Final Internship Report

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At a glance

I built an electronic health records system for a clinic in Haiti. As we all know, reliable patient medical records are crucial to quality care. I worked with the head epidemiologist at STAND to improve the usability of the app. To achieve this, I created customized user flows and improved the interface design to allow providers greater ease in navigating the platform. Ultimately, I hope my work motivates providers to engage with the health record system to better support their patients.

Overview of the Internship

Since studying Computer Science at Dartmouth, I was eager to use tech for social good. So I jumped at the opportunity to build an electronic health records system for a clinic in Haiti. This clinic provides valuable care to patients dealing with chronic pain and recurring infections. As we all know, providers often refer to records of past appointments to inform their decisions. Thus, a health record system to ensure reliable patient medical records is important. Yet, providers are reluctant to engage with the existing interface because there are too many tabs and all the hyperlinks are clustered together, making it an arduous task.

My interest in Computer Science and Human-Centered Design makes this usability project the ideal opportunity. Throughout the summer, I worked with the head epidemiologist at STAND over Zoom. We sought to improve the provider's ability to input patient data efficiently. I led two projects to address this issue: First, I implemented separate user flows for general medicine doctors and physiotherapists. This allowed the software to display custom forms with fields relevant to the provider, reducing the provider's cognitive overload. Second, I implemented front-end design changes for providers to navigate the app with greater ease. While there is more work to be done on the platform, I enhanced the usability of the most essential screens of the health records system.

Projects + Types of Work

Who did I work with?

First, I'd like to introduce STAND. The STAND team consists of a group of passionate physiotherapists, general medicine doctors, translators, and neuroscience researchers. These individuals are brought together by a shared interest in orthopedic rehabilitation, especially for patients with chronic pain. Their mission is to "establish permanent access to rehabilitative services in Haiti" by investing heavily in the training of Haitian citizens.

My supervisor was Luke Slipski, STAND's head epidemiologist, who is also a graduate student at the Department of Psychological and Brain Sciences at Dartmouth. Given the nature of the pandemic, my internship was remote. Luke and I had weekly meetings on Zoom and communicated on Slack. We also utilized collaborative platforms like Github to share code and Figma to create interface designs. In the ideal world, I would have joined the volunteers on a trip to Haiti with the newly implemented health records system. This would have been a valuable opportunity to fully understand the clinic workflow and see how the health records system is used in practice. If I had the chance, I could address any bugs in the software while it's been used for the first time, as well as identify new features to build.

What's it like to work at STAND?

At the beginning of the internship, we spent time chatting about the operational flow at the clinic. He described that on each day of their big volunteer trips, there is a waiting room of around a hundred patients each holding a slip of paper with a number on it. A translator is tasked with collecting the patient demographics and recording chief complaints in the electronic health record system. From there, a patient queue for physical therapists and general medicine doctors are formed. Throughout the day, these providers work with a translator to treat the patient and record patient data on the software. This includes a record of the treatment, assistive devices given, and a record of their difference in pain. The process seems simple, but you can imagine it gets difficult when there are communication errors, the lack of Wifi, the lack of identification cards, and the pressure of a room full of people waiting. Over the course of several meetings, I came to understand the main touch points with the electronic health system and how to address the pain points Luke identified.

In the first week of the internship, my supervisor and I outlined our project roadmap. We identified all the issues and prioritized the urgency of each issue, taking into consideration the level of difficulty. In the same document, I kept a record of the goals for each week and what has been accomplished. In addition, I kept a record of the resources used and notes on issues to bring up in the next meeting. I have found this shared document immensely helpful in orienting myself, keeping the large goals in mind, and staying on the same page as my supervisor. As a whole, I worked independently, often referencing documentation for Django and sending Luke updates and questions about his code on Slack.

So, what did I really do?

Created stylistic changes

I designed the interfaces to fit the size of a tablet device and took into careful consideration how people would hold the tablet. ie. positioning buttons close to either side of the screen so people can press it with their thumbs when holding the tablet.

Here's a few more examples:

- Created a style sheets to ensure the platform is pleasant to the eye (ie. consistent button designs and color use)
- Updated the offline bootstrap files to ensure the platform can display these new designs without wifi
- Styled the Pain Catastrophizing Scale questionnaire and created a higher quality visual of the pain scale

Implemented new features

These new features aim to make navigating the electronic record system more effortless.

- Each page displays the individual's name and their role to help providers more easily identify their tablet

- Identified common inputs and created checkboxes for providers to select rather than having to type
- Reduced a 6 page patient intake form to one page by creating individualized forms and user flows

Ongoing work
These are projects that I started, but need to be revisited.
- Identified and addressed bugs on the platform (ie. such as issues with links)
- Created confirmation pages for form submission
- Reduced the redundant text on each page

Expectations vs. Experience

This internship with STAND was an untraditional internship experience since STAND does not have a designated internship program. I would describe my internship to be more like software engineering contract work, but well paced and with ample time to learn.

As a whole, this internship did not stray from my expectations. I would attribute it to the meetings we had prior to committing to the internship. Ultimately, I worked on projects that I anticipated, but there were a lot of reach and high reach goals that I did not have time to achieve.

Work Environment + Work Life Balance

While the pandemic brought upon a lot of anxiety this summer, I am incredibly grateful that the Dickey Center continued to fund this opportunity. I believe that I was able to contribute and learn just as much as I would in a regular environment. More importantly, this opportunity made my summer feel purposeful and exciting. With that, here are some pros and cons of working remotely.

Pros:
- Flexible working hours
- Ability to continue work in the evenings in a comfortable environment, especially since the communication and technology is already set up for a "work from home experience"
- Focused Zoom meetings as attention spans are targeted and time bound

Cons:
- Limited engagement and sense of connection to other members of the STAND team
- Felt like I was constantly working throughout the day and the weekends

What technical skills did I learn?

After taking the course Full Stack Web Development, I had a good idea of the core components of a Front-End framework and how to code in CSS and HTML. In this internship, I gained familiarity with Django, a Python Web framework, and had a glimpse of how to use PostgreSQL.

What has been the hardest part of this experience and how did I approach this challenge?

I found navigating Django to be the most difficult. Django is a framework designed to simplify the process of software implementation. Ironically enough, the moments I found most frustrating are when the framework has attempted to simplify the process, and hid away the code that I need access to. I approached this challenge by being transparent with my supervisor when I needed help. We talked through the code and divided tasks in a way that lets us build off of each other's work. Ultimately, I learned that to be professional doesn't mean you need to know everything or need to figure out everything on your own. Instead, a transparent relationship helps us fill each other's knowledge gaps and move forward.

What has been the most rewarding experience?

The most memorable moments from my internship are the moments my supervisor would say, "Wow this is so much better than what it was before!" And I'd reply, "Let me show you how I did that!"

As someone who was first introduced to Computer Science in college, I often feel far behind my peers. Yet, this internship helped me feel that I have earned my place as a CS major. I realize that I don't need to focus on how fast I learn the material, but on how I can apply these concepts in the real world. In addition, I felt particularly empowered to share my knowledge. This is especially important because if my supervisor understands my code, he will be in a better position to address any bugs that come up.

What are my main takeaways?

STAND has taught me how a non-profit organization can ensure sustainable development in a developing country. The founders of STAND worked hard to train locals to make up the core team of the organization, taking on roles as translators, administrators and physical therapists. Hence, even without external volunteer trips, the clinic continues to run year round.

I was also fascinated to see how this clinic provides valuable data for researchers to study chronic pain. Through my conversations with Luke, I came to understand that the chronic pain that many patients face is a lasting effect of the category 4 Hurricane Matthew in 2016.

Interestingly enough, many patients report lower instances of pain after their visit at STAND, which Luke speculates has to do with the laughter and expressions of care during the visit.

Lasting Impact

This internship was the first time I used tech for social good. I felt inspired that I had the web development skills to contribute to a meaningful non-profit. I now imagine that providers no longer need to click through irrelevant pages or to zoom far in on the tablet just to click on a checkbox. I hope that since the provider would spend less time looking at the tablet, they would be in a better mood to work with the patients. After all, a large part of effective treatment hinges on the patient's sense of connection with the doctor, especially for chronic pain.

I'm grateful that my work with STAND gives me the confidence and credibility to continue pursuing software engineering, moving me forward with my interest in using tech for social good.