

TACKLING DEMOTIVATION IN STEM FIELDS: A STUDENT'S PERSPECTIVE

KAVYA M. PANDRANGI

First Year Undergraduate, University of California, Los Angeles

Abstract

The fields of STEM/STEAM are ones in which curiosity and creativity meet a very high level of rigor. When navigating such a field, staying motivated and maintaining belief in oneself and one's intelligence can prove difficult. Self-doubt and discouragement quickly creep in for many students, as they did for me at times. In this piece, I give an account of my STEM journey, from high school chemistry to science fairs, the challenges and disheartening moments that I faced, and the growth and inspiration that came out of them that I take with me as I begin to pursue a career in STEM.

Keywords: STEM Education, motivation, Science Fair, Science Education

My story

I have always wanted to be a doctor. Even from childhood, when I would be asked if I would become a software engineer like my mother and father (and the rest of my family and relatives for that matter), I would shake my head, saying that I would one day become a doctor. As a result of this dream, science was always a favorite subject throughout elementary and middle school. I would breeze through any worksheets or labs I was given during science classes, whether it was biology or physics. I spent my free time working on my anatomy coloring books and reading science fun facts in *Weird but True* books. Naturally, I assumed that this trend of success in STEM would continue, as I started high school in one of the most competitive and STEM-focused schools in my state. Then came grade 10 honors chemistry. Despite my grip on the subject through elementary and middle school, topics such as molecular geometry, thermodynamics, and stoichiometry flew right over my head. For the very first time, I was completely lost in a science class. I watched in horror as others grasped the concepts immediately and earned the “A” grades that I once got while I was left with “B”s and “C”s. I found thoughts such as “Was I actually not good at science?” lingering at the back of my head and started telling myself “Maybe I shouldn’t go into medicine if I don’t understand simple chemistry.” As discouragement crept in and my grades dipped, I was finding it hard to stay motivated in this rigorous field.

Soon enough, however, inspiration struck. Despite my doubts about pre-med at this time, I was continuing my pre-med extracurriculars. This time, I was shadowing a physician in a pediatric clinic. I had been shadowing this physician for a while now, so I was intrigued when I saw a doctor that I hadn’t seen in the clinic before at her desk. For the sake of networking and as well as for my own curiosity, I decided to introduce myself to her. From the moment I started talking to her, she was warm, friendly, and clearly knowledgeable – exactly the kind of doctor I wanted to be. She was a family medicine doctor practicing at this small San Jose clinic, and as we talked, I discovered that she was actually a refugee from North Korea. She had bravely traveled the 9000 kilometers alone. She told me that upon arriving, she too was, although exhilarated, feeling discouraged in this new country. She told me, however, that she ended up finding support and inspiration in her medical school advisors. She worked hard with them as her support and inspiration to get through medical school and residency. Now, she is not only a doctor, but a very successful one in her practice.

This interaction really put it all into perspective. If she could go through such hardship and demotivation and still succeed in this field, then why couldn’t I? Going through honors chemistry didn’t seem so bad at that moment. From that moment, this physician became my silent mentor – a reminder that I could get through any difficult class, project, or job that was thrown my way. I gained inspiration and confidence in science from that moment, not from studying harder or from reading textbooks, but from a person and her story.

As inspired as I was, however, moments of discouragement in fields as rigorous as STEM are inevitable. Since grade 6, I have been quite good at science fairs, earning grand prizes, first place awards, and nominations to the state and national science fairs. With this strength in mind, I decided to again participate in the science fair in grade 10. I not only worked hard, but I went out of my comfort zone in science to code a virtual reality app to be used in hospitals. I proudly presented this app to the judges and seeing the smiles on their faces, I was sure that I would once again earn 1st prize. A month later I received my prize packet, and eagerly opened it. I reached in, however, to find, not a first-place medal, but a ribbon for honorable mention. Despite that still being quite an accomplishment, I was crushed. Why was I not good at science fair anymore? But amidst this sadness, an idea struck. Why should I be discouraged by a high school regional science fair? The next day, I decided to instead submit my project to two national level conferences, one in biomedical engineering and one in neuroscience. I waited for the results with stubborn determination that my hard work would be appreciated. To my surprise, my work was actually accepted at both of these national conferences, where most presenters were actually undergraduates or graduate students rather than high schoolers like me. I was elated – my project which had barely made it in a regional science fair is now in national (under)graduate-level conferences.

This taught me a few very important lessons that I hope to relay to future students. First is to think about the bigger picture. Initially, I was hyper fixated on this specific science fair, ignoring all the other opportunities I had to take my project to the next level. When I broke out of this hyper-fixation, I opened myself up to these opportunities and was much more successful. Second is to stay motivated despite what those around you say. Even though the reviewers at the regional science fair believed that my work merited an honorable mention, I stayed determined because I believed that the work I put in deserved more. I stood behind my project rather than questioning if my lack of a higher award was due to my inability or the quality of my work. I truly believe that these two lessons, along with the previous lesson regarding inspiration will allow students like me to stay motivated in the rigorous field of STEM.

Currently, I am an incoming first-year student at the University of California, Los Angeles, pursuing just the subject I nearly gave up on in grade 10, and I still remind myself of the inspirational story of the physician and my memory of science fair to keep myself going. This doesn't mean that demotivation will never strike me again as I go through even more difficult science courses or projects, but what my experience has shown me is how to get out of the spiral of discouragement: look for inspiration in those around you and stay stubbornly determined. And I hope students such as myself have been inspired to do the same.

As for educators, I wish for this account of my experience as a student to inspire you to expand your definition of education and teaching. Confidence and skill in STEM come not only through lessons, readings, and study halls, but is supplemented through inspiration and stories. Tackle demotivation in students by serving as that inspiration – by relating to them and by sharing stories that build confidence. In the end, the best educators are those who keep their

students excited and confident about a subject; not necessarily those with the best organized lectures or hardest tests.