Thesis Project Portfolio

Tracking Workflow Metrics: How I Used Design to Improve Efficiency

(Technical Report)

Using the Americans with Disabilities Act to Analyze Accessibility-Induced Inequity on the

Internet

(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Table of Contents

Sociotechnical Synthesis

(Executive Summary)

How Real Experiences and Practice Translate to Research

*"Design is about making things good (and then better)
and right (and fantastic) for the people who use and
encounter them." - Matt Beale*

Over 90% of websites contain some sort of accessibility issue according to the web content accessibility guidelines. My technical project report reviewed my experience as a software engineer intern at Qualtrics, a company that creates cloud-based solutions for experience management. I learned how to understand the customers' needs, create a low-cost wireframe, get feedback, and develop a final product. Throughout this process, I was surprised by the lack of attention focused on the accessibility of my project, especially at a company that focuses on customer experience. Thus, I focused my research on how poor accessibility can be improved by viewing it through the lens of the Americans with Disabilities Act. If a company like Qualtrics is in this state, other competitors must be at the same or lower coverage level of disabled users. My STS Research Paper discerns how poor accessibility causes inequity on the internet and how the ADA can be used to frame improvements to it. This experience complemented my STS research as I understood how accessibility is not prioritized in practice.

The technical portion of my thesis produced invaluable insights into the software engineering industry. I chose to write about my internship at Qualtrics as a software engineer intern. Qualtrics needed an easier method for tracking internal metrics of software performance since its current solution forced users to go through multiple third-party services to access the same information which could be achieved much more easily through a centralized platform. As a member of the xFlow Runtime team, I developed a dashboard to view the data from each third-

party service, like AWS Dynamo DB, Redis, and more. First, I identified the problem and areas for improvement by speaking to potential users, who were other engineers at the company, and my mentor and manager. I then created a design document and mockups for the web app using Figma, a wireframing/mockup tool, to visualize the app at a low cost. Next, I presented the design document and proposed project to my team for feedback and changes. This cycle continued until I had perfected the plan for the project and was ready to start development. Finally, I coded the dashboard that I designed using ReactJS, ExpressJS, and more technologies and shared the final product with my customers for their use. Since completing the project, some features have already been added, and the tool is still in use today at Qualtrics.

In my STS research, I produced a report on the extent to which the Americans with Disabilities Act can be used to improve accessibility efforts on the internet. My analysis focused on analyzing existing cases of internet inaccessibility in addition to my experience as an intern to understand what went wrong and how we can learn from those mistakes. Specializing on the Americans with Disabilities Act helped me specify my research rather than focusing on the entire World Wide Web and helped me gain valuable insights into specific experiences of disabled people experiencing inequity in the past. My analysis concluded that the Americans with Disabilities Act is a good lens to view problems today as it provides structure to identify problems in existing and future cases. From my research, I was able to identify three problems with the accessibility process: failure to account for disabled users, lack of assistive device support, and a low priority for accessibility. By improving the design thinking and software development lifecycle, these problems can be improved for users with disabilities.

From both my technical project and my STS research, I was able to identify insights within the technical, organizational, and cultural aspects of accessibility in software development

and how they support ethical responsibility. My technical experience and research both overlapped nicely, and I understood that companies have the technical competence to put more effort into accessibility. Yet, the existing cultural software development process puts little to no emphasis on it. For example, when I presented some of my conscious design decisions to my customers during my internship, like following the WCAG AAA contrast guidelines for foreground and background colors, they seemed to care more about the functionality of the product instead. An organizational problem also exists in the communication between parties. Software engineers create solutions based on the deliverables designers and UX researchers give them. However, the deliverables they are creating are not iterating and testing with disabled users, causing a negative feedback loop. The process must be redesigned so that disabled customers are involved. It is a basic human right to browse the internet, and as engineers it is our responsibility to create an equitable experience.