PAM BROUSSEAU: That was so much fun. That was an exciting lesson.

MELISSA NIX: Why, yeah it was. Thank you. Thank you for being a part of it.

PAM BROUSSEAU: You're welcome.

MELISSA NIX: I'm certainly glad you were there.

PAM BROUSSEAU: Thank you for inviting me in. So, reflecting on the lesson ...

MELISSA NIX: Mm-hmm.

PAM BROUSSEAU: What things do you think went well?

MELISSA NIX: Reflecting on the lessons, things that went well were students definitely were following along, definitely kind of pushed them a bit so that they were engaged and it was not too easy for them at any given moment, I think in terms of cognitive demand, that was something that was there. And I'm glad I started with the number talk just to kind of get them primed and ready. And I'm really glad that some students were using the knowledge that they already had to kind of apply it to that last problem, the carnival problem. I didn't see any of the misconceptions that I had seen in the last couple of days about *x* and *x* being *x* squared, when it was the dimensions on the side of the rectangle.

PAM BROUSSEAU: Why do you think that was? Why do you think that you didn't see the misconceptions that you have seen recently?

MELISSA NIX: Well for starters, during the lesson I heard that that was gonna possibly come up and so I spent some extra time making those visual representations with the first blue and orange rectangles. When I made those blue and orange rectangles and I actually, you know, departmentalized it -- or compartmentalized it into that *x* and *x* to give me the *x* squared and the *x* squared, I think that helped them a little bit because there was still that underlying uncertainty about what happens when I'm combining terms. Am I actually squaring them or am I -- is it an *x* and an *x* to get me *x* squared, or an *x* and an *x* to get me 2*x*? And their -- they just haven't had enough real experience with that, I mean they really haven't had much of any experience with that, just very cursory. So, I think it was nice to be able to visually show, you know, what is an *x* and an *x* gonna get you, and then tie it back into that multiplication array, sort of, bring back that same structure that they've seen. So, I kind of feel like I tried to see what might've been a mis-- a hiccup later on, and I wove that into the lesson. That wasn't intended, for me to show that -- it was the *z*. To show that 2*z* times *z* is actually 2*z* squared, and to show that 2*z* was *z* and *z*, wasn't a part of my initial lesson; that was something I did in the moment to try to avoid that hiccup coming out later on when they did the actual problem.

PAM BROUSSEAU: So, it's thinking about the misconceptions you've seen. Then in the moment, it was, "Okay, we're gonna focus on this, and try to illustrate that," so that helps deepen the understanding, the correct understanding, the conceptual understanding versus the misconception.

MELISSA NIX: Sure, we had done some work with algebra tiles, just on Monday, where they kind of got to see, you know, *x* and *x*, and *x* times *x* got me an *x* squared, and an *x* times *y* got me an *xy*, but it was literally just sort of a day of exploration of knowing what those names are before we started playing with them more on Tuesday and Wednesday. Today's Thursday, so there's still some of that beginning sense-making, and yeah, I thought the final problem was a good push to kind of apply some of that sense-making, "But what does happen when I multiple an *x* and a *y*? I see an *x* and a *y* over here, in the area of the middle region, but is that what happens when you multiple an *x* and a *y*?" I mean, I had a student ask me that and, "I don't know, what could we rely back on to do what we did earlier? What would happen when you multiply an *x* and a *y*?"

PAM BROUSSEAU: So, would it be fair to say that you mix up your lesson design? So, one day might be exploration, and this was a concept development lesson?

MELISSA NIX: Yes, so I would say that for sure. And before we even got into talking about what variables are and what happens when you multiply variables, that's when I pulled out some manipulatives, so that they could tangibly see a visual representation to anchor it in that concrete, because today gets to be a little bit more abstract in this application. I mean it has an application, but it's still pretty abstract.

PAM BROUSSEAU: So concrete to abstract?

MELISSA NIX: Concrete to abstract.