We also ask that students have to create a physical prototype of their solution.

**Annalies Corbin:** [00:10:48] Excellent.

**Heather Sherman:** [00:10:49] So, instead of just writing a paper, students have to build something, and students have to learn with their hands in their bodies to create a solution that they can get other people to look at and get feedback on.

**Heather Sherman:** [00:11:04] And so, we ask schools to help teams, help students form teams. We ask them to research the problem. And schools have chosen to run design challenges as a semester-long project. They can run it as a couple-of-week project. You can do it in one class. You can do it across grades. We don't prescribe how schools do it, when schools do it. We just ask that they do it.

**Heather Sherman:** [00:11:35] The other constraint is that schools need to have an exhibition of student learning. So, we want to make sure that students have an opportunity to share their expertise about all the work that they have done with an authentic audience. So, either people from the community, or their peers, or teachers, or parents, so that they can say, "Hey, look at all the things that I've learned," and have an opportunity to share their knowledge.

**Heather Sherman:** [00:12:01] Then, once students complete their school level showcase, we invite schools from all across the state to come to Battelle, and we have a statewide showcase, which is really amazing because getting all of these students together from kindergarten to 12th grade to share what they've learned over the past year is really inspiring.

**Annalies Corbin:** [00:12:22] It's pretty dang epic actually. It is mind boggling and leaves quite the impact on everybody who participates. So, Jeanne, within this framework then, again, back to that teacher who's out there, or that school, or community that says, "We really want to take this on," you're really the industry partner.

**Annalies Corbin:** [00:12:44] So, Battelle comes to this with this framework. And quite frankly, this is the framework that the Battelle research scientists use every single day in their labs, every single day in their works. And the PAST Foundation and at the Innovation Lab, you go there, and you can see this happening in real time all the time because that's the real way we solve problems.

**Annalies Corbin:** [00:13:02] So, as an example of the local industry participant in this, how do you then influence and actually craft the challenge itself? We have a framework, but it's industry that's leading the question we're trying to solve. Yes?

**Jeanne Gogolski:** [00:13:16] Yes. I think they have so many things that students could work on. When I listen to Heather talk, I get excited all over again, truthfully, because I think the same things that you're teaching them are the things that farmers and industry folks are doing every day. They're trying to solve a problem. Take water quality, for example, which has been a big challenge in Ohio with harmful algae blooms coming in Lake Erie. The farmers say, "How do we contribute to this problem? And how can we help solve it."

**Jeanne Gogolski:** [00:13:45] And as we all know, in water quality, it's very complex. So, when students start looking at that, when industry starts looking at that, millions of research dollars have been spent trying to figure all of that out. And they use the design cycle. Basically, they ask questions.

**Jeanne Gogolski:** [00:14:01] So, in the real world, we're doing that. We want to provide for teachers and students in Ohio the resources, the resources. So, we want to provide the authentic audience that you mentioned. We want to do that. We want to provide information. I had teachers call me and say, "Do you know somebody we can interview about soil science?" We had a kid call and ask for GMO soybeans and non-GMO soybeans. He has his own experiment going, and we put him in touch with a researcher at Ohio State.

**Jeanne Gogolski:** [00:14:35] So, we want to be the resource and the authentic audience to help kids practice this real-world design solving problems is what we're about, too, in the industry.

**Annalies Corbin:** [00:14:49] Yeah. Well, and a bit of nuts and bolts because I know, in my own practice, is when we start things, one of the things you want to know really early on is what are the some of the steps, so I can roll up my sleeves and figure that out. And that teacher, was there a lot session? Was there PD? In the field, teaching, learning, and work, everybody talks about that professional development component.

And it shifts all the time in the way we think about it. And is it positive? Is it punitive? What does it really mean? At the end of the day, I would say, "Hey, that's us learning."

**Annalies Corbin:** [00:15:18] So, what does the learning piece look like as I get ready to lead my students through whatever the design challenges? And I open that up to the two of you, so.

**Heather Sherman:** [00:15:26] I think that there are a couple of pieces to that. The first two challenges that we did with the opioid and the heart health, the focus was more -- I think, students took it on a more social studies health perspective. This year, we recognized that we had an opportunity to look at this problem through a couple of different lenses.

**Heather Sherman:** [00:15:48] But because of our partnership with Ohio Corn and Wheat and Ohio Soy, we had an opportunity to explore the really science piece. So, we wanted to make sure that we were preparing teachers to tackle this problem and have good support for the biotech, for the food storage, the logistics, soil science, water quality.

**Heather Sherman:** [00:16:09] And so what we did was we hosted a day-long professional development session at the 4-H Center, which featured a number of industry experts. We had -- Jeanne, help me with who we had there.

**Jeanne Gogolski:** [00:16:22] We had some soil scientists, and we had a seed geneticist from Ohio State. We took teachers on a bus to Waterman Research Farms, which is just a mile from the stadium. And they heard about the hundreds of research projects that are going on there with agriculture, with animal agriculture too, not just crops. That was a really exciting, fun day.

**Jeanne Gogolski:** [00:16:45] And, truthfully, so few people know about their food supply, food production in Ohio, that you feel like you're starting in scratch sometimes. Like the corn in this field is not edible corn, it's not sweet corn. It's dead corn.

**Annalies Corbin:** [00:17:01] Feed, yeah.



**Jeanne Gogolski:** [00:17:01] It's feed corn.

**Annalies Corbin:** [00:17:01] It's feed corn.

**Jeanne Gogolski:** [00:17:02] So, just some basic facts. And that's why, I think, teachers were excited, and enjoyed that day, and more intrigued by what we did. So, that was one thing we did. We created that list of resources.

**Heather Sherman:** [00:17:16] Exactly.

**Jeanne Gogolski:** [00:17:17] A long list of resources that can be found at [grownnextgen.org](http://grownnextgen.org), which is where the Soybean Council resources are found and [ohiocornandwheat.org](http://ohiocornandwheat.org). Also, there, you can find a long list of resources that can help you when you have questions about any of these topics.

**Annalies Corbin:** [00:17:36] And for our listeners, these resources that Heather and Jeanne are referencing will be on the show note. So, no worries there. We'll make sure that we gather all of that. So, just keep listening. So then, as the teachers have this professional development, and, now, they're going back and actually going to start working with the kids, what does that look and feel like?

**Heather Sherman:** [00:17:57] Well, so in the day-long PD that we did do, we had a lot of access to these industry experts, but we also ran a couple of sessions, more practical about, how do you run a design challenge? What does it look like? A lot of schools start with a hook activity, where we get kids excited about the notion of a design challenge.

**Heather Sherman:** [00:18:16] So, we did a hook activity at our professional development session where we had a hunger banquet. And a hunger banquet is an exercise where you demonstrate how the food resources in the world are unequally distributed. And so, that was a way for us to hook teachers in to the weight of this problem.

**Heather Sherman:** [00:18:36] And so, that was a way to model hook activity for teachers. They could, then, either choose to do that or a different activity. I know that some schools are bringing in community partners like the Mid-Ohio Food Bank, or we've

got another school who's bringing in a farmer to speak. And so, a way to get the kids to start to care about this problem.

**Heather Sherman:** [00:18:55] Then, we ask teachers to help students begin to access what the problem looks like in their community because if you live in an urban setting, the problem might manifest itself in one way. If you live in a specific neighborhood, it might be different. If you live in a rural community, it might be different. And so, we ask teachers to help students begin to look at what the problem feels like in their local context and begin to do research about that.

**Heather Sherman:** [00:19:22] From there, what ideas do you have to solve that problem? And so, sometimes, teachers will take the problem. The problem statement this year is, "Imagine prototype and design: your solution to food insecurity in your life, community, or world." So, it's a really big problem. Sometimes, teachers choose to make it smaller and modify it, so that it becomes a little bit more manageable.

**Annalies Corbin:** [00:19:48] Well, the big white sheet of paper is terrifying.

**Heather Sherman:** [00:19:50] Yes.

**Annalies Corbin:** [00:19:50] It's kind of like a podcast interview. What are we doing? Why are we doing this? All of that. It's intriguing because one of the things that I have found fascinating, and at the Innovation Lab, we've really embraced ag in a number of different ways. And so, we've watched students over a variety of years, sort of, wrestle with the whole notion, given the fact we're in Columbus, Ohio, which is in a state that has a tremendous amount of traditional, like, ag, in the sense that it's rural, it's out, it's wide expanse farming.

**Annalies Corbin:** [00:20:27] And so, one of the struggles that we've really tried to be able to address through the work that we're doing specifically in the lab has been around helping urban and suburban kids really understand where food comes from because a lot of those kids, we have kids who've never left the city. They have no idea other than on television or in photos what farm looks like.

**Annalies Corbin:** [00:20:53] And so, part of, I think, the thing that's really intriguing to me about this, and especially as a teacher thinking about how they modified to give it local relevancy. And I guess that's one of the other things I love about design challenge when done well. It doesn't matter what the big overarching question is, it lends itself to a structure that makes it highly adaptable to be meaningful for the participant. And that, at the end of the day, is the key to contextualizing learning.

**Annalies Corbin:** [00:21:19] And so, for our kids, for example, we've had a number of kids over the years who've opted in to study food deserts as it relates, specifically, to what happens when immigrants come into our city. Columbus is an immigrant landing pad, and we've got folks who come and have no idea where to find food. And we've got folks living right next door to them who have no idea where the food that they're used to even comes from. And it's a very complex problem as it relates to social justice, and equity, and opportunity. So, Jeanne, how do you then take that's kind of a scenario with an individual teacher through the support services you're providing and actually help them craft the thing?

**Jeanne Gogolski:** [00:21:58] That's a great question. Most of the time, I think, what we're trying to do is create this curiosity about it, so that both teachers and students begin to look around and think, "What is going on here? What is the real problem?" or "What is one of the problems we can even address?"

**Jeanne Gogolski:** [00:22:15] When I'm working with teachers, sometimes, I say, "We drive down the road in Ohio. You go south on 71, or north on 71, and you see corn on one side because you know what corn looks like, and what is that other crop on the other side? And it's soybeans. And so, what are all those soybeans for? There's a million of them."

**Jeanne Gogolski:** [00:22:34] When you walk into your school lunch room, and you watch things going in the trash, there's some real -- just that you would start to think about food waste, for example. And are there ways we can solve this problem as a school, myself at home, at school, in the larger community, in the world? 40%, they estimate 40% of our food is wasted.

**Jeanne Gogolski:** [00:22:59] Biotech, for example, is trying to solve some of those programs. So, the Arctic Apple is a result of that that apples don't brown as quickly. I mean, there's just so much, Annalies. I don't even know how to answer that question honestly because it feels like if we could create some curiosity around our food supply, I think that the things teachers could do with students would be endless by asking a great question.

**Jeanne Gogolski:** [00:23:26] Food waste is a problem. How can we solve that in our school lunchroom? That's something, I think, teachers can grab hold of, help students figure out using the skills they're learning in school math, social studies, all of that.

**Jeanne Gogolski:** [00:23:40] So, food deserts mean surveys, and looking around your own community, and seeing where you get fresh food. Even understanding what fresh food is. Why do we have blueberries that come from South America? What are the crops that if you were really going to -- So, there's a million questions to be answered. And I think if we could create some curiosity around our food supply with teachers and students, then it would be a topic we'd be talking about all the time.

**Annalies Corbin:** [00:24:11] And the reality of it is because it is very, very real in every community, especially issues tied to food, not just food security but the inequity, and it is becoming a problem that, I think, is taking a lot of communities by surprise. We have a lot of traditional stereotypes about what it means to be in a situation where food is problematic.

**Annalies Corbin:** [00:24:37] And what we're finding are communities are finally realizing is it's far more prevalent than we realize that folks struggle on a regular basis to make sure they have enough food, they have healthy food, they have safe food, and they're able to get access to that food, whether it's in inner city, or it's in the suburb, it's in wealthy neighborhoods. It's an intriguing, ongoing thing that the communities are wrestling with.

**Annalies Corbin:** [00:25:05] So, for the students, though. right. So, for the student experience in the middle of this, once the challenge has been laid, what's the process or the experience for the kid?

**Heather Sherman:** [00:25:19] Well, I think that what you just said really hit on something for me that's so important about this. If you're not someone who struggles with food insecurity, this is a great way to build empathy and awareness that, "Oh. Oh, my goodness, there are people who don't have enough to eat. There are people in my school, maybe someone who sits next to me every day, who doesn't have enough to eat," or "Oh my gosh, I never thought about what that crop was that wasn't corn driving up the road."

**Heather Sherman:** [00:25:44] So, the design challenge helps identify and suss out problems or questions that does exist. So, you build that curiosity. And then, students start to realize, "Oh my gosh, there are a number of ways that food insecurity affects us." And so, that, I think, is the very first step. And then, from there, you have to start to whittle down, "Okay, of all these problems I just surfaced, which one do I want to work on?" And so, that's when students start to do research and pick one that really resonates with them or resonates with the team, and off you go.

**Annalies Corbin:** [00:26:23] And off you go. And that's the best part. And so, the off you go and the full immersive nature of design challenge. At the end of the day, design challenge is probably one of the single most, in my mind, effective ways to change the lives of learners. And I've said this a million times over the years that it's thrilling and exciting but having been immersed in it for so long, honest to goodness, for me, it's chills. It's just the watching of the context of the world suddenly have meaning in an individual, in a student.

**Annalies Corbin:** [00:27:00] And yesterday, I had the privilege of interviewing three amazing young women who have gone through the Battelle design challenges. And they told me without fail that all the wonderful amazing things they got to do within, in this case, STEM school, it never really solidified how special this type of learning experience was until they did the opioid design challenge because, suddenly, they understood how all the pieces connected, and they found confidence in their ability to solve something they had no idea about.

**Heather Sherman:** [00:27:39] Last year, I have a great story about that. We had students at a local middle school, and it was the heart healthy design challenge. And students came up with a number of instances, a number of solutions. And, sometimes,

you see trends. We had a lot of students who came up with healthy fun runs, or dodgeball games, and tournaments, and stuff. But this group of students decided that they would like to have their school create a cooking class. And the cooking class was supposed to teach students how to prepare heart-healthy foods, so that they could take those heart-healthy food preparation skills back home, and then improve the heart health of their community.

**Heather Sherman:** [00:28:18] So as part of their project, they looked across the school. They identified a room in the school that they said, "This would be the ideal location for our kitchen." They, then, for their prototype or their model, they constructed what the kitchen would look like and what supplies they would need. And, ultimately, they presented their proposal to the principal, and then the superintendent of the district, and then, ultimately, the school board. They also looked about where the class could potentially fit in the schedule.

**Heather Sherman:** [00:28:49] So, the students through that experience got to realize that they themselves could have the power to change the world. And that, to me, is just the wow of why we do this work.

**Annalies Corbin:** [00:29:01] Yeah, it is the wow.

**Jeanne Gogolski:** [00:29:02] Drilling down into these problems when I think about what your students, what those students learned about picking your room, setting up a kitchen, I just can't imagine how many different skills they learned from being a part of that. And, for me, when I start thinking about kids and the idea that the work they're doing in school matters, the things that they're learning in school make a difference.

**Jeanne Gogolski:** [00:29:29] I think, it's an opportunity for them to have student voice in what they're choosing to learn. They get excited about, and energized by it, and realize that they become problem solvers. And goodness, we're going to need those. We're going to need those kids because we continue as agriculture faces things like climate change. And the 9 billion and trying to feed people on less land with less water, those things are going to need some bright, amazing, the best STEM students in Ohio.

**Annalies Corbin:** [00:30:03] And around the world, absolutely, absolutely.

**Jeanne Gogolski:** [00:30:06] Yes.

**Annalies Corbin:** [00:30:07] So, as we think about wrapping here, there are two pieces that I think that are really, really critically important that we have to touch on. And one of them is the notion of the authentic audience. Heather mentioned that as part of the process. And at PAST, we advocate this all the time that as we truly, truly think about the transition on the teaching side, that transition in the learning component, and how that actually then quite frankly translates back into the world of work, authentic audience is one of the most effective, simplest, most comprehensive things that, I think, a teacher in their work, in their practice can do. We always see all the time that an audience of one is authentic to no one.

**Heather Sherman:** [00:30:55] Right.

**Annalies Corbin:** [00:30:56] Right? So, Heather, circle back around for me on that because we see this happen in a thousand different ways. And I can tell you there is a day in the spring at the PAST Innovation Lab where in-resident school partners come in, and they do their Capstone, their presentations. That is my favorite day.

**Heather Sherman:** [00:31:12] It's my favorite day too.

**Annalies Corbin:** [00:31:13] All year round. And it's my favorite day because these kids are standing up there, alongside researchers in R&D, whatever their problem and their project was, and they essentially defend their way out of the program through their public demonstration of knowledge. It's awing.

**Heather Sherman:** [00:31:37] It's amazing. It is absolutely amazing. And I think that as students spend the time working on their design challenge project, they begin to develop their expertise. And, finally, there is an audience, an authentic audience. I remember the very first year for the opioid challenge there at one school. The audience consisted of a police officer, a mother who had lost her child to opioids, other community members, and community agencies, and recovery houses. And these students stood there, and presented their ideas, and got a chance to get feedback from

people who were in the field who knew, who had firsthand experience as adults to say, "Wow, the solution really makes sense."

**Heather Sherman:** [00:32:18] And the students had rehearsed, they had practiced, they were able to justify their reasoning. And this is a skill that we all have to do for the rest of our lives as adults. And so, what better time than middle school, elementary school to start getting to do that.

**Annalies Corbin:** [00:32:35] Yeah, it's absolutely amazing because, at the end of the day, what happens is we watch this young person through this process go from, "I know nothing about this," to the expert on the solution.

**Heather Sherman:** [00:32:50] Yes.

**Annalies Corbin:** [00:32:50] And it may not be the global solution but it's the solution they worked to. And no one is more of an expert in that moment than that individual. And you can watch the kids realize, "My place in the world has shifted."

**Heather Sherman:** [00:33:09] Yes.

**Jeanne Gogolski:** [00:33:10] I think, Annalies, it also works the opposite way because when you have industry folks there listening to these students, you get hope for the future, you get enthusiastic again about education, and you begin to think, "This is going to be great. It's all going to be OK. Because these students are so enthusiastic, knowledgeable, credible, and they're excited." And that's really something that industry does not get to see very much. So, we'll be there in full force. There are 26,000 farmers in Ohio, and we won't have all of them there, but-

**Annalies Corbin:** [00:33:50] We try.

**Jeanne Gogolski:** [00:33:50] I think all of them would love to come. And so, they are interested in what's going on. We're going to have a lot of industry-related folks there because I think that they will be intrigued by what's going on, and the students will have great questions for them too. So, we're very excited about this.



**Annalies Corbin:** [00:34:09] It's awesome to watch. And it's been awesome to watch the two of you and your organizations roll up your sleeves together and craft this. That's been the other thing. And I want to thank you both for that piece because some of that has happened in the Innovation Lab. Just inadvertently, meeting there and being able to watch over a period of many months get ready to do this work has been a wonderful thing to really sort of see how industry says, "We can actually tackle this," and have a very, very meaningful role in education, rather than just waiting for education to send us folks, and then we have to figure out what to do with them, whether that's backfilling gaps, or full-on retraining, or some other mechanism that suddenly we weren't prepared for. So, this way, we actually get to be part of the solution of our own workforce. And that's one of the things that I love collectively about the work that we are all doing.

**Annalies Corbin:** [00:35:06] So, Jeanne, I want to circle back around again as that teacher contemplating doing this, and my kids are going through this amazing experience. They're presenting. They're getting to that point where they're standing there as that expert. What's that experience like for me? And I'm asking you the question because you do so much teacher professional development and support, whether it'd be specific to this challenge or the other work that you do. And I know you bump up against this frequently. And at the end of the day, these are awesome experiences for students in our industry, but if it doesn't change practice.

**Jeanne Gogolski:** [00:35:42] Right. I think teachers, because I was a teacher.

**Annalies Corbin:** [00:35:48] Exactly.

**Jeanne Gogolski:** [00:35:48] I don't want to insult teachers here. But I'm a teacher too, so I think I can say it.

**Annalies Corbin:** [00:35:51] We all are teachers here, absolutely.

**Jeanne Gogolski:** [00:35:51] I do think that teachers have always thought they needed to be the smartest person in the room. They needed to be the old saying was, "The sage on stage." And so, I think, for teachers, particularly, this is something that the design challenge us so well, and that is you are definitely, as a teacher, just guiding the learning, getting like-

**Annalies Corbin:** [00:36:15] Exactly.

**Jeanne Gogolski:** [00:36:15] And it's really hard to teach teachers to step back and let kids lead their own lead learning, ask tough questions, figure out some answers, run it by some experts, all the things that go along with a design challenge that Heather's been talking about here that's so wonderful. So, to teach teachers how to step back is not an easy thing.

**Annalies Corbin:** [00:36:39] It's not.

**Jeanne Gogolski:** [00:36:40] We do summer workshops all the time. And we have them actually, while they're learning about the topic, we also take them out in the field, so that they can, again, get their curiosity going, talk to a farmer, talk to an agronomist, ask the questions about GMOs, and water quality, and all that stuff you've been one to ask. So, I think that one of the main things that we try to do in our professional development is to energize teachers again.

**Annalies Corbin:** [00:37:07] Absolutely.

**Jeanne Gogolski:** [00:37:08] And make them feel like the things that they are teaching kids are relevant, interesting, and don't need to be, "Let's read from a book and take a test."

**Annalies Corbin:** [00:37:18] Absolutely, absolutely. One of the kids that I was interviewing yesterday, I asked the question, "So, what's a great teacher?" And the response to that question was, "I don't need you to share your content knowledge with me." This is almost direct. "I don't need content knowledge from you. I've got that. I can look anything and everything up. What I desperately need from my teachers is to teach me how to learn, to mentor me, and help me navigate the world."

**Heather Sherman:** [00:37:53] Wow.

**Annalies Corbin:** [00:37:54] That is a very, very different perspective than 50, 100 years ago. The world has changed. Knowledge is right in front of us. They need people to lead with them right. And so, I think that Jeanne, you're spot on.

**Heather Sherman:** [00:38:09] I think one of the pieces that teachers do provide in this is a lot of the structure.

**Annalies Corbin:** [00:38:13] Exactly, the facilitation.

**Heather Sherman:** [00:38:14] Yeah.

**Annalies Corbin:** [00:38:16] Yeah.

**Heather Sherman:** [00:38:16] This is when you need to have this done in order to be able to get to our showcase, which is on this date, help setting up the industry experts, and making sure that the students are prepared and feel confident. All of these things, that stuff's really important.

**Annalies Corbin:** [00:38:30] And it's complex, and it comes from life experience. And, I think, that's really important not to minimize that, right?

**Heather Sherman:** [00:38:39] Oh no. Yeah.

**Annalies Corbin:** [00:38:39] As the teacher, as that facilitator of learning, yes, content knowledge has changed, access to that has changed, but we bring with us as the practitioner. That body of experience that leads to helping someone else go down the road. And that's really powerful.

**Annalies Corbin:** [00:38:57] So, as we sort of think about and close with this conversation, what's the parting shot, that one nugget that you want to give back to that teacher we started with in the room who's contemplating this? What's the walk-away? What's that one thing to take away, and then do this, do the design challenge? Heather, what's your parting shot?

**Heather Sherman:** [00:39:20] Well, this year, this design challenge, we expect we'll touch 3000 students.

**Annalies Corbin:** [00:39:26] Awesome.

**Heather Sherman:** [00:39:27] We are going to do another one next year. You don't have to do this design challenge, but there is a ton of resources online. Do a day-long design challenge, a week-long design challenge. Try to help your students experience the design cycle as just a first step. Just get in there and give it a shot.

**Annalies Corbin:** [00:39:48] Jeanne?

**Jeanne Gogolski:** [00:39:49] I would say be curious about your food supply. Ask some questions. Not just Google the answers but really look around, think about it. When you start thinking about all the questions that we have about food and the fact that everybody eats, just be curious about it. Ask, ask. And for teachers, there are plenty of resources for you. And I stand ready to help. So, I would love to help you think about your food supply with students, get them going with some great questions. But we, as an agriculture industry, care about how people are thinking about their food supply, the facts about their food supply, and we stand ready to help. So, anything, I'm open. I would like to help you understand food. And since everybody eats, everybody ought to be curious and asking questions.

**Annalies Corbin:** [00:40:45] Absolutely. And so, for our listeners, again, we will be posting resources, including access to this design challenge and to both these wonderful ladies. And I want to thank you both profusely, not just for today, but it has been an honor, and a privilege, and quite frankly humbling to get to go on this journey with the two of you. So, thank you so much for being part of our community.

**Heather Sherman:** [00:41:08] Thank you.

**Jeanne Gogolski:** [00:41:08] Thank you.

**Heather Sherman:** [00:41:08] Likewise.