

Outline/Draft 1:

introduction

When I think back on the experiences that have shaped me most as a student, none of them have been in a classroom. The moments where I have had to build something real have taught me infinitely more. There has always been something captivating to me in building something from nothing. Ideas that start as doodles on notebook margins take form, limited only by my skill and dedication. Every time I've built, tested or fixed something, I've learned more than I could from a textbook.

talking about robotics

When I joined robotics as a freshman, I thought I would just be wiring and building robots. Walking in those doors the first day, I was ready for the technical challenge. I wasn't, however, ready for the collaborative challenges that came with working on the team. Over the first year, I was promoted to manager, the youngest subgroup manager in the team's history. I had to lead my team, keep them organized, and ensure every voice was heard. Over my time building the robot that year, my team and I built not just engineering skill, but resilience, working through every issue.

In my following years on the team, as I have moved from subgroup to overall manager, I have embraced failure more and more, every challenge in the robot's construction serving not as a hindrance, but as a lesson. Every failing mechanism and every lost match gives the team something new to learn, more data to work with in the future. Robotics has taught me that engineering isn't about having the correct idea. Engineering is about the continuous improvement of a flawed idea, driven by collaborative testing. This future-focused approach has heavily shaped me as a learner, influencing my approach to problems in my independent work.

talking about ISEF & community service

As someone looking to pursue a career in electrical engineering, qualifying for ISEF was a dream come true. My Grand and Special Category Awards from my regional fair were validation of everything I had worked towards for years, confirming that the thousands of hours spent on teaching myself engineering, and seeking outside opportunities had been worth it. For months leading up, I had spent nights poring over datasheets and staring at failing code. When my project was working, I was overjoyed, and when it wasn't, I could think of nothing else.

At ISEF, every experiment was a lesson in iteration. Every time code crashed, or motors burned out, I had to analyze the issue and keep moving on. Every minute spent calculating forces and building circuit boards refined my real-world skills, teaching me about how complex engineering problems require not just technical knowledge, but also critical thinking and creative problem-solving. ISEF allowed for students to turn abstract concepts into real understanding and results, a lesson that deepened the value I already saw in my technical outreach.

Over my time in high-school, I have volunteered more than 200 hours teaching STEM concepts like physics and programming, created and implemented a 6-week 3D printing course, and led a

project-based microcontroller summer camp. The experiences I lead have a heavy focus on tangible prototyping and the lessons learned from failure, reflecting what I've learned through my own work.

talking about how experiential learning has changed my approach to learning

Throughout my time as a maker, one thought has always stuck with me. Throughout dozens of projects, spanning four years, there has been one constant. That constant was failure. Ever since my first project failed, I have been hooked. Because that's what learning is. Learning is iterative and hands-on. Learning is active and messy, and learning is never afraid to break some prototypes along the way. My experiences with interdisciplinary engineering have shaped not only my identity as a maker, but my identity overall. The perspective on failure offered by engineering is not one of regret, but one of joy. Experiential learning allows for this perspective to form slowly, project by project. If we have students who treat failure like a tool, we have students who are more curious, more persistent and more adaptable. Experiential learning isn't just what teaches interdisciplinary skills, it's what makes education real.