Episode 3:Tinkering and Equity

Time • 22:25

SPEAKERS
Ihuoma Ihuekwumere, Paula Hooper, Melissa McCloud, Anya Kamenetz, Ernesto Rodriguez, Ryan Kurada

Anya Kamenetz 00:00
Melissa McCloud lives on the Quartz Valley Indian Reservation in far Northern California. She takes care of children in her home.

Melissa McCloud 00:07
I got started taking care of kids, when I was younger. I helped my mom take care of my younger siblings. So I always wanted to do it, I always wanted to go into the childcare field and to be a preschool teacher or to do something. But, I didn't really like the school part of it. I had a nephew who was newborn and a niece and another one, they, they started saying, "well, who's gonna watch him when we go back to work?" And I said, "Me, I will, I will. I'll stay home and watch him."

Anya Kamenetz 00:45
That nephew and that nice are all grown up now. But Melissa still takes in infants up to children 12 years old. Their days are pretty simple. They go outside, they help with the chores,

Melissa McCloud 00:56
They get excited to go help me bring in wood. The, the parents will be like, "well, they won't do that at our house." I said, "well, it's different when it's here." You know, we we make it fun. They help pick up everything. They help pick up the toys, they go get wood, they're more than happy to do all of it.

Anya Kamenetz 01:16
Melissa wasn't a big formal school person, but she loves seeing the kids learn and learning with them.

Melissa McCloud 01:22
When we make something fun, it interests them more. I guess I'm just not like the paper, pencil, book kind of person. I was always a hands on learner myself and so I try to show them things, I try to teach them stuff that's important.

Anya Kamenetz 01:48
Welcome to the third episode of Tinkering Together, a podcast miniseries from the Exploratorium's Tinkering Studio in San Francisco, California. I'm your host Anya Kamenetz, a journalist and author who's very curious about how children learn. And over these three episodes, we've been exploring tinkering, which is an approach to learning that Melissa has recently been practicing with her students

in partnership with the Tinkering Studio located inside the Exploratorium, the museum of science, art and human perception on San Francisco's beautiful waterfront, the Embarcadero. In the first episode of our podcasts, we talked about the basic conceptual elements of tinkering, about Purposeful Play and Focused Exploration. And we talked about how tinkering moves in cycles, cycles that are capped off by reflection, and then relaunching into a new cycle. In the second episode, we covered how tinkering can introduce children to scientific thinking, and also encourage some social and emotional skills and dispositions that are useful throughout people's lives. And in this episode, we're going to take on some kind of surprising themes. Equity, justice, empowerment. What can tinkering as a pedagogy do for the world at large? What kinds of relationships might it encourage within the classroom? How can they generalize beyond the classroom, and how tinkering might encourage students and teachers to see themselves differently? So to get started, I asked some early learning teachers how they thought tinkering, connected to equity. And the first point a lot of them brought up was how tinkering projects are constructed to make science feel more accessible, even to people who might not match the stereotypes of a scientist or an engineer. This starts with the materials. So the folks at the Exploratorium would tell you that they carefully and intentionally choose certain materials to illustrate concepts like momentum or balance. To do this, they are often repurposing everyday objects: paper towel rolls, or Amazon boxes. And that can be really important.

Ryan Kurada 03:55
The first thing, and I've heard it myself directly, "I don't have money for these resources, I don't have time for these." So how can we take away those barriers?

Anya Kamenetz 04:05
Ryan Kurada is a preschool teacher and he coaches other teachers in STEAM, science, technology, engineering, arts and math. He says, teachers often feel that they don't have the resources to incorporate hands on science activities in the classroom.

Ryan Kurada 04:20
It's just the lack of funds in public education. But, rethinking materials to what accessible around your space. I can, you know, use my glasses as a balancing tool, right? Or my phone as if I'm going to do a light and shadow exploration I can use a flashlight. I can use you know, just things around me.

Melissa McCloud 04:45
Especially being way out here in the mountains, we don't just run to the store to buy a package or something, you know, or…

Anya Kamenetz 04:54
for Melissa McLeod living on the reservation. Using what's on hand is partly practical. And partly it speaks to something traditional,

Melissa McCloud 05:01
The way tinkering works, like we're natural gatherers, we look around to see what we have in our environment, or what is around us to use. I tried to share with the kids different stuff; we can dye the

water with different materials that are just natural. We use that for painting, weaving grass and the bear grass and stuff like that, you know, we use what's around us, we use what is there.

Ryan Kurada 05:35
So science doesn't have to be this grandiose, expensive, experiment. Just manipulate with things in your space. Right? I think it's a it's a shift. That's a shift. From materials I need to buy, to materials I can be resourceful and use, you know, around me.

Anya Kamenetz 05:55
Ihouma Ihuekwumere, another teacher we talked to in San Francisco, echoed this idea that tinkering can feel accessible in a really tangible way. She also noted how tinkering felt inclusive, for example, for all genders.

Ihuoma Ihuekwumere 06:07
There are some areas of the classroom, like the science area, the block area — not a lot of girls go over there. And then you ask yourself, why are they not going over there? And you find that is usually from the influence of the role models that they have. So, you would find several teachers that say, "Oh, I don't, I don't like math. I just like art."

Anya Kamenetz 06:30
There is research to back up this point, by the way, specifically it shows that girl students can pick up math anxiety by osmosis from their teachers, especially in the early grades. Ihuoma has gotten creative in her classroom to try to interest her girl students in activities like blocks.

Ihuoma Ihuekwumere 06:46
There was a year, I had to wrap up the blocks in pink paper, so that the girls would be attracted to it, and say, "Okay, we're building castles." I'm like, if it's castles then let's go for it doesn't have to be a garage, or you know, the zoo or whatever else the boys were making. If it's a castle, I'll take it. Whatever it takes to get you there.

Anya Kamenetz 07:08
She said, by contrast, when her class tried tinkering, there were no such heavy gender barriers. Everyone was excited to participate. Everyone had a way in.

Ihuoma Ihuekwumere 07:17
You see it play out in the classroom, and you want to bridge that gap and say, "hey, you should have these opportunities too." You know, this is not to say, "oh, slow down the boys." No, is more of bridging the gap.

Anya Kamenetz 07:35
She said it felt empowering for teachers. And that emboldened the students.

Ihuoma Ihuekwumere 07:40

With the tinkering, just because the, the, the staff were so excited to, you know, try and fail and laugh and like, "uh-oh moments" that happened, we found that girls were saying, "I want to do this!" And they took over the classroom.

Anya Kamenetz 08:02
Ernesto Rodriguez is another teacher we spoke to who has experience with tinkering. He has a bilingual classroom where the students speak English and Spanish. And he told me how tinkering promoted vocabulary building and conversation between them. And he also saw how children collaborated across age divides.

Ernesto Rodriguez 08:17
I have from two and a half years old until five and a half years old, so the gap is very… is big. So some of the kids, they were just learning how to share. And other kids that were already like, being the lead of the activity and taking turns. So for them, it was really, really cool to… to kind of step back and say, "You know what? Oh, this is a little buddy that have played with me, he's just three and I'm five and a half." So the young ones learn of the old ones, and the old ones learn from the young ones. And I learned to have to navigate all these activities, and all these dynamics between them, you know.

Anya Kamenetz 09:05
So as Ernie says the teachers themselves are learning. In fact, they're like the oldest students in the classroom. Paula Hooper is an Assistant Professor of Instruction in the Masters of Science and Education Program and Learning Sciences at Northwestern University. She teaches teachers and she's thought a lot about equity. This letting down of barriers, this kind of openness and inclusivity is something that she wants to see happen in classrooms all the time.

Paula Hooper 09:31
A lot of the work that I do helps teachers to think about, okay, how pedagogically can I make this situation, a place where kids are sharing their ideas? Being not afraid to grapple with their ideas, being excited about sharing their ideas.

Anya Kamenetz 09:49
So from Melissa this excitement emerged when her children's tinkering explorations connected with the nature that surrounds them in Quartz Valley.

Melissa McCloud 09:57
We thought of the lights and shadows. It was kind of funny we were like, "Okay we go out and play tag or we look at the sun versus the moon," you know kind of thing that was our natural reaction, I guess? We didn't think of all lights and flashlights and stuff. We thought of the moonlight, the sunlight. That's what came into our mind at first.

Anya Kamenetz 10:22
So one day she took the kids outside for a shadow walk. In Quartz Valley, as the name suggests, there are natural crystals to be found when you walk around.

Melissa McCloud 10:32
We were working on light and shadow and the kids, they see their shadows… they were looking around, they like to find rocks, pretty rocks to give to me. Auntie, look at this pretty one. It's a quartz usually, you know. And so I showed them that the light can, you can see through it, you know, it could shine. And if you put a flashlight up, it really shines. I guess, I decided to go a little bit further than that. I go "Now we're gonna go for a walk." And I go, "We're gonna go find some pretty rocks. And you guys can find your own that can shine."

Anya Kamenetz 11:14
So they went on their walk and they came to the creek.

Melissa McCloud 11:16
And it's a really good time now because the creeks are running really good. And a lot of the rocks are really clean. And so they they could see the way the water with the ripples were taking this different effect. They're all looking because they wanted the rocks. And I'm like, Okay, wait, you know, be careful, everybody spread out.

Anya Kamenetz 11:40
And the kids' light and shadow exploration started with the crystals, but it grew to include the water itself.

Melissa McCloud 11:47
They were watching as the ripples… They could see this really bright rock down there. But they were saying "Look at it, it's going, it's making waves" or something you know.

Anya Kamenetz 12:07
Paula Hooper, who teaches teachers told me that tinkering is one way of taking sometimes loftier, abstract ideas and bringing them, well, down to earth. Like about equity and learning.

Paula Hooper 12:17
I think we're in an interesting moment right now, where there's been a lot of work on sort of multicultural education and white privilege and all these kinds of things that raise up the need for equity. Right. And then there's been other stuff that sort of has said, "Okay, well, what is feminist pedagogy? What is what is transgressive pedagogy? What are all these kinds of pedagogies that have happened more in university level teaching?" And there, there's not a lot for people to really glom on to that says, "Okay, once you see the importance of equity, how do you put that into practice?"

Anya Kamenetz 13:01
Speaking to the importance of equity: in the United States, compared to any other age group, it's children who are the ones most likely to be living in poverty, to be immigrants, or to be people of color. And all of that is because of lack of public support for families. And we also see these inequities extend into early childhood education. They're underfunded, they're under supported, the workforce is making about $25,000 a year. And they're most likely to be women of color who are taking care of and educating young children. Ihuoma, Ernesto Ryan, and Melissa, all of them teach some children who

came from the margins in one way or another. And you know, tinkering is not some kind of magic wand that's going to fix all of these inequities out there in society, or in our early childhood classrooms. But what it does do is it offers up opportunities, these little moments of discovery and connection. And, what these teachers told me was that compared to some traditional forms of pedagogy that ranks students in a hierarchy, or where there's just one right answer, or where students are earning merits or demerits — tinkering is different. Instead, it can bridge divides between girls and boys, between English and Spanish speakers, richer and poor, older and younger students, and even between students and teachers. Because teachers are being invited to learn and discover alongside their students. In a tinkering classroom or tinkering activity you're deliberately positioning everyone as collaborators, there's no one right answer, everyone is invited. So that can look and feel a little more equitable. As Paula put it,

Paula Hooper 14:30
The ways that you help kids to see each other's ideas as valuable and to not have a sense of hierarchy in your room. Which doesn't mean that kids can't know that somebody doesn't understand something better than somebody else, but to have people know, that… have kids know that they're all able to be successful learners together.

Anya Kamenetz 14:58
So one of these connections between tinkering and equity is about connecting people. It's about lowering barriers, toppling hierarchies, changing how people interact. But yet another dimension of equity is about empowerment, right? When you think about the society that we're building toward, how do we set up children to recognize themselves as learners? To recognize their knowledge and thinking as inherently valuable, because the classroom is not just a place where we explore a content area, or a concept or a skill. As a student, you're also always learning about yourself and yourself in relationship to others. So you as the learner are part of the subject. And what was important for Paula as well was it students should be invited to connect their experiences, in school and out of school.

Paula Hooper 15:42
The way you think about these ideas outside of school is the same idea. And so how can you design experiences in school, so that that bridge feels… helps them draw on it and see themselves and actually be strong learners in that?

Anya Kamenetz 16:02
Can tinkering function as a cultural practice in this way? When it bridges, when it encourages students to bridge their knowledge outside school, and inside school. So for Melissa tinkering was a lens, to focus the light back on her students, it helped them see the value of some practices that she and they were already doing.

Melissa McCloud 16:22
I think, play helps kids discover for themselves. And I think through tinkering, it has really brought… brought it out to me — and, I try to get it across to the kids — that this is math, this is science, this is something that we've been doing all along, but we just didn't realize this is what we were doing. How

did we connect it? But it helped us to realize that it was math, it was science, and our normal everyday play was something that we would… that is actually learning,

Anya Kamenetz 17:07
Paula says this all adds up to something, even maybe a little bit bigger than equity. She talked about the potential to create education that is liberatory. And I asked her to expand on that.

Paula Hooper 17:19
I think there's… that that is the difficulty in that, it's because you don't want to be too simplistic about it.

Anya Kamenetz 17:26
She was careful to say that there's no easy formula or recipe for this, it's not automatic.

Paula Hooper 17:31
We fall prey to what the system of education often wants to do, which is to boil it down, to boil down what it means to have kids achieve, or to be equitable, or to— whatever you want to do — to something that is easy. But this is not easy, right? And… so that's why one of the things I tried to do with my teachers is help them to hold the complexity of what it means to be a good educator.

Anya Kamenetz 18:00
But tinkering does set up these moments, where girls are on equal footing with boys or where a younger child brings something to what an older child is doing. And as a teacher, you have the opportunity there to emphasize that everyone has something unique to contribute. Everyone can take the explorations in a whole new direction.

Paula Hooper 18:17
You want to have kids be able to generalize the ability to value difference.

Anya Kamenetz 18:26
So both in the classroom and in kids everyday lives, a tinkering approach can reinforce the message that differences aren't just to be tolerated, they're necessary. And that includes children valuing what they uniquely bring to the table.

Paula Hooper 18:40
One of the things that that means in terms of liberatory education, is to recognize things like the ways that you have kids talk about things of value, the ways that they talk, is really important. The ways that you make… develop relationships with kids, with kids really understand that you want to understand who they are and their ideas. And so those are some of the ideas that are clear ideas — I wouldn't say that they're simple, but they're clear ideas that actually helped to form liberatory education.

Anya Kamenetz 19:16
So for Melissa's children in Quartz Valley, they took this notion of light and shadow from what was suggested to them — a flashlight — to something they saw around them — a crystal — to something that was transforming, wildly different — flowing water, ripples, waves in a creek. And Melissa sees this

happening, she doesn't try to control it or correct this flow of ideas. She recognizes it. She sees something special going on.

Melissa McCloud 19:40
We took… with that, you know, with what we were working with and just kind of went a little bit different, I guess. And even different than I thought with the kids because they discover their own… own way to look at something.

Anya Kamenetz 19:57
And she echoed with a lot of teachers who have experimented with tinkering also said that this really caught their students enthusiasm.

Melissa McCloud 20:04
It's exciting too, when the kids discover something that we weren't even thinking about. Because, I wasn't thinking that's the way it was going to go. But when they started showing me the… the different waves or the way that was shining, or the way they could see through something else, and not just the rocks that I was thinking that we were looking for, it's… it's really exciting, because they're excited.

Anya Kamenetz 20:30
And then she as a teacher experienced that reflected moment of delight, as the kids caught the spark and they came into themselves as learners and as explorers. Melissa said that tinkering sparked something in her. So working with the staff at the Tinkering Studio, changed how she thought of herself as a teacher, even though she may not have been formally educated or certified.

Melissa McCloud 20:51
I was really intimidated at first. But I feel like the staff and everyone made me feel like I was part of the educators. And I didn't feel like I was right or wrong. I felt like if I tried, it was, it was good enough. So it really made me feel good and really made me… actually helped uplift myself to feeling like, I'm not, you know, like, just because I wasn't a certified teacher, that I wasn't… I wasn't any good.

Anya Kamenetz 21:30
And that makes me wonder: what happens to a group of learners, if the teachers working alongside them feel good about themselves feel uplifted, supported? Can they pay forward that feeling of being good enough? Can liberatory education settings be liberatory for teachers too? Tinkering Together is a production of the Exploratorium's Tinkering Studio. It was written and recorded by myself Anya Kamenetz and produced by Carin Leong. Thanks to Claudia Caro, Mike Petrich, Luigi Anzivino, and the rest of the Tinkering Studio team. Thanks for listening. If you have feedback on the podcast, please go to tinkeringtogether.org. We're going have a forum for comments through April 4 2022. We'd love to hear from you.