Productive Struggle

Brooke Nixon-Friedheim: The first standard for mathematical practice is for students to make sense of problems and persevere in solving them and I think that that is the most important standard for mathematical practice in the entire Common Core standards. The act of letting students engage in productive struggle is really one of the hardest things to do as a teacher but it is a really difficult thing to sit back and watch your students struggle. Chris, you had a reaction to that, why did you have a reaction?

Chris: Well because it makes sense now that how it's aligned away from the X thing but I put it actually on the X line.

Brooke Nixon-Friedheim: What's the difference, who wants to explain what's the difference between what Chris had and what's up here. Who wants to explain that, Amanda?

Amanda: Because if you put it on the line it won't be an equal distance away from the line as the original is, and that's what reflection of the line is, it has to be an equal distance. My teacher prefers us to try and get it on our own at first. She'll help you, guide you to the answer but she wants you to figure it out on your own.

Brooke Nixon-Friedheim: The first element of today's lesson was to bridge the gap between what we did yesterday and what we are going to be doing today. Our activity that we worked on today was to look at how transformation happens on the coordinate plane. So the first thing that the students did was to look at how movements might be happening, bridging the gap between just counting units to using actual coordinates. Then after that, the students moved into an activity where they were, we went through a few thing that they might be making conjectures about as they worked on the activity. The students had an opportunity to work in partners within their teams that they have to be able to get some practice and get some fluency in this topic.

Amanda: If you know the coordinates of one, of one thing and you know, how many you're translating...

Student: Yeah so you add together the X and Y variables, well not variables, but positions. If you have the X+X like if it's, you have to move it -3 and it's at 4 so it will be 4+ -3.

Brooke Nixon-Friedheim: Then we talked about it together in terms of putting it together and trying to generalize what they came up with in a specific context.

Student: What do we do for a translation?

Student: Translation? You just shift over.

Student: Oh slide shift. Just put that? Slide shift? I try to resolve what I don't know before assistance and I feel comfortable asking a question because I know from asking a question I benefit also, somebody I might have been scared to ask a question also benefits. I put 'equal distance from X axis', as in like let's say, it's A is 1 and 1, it would be. So basically reflect it, it would be… So you see how is (1,1) that would end up being (1,-1) and then…

Brooke Nixon-Friedheim: So yeah, so it starts at (1,1) and it would go.

Student: (1,-1).

Brooke Nixon-Friedheim: (1,-1), so what changed? You said it went from (1,1) this point here right from (1,1) to (1,-1). What's the same, what's different?

Student: The X is the same and the Y changed.

Brooke Nixon-Friedheim: The X is the same and the Y changes. Okay so let's get that down.

Student: So when I find a problem I like to take it out of the box, take out of the box and look at it in different angles and perspectives and make sure that I find the answer. When I'm struggling and I get the answer and I finally get it, it's very overwhelming. I feel overjoyed, very relieved, a lot of weight gets lifted off your shoulders.

Amanda: I feel like this class is helping me prepare for college and career, because in this class Miss Nixon does try to make it challenging for you to see things in different ways and I feel like in college it is going to be challenging and teachers aren't going to tell you the answer so it's good for you to be able to think of things on your own as far as how to do things, different ways to answer them, how to ask like intelligent questions and things like that.

Brooke Nixon-Friedheim: They are going to have to learn how to solve problems for their entire life, regardless of what career they end up in. They're going to have math come in through the back door so to speak, where they're going to have to figure what math is appropriate or even just what problem solving skills are appropriate and you know any job that they can come up with they're really going to have to use those problem solving skills.