Science Modeling Talks

Episode 72 - "Teacher of the year, Gender Equity, Adapting to the changing education landscape"

Guest: Lynn Jorgensen

Mark Royce (01:07):

Hi Lynn. How are you doing today?

Lynn Orgensen (01:10):

I'm doing well, thank you.

Mark Royce (01:12):

You're in Gilbert, Arizona now. Is it hot there right now?

Lynn Orgensen (01:16):

Um, yes. I think it was 110 today.

Mark Royce (01:19):

110. Yeah. Okay. I'm sorry.

Lynn Orgensen (01:24):

Not for the faint of heart. We all regret our life choices in August.

Mark Royce (01:28):

Yeah. <laugh>. But you live in air conditioned homes?

Lynn Orgensen (01:32):

We do,

Mark Royce (01:33):

Yeah. <laugh>. That's good. It's a little warm here too on the west coast in Central California, but not 110. So I'm excited to talk to you today. I wanted to find out and have you tell us a little bit about the fact, I know you were awarded the Phystech Teacher of the Year award. The PHYSTECH is the physics Teacher Education Coalition. And that's connected somehow with the American Physical Society and also the American Association of Physics Teachers. Right? Are they all affiliated?

Lynn Orgensen (02:11):

They're all kind of affiliated. This is a co-award from both groups. It is talking about my role and my support for

teachers, both in-service and pre-service, along with the work I do in the general community for teachers.

Mark Royce (02:28):

That's awesome.

Lynn Orgensen (02:28):

And so they kind of both work together for that one. So it's been a huge honor and kind of an amazing thing that I've been able to work with this year.

Mark Royce (02:36):

That is really great. And I know that in the past you served with the AMTA as... You were president at one point and served on the board and, not too long ago really. Right? Didn't, weren't you?

Lynn Orgensen (02:53):

Yes. I just stepped off my four year presidential cycle in July. So July with July's board meeting. That was my official step off. And I've been working with them and on the board for the last four years, doing some, working with amazing people, looking for ways to support the teaching community, not just physics, but all sciences. And it's been a pretty awesome experience.

Mark Royce (03:16):

That's really great. Well, congratulations on the award, and thank you for all the work that you have done and are doing for the science community. It's really exciting. I wanted to find out a couple of things about you. What was it that led you into the world of modeling? I know you graduated with degrees in physics and were headed on a teaching path, but what led you toward the modeling world?

Lynn Orgensen (03:46):

The modeling world actually has two parts. When I did my student teaching forever and ever ago, back in 2000, like 1999, 2000 is when I did my student teaching. The teacher I was paired with had actually gone through ASU's modeling program. So we did a lot of modeling instruction before I even knew what modeling was. And so that was my first exposure was as a student teacher. I'm like, yeah, this makes sense. And then when I started teaching, I was hired literally a week before school started. I got my keys to the classroom three days before school started. And so definitely panicking. The year we started was a year we were still doing like big district convocations where everybody had to get together and it happened to be at our school. And I ran into a friend and the friend had just been teaching for a year or so and said, oh, I'm so glad I ran into you.

Lynn Orgensen (04:48):

You've got to meet this other physics teacher from another high school. He's going to be able to help you. 'cause she knew what happened. And so she introduced me to my friend Jim Achenbaum, who had been a long-time modeler as well. And he took me under his wing and he is like, okay, you're gonna survive this year. That's what we're gonna do. But after that you need to go take a modeling workshop at ASU, whether you get your master's degree or not, you need to take the modeling workshops. They will help you understand how to teach physics. Like you might know physics, but modeling helps you understand how to actually get your information across to your students. And and he was right. I took that first workshop and it's like my eyes were opened. It's like, this explains so much. It's the why behind all of the science we do. And it was just, I was absolutely hooked and decided after that first workshop that yeah, I'm gonna go get my master's degree. I'm gonna keep doing this and look to continue to just be a better teacher each year.

Mark Royce (05:56):

Wow. I'm sure glad you discovered it 'cause you've made an impact. So you hadn't really been teaching very long, hardly at all before you found modeling?

Lynn Orgensen (06:08):

No, I actually literally was after my first year teaching, I had to do an AP summer institute that summer. And so it was my second year teaching that I got a modeling workshop in. And so with two years of teaching under my belt, I went straight into modeling and I never looked back. It was just so eye-opening of how to get kids engaged and get them talking and get them thinking and moving. And it was just absolutely everything I ever needed.

Mark Royce (06:42):

Wow. So how would you describe to somebody how modeling instruction influenced you as a teacher and kind of helped form the trajectory of your career?

Lynn Orgensen (06:57):

What I really love about modeling, and it's kind of different for each, in each of the, kind of the sections we have in there, but for me, modeling helped the labs-- helped connect the labs to the equations and the content. Sometimes there feels like there's a disparity, like this kind of disconnect between here's a set of equations and here's a lab, but there's no connection between them. And modeling kind of bridges that gap really beautifully of, we're gonna observe stuff, we're going to work with stuff, we're gonna get equations, we're gonna understand that these graphs are going to give us equations. And the equations you have are tied directly to what we just did. They have a physical connection back to our students. And that really resonated with me that first two years teaching. We always had to do these surveys and the kids were like, I don't get the labs. I don't understand why we're doing them. They don't make sense. But once --that's kind of a typical student reaction. But once we started modeling and working with that, they had buy-in, they had understanding. These labs meant something. They weren't just busy work. They became kind of our purpose and our way of life in our classroom.

Mark Royce (08:15):

Wow. Yeah. That's that's awesome. So what would you say have become --in the classroom, what are your, what are your specialties? What are the things that you feel that you really do quite well and are accomplished at?

Lynn Orgensen (08:34):

I think <laugh>, I'm pretty good at wait time. I think those are the jokes we always talk about. We have to get really good at uncomfortable silence for our students. But I deal primarily with AP students. Last year I had one section of regular and four sections of AP classes. This year I have two sections of regular and three sections of AP classes. So I mostly teach AP and modeling works really, really well with the AP students. We know they're gonna be good at math. They're like, I'm good at math. I'm not worried about it. But AP physics goes beyond math. It is so much of a focus on conceptual understanding and deep connections between the equations and the graphs and the material they're doing. And AP helps or modeling really helps fill that gap with AP to really help students understand how things are connected and that there's these relationships. Not just an equation, but we can focus on the graphs. There's multiple forms of representation, which is all of the kind of things AP loves to hear and to see, we're able to do that with modeling really nicely.

Mark Royce (09:54):

Yeah. Do you find that your AP students are more likely to go into careers in the STEM area? Or how would you describe in your classrooms the difference between your regular physics class and your AP classes?

Lynn Orgensen (10:09):

Well, that's kind of changed over the years since like, there's that I think for almost every teacher, there's the, before COVID and after COVID group. About the time of COVID, our district made a change. And our change was that all students for graduation, it's not a state requirement, but it's, our district very strongly recommends requirement. Students take biology, chemistry, and then physics as their three sciences for graduation. And when they did that, it was less student choice and more they're going to. And so since they made that shift, my regular classes are all sorts of varieties of students, students who may not be-- I'd say like there's a group of like a third to a fourth, aren't necessarily planning on on going to college, but they're graduating. And so we're getting a broader view of those. So especially modeling is so helpful for that group where math is a struggle for them.

Lynn Orgensen (11:15):

And we're like, Hey, you can do slope and area like you, you're fine. You're gonna be fine in this class. It's gonna be great. But whereas my AP kids, I would say of my AP students, 75% of them are planning a career in one of the STEM fields. Absolutely. They're planning that. And then there's a subset that 25% they're not, but they're all planning on going to college. And those who aren't still wanna take the AP exam, still wanna do stuff to be able to get that science elective credit out of the way. And so all of my AP kids are going to college. Most of them are gonna go into science and technology and engineering. I send a lot of engineers off and then a lot of computer science people. And I get, then I get lucky, I get like one or two physics kids a year. Kids are like, I'm gonna study acoustics. I'm like, yes. We didn't even get a chance to talk about that, but I'm glad you love physics

Mark Royce (12:17):

That's awesome. I'm glad you mentioned acoustics. I come from a music background and production, you know so acoustic environment is something that I've studied quite a bit. So, is Gilbert High School a large high school? Or, how would you characterize the school itself that you're in?

Lynn Orgensen (12:39):

We're not the largest high school in the district. We've got about 2,400 students at our school and about 25% of our students are on free and reduced lunch. And so we have a broad range of students and economic backgrounds and family backgrounds. And so we're really quite a large mixing pot. There are other schools that have lower numbers on the free and reduced lunch and higher like enrollment numbers. But we are, we're a really good kind of slice and spectrum of our community and our surrounding areas pretty well. Most kids are doing fine. Some people need a little bit more help. And some people have more support at home, some people have less support. So we have a really, really broad range. I would say we're kind of a medium sized high school. Some other high schools in our district are at 36. There are others in our district that are like at 18. So we're kind of nicely in the middle.

Mark Royce (13:45):

<affirmative>. Gotcha. How big is your science department?

Lynn Orgensen (13:51):

I think our science department is either 13 or 14 teachers this year.

Mark Royce (13:56):

Oh. How many physics teachers?

Lynn Orgensen (14:00):

We have two full-time physics teachers and we have another teacher who we split with science or with math. He has two sections of physics in three sections of Algebra one.

Mark Royce (14:12):

Okay.

Lynn Orgensen (14:13):

We have seven sections of regular physics, two sections of IB physics and in total, four sections of AP physics.

Mark Royce (14:23):

So are you teaching just AP?

Lynn Orgensen (14:26):

I have AP and a section of regular.

Mark Royce (14:29):

Okay. Some schools aren't as large and don't have as large as science staff.

Lynn Orgensen (14:36):

Ours has definitely grown in the 11 years I've been here. We've added more science teachers, we've added more students. When I first started teaching at Gilbert, we were below, below 1800. But we also are now, we have an integrated, it's called GAMS, the Gilbert Accelerated Middle School. And so two of our science teachers are dedicated seventh and eighth grade science teachers. And a couple hundred of the 2,400, like 200 I think are actually junior high kids.

Mark Royce (15:14):

Oh, I see. Interesting.

Lynn Orgensen (15:15):

So we've got those. But yeah, when I was first started we were a smaller high school. And I was the only physics teacher.

Mark Royce (15:22):

Uhhuh. And what was that like for you?

Lynn Orgensen (15:25):

Overwhelming. It was always funny if a person was struggling with it, I'm like, Hey, you know, if-- I didn't have many kids fail, but I also would tell them, look, if you choose to fail, just know that you're taking it with me again next year because there's nobody else, so let's get it done this year. That was a good motivation.

Mark Royce (15:47):

Yeah. That's cool. <laugh>, what would you say to other high school teachers who are the only physics teacher at their school?

Lynn Orgensen (15:59):

It is hard. It's hard when you're the only physics teacher at your school. It's hard when you feel like the professional development doesn't relate to what you are doing. It's hard when you're the only person in the lunchroom who understands your own conversations. Like other people can be well intentioned, they can try, but they don't necessarily understand what you are going through. And I've been there. And the best thing I ever did was I looked outside

of my school to find a community of support. Whether that is finding the modeling community, which I absolutely did, or looking in your local section of AAPT or your local STEM, you know, like STEM teachers, Phoenix or STEM teachers, Cleveland or STEM teachers, X, Y, Z. All of them have amazing professional development and just amazing support groups to help be able to talk with and get ideas off of. And to realize that you're not the only one. There are other people out there who are happy to see, want you to succeed and happy to help and support you in your journey.

Mark Royce (17:15):

I think the idea and of development of community among teachers is critical these days. I know that the AMTA, this is a major discussion that's going on right now in the AMTA is developing a better system of helping create community through online resources. They're very focused on developing it. And a big part of the development will be to be able to create avenues of communication for teachers to connect, to encourage each other, and to find resources together and to share the life of being a teacher in the sciences. And so it's pretty cool what's, what's going on there in the AMTA in the background.

Lynn Orgensen (18:06):

I'm really excited to see those things in the future and how they help, but that community is what keeps teachers feeling, helps prevent us from burning out. It allows us to be like we're not the only one struggling with this. Yes. We all have the things and here are ways and solutions to help with what you're struggling with. It's community kind of keeps us focused on why we are doing what we're doing.

Mark Royce (18:32):

Yeah. I know you were on the AMTA, well president of the AMTA at one point. And what are the things that you would say are the reasons that people who aren't already should get involved with AMTA if they're a science teacher?

Lynn Orgensen (18:50):

So many people feel like they're so overwhelmed and so busy that they just don't have time for one more thing and one more piece. And in fact, people I work with have often wondered why I do stuff outside of my room. And quite frankly, I do it because by going to these activities, by working with these people, by participating in the board meetings and planning and doing these other activities, I have felt more energized and more supported and more excited about what I do than in any other meeting and activity that I do. It just is, there is absolutely something to be said for having a community of like-minded people wanting to just help each other be better. And how that lifts you when you're going through really hard stuff with work and with students and how it keeps you motivated to want to do more and be better. I've never felt like it was a waste of my time or an energy drain. I have always found them to be invigorating. And supportive.

Mark Royce (20:06):

That's cool. You've been able to, I assume you've participated in some of the online offerings that AMTA has done with some of their webinars and, you know, they have all kinds of different things going on all year long.

Lynn Orgensen (20:21):

I've done a bunch of them and I think connectED is coming up and it's just so fun talking with other people and hearing their stories. And so much of it is realizing, one, I'm not the only one and two, oh, that was a really good idea. I'm going to see how I can adapt it or steal it from my own classroom too.

Mark Royce (20:40):

Yeah. That's great. That's really cool. I looked you up online and I saw at one point, that you had done some presen-

tations about gender equity. And I'd love to hear your thoughts, 'cause I know they're probably run pretty deep on that for you. And, uh, I'd love to hear what you have to share about that.

Lynn Orgensen (21:02):

I'd love to. My idea and my purpose and my passion, aside from AP -- aside from physics and aside from AP, is supporting women and underrepresented groups in our science classrooms. Having a degree in physics and going through university, there were times when I was one of three or four girls in a class of 30. And sometimes I would recognize it because it was very obvious. And other times, just because of the way the teachers handled things, you didn't even notice. I didn't even notice that I was kind of an oddball and alone on there. And sometimes it's like really obvious and I know how awkward and hard it was for me sometimes being the only girl. And it is really hard to feel like you're isolated. And I think well and not, not think.

Lynn Orgensen (21:56):

I know from the research and the work that I have done that girls are feel far more of, if something is hard, it's just them. Boys, if they had a bad test, they're like, I had a bad test. Girls. If they have a bad test, I know nothing. And that's just kind of a brain wiring of boys come across as more confidence and girls don't. And so there are a lot of things we use with modeling that we can use to help support girls as well. How we arrange our groups is a huge one. Girls thrive with whiteboarding, especially if they're in small groups with other girls because they're able to be a little more comfortable with three or four other people instead of an entire class. With three or four people it's easier to share your ideas and have that communication.

Lynn Orgensen (22:47):

It's easier to ask me questions when it's in small groups. So a lot of the things we do to support gender equity help with a lot of kids who have like IEPs and 504s as well. 'cause those are the same thing that they need. But when I work with groups, I really try not just going beyond the making sure a girl's not isolated as the only girl in the group. In fact, we go exactly. So much the opposite. We work to make sure that the girls, if they're in groups, when they're in groups, are the majority. That it's not just two girls and two boys, but all girls or three girls and one boy. Because the research has, has just come out. BYU did a study about five years ago that noted that when girls are not the majority in a group, they're interrupted more.

Lynn Orgensen (23:43):

Even when they're equal and equal, girls are interrupted more and with less, positive interruptions. Like they're kind of cutting off and they're losing it. And so then they kind of lose sight of their confidence in what they can do. But when they're in a bigger group with their own self, they get to work the lab material, they get to do stuff, they get to run the equipment, and they start realizing that they're good at science too, and that there is a place for them in science and that they can do this.

Mark Royce (24:14):

Well, you're an example in your, in your career, as a physics teacher. I know my wife taught physics and now is in chemistry. And, how do you see the gender equality issue playing out in, in your field right now?

Lynn Orgensen (24:37):

I would say it has gotten in my field... a couple years ago I'd been like, I don't know, but in the time I have, the last two years, all of the physics teachers at our school were girls. We had one move away. We now have a physics, two of our physics teachers are female. We have one male physics teacher. I'm seeing not just because teaching is primarily we get a lot more women in teaching, but in our science department especially, we have more women in our science department than we do men. And I think that is an amazing and awesome thing for girls to have this mirror and window of -- They see someone who can do something similar and they're able to see a path forward and what that might be for them.

Lynn Orgensen (25:30):

And I think that's really changed because when I was in high school, I did not have a single female science teacher. At all in high school. I don't believe I had, I did not have a single female science teacher in college. I had female math teachers tons, but not in science. And now I'm seeing more professors as women. I'm seeing more high school science teachers that are women. And it's really kind of awesome to see the growth in those fields. I mean it's not great. The numbers, but they have gotten better. And that gives me some hope of if we keep doing the things we need to in the high school, inspiring girls and supporting them and helping them, we can get them to stay excited about science through the hard slog that freshmen and sophomore year in universities are.

Mark Royce (26:31):

That seems like a great improvement. And especially, I mean, you know, with so much gender bias from our history and in so many areas in life, it's great. It's really great to see women succeeding, and proving themselves worthy and effective, you know? I mean, it's really great. Love it. I want you to share with our listeners the best modeling tips that you have. What are the really the strong things that you, I really wanna share this with other modeling teachers. Or other teachers in general. You know,

Lynn Orgensen (27:15):

One of my big theories in life that I kind of really put into practice and has happened because of modeling is I would rather do something with a hands-on activity or demonstration that the students then whiteboard up and we have discussions on than my kids do another worksheet.

Mark Royce (27:34):

<laugh>

Lynn Orgensen (27:35):

Like that is such a big part, by making science tangible and modeling is such a great support for that. Those of us who are in schools where they're like, Hey, we should cut paper consumption, we're like, but kids need to write to learn science. Whiteboarding is great because it gets the kids up there. And talking and discussing like whiteboarding is probably my absolute favorite thing to do. I don't want kids sitting at their desks ignoring each other as they solve problems independently and then ask me for help when there's somebody perfectly capable right next to them. But when they're at lab stations, they ask each other questions more. They talk, they do. So a big thing I love to do, and I think it's super helpful if you have space. And if not, I have made space in my classroom. My classroom's not ideal, but I've made space to get them away from their desks and up actually standing, standing at lab stations, standing at whiteboards around the room, but not just ignoring each other sitting is a big one. So if you can get them out of their desks, learning and discussions so increase because of that, those discussions that they have increase when they're not sitting.

Mark Royce (28:54):

So Lynn, what would be your advice to teachers... You know, the state of education right now in America, it seems like it's constantly shifting as far as somebody says, this is new and this is good and we gotta implement this. And there's all kinds of new things coming down the pike that are being introduced and teachers are being asked to implement. How would you advise people to adapt to the new things that are coming into play all the time each year, it seems like?

Lynn Orgensen (29:28):

Yeah. It feels like each year, and I think for my school, like every, the last four years at least, there's been one new thing every year for the last four years. So literacy is gonna be our focus and how do we bring that in with science when we're not reading passages and adapting to that? And then for a couple years we had zeros aren't permit-

ted, so a student turns nothing in, not even their name on a blank piece of paper, nothing in, and they get a 50% on that. And this time it's now learning cycles and kind of everything under the sun. You can imagine we see, my big thing has been I wanna be adaptable, but I also don't wanna hate the thing that the the district or my admin or somebody is saying, this is what we are going to do this year.

Lynn Orgensen (30:24):

And so finding ways to bend their stuff to fit the needs that I have and the needs of my students requires some creativity. And some willingness to adapt. I don't have to adapt to literally everything and I'm not rewriting my curriculum and I'm not reworking things, but adapting. So when our school said zeros aren't permitted, okay, fine. But what we'll do is we'll be doing more whiteboarding stuff and we'll be doing more things here and I'll be monitoring what students are doing at whiteboards and kind of using that as their grading assessment on there. And when they put out the big reading initiative and literacy and they wanted us to read things, my push was okay, but literacy and science looks different. Graph reading is literacy, understanding how to decipher a word problem is literacy. I don't have to give my students paragraph length essays and research papers to read for literacy.

Lynn Orgensen (31:30):

Understanding what literacy looks like in my classroom. I was able to work with that. We want more Socratic seminars and student discussions. Great. That's what whiteboarding is. Whiteboarding is small group Socratic seminars. And so being able to spin and adapt what I currently do and make improvements on it to adapt with theirs is really helpful. So right now we're doing learning cycles where we're not allowed to enter. This is our new one. Everyone has a new one. Learning cycles. We're not allowed to enter something into the grade book unless every other physics teacher at my school is entering the exact same item into the grade book. And there's no compliance grading. So you can't just say, great, you finished this worksheet, we're gonna give you a check. You know, check that off. It's not really worth anything.

Lynn Orgensen (32:23):

But we're not to do that. So instead, because students still need to work, students still need to do something. We have come up with these little short, not exit tickets because I don't wanna know what a kid remembers from 10 minutes ago. That's not helpful on learning. We've come up with learning checks or homework quizzes where we take one question from the homework that's just a good representation, not the hardest question, but a medium level and turn that into a four point quiz at the start of class. Here's the thing, where are you at? And we can use that as a self-check on there. And so finding ways to be adaptable on there is a key part. When I was working on my master's degree, one of our professors, one of our instructors had made the comment that as teachers and he had been teaching for many years, and he said, as teachers, the moment we stopped looking for ways to improve ourselves or adapt to better meet the needs of our students, that's when we should be done teaching. That we're going to need to make adjustments and changes every single year. So find ways to make adjustments so that you don't hate grade books or what you're doing. Find a way to make it work for you. Be creative with it.

Mark Royce (33:52):

Yeah. That's awesome. What great advice. If you don't love what you're doing, you shouldn't be doing it. Especially with kids, you know, with teaching. I think, a great teacher in the classroom who really cares about their students and really loves the field that they're sharing are a gift, you know? So anyway, it has been awesome talking with you.

Lynn Orgensen (34:22):

Well, this has been fun. Thank you.

Mark Royce (34:24):

Congratulations again on, on the award that you received, the PHYSTECH Award. And man, that is really something. National Teacher of the Year. That's great.

Lynn Orgensen (34:35):

Thank you. Sometimes we just get in our own little bubble of our classroom with our heads down doing our thing that we forget the impact and influence we have on others around us. And so this is really kind of an awesome honor and nice little eye-opener for me.

Mark Royce (34:51):

Well, Lynn, thanks again for talking with me, and I know our listeners are gonna really enjoy this conversation.

Lynn Orgensen (34:58):

Oh, absolutely. Thank you so much, Mark. This has been lovely.

Mark Royce (35:01):

Yep. You take care.

Lynn Orgensen (35:02):

All right. Thank you.