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Engineering: Communication by Design

Engineer Better Medicines

Jordyn Burger | Class of 2014
Engineering with Concentration in Biomechanics

This Portfolio is submitted in partial fulfillment of the Olin Grand Challenge Scholars Program.

Before coming to Olin, I knew I wanted one thing with my education: I wanted to help people. I believe that empathy is a defining aspect of who I am, and I want to harness this part of me to make some sort of change (which is broad, I know). I wanted to use my time at Olin to develop and pursue my passions, or at least, discover what they are. Over my four years at Olin, I believe I have found those passions, which I can summarize into three main categories: healthcare, design, and education. The stories that define my Olin experience have characteristics of one (if not more) of these themes, which I believe will shape the way I help people after my college career. Olin has given me the tools to make a difference in these categories, which these stories capture.

SERvice Learning/Global Awareness: Learning to communicate while building community

Before arriving at Olin, I found my first love for a cause: the American Cancer Society's Relay for Life. My sophomore year of high school, I watched my family come together as my grandfather began his ongoing fight against cancer. I stood surrounded by my friends as survivors marched by, thinking to myself, 'I want my grandfather to join this strong group of men, women, and children.' I participated in my first relay that same year, and by my senior year, I was co-chairing an event, leading a team of 40 students. Our event had nearly 1,000 attendees, and raised close to \$30,000. Needless to say, I was very proud of our success.

But what made us successful? Our ability to collaborate? Our willingness to go with the flow when rainstorms flooded our opening ceremonies? I honestly believe that wasn't the key. What made our Relay flourish was our emphasis on the message, bringing the community together around fighting cancer. It was emphasizing the large impact cancer has across the world, on all types of people, that connected all of our participants. We focused on spreading key cancer facts, running theme laps to promote healthy habits, and held rounds of trivia to make sure participants knew the facts and numbers. We looked at how cancer didn't just affect our friends and family, but everyone around the globe. We shared that cancer isn't a disease of the developed world, but a disease of the world. Our goal was to have relayers leave knowing something new, something useful that they could share with others. These lessons I learned from my high school relay seasons carried into Olin, and became important aspects of how Olin and Relay were connected.

This Relay experience shaped my interest in community service as I came to Olin. I became a member of the community SERvice board my very first month of school, and continued to work with SERV (the organization) for three years. I found SERV was a great way for me to make my voice heard in the Olin community while sharing my passion for community service. I would tell other students why I participated in Relay, stories of watching my grandfather walk the survivor lap 9 times, and watch as they smiled and agreed to come to an event. Just as in high school, my driving activity was Relay for Life, and getting the school involved was my top priority. I found that it wasn't the facts or the activities that made people excited. It was my passion for changing the way we see cancer, and the way communities can come together that rallied Olin towards Relay for Life.

Discovering how my passions can affect others has become a valuable aspect to how I communicate in other contexts as well, and has shaped the way I approach design. Though I may not have known it at the time, Relay for Life was my first encounter with experiential design. Planning events around themes such as movies meant taking a message and elevating it to an experience. That meant we didn't have an entrance to our event: we had a red carpet, complete with paparazzi. Theme laps were based on Disney movies, and our closing ceremony included our version of the Oscars. Relay taught me to not only focus on the message I want my users to take away - I think about how an entire experience can be shaped through more than just words. Relay has taught me the importance of thinking of each detail to shape an entire experience, using all senses to make an impact.

Entrepreneurial Experience: Understanding the Role of Community Service at Olin

As I previously mentioned, I was very active in community service at Olin. Community service at Olin has changed over my time here, and I spent a lot of time understanding why and taking measures to preserve what was believed to be key to the culture of community service at Olin. I wanted to understand the why in order to keep community service integral to the Olin experience for future Olin students to come.

All Olin students take a course called Fundamentals in Business and Entrepreneurship. For our final projects, we were instructed to change the world in some way. My four person team focused on changing our local world of Olin. After chatting with students in different graduating classes, we learned that students were not participating in activities in the numbers they had in the early years of Olin. We wanted to understand why students were not participating in Friday SERVICE as much as they had in the past. But we didn't stop there- we wanted to show the community our findings, and give them something to build off of in the future. We interviewed students, and asked them what community service meant to them. We pushed them to think about what they did to help the Olin community and beyond, and compiled these interviews into a video which has been used at introductions to community service at the beginning of the school year for first years ever since.

This video had a large impact on my participation in activities at Olin. My second year, I was the Friday SERVICE coordinator. This meant that for each Friday, I was planning an activity for students that lasted two hours. I would not have considered even running for this position had it not been for the video my FBE team had created. Creating that video inspired me. I was motivated to continue my work towards maintaining Friday SERVICE time based on the work my FBE team had done. I went into this role with a few goals. First, I wanted to do as many different activities as possible. Second, I wanted to plan events that students would actually participate in. This meant I wanted at least 10 students attending each of the events I organized. Finally, I wanted to involve as many students as possible. I targeted specific clubs and organizations to plan their own Friday SERVICE events. Essentially, I used the practices we learned in our business class, focusing on how participation can be increased. Those practices worked-I achieved my minimum goal for participation each week, often surpassing it by three fold.

Students seemed excited by the variety of projects, from kickball to knitting blankets for a shelter. Best of all, by involving other students in the actual organization of the events, I was harnessing social pressure, and extending the network of people excited about the activities we were throwing. By setting these goals for myself at the beginning of my role as Friday SERvice coordinator, I shaped my experience in this role for the year, and learned valuable lessons about involving others in executing small, varied events.

Interdisciplinary Experience

I believe that my entire Olin experience qualifies as interdisciplinary. The most clear manifestation of this is in my major concentration. When I graduate, my diploma will say "Engineering with a concentration in biomechanics." Over and over, people have asked me what my concentration entails. In all honesty, my view and understanding of my major has shifted greatly overtime at Olin. I wanted to have a concentration that reflected my interest in healthcare. More specifically, I wanted to have a concentration that allowed me to explore classes to make meaningful progress in the realm of healthcare. To do this, I combined the disciplines of bioengineering and mechanical engineering as they exist at Olin. In terms of my classes, I chose to take classes within both majors, such as biomechanics, and focused projects from classes in one major around another. This meant that in mechanical engineering classes like Mechanics of Solids and Structures, my final project was around more bioengineering topics, such as medical stents..

My interdisciplinary major has largely shaped the sorts of projects I sought out while at Olin. I am working on medical device design for my senior capstone project. My summer experiences reflected my interest in these fields as well. I spent two years working at GE Healthcare on imaging machines. What makes these experiences stand out to me is the way I was able to use my design-centered education to make real, meaningful progress in healthcare. This only validates my decision to major in biomechanics, allowing me to learn across disciplines while furthering my knowledge in design.

Long Term project: Research as more than just background information.

What makes my Olin experience unique across Olin students is my emphasis on using what I learn across disciplines. Over my time at Olin, my understanding of research has greatly shifted. I have had the opportunity to participate in multiple research groups, each teaching me something unique.

My first experience in a research group was in the biology space; I worked with Professor Joanne Pratt for a year learning about Fas Ligand and RassF1a, looking to understand the role of this death receptor in lymphocytes. I spent hours in the lab designing and executing procedures, analysing my results with the team. Though I left the research group before we reached larger conclusions about Fas Ligand, I learned incredible amounts about experimental design's role in understanding science. I watched the smallest of changes in timing and concentration of antibodies in my western blotting process have a large impact on the images

seen once the western blots were developed. Iteration became my best friend, as my research team worked towards finding the optimal amounts of antibodies, as well as actual transfections, to test.

I've mentioned my interest in design. At Olin, design is focused around users, and understanding people before creating/ideating products. In my second year, I spent a semester working alongside wheelchair athletes for user-oriented collaborative design, a course revolving around understanding users needs and values to develop a meaningful and useful product. For the first time, research was no longer defined by looking things up in books or the internet. Research meant talking to people, and really listening to them; watching physical cues, picking up on key quotes and tones of voices. It meant parsing through what was learned, and using empathy to determine what our users truly value. This type of research was new to me, and is still exciting. Interacting with each new user presents its own set of challenges and opportunities to try different techniques to gain more insight.

My most recent research endeavor has been in the education space. At the beginning of my junior year at Olin, I discovered a new passion: a love for education. I chose to take an education class on a whim, and I became fascinated by pedagogy and a desire to understand why the US education system is the way it is today. Because of this, I joined two education research groups, and spent a year and a half working on qualitative data. This qualitative data came in the form of survey responses collected over two years from two undergraduate engineering institutions. The method of analysis used on this data is called grounded theory, meaning that theory was derived from the data, rather than an existing theory applied to the data. Similarly to my experience with UOCD, this research has taught me to look beyond what is simply stated in front of me. Here, I focus on the written word, whereas UOCD was the spoken word. Though these are by definition different, they both rely on similar techniques.

Conclusion

Though this is a small sample of my Olin experiences, I believe that the stories shared in this portfolio reflect the skills I have learned and developed at Olin that make me the well-rounded individual I am today. I have found a love for design and education, and focused my love for healthcare through my major. Through the world of design, I have found a way to utilize my empathy in a new form of communication, both verbally and visually.