



★ **TWELVE POINTS ABOUT** ★
MY TEACHING

**Why I think some people seem to think
I am a good math teacher**



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I have been asked:

What makes you a good math teacher?

And I sat down recently to try to give a serious answer to this question.

But I first need to point out that I disagree with the premise of this question. I am not sure that I am a good math teacher. People will be shocked to learn that I always arrange the tables in my classes and workshops so that everyone is facing the board. I lecture, I only lecture, and all is focused on the teacher in the room. I use the board extensively, and there is absolutely no technology anywhere in sight as I teach. And I don't do anything innovative in the classroom – seriously, zero, zip, zilch on the innovation front.

So this ego-full, self-focused piece is my attempt to answer the question as to why some people seem to think I am a good teacher despite the above. It comes as twelve points.

Success 1: *I have a cute accent.*

I am serious in that I think this a big part of my success in the classroom.

I was raised in Australia with a British father and as a result my accent is something confusing: Australians think I am British, Brits know I am Australian, and everyone else is confused as to what I am. But my accent seems to be extremely pleasing to the American ear and I am fully aware that it works to my full advantage in my American life.

Success 2: *I treat everyone like adults - even kids.*

I always assume everyone just does the right thing.

Well, I need to qualify that. We are all human and I know we make silly mistakes when under stress and pressure and so might slip on doing the right thing every now and then. But that is the learning process for all this.

So I assume people just do the right thing, and if they don't, will learn from the goof and just not do it again.

I had one blatant, silly act of cheating as a college professor: I received two identical, word for word, silly error for silly error, homework papers. My response was to give one paper an A+ and the other a C- and never say a word. It turned out that the two authors never said a word either and it never happened again.

I once gave a lecture on cheating 101, general pieces of basic advice on how to get away with things. (If you've copied someone's paper, don't hand it at the same time as your partner-in-

crime: make sure your papers sit in different parts of the pile. Photocopying someone's answers is just a ludicrous idea. Don't copy the same spelling and obvious math mistakes – perhaps insert a few more of your own. Don't wear a baseball cap during an exam – the rim points the same way you are looking. And so on.)

When I moved to high-school teaching I was flabbergasted at the idea of “needing to remove the temptation of cheating” for our students. This incorporated ideas such as erecting screens between seats during class quizzes and having students being supervised while they do make-up tests. Where are students meant to learn about the wrongs of cheating and making those first-time silly mistakes? Plus the insult to students assuming they can't be adult about all this! I did none of the things I deemed insulting to students.

There was one time when young Jenna was looking over at someone's paper during a quiz. I just walked up behind her and quietly whispered: “Just be careful where your eyes go during a quiz.” End of issue. I just ask students “to do the right thing” when it comes to finishing up a test at home. Even if they slip, there is an emotion that accompanies the wrong doing that sits and lingers, and contending with that emotion is the learning experience. (Plus students, by and large, do do the right thing!)

Success 3: *I am quirky and I like to play with ideas.*

Here's a tiny piece of quirkiness that illustrates the power of playfulness:

In learning about permutations we start by counting the number of ways to rearrange letters in words or, better yet, in our names: the letters of JIM can be arranged $3! = 6$ ways, the letters of JAMES $5! = 120$ ways. But a name like BOB or DANA represents a problem. (Brute force gives 3 and 12 ways, respectively.) The problem is worse for the word CHEESE. So we need to figure out a reasonable way to handle repeated letters.

As ideas develop we go from CHEESE to CHEESES to CHEESIEST, and when we have the hang of it, we go straight to CHEESIESTESSNESS, the quality of being the cheesiest of all the cheeses. People just seem to love the “word” cheesiestessness and the whole lesson sticks.

I also love squine and cosquine (www.jamestanton.com/?p=605). I love to ask how many degrees there are in a Martian circle (www.jamestanton.com/?p=633). And I love quirky words from the history of math: *vinculum*, *obelus*, *radix*, and so on (www.jamestanton.com/?p=1258).

Success 4: *I think hard about "what's really going on" and "why anyone cares."*

I think I am good at thinking deeply about stuff and can cut through all the usual surrounding clutter. That's why my lecture style works, I think: what I ramble on about is de-cluttered content and so sustains interest.

Plus I do the quirky, straight to the heart-of-the-matter, lectures. Exploding Dots is a prime example. (www.gdaymath.com/courses/exploding-dots/)

Success 5: *I break every 37½ minutes.*

I once read a paper early in my career that said that the average attention span of an audience member sitting through a lecture-style presentation is 37½ minutes. I've taken that as a literal fact, and have made it a universal law in my teaching. I tell this little story at the start of my courses and workshops and we religiously have a break at the 37½ minute mark, even if it is only a 45 minute class!

Success 6: *I know some history of math.*

I want math to be the human story that it is. I share the tales of the backs and forths and the struggles of developing ideas leading to how we see and use them today.

Success 7: *I am not at all afraid to make mistakes. Even whopper of ones.*

It is a vital and genuine part of math to be human in your relationship with it. I don't need to be seen as the expert. But I do need to model what it means to engage with mathematics as a human being.

Success 8: *I seem to be good at helping people feel it is okay not to know.*

After all, I know very little myself. The message I give is that it is completely okay not to know something, but it is not okay not to want to find out.

This notion is tied into the use of the word *should*, as in “you should know this” or “students should know.” *Should* statements often have a feeling of judgement attached to them and they induce unpleasant sinking feelings in the gut for the recipients. I avoid making should comments.

And usually these statements are moot: even if students should know how to distribute a negative sign by grade 9 and your students don't, it is irrelevant – it just means that you need to talk about distributing the negative sign with that class. (Try something like 1.4 of www.gdaymath.com/courses/astounding-power-of-area/.)

But there is another aspect of these “should” comments that worries me. As one's mathematical sophistication grows one starts to see former concepts in a new light. Subtleties and hidden assumptions become clear and previously comfortable topics become uncomfortable and shaky. The idea that, for example, by the end of middle school students should be comfortable with fractions is ludicrous to me. Fractions are actually very hard and a thinking high-school student really should revisit them and be uncomfortable with them! (www.jamestanton.com/?p=1461.) (Did I just use the word “should”?)

Success 9: *I think I am good at recognizing "hazy" thinking.*

You know when you are lecturing or teaching on content that you really haven't quite properly sorted out for yourself. You can do the work, you can explain the piece, but you know you don't really "get it," the heart of it, that is. I have lectured while in this state too, it happens, but I share my emotional state with the audience. I like to think it helps students recognize hazy thinking when it happens to them too. Hazy thinking is a call to go for a walk, to mull on the idea, and to ask "What's really going on with this topic?"

Success 10: *I incorporate in my courses moments of "looking back" as part of pushing forward.*

Here's a piece that illustrates what I mean by this. www.jamestanton.com/wp-content/uploads/2012/03/Curriculum-Essay_August-2015_Undergraduate-Courses-for-Teaching1.pdf

Success 11: *I have a PhD from Princeton of all bleedin' places!*

People seem to think that means I know my stuff. Hmm. That perception certainly contributes to my teaching success.

Success 12: *I am not obsessed about assessment.*

I just want students to prove to me that they get it in the end. If it takes a while before they do and grades are lousy during that period, no worries, get it in the end we can ignore all that. This notion seems to be an anathema in high-school world - of all places!

(If I am forced to think about assessment in high-school teaching, I think this way: <http://www.jamestanton.com/?p=968>.)