

LONGstorySHORT

with LESLIE WILCOX



TITLE: LINDA FURUTO

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I studied about six hours day, just on mathematics, because I wanted to keep up with my peers. And um, one of the greatest accomplishments of my—of my life as far as passing that class um, and uh, above and beyond passing that math class, I really did learn the importance of a positive attitude, working hard, and having a support network of people who want you to succeed an—and can help you. I wanted to go into mathematics because I struggled with it, and I know so many of our local kids struggle with mathematics.

Linda Furuto is next... On Long Story Short.

Aloha Mai Kakou. I'm Leslie Wilcox.

University of Hawaii Associate Professor Linda Furuto is an accomplished math teacher who shows students how to use math to better understand their world. It's one of the reasons that in 2010... Linda Furuto was named one of Hawaii's top "40 under 40" professionals. She's cerebral and she's physical. She was invited to train as an apprentice navigator on the double-hulled Polynesian voyaging canoe... Hokulea, and she is picking up different legs of its current worldwide voyage. While math was acquired passion, Furuto took to the ocean right away, as a keiki growing up in Hauula on the windward side of Oahu.

I had the most wonderful and best childhood. I grew up in a 12.5-mile stretch between Kaaawa and Kahuku, and to me, the most important things in life are ohana and values. Um, I'm really grateful for the opportunities that I had to um, let's see, go spearfishing. With—with my dad and uncles. And um, borrow the plastic trays from McDonald's to go bodysurfing with my friends. But we always returned them.

We just really—

Bodysurfing with the—

Yeah.

--plastic trays?

Yeah.

They're kind of small, aren't they?

Oh, but they're the perfect size if you reach under your arm, like that.

Oh, like that.

Yeah!

Oh, bodysurfing.

M-hm.

Right.

M-hm. And we always returned them.

Just maybe not in the same condition.

That would be which McDonald's? The—

Uh—

The one in—

Laie. Um, but my favorite was um, jumping into the dumpsters be—behind Hauula Shopping Center. Used to be Pay 'n Save there. And we'd grab out the cardboard boxes. My three younger brothers and I; Matt, Nick, and Dan. We—we'd flatten the cardboard boxes, and see who could ride them the fastest down the dirt hills behind Hauula Shopping Center. It was so fun.

Dirt and mud, or just dirt?

Um, it was mostly dirty. But that's a great question, because it was—

Mudsliding—

--even better.

--would be fast; right?

Exactly.

Mudslides were the best. But that was—that was my world.

So, your parents saved a lot on toys for you.

I think so. Nature was—provided all the toys that we needed. Yeah.

What's your family like?

My family . . . my family's just amazing. They're kind, they're loving, unconditionally loving, and generous. And supportive in everything that I've done so far. I also want to clarify that—that to me, ohana is not just necessarily the people that we're related to by blood, but to me, my definition of ohana is the extent to which we're willing to do something for another person. The commitment that we have to each other, the dedication to the projects and visions, and love. And so, my ohana is really stretch—really stretches from hanabata days in Kahuku, to transferring to Punahou as a tenth-grader, leaving the islands for school and work, and then coming back home to be part of the University of Hawaii, East-West Center, the Church of Jesus Christ of Latter Day Saints, and the Polynesian Voyaging Society ohana, among others.

Did your parents explicitly give you values, or did you just soak them up by osmosis?

I would say both. I would say that it's extremely difficult to measure the size of my mom's heart.

Tell me about your mom. I believe she's a social worker; right?

M-hm; yup. So, typically, when the kids—the four kids would come home, and my dad, who's a—a mathematician would say, Okay, tell me what you did chronologically, from the time you got out of school until the time you went to soccer practice, or hula, to the time you arrived home. And then my mom would say, Honey ... you know what, tell me how you feel.

Oh, you've got one on this side—

--and one on that side. Perfect blend.

Yeah; my mom instilled in me a sense of social justice and equity in all I do. I strive—

And your dad could measure it.

And my dad could measure it. Yeah; yes. My dad is very strict, growing up. And he ... he showed us—showed his love in different ways. So, instead of saying, I love you, he would show us his love by the things he did, his actions.

For example, when my family moved from Kahuku to Punahou, I was in the tenth grade. My parents commuted from Honolulu to Laie, five days a week, sometimes more. So that—

Rather than make you commute, they commuted.

Yup.

Wow. How long did they do that?

Uh ... maybe about a decade.

Linda Furuto's Transition from Kahuku High School to Honolulu Prep Academy Punahou School in the 10th grade was not easy. And although her father is a mathematician...she struggled with the subject in school.

That was a culture shock, as well as—

M-hm.

--an academic shock; right?

M-hm. M-hm.

What was that like for you socially?

It was socially very difficult at first. I remember eating lunch in the bathroom, because I didn't have any friends, and felt like a lot of folks all already had their cliques.

M-hm.

But life has a way of always opening a door, sometimes in the least expected ways. And I found a network at Punahou School of friends, lifelong friends who I cherish to this day.

How'd you find them?

I think Punahou—Punahou has a very nurturing environment.

M-hm.

And so, I ... tried out for the swim team, track, marching band, jazz band.

Speech and debate. Yes, Golden Key, Honor Society, various clubs and activities where I learned to find my voice, literally, like in speech and debate.

Were you getting As?

No.

No; I was getting Ds and Fs.

I had Ds and Fs my first quarter. I received demerits because I wasn't passing my classes and I just remember thinking, I'm working, I'm physically, intellectually, mentally working as hard as I possibly can, but I'm still not passing.

The hardest math class that I've ever taken to this day was Algebra II Trigonometry Honors in the tenth grade at Punahou School with uh, Mrs. Craven and Mr. Best. So, that was the year I transferred from Kahuku to Punahou. I was about two and a half years behind my peers. Um ... but I really—I really love a challenge, and maybe I'm a little bit stubborn too. But I didn't want to drop that class.

Did your father see you struggling with math—

M-hm.

--so much?

M-hm.

And what were his thoughts about that?

He let me struggle.

Not an enabler.

Um, he would say ... hypothetically, say I was working on the derivatives, the math problem in—in calculus. He would say ... Okay, kid; you want help? I want you to prove to me the fundamental theory about calculus, and then I'll help you. By the time I had proven a theorem or postulate that would actually help me answer the question, I didn't need his help anymore. So, it was a life lesson again in helping me - guide my path along—along um, learning about ... my own self, my identity, the values, what I—what I was ... and continue—continuously willing —to work hard for, to [Indistinct] for.

Linda Furuto's perseverance is a defining trait. She works hard on her goals. She earned a math degree from Brigham Young University in Utah, a Master's in math education from Harvard University and she studied at UCLA for her Doctorate. After almost a decade on the mainland... a job offer...brought Furuto home.

I'm very passionate about ethnomathematics, and—

What is ethnomathematics?

Ethnomathematics is defined as the intersections of culture, historical traditions, sociocultural roots, among others. It encourages the investigations and adaptations of these concepts, both within and outside of the classroom in real world experiences. The goal—

That's the answer to the question, then, when kids say, How is this relevant to me? Why should I take this?

Exactly; exactly as you've said. The goal of ethnomathematics is to acknowledge that diverse systems and cultural frameworks have existed since the beginning of time, and to help educators foster pathways that lead to increased student engagement through disciplines like mathematics, science, technology, and engineering.

... I'm so grateful that the University of Hawaii West Oahu hired me. I was hired as the first math faculty to—to build the math program um, and ... I was the only math faculty for the first six years as UH West Oahu transitioned from a two-year to uh, a four-year liberal arts comprehensive university. It was an amazing opportunity to be part of that, because ... I utilized Hokulea and ethnomathematics to help me build that program, to seek out, help from the other campuses within the University of Hawaii system, all who helped me design, from the ground up, um, institutional learning outcomes, go through accreditation, admissions and graduation requirements, design a baccalaureate degree in mathematics, um, which would not have been possible without enrollment in mathematics courses increased fourteen hundred percent. We started off—

Wow.

--with a population of about eight hundred sixty-six students in 2007, and when I left, there were approximately twenty-four hundred students. We had a couple math classes when I started. There were upwards of twenty math classes by the time I left. And, those are quantitative statistics, but qualitatively when we take a look at the individual students who would say things like ... I hated math, I used to think that it was ... boring and I felt no connection to it, but now I see that math is my culture, that math celebrates me, and mathematics validates who I am, and because of that, I want to be a secondary math teacher in Hawaii. I want to go back to my community on the Leeward side of Oahu, because this is ... this is what matters to us and our students. And I think that, to me, speaks ... volumes, much more than the quantitative part, just knowing that, the life of a student has in some way, shape, or form been transformed, because that student is a link in generations and will help to raise many, many generations—

M-hm.

--to come afterwards.

In 2013, Linda Furuto accepted a job as an associate professor at the University of Hawaii at Manoa. There...she continues to encourage her students to think about math in a new way... to integrate math into their everyday process and world view. She has been recognized with two Excellence-In-Teaching awards from the U.H. Board of Regents and the Math Association of America.

Could you tell me, if you're trying to introduce or recruit a student to the study of mathematics, and they want to know, why should I care—

Mm.

What do you tell them?

On the first day of class, I always share with my students is the—is the old adage that, people don't care how much you know, until they know how much you care. And I really believe that's true. People ... people don't really care about your CV or your resume until you know that you're gonna walk beside them in their mathematical journey, and beyond that in life as well. I always strive to help my students understand that their knowledge matters, and that their culture matters, and what they bring to the mathematics classroom is ... centuries, centuries of rich mathematical traditions. And that just because ... their ideas of mathematics aren't written in a mathematics textbook doesn't mean that's not exactly what it is.

Seems like, Linda, as you talk, I'm thinking very literally and you know, mathematics. And you always kind of take it metaphorically and to ... a more expansive place.

Mm.

A more visionary place. But it all starts with—

M-hm.

--your sense of how things work.

M-hm.

Right?

So, maybe we can—I'll go back to the ethnomathematics and STEM institute.

Sure.

So an example of a literal example, a specific example of mathematics, actually, STEM is, for example, when we go to from the heavens down to the valleys, when we go to Waimea Valley, we um, debark some of the trees with the workers there. And we talk about rock wall formations and the significance of the pohaku stones. And we talk about vectors. So, direction and magnitude in the placement of these stones. We need to know where they go, because we don't have cement. And as we talk about vectors, we connect them to standards, such as the mathematics common core state standards or the next generation science standards.

In terms of the makeup of the rock wall?

And the mathematical content involved with attention to precision and finding ... beauty, power, clarity, and precision, and symbolic reasoning. So, making the connections be—uh, really in P-20 education, from early childhood education through higher ed. At the four hundred year old Waikalua Loko fishpond, with the Pacific American Foundation, we talk about ellipses and foci. So, why are fishponds oriented in a certain way? Why is the auwai um, the connection between the ocean water and the fresh water - why does it have a certain placement?

M-hm.

How does that relate to rates of change or derivatives? And how do we take that back to the classroom? And how do students understand what a derivative is, and how does that impact the way that they ... not just memorize them for a math test or a physics exam, but then carry it with them so that we can eventually prepare them for college, career, and community readiness?

How did math figure prominently in the life of ancient Hawaiians? Who didn't have our tools. But who loved tools.

Great question. There's no exact or formal term for a mathematician or a scientist, but what they did in order to build with pohaku or what they did to design the—like the structural engineering involved with designing a fishpond, or what they did to ... take a look at the ecosystems and how—how we're connected through place-based education, those are—those are some other ways that they incorporated mathematics.

University of Hawaii Associate Professor Linda Furuto is using her knowledge of math principles...as an apprentice navigator and education specialist on Hokulea's Worldwide Voyage...which was launched in 2014. The Journey is called Malama Honua or "Caring for Island Earth." Furuto was there at the very beginning of the epic travels—that first leg from Hawaii to Tahiti.

Our kumu, like ... Nainoa and Bruce Blankenfeld, Kalepa Baybayan, Bob Perkins, as part of my apprentice navigator and education specialist training, they would ask me questions like, Linda, what do you think is the purpose of education? When do you

think a child starts learning? And where do you see yourself in forty years? Uh, no pressure.

And do it in twenty-five words or less.

So, we studied really, really hard. We looked at charts, we mapped things out. And because we had done all that work beforehand . . . as Uncle Pinky Thompson said, ninety percent is preparation, of voyaging is preparation. We'd done that preparation. So, we'd reached the point where we had to trust ourselves. And that's really hard sometimes, between the squalls and the massive waves, to trust what your naau is telling you. But I do know from experience that . . . it helps you, and that you need to know that, because when you're trying to find coconut trees after twenty-five hundred miles . . . something inside of you has got to trust itself and to know that . . . that we've done the preparation, and to also know that we never sail alone, and even if there's thirteen people on Hokulea, thousands of people are guiding Hokulea on her journey . . . on her journey to Keala Kahiki.

What was that first trip like, the first leg of the worldwide voyage? Tell me a little bit about that.

I remember when we left Hilo . . . Kumukahi, in May 2014.

We waited until . . . nature told us it was the right time. And it was the right time, because when we hit the . . . the intertropical convergent zone and the doldrums, which can typically be dark, very dark, we had the full moon, the light of the full moon guiding us like a spotlight. And we could see the door, this like quadrilateral at the end of the horizon, just showing us where we needed to guide Hokulea to get through. We barely touched the sweep, which is how we steer the canoe, because it's Keala Kahiki Hokulea was finding her way home, from Hawaii to Tahiti. And we used principles of science, technology, engineering and math to um, use weight distribution, forward or aft so that we could, guide the canoe into the wind or off the wind. We also used . . . sails. We brought so many sails, so we could use the dynamics of the winds to get us there.

Rangiroa was the first land that we saw after sixteen days of being out on the open ocean. And Nainoa said, Okay guys, you know your calculations, but you need to put that on the side and you need to trust your naau. You need to trust what it's telling you, because those are the signs that are gonna help you find the land. And we did.

I love the Promise to Children document that we're carrying with us on Hokulea around the world. And part of it reads, We believe the betterment of humanity is inherently possible, and we believe our schools from early childhood education through graduate studies are a powerful force for good. As we sail forty-seven thousand nautical miles around the earth, we will share Hawaii's gifts of kindness and caring with our—with our brothers and sisters.

To me, the real highlight was just seeing the smiles of the children and ... having them experience um ... their, our shared culture. And thousands have been able to come onboard the floating classrooms, Hokulea and Hikianalia, models of island sustainability and exploration of ancient wisdom and modern connections.

What's it like, just day-by-day, on the Hokulea, heading out across a huge expanse of ocean? Where do you sleep?

We sleep in the hulls. The hulls are pretty deep, and there's a platform that goes on top of the hull, with a little puka, so you can descend below. And when you descend below, we keep, there we keep like food, water, miscellaneous supplies, and then ... so you have a puka. And then, there's a hatch cover. On top of the hatch cover is a plywood. On top of the plywood is a foam mattress; it's maybe a few inches thick. That's what we sleep on. And then, there's a canvas ... a canvas tent above us. But we're not dry.

You're not dry?

No, we're not dry.

Throughout the night, you're not?

We are not—well, um ... people like me who are apprentice and at the very bottom, we're never dry.

And you could still sleep well?

M-hm; m-hm. Because we know we're exactly where we need to be. And so, when our master navigators they sleep at the—at the back of canoe, where it's drier. But eventually, maybe we'll get to move back--a little bit more each voyage.

Linda Furuto says navigator Nainoa Thompson...one of her mentors...asked her several times to become an apprentice before she said yes. Furuto had to be sure she was ready for the monumental responsibility.

... I realize that this is a lifelong commitment, and that this is something that I'm pledging to do for the rest of my life, not just for myself, but to help in schools and to help through ... education, P-20 education and beyond the classroom through place-based education. And these are things that I think about every day, because this is my commitment to—to honor my teachers

This is—this is my path, this is not something I asked for, and never asked to be an apprentice navigator. I never asked to be on that first leg from Hawaii to Tahiti. It's a gift that comes with lifelong kuleana, and I embrace it.

It's a lot of kuleana. And you're looking for the—I mean, you're on your way to having that burden.

I do think about that. And Leslie, if I could share with you a quote. Just because I think navigating past, present, and future visions is one of my pillars, and something that I think about every single day. As we were getting ready to leave for Tahiti, Nainoa called me up about eight-thirty at night. He's like ... Eh, Linda; what you doing?

But Leslie, I was really watching TV.

But I didn't want to tell him that.

I was looking at the stars, Nainoa.

Exactly. And it—yes, I saw this, at this declination. We ended up meeting about ten-thirty at night, and we went walking at Paiko's. And ...

That's East Honolulu.

M-hm.

Lagoon.

M-hm.

Okay.

M-hm. And we watched the star constellations, Hokulea, Hawaii's Venus star, and her companion star Hikianalia. So, our Taurus and Spica just rising in the heavens. And Nainoa imparted wisdom that I hope I'll always carry with me. And he said, Linda, you have to have a vision. If you don't, someone will take it away from you, or they'll give you theirs. And that's really important. We need to always be grounded in what we're willing to sail for.

At the time of this conversation in 2015, Linda Furuto had sailed on 3 legs of Hokulea's voyage around the globe. Mahalo to Math Education Associate Professor Linda Furuto of the University of Hawaii at Manoa for sharing your story with us. And thank you for joining us. For PBS Hawaii and Long Story Short. I'm Leslie Wilcox. Aloha A Hui Hou.

CREDITS: (30-40 SEC)

Two of my favorite places on Hokulea are the front and the back. On the back is a plaque; it's for our na aumakua and it starts with Pele. And when we have the gods and goddesses, and up to this day, people who have gone before us uh, Papa Mau Piailug, our very first teacher and master navigator, um, and we have Lacy Veach, NASA astronaut and Punahou alum who says you need to take Hokulea around the world because Hawaii is a laboratory for living well on islands, including Island Earth.

Mm.

And when you have Eddie Aikau, whose plaque on the front of the canoe—so that's my other favorite part. It reads, No greater love hath a man than this, that he laid down his life for his friends. And I'm filled with courage, and I'm filled with peace, that I know I'm in the right place.

[END]