

What's Math got to do with it?

So, there I was, standing alone in a darkened room after an outburst of anger, wondering what had just happened to me. Both concerned and curious, I was not used to losing control. I stood there frozen, desperately searching for a solution to avoid dealing with a subject that I was clearly not made to succeed in. This dark cloud had followed me for many years. Now, graduation was just a few semesters away. There seemed to be no choice.

Let's travel back in time. High school algebra. I struggled mightily at each level, barely passing. In retrospect, I often suspect that I was allowed to pass these classes so that the high school could graduate me and claim yet another success story. "Good for the numbers" as they say. Let's fast-forward. For this high school graduate, it's now community college time, and I am once again confronting a familiar foe: algebra. But this time, yes, this time, it's going to be different! I am going to conquer math and prove to myself and the world that I can do this. I am determined!

However, I soon learned that old habits can be hard to break, and old fears can often be even more difficult to ignore. Avoidance and procrastination kicked in. In moments of desperation, I became delusional, convinced of my powers to succeed. Then reality set in in the form of midterm one. After cramming all night engaged in "determined magical thinking," I showed up late for the early morning exam, which is embarrassing enough. I sat down, wrote my name and student ID on the exam cover, then proceeded to engage with the test. Problem 1. Hmm... No clue. OK, on to Problem 2. What is this, some sort of foreign language? I've never seen this before! Let's try Problem 3. Again, no clue on how to even begin.

A few minutes later, I handed in the exam with not so much as even one attempt at engaging and solving the problems. The teacher and I made brief eye contact. She knew I was in trouble. I felt deeply humiliated and embarrassed. I never returned to class, and earned my one **F** in college. A big, bolded, spectacular **F**. An **F** worthy of headlines. If I were to write a book titled "How To *Spectacularly* Fail a Class," it would be modeled after what I did in this community college algebra class.

Let's fast-forward again. It is several years later. After taking some time off to find myself and examine my priorities, I decided to return to college to continue exploring what it is I might become. This time I found myself with a different set of eyes, more focused, determined to succeed, a little more mature. Graduation was only a few semesters away, and I had done very well in a variety of subjects... except for one. Care to guess? Yes, math was still on the plate, one of the last general education requirements left. Same as before, I had found ways to avoid it.

In the fall semester, I vowed to enroll in college algebra that coming spring. Now, it's one week into the spring semester, and guess who had not yet enrolled in algebra. So, I had to sit myself down again and have yet another deeply reflective self-talk. "You know what you are doing. You are avoiding math AGAIN. This cannot go on." I forced myself to enroll in algebra, then

rushed to visit the professor to catch up and to share just a little bit about my fear of math. "No need to worry," he said. "First exam's not for another three weeks. Here are the notes from the first few classes. You'll be fine." I felt reassured, confident. I began to attend lectures.

Then came the moment of truth, when I was faced with an incredible intimidating subject. It was the first time in a very long time to engage with math again on my own. I am home. In front of me are the textbook, a study guide, notes from lecture. I was steely-eyed, determined to be the best math student ever. I had succeeded highly in other classes, so surely I could do the same in algebra! I was ready to crash through that math wall, break it down! Problem set 1, problem 1. Pencil to paper, poised, ready to engage. I looked at first problem, then the math textbook, then back to the problem. OMG! Nothing was happening! How do I even begin? I began to frantically search for a clues. Still nothing. Desperation set in. Surely there must be something to get me going, to engage the math. Nope. Wasn't happening.

My head began to hurt, my stomach tightened. Palms were sweating. Old familiar feelings of doubt surfaced. "You are not a math person!" I told myself. I could hear family members and friends all telling me the same thing. I had heard it for years. Now, I don't get angry very often. It's not in my nature. However, after what seemed like an eternity (in reality 1-2 minutes?), I stood up, grabbed the math textbook, and threw it against the wall as hard as I could. At the top of my lungs I yelled, "F**k math!" I was pissed, livid, beside myself. Enraged. I stood frozen, alone in the middle of the darkened room. I began to ponder what had just happened to me. I also began searching for solutions to this terrible dilemma. Maybe I could somehow be excused from this "stupid" requirement which had nothing to do with my degree. Hire a lawyer and sue the university? It crossed my mind. There must be some way out of this. I'm not a math person, and it's just not fair! Then, I paused, focused, and a feeling of serenity slowly emerged, It allowed me to think. I became aware of the deep-down inner voice within me beginning to make its presence known. It's the voice we all have. When we hear it, we know it's the truth.

And the voice said to me, "*It's not the math. It's you.*"

It was the truth. It was fundamental. These thoughts settled me, grounded me. Yes, it wasn't the math. It was the years of failure and emotional baggage connected to these past experiences that proved to be so powerful that I couldn't even begin to engage the first math problem. Fear of failure. Stage fright. Performance anxiety, even for an audience of one (me). All these things were paralyzing and felt so real. But somehow, they weren't reflective of an objective truth. This false reality was something that I had been created over time. Something that had grown inside, continually reinforced, and taken hold of me and my identity for years. It was a response mechanism, a phobia of sorts. Think about math, try to engage it, and fear and doubt will automatically emerge, often leading to reinforcing and proving the false reality, and thereby creating a self-fulfilling prophecy. A vicious cycle.

So, what needed to change? Most fundamentally, it was my relationship to math. Even just thinking about this subject made me tight, stressed, afraid. So, this is where I began. What was

causing these negative feelings? For me, it was the fear of making mistakes, the fear of failure. And, in my case, there was also the very real fear of perhaps not graduating.

My new approach to math began with short meditation and relaxation sessions. I wanted to enter each study session as calm as possible. Next, I needed to work on overcoming the fear of mistakes. Properly understood, mistakes are simply guides, teachers. They are not meant to taunt. They are not meant to affect one's self esteem, although they can easily have that effect. Luckily, the textbook's study guide was written in a way to help the student view mistakes in their proper perspective. In addition to the correct answer, the guide also contained all the possible wrong answers. If you made an error, gentle and often slightly humorous words and phrases such as "oops" and "be careful" accompanied the explanation. Yeah, not so bad if you put it that way. I finally felt free to laugh at my mistakes, to put them in some sort of healthy perspective, to not take them so seriously.

Over the years I had developed an interest in learning how to learn. Of course, not all subjects are best studied the same way. Let me share with you how best to study math:

- Tip one: Study consistently every day. Not an earth-shattering revelation by any means, just good commonsense. Establish good habits and stick to them. With good habits, the temptation to avoid lessons over time, and the mind has more time to digest and work with the information.
- Tip two: Disciplines involving precise information such as math and science are best engaged with earlier or even first thing each day, when your mind and body are rested. If we succumb to avoidance behavior, we tend to only study when we are up against it, often later in the day. The result is often tired minds trying desperately to study, understand, retain. Cramming before exams. Great way to earn that F.
- Tip three: Simplify, simplify, simplify and slow the mind down. Do your best to demystify anything that seems complicated, and stretch out time by taking it slow.
- Tip four: Neatness. I have a confession to make. For years, I was a "math slob." When I wrote out problems, I was sloppy, unorganized, always somehow in a hurry. When I made mistakes, this sloppiness made it very difficult to retrace my steps and clearly see where the errors occurred. Part of the solution to this became a little 6-inch ruler - my new best friend. Each equation became neat, precise, organized, like a tiny work of art. This also helped my thinking to be neat and organized.

Mistakes became easy to spot and fix, and the whole process became increasingly smooth and enjoyable. I became a math artist! Louvre here we come!

Quite by accident, I discovered one other technique that I found to be both powerful and interesting. It helped to bring life to a seemingly dry subject, to personalize it. In the previous semester, I had taken a course in creative writing. We were required to keep a daily journal, which I took to heart. I continued daily journaling during the "math" semester and would often write to "warm up" before studying. Then, without giving it much thought, I found myself journaling in the notebooks of all the subjects on my schedule. Next to the assigned math

problems would be thoughts and feelings regarding working on the solutions. Fear of making mistakes, how a problem was making me feel (both good and when struggling), how I was approaching a solution. I would constantly remind myself to simplify, not to feel overwhelmed. This allowed me to engage the problems on some sort of personal level I had never dreamed possible. Rather than some sort of lifeless automaton, the inner me was always there, living in the “flow state”, where one is fully engaged and the perception of time and space seem to disappear. Math became colorful, intriguing, interesting, revealing, certainly not something to be fearful of, to avoid. The process became increasingly fun and organic. Each day, I looked forward to “playing” math.

As an added bonus to my overall approach, on more than one occasion the professor had encouraged us to prepare for exams as though we were in a job interview and simply showing what we were capable of. This helped to further reduce any anxiety.

Then, it was time for midterm one. I remember walking into the packed auditorium of more than 300 students. I saw more than a few faces full of dread, fear, anxiety, students trapped in a situation that had yet to play out. I made eye contact with a few. Was I also feeling anxious, maybe just a little scared? Certainly. But deep down, I was confident that I had prepared well. My approach was steady day-by-day and involved no last-minute cramming. Somehow, this day felt a little like an ordinary day, maybe more like a job interview. Thanks to the professor. I finished the test rather quickly, which surprised me. “Do I know the material THAT well?” I asked myself. I took a few more minutes to check things over. Then, a few more minutes into the exam period, I proceeded to gather my things, get up, and walk down to the front of the auditorium, the first to finish. More than a few students looked at me, most likely assuming that I was bombing and doing my best to make a quick exit. A few days later, I received my score. 98%. I had missed a few minor details, in retrospect most likely caused by my rush to be the first student to complete the exam. Ego had cost me a few points. Ugh!

The good habits continued through the rest of the semester. I became increasingly intrigued with the process of studying, never worrying that much about what was yet to come. The following two midterms played out pretty much the same way as the first.

Then, a few days before the final, something unexpected and extraordinary happened. I had read about “solutions” to difficult problems coming to people... in their dreams. This directly spoke to me and how I make sense of learning. And, for the first time in my life, I had math dreams. For several nights, problems would present themselves, work their way to resolution, then magically proceed to go backwards to the original starting point. I literally knew these math problems forwards and backwards. Somehow, it was becoming organic. It was cool!

When I handed in my final, the professor invited me to have a quick word with him. He told me that I had received one of the highest overall scores in the class and urged me to apply to the College of Engineering. “We need students like you,” he said. “It’s obvious you have a talent for math.” I was honored, and a little surprised. I didn’t feel like a “math person.” I was simply

someone who was able to discover positive ways to engage with a subject, which led to good results. I had aced the “job interview” so to speak.

Did I go on to be some sort of ground-breaking mathematician? No. In fact, except for statistics, I chose not to venture up into higher levels of math. While I learned to engage and enjoy a subject that had intimidated me for years, math is not where my mind lives. However, many do enjoy living in the world of math, grappling with and often solving the world’s problems via equations and formulas. I can fully appreciate and revere these amazing minds for all that they do.

The most important thing this experience taught me is that one’s reality, if based on a series of negative experiences, can often be distorted and not truly indicative of one’s potential. Were my negative experiences real? Yes. They happened; they were lived and felt. However, if not properly acknowledged, and dealt with, this emotional baggage can sabotage and undermine attempts to engage with, learn, and yes, even deeply enjoy a multitude of subjects.

The truth about oneself can emerge in a variety of ways. Sometimes it is even the result of an emotional outburst while engaging something that elicits pain and fear (“F math!”). However one’s truth emerges, the recognition that it might not actually be the subject, but actually oneself that needs to be confronted, can at the very least give us a better chance... to overcome.

Epilogue

Over my 23+ years of advising, I have shared this story with hundreds of students and dozens of colleagues, and even presented it once in an abbreviated form at a “learning how to learn” workshop during an Advising Conference. However, this is the first time to share it in the written form.

I once shared this story with a professor friend of mine. He shared a similar story where he tore off his shirt in frustration and anger after failing to understand a statistics problem. “Buttons were flying everywhere!” he said. Years later, he finds himself teaching, among other business courses, yes, you guessed it... statistics.

Many of my social science advisees are afraid of math, science, and other aspects of being a college student. It can be an overwhelming time for many. When appropriate, I share this story (as well as others) to help foster some confidence, and to present students with different ways of perceiving and engaging with a subject (or subjects) that elicit fear and anxiety. Truthful examination, questioning oneself, and being open to different approaches may help to increase the odds of success both in academics and perhaps even in other important areas of life.