Addressing Minority Needs

Grand Challenge Scholars Program Portfolio

Joy of Living & Enhancing Virtual Reality

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Introduction

What drew me to Olin was the emphasis on learning through projects and experiences. Up until sixth grade, this was how I learned. In fact, the motto of my elementary school was "joyous work," and after going to a more conventional high school that emphasized grades and test scores, I sought to return to this approach to learning.

Learning through doing was surprising, challenging, and valuable for my growth as a person. Experiences that stand out are the failure of a website I tried to start for Lesbian, Gay, Bisexual and Transgendered(LGBT) students and perception-expanding experience of studying abroad in Japan. I came into these experiences not entirely prepared, but in the process I learned how much I did not know. Coming out of these experiences, I continue to learn using the skills I acquired.

Qonfide, and LGBT Website

Long Term Project, Entrepreneurial Experience, and Service Learning

The summer after my first year, I started talking to my classmates and teachers in the queer community at Olin about creating an online resource for closeted youth. When I was a student in high school and middle school, I went from wondering if I was gay to realizing I was gay. The entire time, I feared what would happen when I came out. I did not want to be rejected by the people closest to me: family members, friends, teachers, but I also wanted to talk to someone about my sexual identity. I was caught between wanting to say something, but also wanting to stay silent. If I could have had someone to talk to who was not in my life but could understand where I was coming from, I would have had support in this very difficult time in my life. The current resources for youth out there have good intentions, but most are catered towards youth that are already out. One can tell this because most everyone has names and pictures, and I imagine that in this website one might out of place if one were not out. Also, the interactions on the site seemed to be mostly about people talking about their relationships, and I firmly believe that one's gay identity should be separate from one's relationship status. I envisioned a

site where anonymous closeted and questioning youth could message openly gay, lesbian, bisexual and transgendered students.

Over the next year, this idea would grow into a project, and eventually a website called Qonfide that had 30 members. I learned that building a website and a community around it is difficult, and requires a lot more than a functional website. I needed a website that pulled people in and made them feel comfortable signing up and messaging other people on the site. I think this applies to most things in engineering. It's not enough to have something that works. The people whom it is built for should know about it, it should be usable, and it must meet their needs rather than just projected needs.

During the spring time of 2012, Dr. Sarang-Sieminski and I hosted a training session for students interested in becoming student resources for youth. The student resources would be the openly LGBT students on the site that have pictures and profiles. This would allow anonymous, closeted youth to feel like they were talking to a real person while seeking advice from someone who is out. I launched the site shortly after the training session and wrote about it for the student newspaper at Olin. As president of the LGBT organization on campus, I sought to build more LGBT community, and this project dovetailed nicely with outreach efforts to other schools at the time.

During the summer, I continued this work by participating in the Summer Venture Program, a 10-week venture accelerator hosted by Babson College of Entrepreneurship. I used this time to network with the local lesbian, gay, bisexual and transgender youth network through West Suburban Alliance of Gay, Lesbian, Bisexual, Transgendered and Queer Youth (WAGLY).

Despite these efforts to reach youth most in need, I realized why I was facing so much difficulty. Youth that are closeted or questioning are in hiding. They are probably trying to avoid being outed as LGBT, so they are most likely not connected to the LGBT networks I was tapping into. This posed a huge problem then, and I still do not know how to solve this problem. Eventually, I had to terminate Qonfide because of uncontrollable spamming and it was not worth it to keep the website up if use of it was not taking off. The failure of the website was a combination of discouraging and

humbling.

At Olin, we are insulated in a world where others support you and do not take advantage of vulnerabilities. If you leave your bag in a classroom, you can expect to find it when you return later that day. If you have difficulty with a project, you can ask someone who knows more, and they will teach you. But with this site, I had not thought to build in any safeguards. I wanted it open to all and easily accessible, so I removed as many barriers as I could, and the website suffered as a consequence. I think at Olin, we are less afraid of taking mistakes, because there are fewer costs to making mistakes. When I leave Olin, I need to be remember the value that I saw at Olin of making mistakes. However, in the future I will make sure to take security into consideration.

This project was humbling, in that I realized how much I needed to know to even have a chance at being successful. Going into this project, I thought it would be enough to use a website developer tool such as Ning. I soon learned this platform was insufficient, and this project sparked an interest in programming. I had set up a website that had all the functions I thought it needed, yet the website never took off. Through Google analytics, I was able to observe that people would visit and stay for a few seconds, click around, then leave and never join. Something must have been missing in the design of the site, or they didn't feel comfortable using a website. I realized that simply having a functional product is not enough. I had ideas for how to modify the interface to make look cleaner and help people feel secure as they signed up, but I lacked the expertise to develop the website from the ground up. It was then that I realized I needed to actually learn programming.

Programming and Bioinformatics

Interdisciplinary Experience

The following semester, with the understanding that I needed to know how to program, and I needed to know how to design computer interfaces, I took software design and Human Factors in Interface Design. Software Design introduced me to programming in Python, and HFID introduced me to design of computer interfaces.

Taking these initial programming classes would make me reconsider my concentration in bioengineering. I saw how much faster iteration was in programming. I liked that there was thorough documentation, all easily accessible online and not locked away in research papers or textbooks with paywalls and prices. I loved how when code did not work, one could look at error messages or the call log, and get some leads on answers there. However, with the pressure to graduate on time and my interest in bioengineering, I ended up staying with a concentration in Bioengineering. Through a class in bioinformatic algorithms last semester and work this semester at Olin(spring 2014), I am starting to see more of the connections between these two disciplines.

In research this semester(spring 2014), I am analyzing 16SrRNA data of photosynthetic bacterial communities that degrade cellulose and fix nitrogen. Thanks to the Visualization and Analysis of Microbial Population Structures (VAMPS) interface from the Marine Biology Lab at Woods Hole, Massachusetts, we were able to glean insights from masses of data. We started to see trends, and we were able to observe how diversity changed over time depending on the growing conditions (Figure 1). The different colors are different growing conditions, and some have higher rarefaction(Y axis) curves than others, which means more diversity.
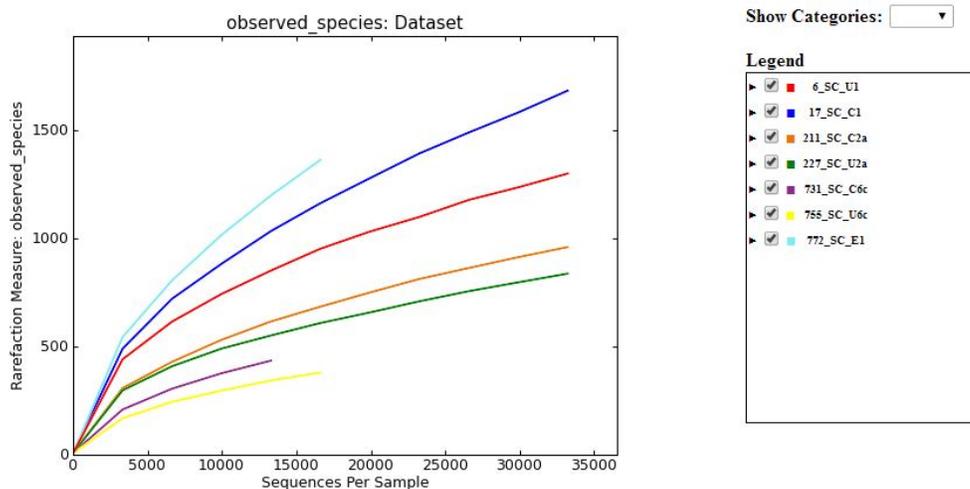

Figure 1. Rarefaction plots allowed us to see the relationship between diversity in populations and their growing conditions.

We also use the Basic Local Alignment Search Tool(BLAST) from the NIH and

meta genome analysis tools from the Joint Genome Institute to identify the bacteria responsible in these populations for cellulose degradation and nitrogen fixation. If we can identify bacteria that can degrade cellulose and fix nitrogen, we can feed bacteria agricultural wastes and get fertilizer as the output. This would be a great alternative the extraction and burning of oil to create fertilizer.

Without these bioinformatics tools, we would have surely been overwhelmed by this data. Thanks to this data, we are also in a better position to decide what cultures to perform meta genome analysis on and what cultures should be studied more in depth. This way, we do not need to isolate every microbe from every culture to find what we want to fine. So I have seen not only the power of informatics tools to interpret results, but also shape future work. In the future, I would like to continue to work that uses computers to derive insights about the function of biological systems that then allow us to solve serious problems.

Study Abroad in Kyoto, Japan
Global Awareness

The Spring semester of my junior year, I studied in Kyoto, Japan, and I became more aware of how big, complicated and beautiful the world is. All of my life, I had lived in English-speaking places, so being in a place where I could speak at the level of a second-grader while having the thoughts of a young adult was a huge shift. I found that I had generally been able to express myself, and Japanese language was something encountered in textbooks, oral exams and Japanese children's cartoons. Now, Japanese was a tool necessary for navigating the world, literally! When I caught the train, biked through the city or took directions from strangers, I needed to be able to form complete sentences with the correct names of places. I would then need to make sense of the rush of sounds coming at me in their answer. Without 3-G data, I could no longer rely on Google maps, and I frequently got lost.

I also found that I smiled more. Because it was harder to make jokes or express positive feelings in words, I expressed these feelings with my face, and I made many friends quickly. For example, whenever I met people and was listening to people talk

about their interests or where they're from, I might not always understand what they're saying. To make up for this, I nodded my head more and smiled to show that I was engaged and listening. I also often made light of my inability to say the correct word, and this was a great source of humor. This experience had me rethinking communication between people, and I am much more aware of my facial expressions and tone when talking to people now.

This whole experience has been humbling and exciting. I cannot say that in my travels of Japan I have come to understand Japan—I was only there 5 months. Rather, I realized how little I knew and still don't know about Japan. Now, when I meet people from abroad, I see their struggles learning English much differently.

Through my study abroad program, I had access to history classes, and I took a class on the Nanking massacre and history of Comfort Women. The Nanking massacre is the series of events surrounding the capture of Nanking(1937) by the Imperial Japanese Army During the Chinese-Japanese war. Comfort women were women gathered from across the Japanese empire to serve as sex slaves during Japan's invasions and occupation of the Asia-Pacific region. This class got me thinking about how we construct narratives about countries, and how those narratives are shaped to serve certain purposes.

We read accounts of the events written by people from various backgrounds, and discussed how they shaped the facts that they highlighted, denied, or supported helped them to accomplish goals. Also important is how the facts are framed. We discussed the value of personal narratives in constructing historical narratives, and we discussed the limitations of paper records and official documents.

I examined a similar theme in Premodern Japan and our studies of minorities throughout Japanese history, and how they interacted with the majority. I learned about the *hinin* (literally translated as "non-human") class of people who were disdained by buddhist priests, yet at the same time needed for the performance of religious rites. We also learned about how Shinto had little significance before it was formalized as the native religion of Japan during a period of nationalism. Buddhist priests were no longer zen masters, and Japan no longer religiously homogenous. In place of these myths, I

then saw a much more interesting, much more human story. Now when I encounter generalizations about nations or group of people, I am much more hesitant to simply accept them. I ask what political purpose those generalizations may be serving, and I go from there.

I studied abroad in Japan to learn about traditional Japanese culture and improve my language skills. Reflecting on this experience, I feel that I gained much more than that. I ended up thinking much more politically and am better equipped to analyze and challenge generalizations and assumptions.

Conclusion

I came to Olin, because I heard that people at Olin believe in learning through experiences and giving students the freedom to fail. I imagined that I might fail a bit here and there, but not actually fail. In one of the most meaningful projects of my time at Olin, I did fail. I tried to start a site(Qonfide) to connect closeted and questioning youth with openly lesbian, gay, bisexual and transgendered(LGBT) youth. I truly believed in this goal, but I ran into my own limitations and some external factors I did not consider. That failure was heavy, but it humbled me, made me more aware of variables , and pushed me to learn programming. A semester after the failure of a site, I studied abroad in Japan, and continued thinking about social issues beyond the experiences of LGBT people. During my time in Japan, my eyes were opened to think more critically about historical narratives and how they shape our perceptions of current international and domestic issues.

Overall, I learned a lot of humility. By taking on large challenges, I saw how much I have to learn, and I plan to continue to challenge and humble myself in the future. During my time at Olin, I have grown in ways I did not expect, and I am grateful for the experience I had.