Mark Royce (00:00):
Hi Muhsin, Kevin, Melanie, How are y'all?

Muhsin Erhan (00:04):
Doing great. How are you?

Kevin Butler (00:05):
Doing great, Mark.

Melanie Dimler (00:06):
Hi, today's a good day.

Mark Royce (00:08):
That's good. Now, now Kevin. And Melanie, you are... Where are you guys?

Kevin Butler (00:13):
We're in the great state of Alabama,

Mark Royce (00:15):
Alabama

Melanie Dimler (00:16):
Trussville, Alabama, which is a suburb of Birmingham.

Mark Royce (00:20):
Okay.

Kevin Butler (00:20):
Yeah, we teach at Hewitt-Trussville High School, outside of Birmingham, Alabama.

Mark Royce (00:25):
Awesome. And you guys are co-teachers.

Kevin Butler (00:27):
Yes, sir.

Mark Royce (00:28):
Cool. And Muhsin, you're in Turkey, right?

Muhsin Erhan (00:32):
Yes. I am in Turkey, in a nice city at the Aegean coast, in Izmir, actually working in an international school.

Mark Royce (00:42):

Okay. And you teach...

Muhsin Erhan (00:44):

I am teaching IB physics and the national curriculum physics at the high school level.

Mark Royce (00:50):

And so the three of you met when you all attended an AMTA workshop, is that correct?

Muhsin Erhan (00:58):

Correct.

Melanie Dimler (00:59):

That's correct.

Mark Royce (00:59):

Specifically what workshop was that? And when?

Melanie Dimler (01:02):

It was the physics modeling workshop, modeling mechanics, and it was the online version of the mechanics course for teachers in June and July of this summer.

Mark Royce (01:17):

Tell me how you guys got introduced to the idea of modeling instruction. Let's start with Kevin. How did you first learn about modeling instruction?

Kevin Butler (01:28):

Well, it was in the interview process for this new position that I have at Hewitt-Trussville High School. I was asked in the interview process, did I know what the modeling physics was, and I had to respond, No, because I've never heard of it really. I never taught physics that way. It's been three years since I've taught physics. And so, I got introduced through accepting this job on a Friday afternoon. And then the following Monday morning, I was in, this modeling workshop for the next six and a half weeks.

Mark Royce (02:05):

And that was just this year.

Kevin Butler (02:07):

It was in June. It was in June.

Mark Royce (02:10):

Yeah. And you'd been teaching how long before that?

Kevin Butler (02:14):

This is my 18th year of teaching in public schools.

Mark Royce (02:19):

and physics for how long?

Kevin Butler (02:20):

I taught three years of physics and two years of engineering.

Mark Royce (02:24):

Wow. And so Melanie, this guy comes into your school, Kevin and you're currently teaching physics, right? Am I right there?

Melanie Dimler (02:35):

I am. I teach advanced physics and AP physics 1 and AP physics, C mechanics at Hewitt-Trussville High School. And I've been teaching there for about 10 years.

Mark Royce (02:47):

Okay. Melanie, I need to ask you this. How did you first get introduced to modeling?

Melanie Dimler (02:53):

So I started teaching in 2011 and I had to go through the alternative certification process through the state of Alabama because I'm a mechanical engineer by degree. And so this is my second career. After a 10 year stay at home mom stint, and I never taught before, but was thrown in a classroom within a week of inquiring about how do I get certified to teach? There was a emergency fill opening at Hewitt-Trussville High School for a physics teacher, six weeks after the school year started. And, I got thrown in the classroom, never taught, didn't have a teaching certificate, had a mechanical engineering degree, knew some physics, but it had been 15 years. So I started teaching and I was like, I don't know what I'm doing. I need to find out the best way to figure out how to teach physics.

Melanie Dimler (03:56):

And I started a master's program through LSU actually, which is my Alma mater. And through that master's program, they introduced me to modeling instruction through that.

Mark Royce (04:09):

What year? What year was this?

Melanie Dimler (04:12):

This was 2013.

Mark Royce (04:16):

Okay.

Melanie Dimler (04:16):

So in 2013, I was introduced to physics modeling and the next, the following summer in 2014, I attended my first modeling training in our physics, modeling training in Arizona. So I have been doing the modeling curriculum and strategies in my classroom since 2014. And when we had to hire a new physics teacher, we interviewed Kevin and we loved them. And I was like, is he willing to do the modeling training? And if he is yay check. And he was, and he did great, and I'm excited to teach this year with him, cause I've been an advocate. And the physics teacher we had before never got to attend a physics modeling training, but since it was online this year, our school was able to afford to send us without having to pay for us to go to Arizona or go somewhere else and be housed there. So, because it was online, it actually allowed us to do it.

Mark Royce (05:20):

Right. Wow. So Muhsin, same question. How did you get introduced originally to the idea of modeling instruction in Turkey? I mean, I'm blown away. It's like you're in Turkey and here you are.

Muhsin Erhan (05:34):

Mr. Brad Bell, well, actually he's the head of our school in American Collegiate Institute. And I think he and Ms. Marvel had crossed roads at some point. I think Mr. Bell attended one of these modeling courses and he is actually coming from a physics background, which makes me quite lucky because I'm a physics teacher. So when he heard about this modeling workshop, he just sent us like all the physics teachers, the link, which is introducing the course. But the funny thing is like, I am, similar to Melanie. I am actually coming from private sector, which I have spent more than like nine years in almost any type of engineering background, like the construction field, mining, energy sector and other kinds of things. And I have quit all of these professions to become a teacher because that was the dream job that I was hunting.

Muhsin Erhan (06:36):

And I decided to do my master's degree on teaching while I was actually working in the private sector. And I had that opportunity to get an internship in the school that I am working right now. And during that internship the school was actually heavily loaded with like hands-on experiments and other kinds of things. And then I realized that if I can be a teacher who is utilizing these kind of models and other kinds of stuff, then I can actually do this profession. So I can become a teacher if teaching will become like this. And eventually, Mr. Bell came up with this idea. He told me that there's this modeling workshop where they are literally giving you a full lesson plan and conducting the modeling lessons. Because from my master's degree program, we had this modeling workshop, but it was just written on paper.

Muhsin Erhan (07:35):

We were just checking the lesson plans. We were just writing the lesson plans, but we were never conducting those things. They were just written on the paper. This was the first time I was introduced to a modeling workshop where you literally are becoming the teacher, becoming the student, becoming the person who has no idea what's going on, trying and trying to figure out the physics behind those devices or tools or systems. And that was quite amazing. I was not expecting such a team. Like I was not expecting to get all these units in mechanics conducted physically. Like I was expecting to talk about it, read about it, but was not expecting to do the experiments, figure out what you can do without just using any technical terminology and other kind of stuff. So it was great for me.

Mark Royce (08:33):

Now you mentioned, the name that I picked up on that I've heard before was Warble. Kelly Warble. Yeah. And she, if I understand correctly, was one of your instructors in the workshop, along with who -- who was the co-leader?

Melanie Dimler (08:51):

Kirticia Jarrett.

Mark Royce (08:53):

Kirticia Jarrett. So tell me, and at this point, any of you can pick up, what the experience under those two in the workshops-- What was your experience like, how was their leadership? What did you, what did you glean? How did it impact you? Go ahead. Just anybody,

Muhsin Erhan (09:12):

What I can say is like the first thing that I like, the first impression that I got, uh, for Ms. Warble is that she was quite experienced with the field knowledge or the area of expertise. She had this area of expertise, but she also had the knowledge of transferring the information to the low levels. Like you might master the physics on a very higher level, let's say the college level. But the problem that, for example, for me, the problem that I was facing is that I was not able to transfer that information appropriately for the high school students. So for Ms. Warble, there was no problem at like lowering down the level of information or tuning up the level of information for the student mode or for the teacher mode. So she was quite experienced and she was quite good at switching in between modes and for Kirticia, she had this enormous experience, like at school, with different curriculums, and like, she knew what was going on AP curriculum. She knew what was going on in the IB curriculum, and other curriculums. And she also had the experience of this modeling implemented or already covered on this curriculum. Like those two were combined in a creme de LA creme mode for us.

Mark Royce (10:47):

That's great. Yeah. Kevin, how about you? What was the experience like with their instruction?

Kevin Butler (10:54):

And I think they were great. They showed us, you know, that, Hey, we're going to let you run with it. And we're going to let you experiment. We're going to guide you in the right direction. They showed us how a teacher is supposed to run the class by their interactions. And they let us, you know, struggle at times. And let us find out the answers on our own at times, because that's what we're going to be doing in a classroom. So that's what they shared is how a true classroom would work. Um, and then if we had ideas that were off the rails or not correct, they would guide you back in the right direction. And so we got a lot of not only just physics teaching points, but a lot of teaching points too, about how to guide the student, how to pull information from the student, because in this, the unique thing that I learned about the modeling curriculum is you're not up there lecturing telling them what they're going to use.

Kevin Butler (11:51):

You're letting them discover what they're going to use. And, you know, it's much like the real world when they get out of college or when they're, --here you're a business guy, you've got this problem, you've got to figure out how to solve it. And you've got to go back on your prior knowledge, because this company is not going to teach you how to solve that problem. You're there to solve that problem, or if you're an engineer or whatever your job is to use your prior knowledge that you've obtained to solve

the solution. And that's what I thought was unique about the modeling situation is we're just going to build on this prior knowledge you have and show you how, you know, the information. This is just a new way to look at it and apply the information. And so not being in the physics world.

Kevin Butler (12:40):

I think the last physics class I taught was four or five years ago. I was rusty on my physics. I didn't brush up on it before my interview for the position. So I was rusty on all of my physics terminology and applications and formulas and all of that. And so it kind of was unique to see, Hey, this can be done. Even the struggling students will find their little niche in the group because we worked as a group, much, like they suggest you have the group set up in class is we would break off into our virtual break rooms and solve these problems much. Like you would expect a high school student to do

Mark Royce (13:23):

Awesome. You're lucky. You're jumping in and you got gotta bone up on your physics, but you've also got Melanie right there. So it's probably going to go more quickly for you that way. That's awesome. Melanie, go ahead.

Kevin Butler (13:41):

I'll let her talk about how she and I were able to do that in our classroom. Since our classrooms are next door, we were able to go into the school and have our virtual meetings virtually side-by-side, to use some of the things in the classroom.

Mark Royce (13:55):

Oh, that's cool.

Melanie Dimler (13:56):

Yeah. This summer workshop allowed Kevin and I to really do all of the discovery and paradigm experiments in our classroom setting together, before the school year started. So we do have a leg up, but to answer your question about Kelly and Kirticia, I love this modeling workshop for many reasons. It was a refresher for me. So I've been through the workshop with Jeff Steiner the first time who was an excellent modeling instructor, and then Kelly and Kirticia, also very professional and experienced and helpful. And one of the things I took away from this modeling workshop versus the first time was how to do this online because with the new climate, with online learning and the pandemic and virtual classrooms, I struggled last year, doing modeling well, virtually. I didn't know how to do it. It's just, it's not a lecture.

Melanie Dimler (15:08):

So it wasn't conducive to someone taping my class and then showing it to the students who were at home and Kelly, and Kirticia showed us through many online resources, how to make this work online. And I appreciated that. So if, and when, we have to do this online, which I don't think is the best scenario, but if it is a scenario we have to do, there are many ways to do it well online. And Kelly and Kirticia were experienced with that after this year, and helped us like literally did that with us since the class was online.

Mark Royce (15:47):

I know that the modeling community is growing, but it's pretty tight. And it's really neat that there are so many resources in other teachers that you guys, you know, share information, and help equip each other with the things you've learned over doing it. And I know the online thing has been a big one for teachers helping other teachers to get in on it and succeed with it. Muhsin, how was... Melanie mentioned that this was a big thing that she took away from the workshop. What is something that you took away from the workshop that was really significant for you?

Muhsin Erhan (16:32):

That was the exact thing that I was thinking when actually Melanie talked about the thing that she took from this workshop for me, it was getting aside and letting students rule the class or ruled the lesson because like, I am not as experienced as Kevin. Like this is the fourth year on my teaching and I need lots of, and lots of experience. So I just need to find ways to like step aside and get the students on the stage. And, or in, like in other words, play the fool to make them share. And that was going in a perfect mood with Kirticia and Kelly. They were just setting up the climate. So we were the ones who were actually doing all the things and we were enjoying doing it. And that is the desire for a teacher. That is what I desire as a teacher as well, instead of just lecturing in a boring way.

Muhsin Erhan (17:40):

I just want my students go crazy inside the classroom to figure out what's going on, how or how they can handle this situation to come up with a solution to any particular problem or to any particular set up. So all these lessons wired in a way where we ended up either giving wrong answers or trying to figure out the right answers together in a group. And we were doing all the things like we were trying to generate the models. We were trying to come up with the experiments. We were trying to find out ways to, I don't know, use the online tools to extract information and eventually come up with the technical terminology and the right physical information that we are normally in a lecturing environment providing at the very beginning and making it quite boring. So this time we were like explorers. We were just trying to dig for the unknown and eventually coming up with the right to say acceleration because after that hassling and that like, working in a hard manner, we earn our right to call that term acceleration.

Muhsin Erhan (18:56):

Because now we have spent lots of, lots of time together to realize that when the speed of an object is changing, that technical term can be named as acceleration. So it was in a situation where we are not allowed to use any technical terminology before discovering it. And in this workshop, literally, like I really enjoyed the exploration part where this part is quite missing for the regular teaching. You are not building up the knowledge or the information that you are sharing with your students based on their prior knowledge first. So you are not letting or setting up the stage for the kids. Most of the times when we are doing the regular teaching or the lecturing mode, but here you are just setting up the stage for the kids, letting them get onto the stage, share their ideas. There is nothing wrong on the things that they are saying.

Muhsin Erhan (20:02):

Eventually they will work together to come up with the right model. And that's exactly what has happened for me. So I was just taking these small notes on things that I can actually implement on my own teaching. And that was the version of the teacher that I really wanted to be. That was the main reason that I shifted my career from private sector to become a teacher, because I just want to teach my

kids the only thing that I want to teach my kids to explore their surroundings. Like you get a tool and try to find ways to use that tool to measure something. I don't know. It doesn't matter what you are measuring. It doesn't matter how you are measuring, but figure out how you can get the end of that problem eventually by just using the gadgets and the tools and the information that you observe and the information that's available to you. So you are on the stage, go shine, go find something. It doesn't matter if it is like a little bit wrong, we can figure out and correct it together as a group. So I actually took lots of, lots of things from this modeling workshop.

Mark Royce (21:16):

That's wonderful. I love hearing the passion in you, as you speak about teaching and it's like, it's more than just a career. It's something that you really, really feel passionate about pursuing. And I love hearing that. And, you know, I've been doing these interviews for about two years in the three of you exhibit a lot of what I've seen in most of the modelers that I've talked to is this passion and enthusiasm about teaching and especially about teaching science and, you know, it's, it's really cool. So, I want to ask you guys if and how this workshop has changed you or influenced you in how you're going to teach moving forward. Okay. So Kevin, let's start with you and, uh, sure.

Kevin Butler (22:16):

Well, it's really changed my philosophy in the classroom. Instead of being the stand in front, know all, here's the information to use... I want to be kind of the let's sit back, here's the problem. And let's see what you can do with the problem, because I've learned that students really want to prove you wrong. And, you know, if you tell them, Hey, I bet you can't do this. You know, they're going to try to prove that they can do it. And that's what, you know, they like to be challenged. They don't admit they like to be challenged, but they like to be challenged, to a point where, Hey, you know, I know how to do this. And after they get a couple of those, cause we could see this in our class as well. We had some individuals who were kind of sitting back and waiting.

Kevin Butler (23:10):

And after we had a couple of our modeling sessions on different topics, people started feeling more confident about talking about their information and sharing information. And I think that's important for students to see. And once one of them feels more confident in that group, it kind of spreads, in a good way, not like the COVID way, but in a good way that they, they take confidence from each other. And you know, these young people will strengthen each other and encourage each other in ways that we can't get to pull information out of them. And so there are them being in their small board meetings and their small group meetings and sharing information and hitting each other and solving it together. I think that's going to be a new way of reaching out to them and letting them show off the knowledge they have and the experiences that they've had in the past that they can relate to.

Mark Royce (24:13):

Melanie, I know that this is your second workshop and you've been teaching a little longer in physics. Can you answer that question about how it influenced you this workshop?

Melanie Dimler (24:24):

I can. This second time around actually just reenergized me to continue with stepping back and not lecturing like at all. And that's hard for a teacher. Some people think, well, if the students are doing all the work, what is the teacher doing with modeling and it's actually harder. It's actually much harder to

teach this way than to get up and just talk. Getting up in front of a class and just talking about what you know is pretty easy compared to creating the kind of environment necessary to have students feel safe, to discover things for themselves and, and confident to work with each other and the confidence to be wrong. And I think I'm just reenergized taking a back seat in my classroom, doing a lot of behind the scenes work to set things up.

Melanie Dimler (25:25):

And also we have some great new technology. So just implementing the new technologies in my modeling classroom. We have these smart carts we're going to use. Kevin and I were already talking about new experiments we can do this year that we've never done. And once the students are confident doing a paradigm lab... Like the beauty in modeling to me is show the students a physical phenomenon and just let's have a conversation. What do you observe? And then based on what you observe, what can you measure? What can you change? And let them come up with an experiment and run with it. And they're excited to do that. And when they do that successfully, a couple of times, they get to the point where they're creating experiments without me even setting them up. And so that's how to become a problem solver. And, and like Kevin said earlier, extrapolate that to any context in your life, solve a problem. What do you, what do you observe? What can you change? And, and, so I I'm re-energized is what I am about the modeling and also not scared to do it online, when needed. So I'm grateful for having the opportunity to go through this class twice.

Mark Royce (26:55):

So Muhsin, you've been teaching physics for, did you say four years?

Muhsin Erhan (27:00):

Yes. This is the fourth year of mine.

Mark Royce (27:03):

Yeah. And now you've gone to this workshop after four years. Talk to me about how it's changing you, how you see moving forward with your instruction in the classroom. After the workshop,

Muhsin Erhan (27:18):

From my point of view or from my own experience, I do realize that there are a few problems that are popping up in a regular physics classroom. We have different types of students that coming into the physics classroom with different expectations. Some of them are math geniuses. So they think that they can actually wire up the mathematics, put the numbers into the equations and get the results and get a higher grade. Some of them are really scared from mathematics, and that's why they think that they are going to fail the course. So imagine that you're in this weird situation where you have students from different versions and you are trying to convince both of them wrong. You are trying to say the math genius guy, that, okay, this classroom is just a playground where you can utilize the mathematics to simplify the stuff at the very end.

Muhsin Erhan (28:23):

So stop bragging about your advanced math skills. They will be only important if you are able to like observe and extract enough information to get a relationship. And we don't need to worry about that advanced level mathematics. You just need your eyes. You just need your ears to hear something, see something and look at the trends and eventually get the relationship between A and B. Physics is not

just the relationship or the equation that you memorized to succeed in your advanced mathematical levels. On the other hand, we just need to tell the person who is afraid of failing from physics, because like he don't have like advanced mathematical skill. We just need to tell him, or her calm down, you will get to the level that you are going to realize that right after enough observation, you will have the key to solve that issue eventually.

Muhsin Erhan (29:29):

And all you need to do is get into this class, start building up the information from the models that you have on your hand. Like, just look around yourself, as I say, look at the equipment that is available and just start thinking. You don't need anything else. Like you just, all you need to do is just trigger a thinking mechanism. Like what I can do with the balance, like what I can do with the balance. And you can do various things and that's not wrong. Like eventually you will come up with something useful, which will help you to learn the physics behind it. And it will make your life easier and it will make you feel happier. So like, that's the thing that I realized that I am going to implement into my teaching as well. And the third thing is, or the third type of person-- he is actually getting to the physic classroom is me. A teacher with four years experience, who is scared to death to not be able to cover the curriculum.

Muhsin Erhan (30:46):

If he actually goes into the modeling work and try to pull up something much more useful for the students, like try to come up with a modeling example to cover. Let's say, accelerated motion. Like this is always out there. You are just as afraid to not be able to finish up the curriculum. You are just afraid to not be able to meet the deadlines, but Hey, as a teacher, I just need to realize that I don't need to worry. The actual teaching or the actual learning happens when the kids are on the stage. And when they feel comfortable to share what they eventually got, it doesn't constitute as the actual learning when the kids are just mumbling the things or repeating the things that I have just sent them, or I have just told them, that's not the way that I want to do the teaching, but after this workshop, I have actual physical proof that it is doable.

Muhsin Erhan (31:50):

Like we can actually agree. We can actually do it with this diverse classroom environment, where you have like high level students, when you have low achievers or where you have students who are like willing to do a hands-on or where you have students who are trying to come up with mathematical relationships. The modeling is the program where you can blend all of these things together to come up with a situation or with a solution to any kind of problem. That is the meat of it. And like with those paradigm labs, I think Melanie and Kevin also remembers, we were just starting with this silly question. Like we have a toy car, we have a watch and we have meter stick , okay. What we can do with these three things. And eventually we have finished up covering entire mechanics curriculum with all those like very basic gadgets.

Muhsin Erhan (32:52):

And we ended up pulling up the relationships for the circular motion. We ended up pulling up the relationship for harmonic motion. Like these are really big words, but the starting point is just three or four simple gadgets. And the silly question like you are asking, okay, we have these four devices. We don't know what to do. What do you want to do with those things? Okay, it's your stage students go and start doing it. So from now on, now I can actually convince myself that it is doable and I am going to

lead. Maybe I think maybe I will fail to finish the curriculum, but I will definitely feel much more grateful and I will definitely feel a joyful physics teacher together with my students.

Mark Royce (33:44):

Uh that's awesome, man. Wow. I'm curious. You guys have the resources from the workshop itself, the time you spent there. Are you all able to take advantage of the other resources that AMTA provides through their website? And I know they have some social media stuf, and Muhsin, are you able to connect into the AMTA resources in Turkey?

Muhsin Erhan (34:14):

Normally I actually did not know any of those sources. I actually didn't know that there was a modeling community present in the United States where all these teachers who are actually sharing the same ideas or same concerns with me, get together. And instead of just getting together, they started creating sources together. And so I didn't know those things before this modeling workshop. Now I have all those sources are available for me, and throughout the workshop, since we have completed that workshop, the registering fee was like downgraded, or they have just canceled out much of the registering fee, so for a small amount of payment for the registration, I can actually have access to all those sources that I can use, which is quite great because that's the most painful part for being a teacher that you are trying to do these kinds of things.

Muhsin Erhan (35:21):

If you do not have like ready-made materials, which will guide you through this sort of modeling experiences, you will feel overwhelmed because it's not easy. It's not easy. It's not like preparing a very basic worksheet, which includes four or five, multiple choice questions, one or two open-ended questions, which is trying to like get, get an answer on a very regular basis. You are just trying to create a system where the students will eventually try to figure out something. That's why you need sources from experienced people. And this AMTA community is actually quite good at like sharing and talking about the quality of those sources or updating the quality of those sources. Eventually there are like three versions availble. Am I wrong, Melanie, I'm quite new, but

Melanie Dimler (36:23):

You are right. And I think it's one of the reasons I think I convinced Kevin, Hey, this workshop is worth it because they give you all these resources at the end and you don't have to reinvent the wheel. And all these resources are so well scaffolded and so well done. And based on physics educational research, decades of it. And once you go through the modeling curriculum one year in your classroom, you're like, wow, this took a lot of work from a lot of people to create this curriculum and all the resources that are available to us. And it's, you know, it's our job to then have that modeling spirit in our classroom and implement it, but all of the worksheets and even tests and quizzes and lab experiments and teacher notes, it's all there for us. So it does help because that stuff is a full-time job to create. And if you have to learn how to teach in a new way, and every other thing a teacher is tasked to do during the year, it's hard to also create curriculum. So I appreciate that the AMTA website and the modeling community of teachers is so generous with resources and ideas, and you could go online and find all kinds of resources, but the modeling resources on the AMTA website with the full curriculum scaffolded up purposefully, is invaluable.

Mark Royce (38:09):

So I would ask you three, what you would share with others about the workshop and about modeling in general and what would you say to another teacher who isn't involved already to encourage them to get involved? Okay, Melanie, let's start with you.

Melanie Dimler (38:30):

So I've used the modeling curriculum since 2014, and I was hesitant at first to use it in my AP physics classes, because I didn't know, since it was a very specific exam we had to prepare for at the end of the year for AP physics. I didn't know how the modeling curriculum would fit into that. And surprisingly it works really well at all levels of introductory physics, from on-level physics, advanced physics, my AP classes eat up this approach to learning mechanics. And I actually use the modeling resources just as much or more in my AP classes than even the AP resources. And I've noticed that once we get a good foundation through the modeling curriculum and approach to mechanics, that the students then can learn these much more difficult concepts on an even deeper level as the year progresses and the content becomes more difficult. So I love modeling. I'm a big advocate for it even in AP or IB classes, if any teachers are hesitant to do it in those level classes.

Mark Royce (40:03):

Yeah. And Muhsin, how about you? What would you share with other teachers that would encourage them to get involved with modeling?

Muhsin Erhan (40:11):

I think there is this kind of approach among teachers. Like teachers think that for each curriculum, we just need to have a different approach. Like for example, in our national curriculum, we are having a university entrance exam where the students needs to like study all the topics and respond some multiple choice questions. In IB curriculum, the students are expected to take like practical exams, like paper practical exams or open-ended questions, exam, and multiple choices. But I think in common, that's not the approach that we should have. The approach towards this science or these courses should be in a base, what type of a student we want to have in those classroom. Like, it doesn't matter which curriculum that you are teaching, but it will be important. The mindset of the student that you have in that classroom and the mindset of a student for a classroom of science should be that you are expecting to see explorers.

Muhsin Erhan (41:24):

The students who are actually doing what all these great scientists have been doing for the last, I don't know, 2000 or 3000 years. They are just trying to explore what is going on in their surroundings to become this great people. And this is modeling. This is what modeling can offer. Like the modeling courses can actually make these small, very excited minds as giant explorers so they can feel happy and they can feel joyful right after, I don't know, discovering the Hooke's Law. You don't need to ruin that joy by just getting in front of the table and start pumping information for them to type their hand notes. Like they don't need to do it, let them just use this approach to figure that out by themselves. And don't worry, you will not be alone. And eventually we have these workshops where some-- like not a giant community, but a community that's actually growing day by day-- will be willing to share their experiences with you.

Muhsin Erhan (42:43):

And that's what I will definitely tell my colleagues when I return back to school. Like let's adapt our curriculum. Like we don't need to rush for it. Let's try to switch or shift one or two lesson plans into modeling, and let's try to test it out. Let's see how it goes. And let's ask questions to students about their feelings and let's check the results in some of the like exams and try to see whether the students are actually learning or not. I think at the end, because that's, what's happening for me. After this modeling course, I feel much more knowledgeable. Like I feel that I have learned a lot. And I think that will be exactly the same for my kids as well, because they will be in charge. They will be at the stage and eventually they can actually say that. Okay. I have figured out the story. So I know that theory.

Mark Royce (43:40):

Very good.

Melanie Dimler (43:41):

Yes. And I'll go back and add something based on what Muhsin said. The students like, say in an AP class, they're given a very intimidating equation sheet in an AP class and through modeling, I'm able to say, okay, this equation sheet that everyone sees online for AP physics one, we're not allowed to use any of these equations until we discover where they came from first. And the kids embrace that because they they've seen equation sheets before. They're intimidating. Like when do I use this equation? How do I know? What is it even mean? What are these symbols? And that's intimidating to a first year physics students. And when I say, we're not going to use any of these equations until we discover experimentally with our own hands in our own classroom, where it came from first, they love that. And they embrace that and they don't even want to use an equation unless they discover it first.

Mark Royce (44:42):

Oh, that's awesome. Kevin?

Kevin Butler (44:46):

Mark building upon their comments, both of Melanie and Muhsin mentioned there. My thought is this needs to be started earlier. Maybe middle school, when those students are, or we're starting in science, lose those students, that desire to take the math, to take the harder level, higher level math courses. Maybe we need to start this earlier because, like they were saying, it has that excitement attached to it. And that confidence building that I can do this. And maybe we need to look at this in an earlier curriculum. Um, so that we're not--

Mark Royce (45:24):

Maybe maybe bring more kids along.

Kevin Butler (45:27):

Exactly, You know, start them earlier in this modeling technique. Because, I've been an administrator in a school and I'm looking at, I've got to find more just general classes to meet the student's need for graduation. They're not taking the hard level physics and AP courses because they're told they're hard and they don't have that thrill of science anymore. And so maybe if we started this earlier and it went farther vertically in the curriculum that more teachers were teaching the modeling methods, then, maybe students would be more excited about sciences in general and staying in and taking tougher chemistry or tougher physics class, so that they could be more successful in the science world.

Mark Royce (46:16):

I know a lot of modelers agree with you. A lot of high school teachers agree with you, that the kids are, you know, it takes them a while to get them up to speed in the modeling methodology in the classroom. And if they'd had been exposed to it earlier, they'd be able to launch a little quicker in the high school setting. So, you know, I can tell with talking with you three, that we could talk for a long time, we'd have a lot to cover. You know, unfortunately our time is kind of, we're there. And gosh, it has been really, really wonderful to chat with the three of you and, Muhsin, having you join us from Turkey has been a wonderful experience. I think you're my longest distance interview so far in the two years I've been doing this and it's been really exciting to have you and Melanie and Kevin, I just wish you the very best at your school together as you guys figure this all out as you go along. It's been great. And I just want to say thank you to each one of you.

Melanie Dimler (47:28):

Thank you, Mark.

Kevin Butler (47:30):

Thank you, Mark. Appreciate it.

Muhsin Erhan (47:31):

I really want to thank all of you as well. I mean, like throughout the workshop, I really enjoyed accompanying with Melanie and Kevin and the rest of the crew. I mean, it was a great experience. I just want to say that like all of them have contributed. We have loved, we have learned like it was a joyful period. I wish that we had the chance to actually do it face-to-face, but this was the opportunity that we have taken and do it online. And it was, even though we have done it online, it was perfect. And on the other hand, this podcast, this is the first time I am actually joining a podcast and I am actually sharing my ideas or sharing my passion about science. And I really want to thank you, Mark, for providing this opportunity for me.

Melanie Dimler (48:26):

I agree. I agree.

Mark Royce (48:28):

Well, it's been a joy for me, and I know that our listeners are going to really get a lot from this conversation. And I want to say, thanks again for sharing your perspectives, your insights. It's been wonderful. Thanks you guys.

Melanie Dimler (48:44):

Thank you.

Kevin Butler (48:44):

Thank you.

Muhsin Erhan (48:45):

Thank you.