

MATH 105 (CN 7612) TOPIC FOR DISCUSSION 1 MEYER SPRING 2014

STORY: At a recent New Year’s Eve party I met Randy, who is a friend of a friend of mine, and we got to talking about education. He’s the principal at a small K-12 school in a village on the Bering Sea in Alaska. As we got into our conversation he shared a bit with me about his experience of his own education in mathematics. One thing he shared is that he figured out in fourth grade that he was not a mathematician. A second thing he shared had to do with how math is taught and what worked or didn’t work for him. A third thing had to do with connections between math and writing. Fourthly, as we finished our conversation he shared what was good and what stuck with him.

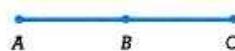
That first thing he shared was about his first assignment on graphing. He was supposed to make a table, find values and graph a line. He was totally stuck. He worked as hard as he could, as long as he could, and he just couldn’t figure it out. He asked his parents for help, and they didn’t know how to do it either, so he wasn’t able to do the homework. He went to school the next day and checked in with his classmates. They had been able to do it, but as they tried to explain it to him he just didn’t get it, and he felt like everyone else knew how to do it, but he didn’t. He internalized at that moment that he was bad at math and couldn’t be good at it.

The second thing he shared is that the way he was taught to work with numbers was just by being given the algorithm (method). He wasn’t told why or how it worked. He was just basically told, “Here are the steps; follow them. Put this number here, then put this number there, then put them together, then . . . ” He felt like he was just mimicking and had no understanding, and that was frustrating for him and left him feeling that math was a dry, meaningless series of actions you have to do.

Complete each proof.

29. Given: B is the midpoint of \overline{AC} .

Prove: $AB = \frac{1}{2}AC$



Proof:

STATEMENTS	REASONS
1. B is the midpoint of \overline{AC} .	1. Given
2. $AB = BC$	2. _____
3. $AB + BC = AC$	3. _____
4. $AB + AB = AC$	4. _____
5. $2AB = AC$	5. _____
6. $AB = \frac{1}{2}AC$	6. _____

Figure 1: Two-Column Proof from Merrill Geometry

The third thing he shared is that he is very good with words and language, so when he realized he wasn’t a mathematician he automatically focused on his strength in writing. However, a while later he said that his geometry class in high school

had really helped him with his writing. He said that having done those two-column proofs about equal angles and parallel lines taught him how to structure his writing - that you start with what you know or what you are given, and then you build it up step-by-step until you come to the conclusion that you want to get across. He shared that this made him an excellent writer in high school and college.

The fourth thing he shared is that he did have a really positive experience in college with the math class he had to take there. He talked about a professor who came into class one day having taken the tire off his bike. He brought the tire to class, put a piece of chalk on it, rolled it across the tray of the board and said, "That's what a cycloid is." That made it really real and visual and fun for Randy; it totally made sense. The professor also showed them that there is math behind puzzles and games, such as the Towers of Hanoi puzzle. He said the professor was pretty crazy but really fun and that he liked that class - was his best, most memorable math class. He still is not fond of math, but he really enjoyed that class to the point where he could remember it clearly more than 30 years later and tell me about it with enthusiasm.

SOME THINGS TO PONDER RELATING TO RANDY'S STORY:

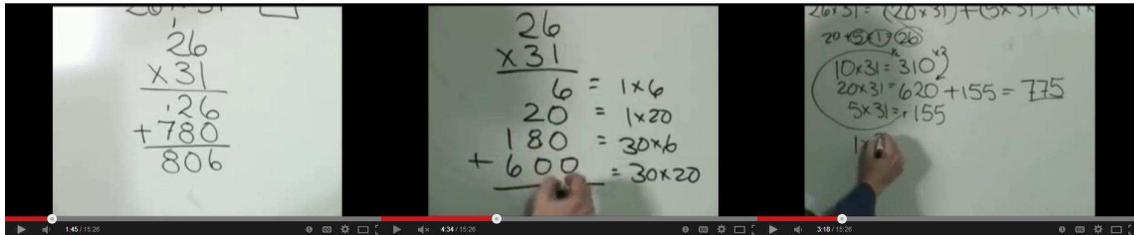
- I've heard it said, "It only takes one good history teacher to turn on a child to history, but it only takes one bad math teacher to destroy math for a child forever." This comment seems to mesh with what Randy shared with me; do you think it is a common phenomenon? Do you think it is true in general?

- Following up with a little different slant, if this had been a literature question in fourth grade that he got stuck on, do you think it would have had the same impact? Why or why not? Does it seem to you that math is different in some way than other topics, in some way that stresses people out more than other topics? If so, why? If not, in what other topics do you see this type of anxiety?

- Can anything be done for someone like Randy who has hit a wall with a certain topic and gets totally turned off on math because of it? If so, what? If not, why not?

- What do you think of the fact that Randy consciously sees math and language as being totally different and sees himself as being really good at the one but terrible at the other, and yet he mentioned that taking geometry is the one thing that most significantly improved his writing skills? How similar or different do you sense math and language to be? Might you be able to make connections between the two areas for students who feel stronger in one area than the other? If so, how? If not, why not?

– With Common Core just coming on the scene (2014) there are a lot of people expressing disgust to the point of rage that such methods as those shown in the second two frames below will be used in teaching multiplication instead of using the ‘standard algorithm’ (as shown in the first frame). Arguments against them have to do with them being long and complicated and something that parents aren’t familiar with and won’t be able to help their kids with. On the other hand, Randy, a parent, teacher, and principal, expresses how the ‘standard algorithm’ frustrated him when he was a child because it was just steps he had to do without knowing why. Is there a right and a wrong side in this argument? What might be a good way to approach these differences?



– What do you think was different about his math experience with that college class that made it such a good experience for him even though he entered college not liking math and believing he wasn’t good at it?

– Other than making him happy for one semester, do you think the good experience in math class that he had in college had any lasting positive impact, or was it just a nice change of pace for one semester with little to no ongoing impact? Whether or not it had ongoing positive impact did it come too late? Would it have made a difference if he had experienced this in elementary school or high school, or not?