

[Episode 17 - A Conversation between Devin & Paris Transcript]

Hi guys. My name is Paris Toews.

(Runneals) I'm Devin Runneals.

(Toews) And we're here to talk a little bit about how we decided to study math and what our experience has been as women in the STEM field.

(Runneals) I decided to major in mathematics accidentally actually. I originally graduated high school and didn't want to have anything to do with college right away. I didn't get very far, so eventually I came back and was more interested in biology at the time, but due to the course of events, I just always found myself doing math and enjoying it, and I got kind of sad when I realized that I didn't need to take math classes anymore, so I just kind of decided to keep taking math classes.

(Toews) And I'm not majoring in math, but math is very much a part of my day-to-day life. I tutor math. I'm in math classes. I work for different programs that help other students. In high school, I took as little math as possible, and when I was done, I never wanted to look back. I always thought it was part of who I was to not enjoy doing math, and it just wasn't going to be part of my future. But when I got to community college, I realized I had to take some more math classes, and I realized I was really good at it. So I decided to stop fighting math, and most of my friends at the time were in the engineering field, so I decided to hop on board and try that out, and I managed to find a field of engineering that really fits me, which is industrial engineering. I want to do management and I want to work on making processes and companies run better. So that's how I got into my field.

(Runneals) I feel like enjoying mathematics is kind of rare. We can both say that we enjoy it. We both love our jobs. We both work as math tutors here at Cabrillo College, and personally it's the best job that I've ever had. And it wasn't always that way. So it is really special to find yourself enjoying math.

(Toews) Yeah, I definitely agree. I think that there's a lot of pressure as women to talk about what our experience has been as women in the STEM fields, and I always kind of hesitate people ask me about what my difficulties have been as a woman in STEM, because to be honest with you, I haven't really had any. I've never met a teacher who told me I couldn't do what I wanted to do because I was a woman. No one in my family has had that sort of reaction towards me. Everyone I've met at Cabrillo has been nothing but supportive. It's true that some of my math classes are full of guys and just a

couple of girls sprinkled in there, but I've never felt uncomfortable because of it. I agree. Personally as well, I never felt like anybody has lower expectations of me just based on gender. I've never felt like I was getting the easy version of anything in mathematics. It's always been pretty equal as far as I could see. Gender bias does exist in a society where women didn't always have equal access to education though. Just due to the echo from the past, there seems to be this underlying assumption that women don't have the same capacity as men do intellectually when it comes to math and science and even though we don't experience it on a personal level, it definitely still exists. All bias doesn't just go away when you give everybody an equal opportunity. It's kind of rooted mentally into our society.

(Runneals) Yeah, I definitely agree with that as well. I actually find that most of the bias that I experience regarding being a woman and being capable of doing anything from doing math to putting oil in my car is that where I most often face sexist remarks is outside of a college campus. It's going to be at the gas station, at the gym. When I'm surrounded by other people that have similar aspirations to me, I don't experience that very often. Which leads me to say that as a woman I almost feel like I have more opportunities. There's more scholarships for women, more drive for colleges to want to accept female applicants into the STEM field just because there are so few of them. So in that way, I almost feel like I have an advantage, which...

(Toews) It's hard not to feel guilty. It's hard not to feel guilty taking advantage of that, because you know that there's somebody regardless of gender or color that might be better qualified for it or more deserving of it, and just to be identifying with some minority, it feels bad sometimes. But at the same time, when it's competitive, and you want to get that internship, or you want to get into that institution, you're going to take that advantage. You're not going to check unspecified gender if being female is going to give you that position almost guaranteed sometimes. So it almost feel bad, but is it necessary? I don't know. Honestly, you could argue either way. But if we assume, and I think we should assume, that women have the same mental capabilities as men intellectually, there shouldn't be favoritism toward either gender really. Based on that assumption that they are equal, then why should one have an advantage over the other in that sense?

(Runneals) Yeah, I agree, and I think that almost goes into a deeper conversation which would be affirmative action, and you know, where did this idea come from that specifically selecting people from certain groups was going to help our university system? In my opinion, if we really want equality in that field, you just take all of those questions off of the application. Don't ask me what my gender is. Don't ask me what my race is.

(Toews) Look at my GPA.

(Runneals) Yeah, exactly. Look at my GPA. Look at my job history. Look at my essays.

(Toews) But then again, that's always based on the assumption that everybody has equal access to education and has the same opportunity, which in America isn't always the case, but we're doing pretty good these days at least on gender lines. Men and women each have equal access to education here no problem. There's no way you can dispute that.

(Runneals) Yeah, I agree. Sometimes I do feel like at least maybe in Santa Cruz, we live in a little bit of a bubble. I don't see as much sexism day to day as you may see in other areas of the country. So I do wonder if that skews my opinion, but of course I do still think... I don't deny that bias exists, just that it really doesn't shape my experience in what I've done so far.

(Toews) Right, and I think it doesn't really matter who you are. You have to admit that everybody has some kind of biased opinion, especially on gender lines. Look at the way children are raised. You've got boys playing with boys' toys wearing boys' clothes, and with girls, it's just the opposite. I mean children are so influenceable at a young age, that it just seems like that's the last thing we want to do is tell them how they're supposed to be, how is society going to accept you? We start really engraining that there is a difference between men and women at a very early age in things where there shouldn't be as far as their interest goes, and I think that if we want to get rid of gender bias, that's probably a good place to start.

(Runneals) I agree, and I think that there's bias even outside of the gender realm, more so in just that the number of people that I meet that if they ask me what I do, and I talk about math, that immediately say, oh, well I'm not good at math. I don't like math. That's not in the cards for me. And I face that every day as a math tutor. So many of the students that I sit down with say, well, I'm just not good at math, so I can't do this. And that shaped me for a long time too in high school. There was never a point in high school that I wasn't good at math. I aced my math classes. I didn't dread doing my math homework, but because everyone else was saying I hate math, I decided I hated math too. And so I decided that I didn't want to take any more math classes. I went to school intending to do any line of work that didn't require me to take any more math. I was terrified to get started in the STEM field because I knew I was going to have to take trig, which at our school is very notorious for being a difficult class. So, if I didn't hold that

feeling of I'm not good at math; I can't do math since I was a kid, maybe I wouldn't have been as afraid, or maybe I wouldn't have spent so many years going against the direction of a STEM field, but that was something that was engrained in me.

(Toews) I was the opposite in high school; I was terrible at math, and it wasn't really that I was terrible. It was that I just never really tried. And it was easier to just be bad at math, and not try than actually try to get anywhere with it. So I kind of took on just not liking math; it was just easier that way. And I see that a lot here. It's like if you don't like it and just by the grace of god you're bad at it, then you don't ever really have to try, and life is easier for you. And I think that if I hadn't come back to school, if I hadn't found math again, and just accepted the challenge and risen above it, I don't think I'd be as happy as I am today. It gave me a different outlook on life, and then it was one of those glass ceilings for me that I had to break through, and once I did that, I had a lot more opportunities. It was kind of life changing for me to accept that you don't have to be bad at math; you don't have to have a negative attitude towards it, and actually if you spend some time with it, and overcome it, it's really rewarding, and you can share that with other people. I mean you meet people tutoring all the time that have that negative attitude about it, and every once in a while, they have a breakthrough and it's like they can't believe it. They feel great, and I think that's what we need to shoot for more for people in secondary schools and high school, even in elementary school, really try to counteract the negativity about math especially since we live in the technology revolution. I mean you're going to have to do math at some point if you want a good job.

(Runneals) Yeah, I have a very similar feeling about that. I am just so much happier now that I have stopped telling myself that I can't choose any career path that involves math. I'm happier surrounding myself with people that can talk about math and science, and even now, summer break, I feel stagnant if I'm not learning new things about how the world works, about how things fit together, and so I definitely was in a mindset for a very long time that those sorts of career paths were not open to me, because I couldn't do it. And I feel so much freer and so much happier without the boundaries of, well I can't do that because there's no way I could pass this class, or there's no way that I could ever comprehend these things. I don't feel those boundaries anymore; I'm pretty sure that any class that I decided to go after, if I wanted it, I could learn the material, and that opens up a lot of doors for me, and the fact that I am able to excel in these courses, makes me almost feel that I have a responsibility to make a difference to change something by learning that material.

(Toews) I agree. And I feel like as far as humanity goes, that should be everybody's goal. We should be trying to better ourselves all the time. With all the entertainment industry it's so easy just to waste a bunch of time without any personal growth, and it's so special to be able to have access to pretty much unlimited education. It's something that's really special in this country. The financial aid program, at least in California, make it really easy for low income people to get a really good education. Cabrillo College is outstanding as far as I'm concerned academically. I mean the teachers and even just the other students in the community, it's a really great place to be, and we're really lucky. We've been researching women in mathematics, and it's not always been this way. It's pretty much a recent thing to be able to have access to so much education affordably for women and even for lower class people in general.

(Runneals) I agree, and definitely back to the bias is that not being educated does lead to ignorance, and like I've said before, most of the sexism that I face in my life are in places where the general population isn't necessarily educated. I went to the cell phone store to buy a new cell phone case, and after the guy talked to me a lot about what I went to school for, and I talked to him about math and physics and wanted to study engineering, and then when I pointed to the pink sparkly phone case that I wanted, he seemed surprised that I could be into engineering and math and still be a girly girl. That it's almost an implication that you are butch or less feminine because you're interested in math. And that's the kind of thing that I face a lot outside of school.

(Toews) I agree. It seems like in the classroom, you're with your peers and your teachers. I don't feel like anybody's expectations are lower. I don't feel any gender bias at all. We all kind of have a common goal. Everybody's got the same experience in these math and physics classes that are really fast paced and the material's challenging, and it's kind of more of a community effort to get through it, whereas when I talk to people outside of academia, it's a totally different ballpark than when I start talking about mathematics, the same kind of thing. There's all these stereotypes that come with that: having an interest in math and not... I don't know what a more female interest would be, like how do you put gender stereotypes on academic majors. You're interested in what you're interested in. And maybe that goes back to little kids when they're standing in the toy aisle, and they're forced to be interested in something that they might not necessarily be because they need to conform. They don't want to be outcasts; they're children. They don't know any better. I think gender bias is really instilled in us at a young age, and I think that it would be pretty easy to overcome if there was a little more acknowledgement about its existence and its source. And if we all

admit it that we all do it to some extent... We all have gender stereotypes, at some point.

(Runneals) Yeah, I think that it all really stems from more education whatever age level that may be at. But being around people that think about solving problems and talk about what those issues are, the more you talk about it the closer we get to finding a solution towards a different sort of future. Not talking about it, I don't think we'll ever really get there.

(Toews) Right, we talked about this earlier too. We're talking about home. It seems like the general expectation in a classroom is probably lower than it should be. Sometimes it was just so easy to get that A even though we made that mistake, so what's going on with the rest of the class, and I think that educational standards could be higher in general. Kids should be going in and getting educated as early as they're able to if they show an interest. The content should have a little more substance and the average is kind of low honestly, and with higher expectations for everyone, everyone would benefit, work a little harder.

(Runneals) Yeah, I see that a lot too. Test averages, teachers are happy to see a test average of C. I would be devastated if I got a C.

(Toews) Yeah, I'm devastated if I get a B. It always just feels like I could do better, and when you get above 90% and the class average was a 70, and it didn't seem like it was that hard of an exam, it just seems like everybody could be trying a little harder. It's very circumstantial too. Some people are taking a huge class load and they have to work, and they just didn't have time to study, but on the whole, at least, students here don't seem to be working a lot. Most of the students in STEM seem to be pretty much full time students. Pretty dedicated people.

(Runneals) Which only adds to it for me, because I work full time. I've always worked full time through school, so that's always been an added stressor. So I think this can also come down to people having the general idea of I can't do it. Whatever I do is good enough because at least I did something, and breaking down that wall of I'm not able to be any better than this and I'm not capable of being the best in the class. If we could break down those walls a little bit more, maybe people would have more courage to make more of an effort and do their best in a course.

(Toews) I think we could definitely have instead of these intimidating environments where people are getting stressed out, kind of a more educationally progressive setup with positive mindsets for people. It really makes a difference what your mindset is when you're walking into an exam

or a classroom environment. If you have a positive attitude and you think you can do it, you're going to do a lot better.

(Runneals) Yeah, and I see a lot too when people aren't successful of blaming the teacher. Saying I don't have a good teacher, so I don't have any chance of success. I think no matter if you're learning style differs from what the teacher has to offer, I think it's beneficial to everyone to make an effort to learn in a new way even if that's not what you started out being comfortable with because the more flexible you are in how you can learn, the easier school is going to be for you going forward. You just need to embrace those situations, those learning experiences and learn new things. Just because you don't necessarily agree with how things are taught immediately... again those are learning experiences.

(Toews) It's good to be able to adapt, and then also, especially if you know you've got the internet, and textbooks end up online a lot of the time for free, and there's lots of used text books around, you really have no excuse for not being able to pick up a book and teach yourself something. That's how it was done in the past. You didn't always have a teacher holding your hand through the whole subject matter, especially with so many available resources. You're going to find one that you're going to understand a little better than the rest. So I think there's really no excuse for not being able to learn on your own. There's no reason why the classroom environment is the only place you're going to get your education, and I know a lot of people that completely bypassed the educational system and taught themselves, and they don't have a degree, but they've got the knowledge equivalent of one. It's just as good depending on your employer, just as valuable sometimes.

(Runneals) I completely agree. I mean how many students do you tutor that if you ask them if they looked in the book for the answer to the question that they have, and they don't even know where to begin.

(Toews) Right, it's like a two hundred dollar resource that they probably had to buy that they don't even know was right in front of them, and it's a wealth of information, so if you really want to learn something, and that's really it right there, is not just doing it because you have to, but if you really want to learn something, it's possible. No matter where you are or what you do or how much you like your teacher or how hard it is to understand them, it's really that everything is so accessible these days that it's kind of hard to not take advantage of it and just really self-educate.

(Runneals) Yeah, and we've kind of strayed a little bit from what we started talking about, but none of the issues we talked about just now are gender

specific; they're universal issues. So if that points to anything about what our educational experience has been...

(Toews) I think it's also good to reflect a little bit on women historically in mathematics that didn't have access to equal opportunity stuff, didn't have textbooks, the internet, to tutors and professors and mentors, but they still were able to get their name in history and make huge contributions to mathematics and other women in science. It's kind of incredible especially in a society that doesn't expect much on you and kind of even frowns on your education or belittles it. We're living pretty fancy now, so we have a lot to be grateful for.

(Runneals) Definitely, yeah. I like to remember that because if you do face a lot of discrimination being a woman or being any sort of minority, if someone tells you you can't do something, who cares what does that mean?

(Toews) It doesn't mean anything. And another thing to be grateful for, even though we can all find complaints about our country sometimes, compared to other places, education is really incredible too. We're really lucky in that regard as well. It's kind of a time-and-place kind of thing.

(Runneals) Yeah, I agree. So I think that about wraps up our conversation today, so thanks for listening.