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Cumulative Reflection from my Experience at Iowa State University

My time at *Iowa State University* has taught me far more than the technical discipline of Computer Engineering. It has taught me how to learn intentionally, how to take responsibility for my own growth, and how to become someone capable of building a future rather than simply reacting to one. Looking back, the difference between who I was in 2020 and who I am now feels less like a gradual change and more like a complete system redesign.

I graduated high school a semester early in 2020, a decision many people thought I would regret. At the time, I simply wanted to move on. I did well enough academically but lacked direction, motivation, and any real sense of long-term purpose. Ironically, the COVID-19 lockdowns meant I did not miss much of that final semester anyway. I worked part-time jobs, earned enough money to buy things I definitely convinced myself were necessary, and spent most of my energy enjoying life with friends.

In hindsight, that period was not wasted time. Outside the structure of school, I explored music production, video creation, writing, poetry, and spending time outdoors. I was learning how to create, experiment, and think independently, skills that would later become surprisingly relevant to engineering. However, as temporary jobs turned into a cycle of repetition and my social world began to feel smaller rather than larger, I realized I had learned everything those experiences could teach me. I felt stuck, and for the first time, I began thinking seriously about longevity and direction.

Higher education became the clearest path forward. I enrolled at *Des Moines Area Community College (DMACC)* in the pre-engineering program, knowing I would have to kick old habits. The transition was humbling. It turns out you can forget a surprising amount of math in just a few years. More importantly, I had to relearn how to learn, how to study with intention, manage time effectively, and push through confusion instead of avoiding it. Meeting students with similar motivations reinforced my decision; many of us were there because we wanted something more stable and meaningful than where we had been.

Transferring to *Iowa State University* marked another major shift. As someone raised primarily in Iowa, ISU had always existed in the background of my life through field trips and childhood visits. I remembered experiments on campus and learning, somewhat memorably, that humans share measurable similarities with bananas. The university always represented possibility, even before I fully understood what engineering meant.

I initially entered the College of Engineering as an Electrical Engineering major before discovering Computer Engineering and realizing it aligned more closely with my interests. The transition from community college to a large research university felt like entering the big leagues. University was not just a place to attend classes; it was a lifestyle. Moving into university housing was my first experience living on my own, and my first semester became an adjustment period in every sense. I was learning course material alongside life skills such as time management, self-discipline, and how to function without my parents.

At times, I felt academically behind peers who had entered university directly after high school. At the same time, I recognized that my non-traditional path gave me perspective and resilience. Working part-time at the *Memorial Union* food court as a dishwasher introduced me to friends from completely different backgrounds and reminded me why I had returned to school in the first place. Nothing motivates long-term planning quite like a soaking wet dinner rush, scraping endless piles of pots and pans.

Early coursework focused heavily on fundamentals. While not immediately inspiring, these courses trained my brain to approach problems methodically. I began to appreciate the engineering mindset itself: struggling through complex material, experiencing the sudden clarity of an “aha” moment, and proving to myself that persistence produced results. Even when specific formulas faded, the problem-solving structures remained.

My academic life really ‘clicked’ during my second semester when I discovered embedded systems. For the first time, engineering felt tangible. Projects began with abstract ideas and ended with functioning systems that I could physically observe and interact with. Writing code that directly controlled hardware, turning lifeless objects into something that felt almost alive; success was not theoretical but real. Embedded systems combined creativity, physics, electronics, and software into a single discipline, and I realized I was not only interested in it but also capable of excelling in it.

The projects developed in my classes strengthened my ability to design systems, recognize engineering problems, and iteratively develop solutions. Debugging hardware and software interactions required patience, experimentation, and learning from failure. Each completed project provided evidence of growth. Something that once seemed impossible had become something I built myself.

As I progressed, I became increasingly concerned about gaining real-world experience. A degree alone did not feel sufficient, and I was ready to move beyond washing dishes. Entering the job search forced another phase of personal development. I learned professional communication skills, including resume writing, interviewing, presenting technical work, wearing suits, handing out business cards, and the overall ‘lingo’ of the industry. This process significantly strengthened

my ability to communicate effectively, since technical knowledge alone was not enough, and clarity mattered just as much. I had also learned the stress of the job market, which was different from applying to be a grocery store clerk or burgermeister. It was a competition in which I felt extremely un-equipped. Yet, I applied endlessly anyway.

Eventually, I joined *Ames National Laboratory*, working on *Rxn Rover*, a laboratory automation platform. Even now, being selected still surprises me. My embedded systems background and visible enthusiasm for projects played a major role in securing the position.

Working in a research environment exposed me to chemists and researchers at every academic level. Collaboration required translating engineering concepts into language accessible to non-engineers while also learning knowledge outside my field. Documentation, communication, and standardized workflows became essential, reinforcing that engineering is fundamentally collaborative.

This experience also deepened my understanding of ethical and professional responsibility. Automation systems influence experimental accuracy, safety, and resource usage. Engineering decisions affect not only technical outcomes but also reliability, environmental considerations, and scientific progress. I learned that good engineering is not just functional; it is responsible, transparent, and maintainable.

Throughout both coursework and research, I increasingly relied on learning beyond formal instruction. Seeking out knowledge from technical documentation, academic papers, online communities, and other creators. Rather than waiting to be taught, I learned to figure out what needs to be figured out. I increasingly push myself to create something, sometimes with no purpose other than learning and having fun. I realized that projects are much more exciting when you really have no idea what you're doing.

One of the most meaningful changes in my approach to work has been organization. I no longer approach projects through improvisation. Instead, I plan, standardize documentation, and design systems so others can easily collaborate and understand. What once felt like a tedious detail now feels essential because successful engineering depends as much on clarity and structure as it does on technical brilliance.

Now, nearing completion of my bachelor's degree, I find myself at an uncertain but exciting crossroads. I am considering whether to pursue graduate study or transition directly into industry. Research appeals to my curiosity and love of continuous learning, while industry offers different opportunities. Both paths represent growth, and for the first time, uncertainty feels less like anxiety and more like possibility.

Ultimately, my college experience has shown me that engineering is not defined solely by technical knowledge but by adaptability, communication, awareness, and lifelong learning. The person I was, a student who entered higher education searching for direction, has become an engineer capable of learning independently, collaborating across disciplines, and approaching complex problems with confidence.

Wherever I go next, Iowa State University will have given me more than a degree. It has given me the tools to keep evolving long after graduation. Perhaps most importantly, it has taught me that growth rarely happens all at once. It happens over time, consistent iteration through iteration, and the occasional unexpected breakthrough, much like engineering itself.