

## Post Interview

### THE LEARNING OPPORTUNITY THAT AROSE

It was really a conundrum for me, in that, I was really pleased when I was monitoring the groups, that I had a group that did sums, and I had a group that did averages and I had a group that did inverse order sums, in other words they assigned one point for number eight. So, the solutions that I would have wanted, I had. What caused the problem for me was that the sum people and the average people didn't get the same list. And my immediate speculation was, was these people had mis-divided. It never occurred to me that the sum people were incorrect because they were adding six single-digit numbers, and I just assumed this was correct. So, in my attempt to try to get some closure on the relationship between the sum and the average, I got misdirected and confused and started thinking like the kids that there were, that we needed to be dividing by eight. At first, when someone said that you divide by six instead of eight, or Caleb said "you changed your way," I thought that the fact that if they started out by eight and then changed to six, that would have caused a problem. But, I was also seeing a problem pretty early in the list. But, if they had just divided them all by six, or all by eight, I was standing up here wrestling with what effect that would have had on the order. In my mind, at the moment, it still shouldn't have changed the rank order whether it was six or eight. So, in my trying to sort through the mathematics for myself, in action, on the spot, I got somewhat confused and I may have contributed to the students' confusion about whether or not you divided by six or eight. But, I do think we went back and got that straightened out. I thought it was interesting that the students who got the reverse sum got it the same as the average. At that point, then I knew that I had a problem with the sums, not with the averages. But, it was surprising to me that these students didn't say, they must not have kept a record of their activity because they would have noted that the sums they divided by weren't the same. So, that is where I thought I might get some help from the kids.

The basic problem was that they didn't see a problem with there being a discrepancy in the list for sums and the list for averages because, for them, I would venture to say that the average is a measure of centrality, it's a way of compacting the numbers and it is not, for them, as precise as the sum. So, that was a real interesting kind of off-balance moment for me because I was trying to decide how much time to go with that. And that was clearly something that I had spent a lot of time thinking about but it was interesting for me, from a pedagogical point of view, that even in action, when that happened to me, it wasn't as smooth for me as I would have thought it would have been, given that I had spent so much time thinking about it, and given the fact that I got the solutions that I had hoped that I would get.

### WHAT THE STUDENTS LEARNED

I did think it was interesting in talking with some of the students after class. One of the groups that didn't do it any of these ways, in fact the group that did what I would view as a less sophisticated mathematical way in that they went back to opinions on this, saw the

problem with those two lists not being the same. So, I think, had we had more time, and had I really pushed that, we might have been able to unpack the difference there, why those two didn't match up and what the problem was.

One of the things that happens when you have a lesson like this is sometimes the kids don't go away with "the" correct answer or "the" correct way. And what actually happened here is I think we ended up with three different solutions that had credibility with the group. I think finding the sum had credibility, I think taking the average, and then I think doing the sum in the reverse order had credibility. So, although the students didn't come away with a unanimous consensus on any one way, I think they did come away with an understanding that there needs to be some way to look at these and to take into consideration that size was number seven on this list, but was number three on that list, if you are actually going to come up with an equitable list that's the result of these original size explorations. And so my goal wasn't that we would get consensus on one particular way, because, to me, from a mathematical point of view, the three ways that we talked about are basically the same mathematics, just couched, or housed differently. So, as long as they could see what the process was yielding as a result of the examination of the lists, I think that, that was a move toward where we would want the students to go in this lesson sequence.

## CLASS ORGANIZATION

One of the things that I was doing as the students were working in groups is I was trying to monitor the groups to see actually what their strategies were. That, in addition to kind of following up to make sure that all of the students in the group were engaged and that no one was being silenced or marginalized in the group. But, as I was walking around I was trying to, in my mind to envision what would be a logical sequence of solutions to be presented. And I thought the frequency was one that we needed to get on the table because it, I wanted the kids to hear what they had to say. But, then I thought that once we brought in the sum or average behind that, they would see the problematic nature of the frequency one. And I think Tiffany did see the problematic nature because she did raise that question of what do you do about comfort when you see it later. And they said, "well, we have already used it so we just discounted it." So, initially, that was the first one and so kids were kinda okay about that but, as the solutions were presented, for me there was some sort of a trend toward a more sophisticated, more mathematically sophisticated solution, which was where I was trying to go. Had I started with the average, going back to the frequency, for me, would not have made any sense. Because I think that these two ways and the reverse sum made sense to the kids, so there was planful selection in having the groups share their ways when I was going around monitoring, which was one of my goals, was trying to decide how to structure the whole-class discussion. Who should I start with, and where would I want to end up?

## CLASS NORMS

I was really pleased with how well the students engaged in the task and I will have to say that, as a result of posing the scenario about buying shoes for my nephew, that I certainly learned something. They seemed to think that this was a real problem for me and genuinely engaged in some kind of activity to try to help me come up with some list. In fact, the group of girls that I talked with at the end of class, I asked them if they thought that if I took our final list, whichever one it would be, to the shoe store, would that be a reasonable way to go about looking for shoes and they seemed to think so. So, they did seem to get engaged well and their norms for participation were very nice. They were very attentive in listening to other peoples' ways and one thing I really noticed was, there was a sense of, they all wanted to share their way, which is pretty indicative of kids this age, but, they seemed to be able to make sense out of the differences between their way and another group. In other words, I mean Tiffany was very clear when she said, when she came up to share her way, she was very clear in saying, "We did it like this group, we just did it backwards, or we changed it." So, not only did she know what she had done, she was able to distinguish the difference between this group and her group.

#### SIGNIFICANCE WITHIN LESSON SEQUENCE

If I think about the problems that are to follow this problem, I would say that basically there weren't any real big surprises for me in this particular lesson. The only thing is, for myself, I've got to go back and work through this notion of averaging in case it surfaces again. I think that the idea of generating these lists, priority lists, makes sense to the students and I think it will make sense in the context of the crime problem. So, the important focus will then be on noting the lack of equality of those factors. That could have arisen here, in fact, some of the kids said, "When I go to the shoe store, I only have so much money and if the shoes don't fit in that price category, I can't have them." So, for them, that clearly was an overarching concern, or a factor that overwrote everything else. So, I think that there's kind of some basis to talk about weighting these as according to importance. And, I think that, in the context of the next problem, that they'll see that issues such as murder and car theft don't have the same importance. So, I am hoping that the notion of some things as counting more than others will emerge from that. But that would be something that I would really want to push for and try to encourage the kids to think about in the context of the next problem.

This is kind of one of those unique situations where I do think that the lesson kind of unfolded as I had anticipated, which sure does make, when you are working on a sequence of lessons, that makes the flow much easier if the initial activity unfolds along the way that you hoped the whole sequence would. So, I think that this activity is a very nice precursor for the problems that are coming, so I think that the activity the students engaged in was a very nice activity, initial activity to kind of set the framework or the groundwork for where we want this instructional sequence to go.

When I think about what kind of closure we got on this lesson and how that plays into the next lesson, I guess that my first inclination, and I'll have to spend some more time

thinking about this, my first inclination would be to leave this problem and go forward, but I am leaving it from an informed point of view. In other words, I know where we got here and I think I have some sense of the students' understandings about how they generated these lists. We didn't come to a strong consensus, and maybe we didn't get tight closure on the lesson, but I think they had some experience with dealing with multiple rankings and try to put those together. So, I would, in talking about the crime problem and presenting that, I would constantly be referring back to their activity in the tennis shoe problem because I would want them, to help them make that bridge between these two activities of the rankings, and how we sort those out. So, like I say right now, I have to spend some more time thinking about it, my initial reaction would be to go forward from this, but use this as an anchor back into the next lesson by saying, "Remember what we did in this problem" and reminding kids of some of the things that they had come up, some of the strategies as we go forward.