

Bonni [00:00:00] Some disciplines tend to get thought of as not necessarily the easiest to grasp. In today's episode Dr. Ainissa Ramirez shares about how and why to make challenging subjects fun.

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Bonni [00:00:24] Welcome to this episode of Teaching in Higher Ed. This is the space where we explore the art and science of being more effective at facilitating learning. We also share ways to increase our personal productivity approaches so we can have more peace in our lives and be even more present for our students.

Bonni [00:00:51] I am so happy today to be welcoming Dr. Ainissa Ramirez to the show and tackling the subject I'm surprised we haven't covered yet as we look at making challenging subjects fun. I can say that she certainly teaches in an area that has been challenging for me. I'm so looking forward to learning from her. And Ainissa, welcome to the show.

Ainissa [00:01:12] Thank you for having me here.

Bonni [00:01:13] Well I'm going to try my best to tackle your background but I'm going to need some help. I was really interested in the books that you've written especially how did you come up with the idea of writing about Newton's Football: The Science Behind America's Game.

Ainissa [00:01:28] You know that happened by accident because a couple of years ago if you asked me if I knew anything about football I could tell you very very little.

Ainissa [00:01:35] I am interested in making science fun and I did a video a couple of years ago that explained the physics of the forward pass and was

approached by a literary agent and also a publisher if I'd be interested in looking at the science behind the game.

Ainissa [00:01:50] And so so it was an opportunity I was teamed up with a sportswriter and what we did is we looked at football but we looked at it from a science lens so that's kind of how I was teamed up to do Newton's Football.

Bonni [00:02:00] What a perfect example of making it fun and I'm sure that attracted a lot of people because they already had that passion for football. I am surprised though that you didn't prior. That's wonderful.

Bonni [00:02:09] And then you also author to Save our Science: How to Inspire a New Generation of Scientists. Talk a little bit about the background on that one.

Ainissa [00:02:18] We'll Save our Science is more aligned to my own passion. A couple of years ago I got a chance to give a TED talk and my theme although I thought they I think they brought me on board because they wanted me to do science demonstrations.

Ainissa [00:02:31] I was known as a professor I would bring in blow torches and blow up things. So I think that's what they were anticipating would be by TED talk and I did a little bit of that in the beginning and then I kind of pivoted and said look all this great science is is wonderful and it makes all these wonderful technologies.

Ainissa [00:02:47] But in order to make this possible we need more people who think about science they don't necessarily have to become a scientist but they need to think like a scientist in order to innovate.

Ainissa [00:02:57] And so Save our Science was sort of a continuation of my TED talk just kind of my manifesto if you will for how we can make other people interested in science. They don't necessarily have to become scientists but have them think about the world that's around them.

Bonni [00:03:12] I'd like to also share a little bit about your educational background your undergraduate degree was from Brown University. Your Ph.D. from Stanford. You spent some time on faculty at Yale. Prior to that a research scientist at Bell Laboratories Lucent Technologies and Eve did award winning research there.

Ainissa [00:03:33] Yep that's me. And I wanted to be a scientist since I was four. And so I went to Brown to do science became a material scientist major really loved it and so I went on to graduate school went to Stanford.

Ainissa [00:03:46] Then I thought it was going to stay in California for the rest of my life because I really loved it. But then the opportunity of a lifetime came. Bell Laboratories which is the place that made the semiconductor and all these wonderful inventions that we benefit from today they were hiring.

Ainissa [00:04:01] And so I applied got in and came back to the east coast because I'm originally from New Jersey loved it but then the telecom bubble burst. I thought I was going to stay at Bell Labs. The rest of my career.

Ainissa [00:04:13] But like many other scientists all of the Bell Labers kind of scattered to the wind and went to different places and I thought that academia was probably best suited for me.

Ainissa [00:04:23] So I headed to New England to Connecticut to Yale was there for about ten years and now I've actually decided that I love being a scientist but I actually love sharing science with other people and so that's the role that I've taken on today which I call a science evangelist.

Bonni [00:04:39] Congratulations that sounds like a fabulous background to set you up to really spread the word about science even broader than Yale. That's what a wonderful thing. I would love to hear a little bit more what did science look like in your four year old mind what kinds of things were emerging at that age.

Ainissa [00:04:56] You know things that turned me on were experiments like with leaves like putting cardboard on two sides of a leaf keeping it in place with a paperclip and then coming back a couple of days and you'd see a spot where the cardboard was and I was like I don't know what this is. It was a lot of biology because that was the most accessible to me.

Ainissa [00:05:15] I lived right across the street from a park. We would go and identify leaves and we'd look at leaves when there are changing colors. And so I learned that this thing that is of investigating and being curious around the world was the thing that people called Science and out of all the classes I was taking later on where I was in grammar school.

Ainissa [00:05:33] That was the class that was most exciting to me. So and I also took things apart as a kid. I didn't necessarily put them back together the right way but I kind of had that leaning.

Ainissa [00:05:42] And my parents just said I think we have a budding scientists and so that's kind of the pathway that was kind of opened up for me and had either of your parents been into science or did they just recognize that even without that kind of a background or Lemont she was a nurse.

Ainissa [00:05:57] As I grew up she went to school while I was in school as well. So there were books there were biology books that are around and my diet my dad repaired computers for IBM so his tools were around and I have to say when he would come home I would be excited to see him but I would also be more excited to see the tools.

Ainissa [00:06:14] Because I would just open them up and start. What does this do and what does this do I mean I just was fascinated by Tolkien having books and having some technical stuff in the house were the things that resonated with me. To become a scientist but no one really said hey you should become a scientist who sort of an idea that I came up with on my own.

Bonni [00:06:30] Would you share with those who might not be familiar with that the television show 321 contact and then talk about how the show had an impact on your life.

Ainissa [00:06:40] I had wanted to be a scientist since I was very young. I didn't have a word for it and then I was watching the show it was in the late 70s early 80s it was called 321 contact.

Ainissa [00:06:50] It was on PBS and it had various segments but in one segment there was a group called the Bloodhound Gang and it had an African-American girl and two other people solving problems. And when I saw her and I saw her solving problems I was like I don't know what that is but that seems really cool.

Ainissa [00:07:06] I want to do more of that and that's kind of where I get the term science. I didn't know what that was. I knew that feeling that I had. I was curious but then I had a word for it.

Ainissa [00:07:17] So by seeing my reflection if you will in this young lady on television doing science this it gave me permission to say hey maybe this is what I should be doing because she can do that.

Ainissa [00:07:28] And so that that show was very very significant for me because that was the way that was where I first found out about the word science. That's where I saw my reflection.

Ainissa [00:07:38] I saw someone who looked like me doing science and they just made it seem so cool that of course you'd want to do science so that show was very important to me and years later I got to meet one of the writers for three to one contact and I actually spoke to him and I said you know because of you I'm a scientist and I don't know if you know but you know here I was a little African-American girl living in Jersey City in a working class neighborhood.

Ainissa [00:08:02] We weren't particularly well-off. There weren't any scientists nearby but this show kind of shot a flare up in the sky and I said Hey what's that. And it said science and I'm like I'm going to follow that pathway and you know I maybe I would have become a scientist through other means but this set the groundwork very very early that this is the pathway that I'm supposed to go in.

Bonni [00:08:24] What were some of the other early influences on you to get you involved in the field of science.

Ainissa [00:08:30] Well I was kind of lucky I think my pathways directly related to teachers that I had. So so I got the idea that I wanted to be a scientist when I was around four and then 321 contact came into my life and so I had that keep me going.

Ainissa [00:08:44] And then in fifth grade I had a great teacher Ms Donahue who she was a science teacher and she was incredibly geeky and I loved it when she had that level of passion for her topic. I just said oh you can be that passionate about that topic.

Ainissa [00:08:58] That's great. I'm going to just take it to that level too because I was in a Catholic school and science wasn't fun. Math wasn't fun. You wanted to be like the cool kids and they weren't doing that. But Ms Donahus gave me permission to continue to follow this passion.

Ainissa [00:09:11] I knew that I wanted to go to this particular high school in Jersey City men again I stumbled on to another teacher Ms Howard. She was

my physics teacher. And again she was a beacon for this cool thing that we call science.

Ainissa [00:09:24] And she's actually the one who gave me a pep talk I don't even think she remembers this but she gave me a very good pep talk which just said shoot as high as you can for the schools that you attend. Again I grew up in Jersey City working class region.

Ainissa [00:09:36] Most people went to school if they went to school they went to school that was very local. They went to college it was like maybe a few miles maybe within the state. Very few people left the state.

Ainissa [00:09:48] And here I am being audacious in saying I want to apply to Brown and Cornell and some other places. It was it was an outrageous where my fellow students were just like what are you doing.

Ainissa [00:09:59] And I'm like well I want to do science and my grades are good I should shoot for these places. Nobody in Jersey City gets into those places. Well I'll just apply and if it doesn't work out I'll go to these other schools. Well it worked out.

Ainissa [00:10:11] I was no slacker I had very good grades. I was a student council president. I just thought I had a pretty good shot. It was my job to at least apply it if they said no it wasn't because I didn't try.

Ainissa [00:10:22] That's what led me to Brown and Brown was probably the best that ever happened to me because there I got to meet people who were also passionate about their topic not necessarily science but every topic and that was like eye opening.

Ainissa [00:10:33] And from there I fell in love with material science. There I was sitting in a class I didn't even know what this class was it was just a prerequisite for engineering which I knew was going to be my major I just didn't know what flavor of engineering and the professor knocked my socks off because he said everything that you understand the reason why my shirt is blue.

Ainissa [00:10:53] The reason why I'm not falling through this for a reason why the light is able to provide light to me has to do with the interaction of atoms. And if you can understand how atoms interact you have a new way to understanding the world.

Ainissa [00:11:06] And then you can also figure out how to change the way atoms interact to make new things and when he said that it was sort of like when you watch a movie and they zoom in really really slowly. He looked into my face and I was just like he's absolutely right.

Ainissa [00:11:21] All these puzzles in my head about how the world work just started to snap together I'm like yeah the atoms control this and the arms control than the air.

Ainissa [00:11:28] What is this. This thing is called Material Science. Well this is the lens that I use to understand the world. This is the thing that I need to pursue. So I went in and became a material science major really liked it fell in love with it later in my career at Brown.

Ainissa [00:11:42] That was you know my junior senior year didn't think I was quite done. Go be an engineer so I said well I'm going to go to graduate school and go get my Master's because I think that will be where I will my my appetite will be satisfied.

Ainissa [00:11:55] I went to Stanford got my master's then I took a job at HP laboratories which was across the street and I noticed all the people were doing all the fun stuff had peach PCs and all the people who were not didn't.

Ainissa [00:12:08] And that didn't seem all that cool to me cause I don't know maybe I've got a little bit of an ego. And I said well I'm going to go back. So I was only at HP Labs for like a couple of months and I'm like I'm going back to graduate school.

Ainissa [00:12:19] And that's when I started this longer journey of becoming a getting my doctorate in material science so that's why my journey and then after that I went off to Bell Laboratories back in New Jersey.

Bonni [00:12:29] You spoke a little bit about then starting to teach at Yale I know for myself coming into higher ed and I could only imagine at Yale that it is often a culture of more seriousness people taking themselves. In my estimation far too seriously.

Bonni [00:12:45] Did you instantly want to insert fun into your classroom or did you spend any time trying to be like a normal traditional academic.

Ainissa [00:12:56] I had taught a little bit before graduate school so I felt very good about my teaching skills. I also knew you know just my approach to life is that when it comes to teaching I try to be more approachable.

Ainissa [00:13:10] And the reason I'm kind of like hedging this question is because there's many other layers that are going on when it's when you see Ainissa Ramirez in front of a classroom teaching science. You've got a woman you've got an African-American teaching a very very difficult topic. I don't think I have the luxury to come off as extremely heavy because there's so much stuff that's going to prevent this communication from going on.

Ainissa [00:13:34] Also as I mentioned I come from a working class background and I'm like look I understand this stuff is hard. Let me translate it for you. That's just because that's the way I was taught. That's that's what I value. Just from my own upbringing. So for me it's very important to just make it approachable because I think all that headiness is hiding.

Ainissa [00:13:55] I think education is about being open and so maybe in a lot of ways. I had a different value set than Yale does but I didn't feel like it was about beating people up. It was like OK you've you've taken this you've taken this opportunity to sit in this classroom and it's my job to get you there.

Ainissa [00:14:13] I know other teachers because I've had these classes like it's your job to get you there. But I feel like it's my job to get you there. I can't get you there completely but I can at least figure out where the gaps are and tell you where to go.

Ainissa [00:14:25] So that's kind of been my approach to teaching science when I was at Yale. Now even more informally it's like look my job is to get you there. And I will show you how to get there.

Bonni [00:14:35] It sounds like a very service oriented mindset.

Ainissa [00:14:39] Yeah maybe it's a Catholic school upbringing.

Bonni [00:14:43] So when we come into one of your classrooms I suspect that you have thought greatly about our mindset coming in that many of us maybe have already decided that we are not good enough to do this we're not smart enough to do this.

Bonni [00:14:58] What are some of the approaches you've used to try to break people's preconceived notions of science and engineering that hinder their learning in your classes.

Ainissa [00:15:08] In my class for me it's all about a hook. The topic could be I want to talk about shape memory materials. I want to talk about how atoms go through a phase change.

Ainissa [00:15:21] Now if I say that out loud eyes are going to glaze over. Someone's going to be looking at their iPhone longingly that's not going to work. But if I bring in this large wire that I wrap around my finger and then heat it with a wire and then it goes back to being straight people like OK what was that.

Ainissa [00:15:39] Then I'm like OK now that I've gotten your attention now we're going to talk about what this material is this material is called The Shape memory material. It undergoes a phase change.

Ainissa [00:15:46] This is going on with the atoms I've got their attention and they're going to ask me questions and then I could always go back to that wire.

Ainissa [00:15:53] So if they asked me a question I could say remember what happened with the wire when we did this because now they have an experience that they can always go back to the kind of relate with the information. So for me it's always the hooks.

Ainissa [00:16:03] The other thing is if they actually know the topic then I will try and put it in a way that's a little bit more relevant. You know I'll have another lecture and we'll talk about mixing different materials together to make them harder. This is called a composite. Or I can say hey look outside you see how they're pouring cement what's in cement.

Ainissa [00:16:22] Well cement has this and this and this together and together all those things make it stronger for these different region reasons. So I just try and apply something that we're doing in the classroom to something real.

Ainissa [00:16:31] Then of course I'm going to do the harder topics. But they know that I'm going to bring in something in that classroom that's relevant to their everyday lives or at least give them a new experience with materials.

Bonni [00:16:41] It sounds like sometimes too it's also helping them relate to past experiences. One of the videos I watched of you had you rubbing your hands

together and talking about the friction that gets created there and then comparing that to the friction that a rocket ship experiences I think that was the example that you were using.

Bonni [00:16:59] And then we can all relate to rubbing their hands together when we're cold trying to create that friction and so some of your hooks sound like they're hooking into prior learning to try to do my best.

Ainissa [00:17:09] I can't say that I'm good at it all the time because this is a new skill for me. I mean scientist or professors when we go into a classroom we have the we have the thinking that we have a hostage situation.

Ainissa [00:17:21] It doesn't matter how I teach this you are going to sit down you're not going to leave and you're going to want more but I don't really think that's a good way to go. And what I'm creating these videos I don't have that luxury at all. Not that that's a luxury.

Ainissa [00:17:33] But I don't have that luxury at all because people are just one click away from stopping stop watching that video. So you have to hook it. You have to turn that upside down. Like let me invite you in. This is an experience you have already let me add a science lends to it so that you can see it from a different way.

Bonni [00:17:48] What are some of the ways you've attempted to move the teaching of science away from memorization and into experimentation.

Ainissa [00:17:58] Well a couple of years ago the Materials Research Society which is a big society that I'm part of a think there about 10000 members. I compiled for them a huge bunch of material science demonstrations which is downloadable for free.

Ainissa [00:18:12] It's called Demo Works. We were at the time working on a new when I say we I mean the Materials Research Society was working with WGBH Nova and a science museum the Ontario Science Center to put together this a program called Making stuff but also there was a museum component to it.

Ainissa [00:18:29] And I just thought that it would be nice to have this resource for teachers whether the teachers of you know K through 12 or college to have a research of free demonstrations that are materials science related. So what is essentially a cookbook so that everybody can have access to these demonstrations using things that you can get at a hardware store.

Ainissa [00:18:47] So I tried to build that arsenal so that people would have something on the ready should they want to do something. Create some come hands on experience for their for their students.

Bonni [00:18:58] Do you see then in your in your teaching methodology that the experimentation comes first and the memorization then comes next.

Ainissa [00:19:08] Well I try to stay away from memorization. I mean the way I think about it is we have to think a little bit about how schools were formed right in the industrial revolution. Everybody had experiences with pulleys and levers and all these other things and then schools came and they provided the language for experiences that people already had.

Ainissa [00:19:31] But now schools like specially K through 12 schools they have to provide both both the experience and the language.

Ainissa [00:19:39] So I just feel like it's important to just create experiences and the language the memorization is memorization is just a product of it. It's easier to test these concepts but that doesn't really mean someone understands these things.

Ainissa [00:19:52] So I try and start and start off with the experience and then we'll learn key words so that's probably where the memorization comes in. But then we're going to try and apply that and that's the higher thinking. So that's the next step.

Bonni [00:20:03] I almost hear you say though that they're not separate they're together the memorization is accidentally happening. I don't even notice because I'm having so much fun.

Ainissa [00:20:12] It's like vocabulary building.

Bonni [00:20:13] Yeah.

Ainissa [00:20:14] And the other thing I try to do is when I do these demonstrations I'll often do demonstrations where students are interacting with other students. I pull myself out of the equation because they'll learn from each other and I'm very pleased because I'll hear them saying terms that I just discussed in the lecture.

Ainissa [00:20:30] They'll like well you know if you add the bulk modulus of this blah blah blah I'm like Aha I just said a second ago. So the memorization has already had happened because it's it's it's language that they need in order to convey their to their colleague about a topic that I've just discussed.

Bonni [00:20:44] But if I'm hearing you correctly it's not a separate and apart from the experimentation in fact it's sort of just embedded in it it's happening.

Ainissa [00:20:51] I would agree. Yeah.

Bonni [00:20:53] One of the things you have talked a lot about is the importance of getting students to learn to fail. You say that scientists call failure day there and I would wonder if you would share about some of your failures and research or some of your student's failures and research. Just so we can start to think about what this looks like.

Ainissa [00:21:10] When I was at Yale one of the things that would frighten a student at these Ivy League schools was a C or a B minus. They would freak out. I've had students cry. It's not pretty. And I would always start my lectures before I even started this class. I would say look the hardest thing that you ever needed to do. You did. You got into Yale. Getting out is easy.

Ainissa [00:21:34] I said you can leave here with a C average and become president of the United States. So let's stop thinking about these grades for a half second. Now the thing is I can't blame this is this is the mode that they've been in all throughout their lives to get here. But I said if we could just put that on pause in this classroom it's really about learning.

Ainissa [00:21:52] You know so that's why I emphasize failure because people are students are gripped when they see what they think of as a bad grade because it's not a representation of a particular day where things weren't working out. They're seeing it as related to themselves.

Ainissa [00:22:08] And that's what I'm trying to separate out. And as for failures I mean oh I mean failures happen all the time. I actually try and exercise what I say to other people is like if we think of failures as data collection it loses its sting.

Ainissa [00:22:24] So if I do something and I break something I'm well. Well I just learned something I don't hold it that way again. You know so that's just a minor thing. And I do that I have a I have a niece and nephew.

Ainissa [00:22:35] And when something happens I don't want them to feel like oh you know you're in trouble. I'm like well what did we learn from that and they'll say well I learned so I'm like OK well then we got something from that experience.

Ainissa [00:22:46] Well let's try to do that. Let's not try to do that again. So that's why I feel very strongly about using data. See I've already converted it using failure as a way to convert to using failure and translating that as data because that's how you innovate. I mean when I was when I was a professor and also when I was a scientist in inventing at Bell Laboratories you try different things. You see what happened.

Ainissa [00:23:10] Some of the things worked out that would give you information of what you should try it would inform you of what you should try the next time. So that's just how you innovate you fail your weight in the answer.

Ainissa [00:23:20] And so in the laboratory when I was one of the patents I was working on which was the solder we call it a universal solder because it can bond to everything. It's a it's regular solder but we've put some special metals in it and by putting those special metals in it now the solder can bond to everything you can bond to metals like it could in the past but now it could bar the glass will putting that special metal into the solder was so hard we tried it as a powder didn't work.

Ainissa [00:23:46] We tried it as a small thin foil on it. We thought it worked. But when we opened it up the foil was just floating inside that didn't work. We heated up really really hot broke the glass.

Ainissa [00:23:58] I mean we were just getting information until we finally figured out how to make it and then it worked. So it's it's this process of trying different things and then seeing what works in fact I like to say that trial and error is just another way to say fail a lot.

Bonni [00:24:12] It is so beautiful to hear you talk about that because I'm picturing you as your 4 year old self putting the leaf between the cardboard and the paperclip that you're still doing that now.

Ainissa [00:24:22] Well I actually had to unlearn because when I was in school I was taught not to do those kinds of things. So when I was 4 I was trying these things but then all throughout school you know what's the right answer which

box you check make sure that you know especially those in Catholic school everybody had uniforms.

Ainissa [00:24:37] Make sure that your uniform look very sharp fit these different uniform kinds of descriptions of what good is.

Ainissa [00:24:44] And it wasn't until you know later on in life that I'm like No it's the messy stuff where you learn you don't you don't learn when it's all working out. You learn why it's not working out.

Bonni [00:24:54] One of the real heartbreaking memories I have was a couple of years ago there were two young men that were friends and they came in. Were not doing well on the exams and were concerned about their performance in the class and they they were just talking about how we don't know how to learn this way because a lot of my teaching is more application oriented and less memorization.

Bonni [00:25:13] Kind of what you've described and they just shared about their schooling there. There has to be a right answer so I'm looking for what the right answer is and there's not one here and it's just heartbreaking because I think there were things that I could do during that one semester that I had some ability to influence these young men but it just broke my heart that I couldn't undo it.

Bonni [00:25:33] I didn't feel like I couldn't undo in one semester what they had had done to them in their educational system. It just was I felt I rarely feel hopeless. But then I just thought oh I want to do what I can to help but it felt like it just wasn't going to be enough.

Ainissa [00:25:47] All you can do is just kind of provide a seed or at least let that boat take a little bit of a different tack. You know you just push the nose of the boat. So it just takes another bit of another direction or you know you push it in a direction.

Ainissa [00:26:00] But yeah you have to it's sort of like you've learned the language and so telling you and you don't know this word. You try to convey something but you can't because you don't have that word until a teacher comes along and teaches you that word and you're like well I'm not accustomed to using this word in a sentence.

Ainissa [00:26:14] This is not comfortable but eventually they'll get there. And that's what I was trying to do with my students I knew that my class was a little strange compared to the other classes that they had. I was bringing in demonstrations and they didn't regret interacting groups.

Ainissa [00:26:29] Other courses were you know people were in rows and the professor would talk for the 50 minutes and then the students would skat would skedaddle out of there really quickly. So I knew my class was very weird but what I wanted to do is give them an opportunity that one time in their life where it was really about learning.

Bonni [00:26:46] Would you share a bit about how you've tried to get musicians involved in the call to make science fun.

Ainissa [00:26:52] I don't know if I've had tremendous success in getting musicians. You know I've been I've been telling everyone who is in music hey we need a new schoolhouse rock.

Ainissa [00:27:02] Hey you know if you're a rap artist we need to have you know raps with music in it because then that would save us. You and I all the trouble of having to give people the vocabulary because they'd already have the vocabulary and we'd be just giving them more experiences.

Ainissa [00:27:16] So I haven't had tremendous success I just it's one of my crazy ideas that we used always to get ideas across and using popular ways. That's the reason why I even looked at Newton's Football you know. As I said I'm not a football fan.

Ainissa [00:27:29] I was kind of sitting in minding my own business but when I found out that more people watched the Super Bowl than vote I said wow this is a great way to get people's attention. Yeah. And so that's why explore music because people are already there let's use that as a vehicle to teach these concepts.

Bonni [00:27:46] I've seen that happening in really powerful ways and charter schools in K through 12 but I haven't seen it in higher ed yet. It doesn't mean it doesn't exist it just means I have a short view.

Bonni [00:27:57] But I wonder if anyone out there is trying to do more of that. I know you've made a call for it. We have to call again I guess.

Ainissa [00:28:05] We just have to keep pushing. I think if it shows success in one place it will move out to other places just like MOOC were popular one place and now everybody's trying to do a MOOC. So you just have to do it create a success story and then spread the word and then that's how things grow.

Bonni [00:28:21] What was it like preparing for and then giving a TED talk. And I was also going to say how did you come up with the idea of bringing a blowtorch onstage with you but you sort of already talked about that as your hook. Does the TED talk prep and then giving him the Ted talk.

Ainissa [00:28:36] Well nothing prepares you for this. And I have to say if I can just back up for a second you know I I left. Well let's put it this way things happened at Yale and a bunch of us had to leave. And I was feeling particularly sad and was kind of out of sight. You know wiring the road of what I was going to do with my career.

Ainissa [00:28:54] I come back to my office and I get an email and it says it's from Ted and says Hey Ainissa click this link. And I had been here before where you could one of these links and then you get a virus and you can never use your computer.

Ainissa [00:29:06] You have to take it over to the I.T. folks. But this this looked I don't know. It's like well you know you have virus protection you know the I.T. guys are pretty good so you could just say you did something stupid.

Ainissa [00:29:17] So let's click on it click on this. Boom this page opens up it's Ted we want you to give a TED talk. And I was like what now.

Ainissa [00:29:25] I had all those demonstrations I had talked about earlier I made a couple of videos based on that again not what a typical professor does. But since they were so popular in my class I said oh this might be a great way to for the for the students to look at them again.

Ainissa [00:29:40] But also for students in the rest of world to benefit from these demonstrations since I worked so hard to create them. Well it ends up that Ted saw one of those and said hey you know we'd like you to come and give a talk.

Ainissa [00:29:51] So I was like OK. And fortunately they lined me up with a speaking coach as as I fleshed out what the ideal was going to be because I thought my talk was going to be more about let me show you these cool

materials. But the thing that they say in the e-mail is that this is going to be the talk of your life.

Ainissa [00:30:08] And when I thought about that I was like ok on my obituary do I want to have the talk of my life that I showed some really really cool materials that I find is enjoyable but it's not my passion or do I really want to tell them what's really really important.

Ainissa [00:30:21] And so I my message is like look we've got to get people excited about science. We're in an intellectual world and we need to get them back in touch with their inner scientist. That is that person that was curious. They don't have to become scientists but they have to think for themselves.

Ainissa [00:30:37] So how do I get that message across so I have to say my talk was seven minutes. I've never prepared more for seven minutes in my entire life. I worked like three months on that talk on my own with the coach. Back and forth and my gut was just not too far.

Ainissa [00:30:54] I want to and before I even gave the talk. I think my talk was on a Friday. And you go to Ted and it starts Monday the whole week. I was in knots that I didn't even 10 I didn't attend the whole time because I would I would do some things and then I'm like let me go to my room to chill out for a while and then come back and get to my room to just chill out for a while because this is it.

Ainissa [00:31:13] This is it. This is your talk. It went really well. Went really well. Got a standing ovation.

Ainissa [00:31:21] I have to say that the person who spoke before me was Bill Nye. And I'm just like what is going on. This is like it wasn't enough torture already I got Bill Nye in front of me.

Bonni [00:31:31] Oh wow.

Ainissa [00:31:32] But I gave this talk started off the blowtorch because I did want to do a science demonstration because that's what I that's what I do. But I use the science. I use the demonstration more as a metaphor. What we have to do we have to get people fired up about things.

Ainissa [00:31:48] That's why I use the blowtorch and create change which is what this wire does. So when I got off the stage Bill Nye's like you totally did it sister.

Bonni [00:31:57] And what is the biggest thing you remember learning about presentations from working with a coach like that.

Ainissa [00:32:05] Well my friend Gina Barnett. She's later become a good friend of mine she she's developed some ways and actually she has a book her book is called Play the Part which is kind of based on what she does. She helps you get out of your way.

Ainissa [00:32:18] You know as a scientist as a as a scholar. We're very very armored. Because it's an art it's a it's our idea and we want to put this out in the world but we want to be protected should it be attacked because that's what we do in the sciences or in or in academia.

Ainissa [00:32:35] But it ends up that it's vulnerability that people really resonate with. So if you're willing to be vulnerable it's actually a position of power because you'll connect with many many more people.

Ainissa [00:32:47] So what Gina had to do was break me down into a little little little pieces and then rebuild me because I was coming from a posture of of look how smart I am. Look at this cool material that you don't really understand blow your mind. That's it. And that's really not going to resonate.

Ainissa [00:33:06] But I'm like. Let me show you this really cool material. Let me show you why it's important. Let me tell you why I'm a scientist. You know if it wasn't for this show 321 contact I wouldn't be here and I wouldn't be able to work on these cool materials.

Ainissa [00:33:21] And by the way if I do this not because I want to be the only scientist I want other people to enjoy the world from this point of view too. I want people to get in touch with their inner scientist.

Ainissa [00:33:32] So I had to come from a position of vulnerability and just open myself up and like look I'm just this black kid who loves science. You know that's that's the core the Yale and all that other stuff that's just branding.

Ainissa [00:33:42] But this is the core this is just a curious kid and I want to share with you my curiosity should we make an opportunity for other people who are

curious to that worked. So that was what she did and she's been one of my best allies since.

Bonni [00:33:56] Well it seems like she's just don't have an impact. Today three years later your sense of vulnerability still comes across to me today that's really powerful.

Ainissa [00:34:05] Well once I found out that being vulnerable is actually powerful as a scientist. People come up to you and they're like they want the answer and then if you don't know the answer you'll just use a steel string a bunch of big words together you'll see something very general that's of course correct.

Ainissa [00:34:18] But now I can just say you know what I don't know. But he was trying to figure that out together blah blah blah. And then people will open up they'll like OK you weren't snowing here.

Ainissa [00:34:26] And I started doing that with students in classes that I've taught to do that with lectures I'm like that's a good question. This is how I would look at it. I don't know if I have the answer. But this is how I look at it. People resonate with that because you showing that you're on the same page.

Bonni [00:34:40] Is there any final advice before we get to the recommendation segment that you want to give about making learning fun.

Ainissa [00:34:49] I have learned the power of a as we said being vulnerable but also being passionate about what you're what you're doing because when it comes to students there's two ways to wake them up. Both of them require passion.

Ainissa [00:35:01] You find out what they're individually passionate about or you be passionate about what your talk is and then they'll say Hey this must be interesting. I must I can I can be passionate about it too. passion begets passion.

Ainissa [00:35:15] So tap into the thing that you're excited about and use it to teach and you'll see that many more people will resonate with it and if you're not passionate about it you've got to change topics or you've got to get back to be passionate because you're doing a disservice by not being passionate.

Ainissa [00:35:29] This is the reason why we went into these different fields. We were excited about these things. So get back in touch with that thing that made you excited and then show that to other people be a beacon for that.

Bonni [00:35:39] This is the point in this show where we each give a recommendation and I'll start. My recommendation is to make more invitations to learn and I'm distinguishing that from having some required or graded assignments.

Bonni [00:35:53] And one of the ways I've been doing that this semester is using a service I've talked about before called Remind which I have shared about before on the show and what this looks like is that I might talk like last week we talked about corporate social responsibility.

Bonni [00:36:07] And one of my classes and then throughout the week a couple of times a day maybe we'll skip a day or a couple of days but they'll get a question that shows up on their phones via text message from me.

Bonni [00:36:19] And it might say- or earlier on we had what are the four factors of production and the business environment and they can choose if they want to to reply back to me and to see if they can recall it because it's all about that that learning through retrieval in your brain retrieving it.

Bonni [00:36:37] And so I'm trying to help them spread out their study and so they're not more tempted to cram but they don't have to do it. I'm not sitting there keeping a scorecard. If they get it wrong I just write back and say actually it's this.

Bonni [00:36:47] And students have just been raving about it and it's just one way that for me especially because remind allows you to schedule these text messages that come I don't I can do it all in one sitting I can schedule a next week's out and do it very quickly.

Bonni [00:37:00] But the students get that personal touch from me and they get an invitation to learn but they don't have to accept that invitation and so far it's gone really well.

Ainissa [00:37:08] That's great. That's really great.

Bonni [00:37:10] And what is your recommendation for people that are listening to Teaching in Higher Ed today.

Ainissa [00:37:15] Well if they're if they're teaching in science topics I would say this is not my recommendation this is Einstein.

Ainissa [00:37:22] He's like you can't explain it to your grandmother. You don't understand it. So I would say to students whenever they went I would ask them something and they would regurgitate from the book.

Ainissa [00:37:34] I'm like OK I'm your grandmother or I'm your 12 year old you know sibling. Explain that again. That means that they'll build they're closer to understanding it and if they don't then we can find the holes. So I would say explain it to your grandmother.

Bonni [00:37:49] Dr. Ainissa Ramirez, thank you so much for joining me on Teaching in Higher Ed today and for all that you're doing to inspire all of us higher ed teachers to have more fun create more fun especially with those challenging topics.

Ainissa [00:38:02] Thank you so much.

Bonni [00:38:06] Thanks once again to Dr. Ainissa Ramirez for being on today's show.

Bonni [00:38:10] If anyone would like to comment on this show you can do so at teachinginhighered.com/66 as well as access all of the great things that she mentioned that I mentioned throughout the episode. I'll be definitely looking to the demo works cookbook and the other things that she shared.

Bonni [00:38:28] As always. If you have yet to subscribe to the teaching in higher ed weekly update you can do that at teachinginhighered.com/subscribe. That's how you get access to the 19 ed tech tools that help use technology to facilitate learning and also get a weekly email with all the show notes and an article about teaching or productivity each week. Thanks so much for listening. As always if you have feedback for me please send that over any way you can. But one good way is teachinginhighered.com/feedback. See you on the next episode.

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