Thesis Project Portfolio

Developing a Project Management Tool for Network Migration to Improve Transparency between Enterprises and Network Experts

(Technical Report)

Breaking Down Barriers: An Analysis on the Flaws of Digital Accessibility in America

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Ashley Ann Rissmeyer

Spring, 2023

Department of Systems and Information Engineering

Contents of Portfolio

Software design, an essential component of software development, refers to the layout and structure of an application. Good software design can drastically impact the effectiveness of a software, as it allows a user to easily navigate and understand how to engage with the interface. This, in turn, promotes the company's profits by generating returning users and credibility. However, poor software design can lead to user confusion and misinterpretation or can even exclude individuals from using the software. While this inability to effectively utilize software was once a nonissue, it presents numerous issues in modern society. Individuals depend on working software to have access to security, entertainment, transportation, and other services, and restricting that access with poor design prevents these individuals from reaping the benefits of technology and engaging with society. My technical and STS papers each address a consequence of poor design and find ways to challenge the current norms in the software development world.

For my technical topic, I addressed poor design in the cloud networking industry. Cloud networking can provide benefits in security, usability, and automation, but the process of establishing a network and migrating it to the cloud is incredibly complex. Successfully completing the migration process requires highly specialized knowledge on computer networking, but also requires an understanding of the details of each device on a network. This means that a network engineer consultant and their enterprise client must tackle the challenge together, but there is no well-designed software to organize the tasks of the migration process. My project works to address this design issue by providing a project management tool that increases transparency in the migration process and between the client and network professional. In order to create this tool, my team interviewed employees of a cloud networking company to establish the scope of the problem, we researched currently existing management tools to

understand current competitors, and we utilized Figma to prototype our proposed software solution. Our final interface provides three unique design components to enhance the migration process: a migration task-based structure that centralizes resources, a map for evaluating the status of migration tasks, and embedded learning resources for furthering knowledge of networking. This provides a well-designed migration software that bridges gaps in both communication and usability in the cloud networking industry.

For my STS topic, I addressed poor design with regard to individuals with disabilities. In order for many individuals with disabilities to utilize the internet, they must use disability-specific assistive technologies, which are dependent on specific design techniques that allow the technology to accurately detect and translate the design to the user. This is called accessible design, and reports indicate that over 90% of websites today do not incorporate it, creating a barrier for equal access in technology. In order to understand the root of this issue and gather how accessibility is defined in America today, I looked at the history of legislation on accessibility, court cases regarding digital accessibility, and guidelines from social organizations. From this research, I was able to conclude that American legislation does not currently provide a concrete definition of what constitutes digital accessibility protections. This, in turn, causes the courts to have mixed decisions on whether corporations should be held responsible for having inaccessible design. Additionally, the available guidelines on accessible design are non-intuitive and do not cover all areas of accessible design. In order to correct this, our country must provide a stronger legal definition for digital accessibility and more thorough guidance on how to ensure design compliance. This would create a legal obligation for designers to ensure individuals with disabilities have equal access to the digital world, and would ensure the definition and standards of accessibility are clearly understood.

Both of these research projects have been incredibly enjoyable. For my technical project, I gained a great deal of knowledge on networking and the intricacies of the migration process. I believe the information my team gathered and the prototype we produced will be helpful to our client, so that they can better organize the workflow of their interface and provide more comprehensive resources to their clients. Furthermore, I think the research will be beneficial to standardize and generally improve communication for network migration as a whole. For my STS project, I was able to learn more about the connections between the disability community and technology. Researching the legislation, court cases, and social guidelines provided context on the status of equality in our country, and it is fulfilling to have the chance to educate others on the disparities that minority groups in our country face. With more time, I would gather accounts from individuals with disabilities on their personal experiences with web inaccessibility or with digital accessibility court cases. This would further contextualize the problem and emphasize the emotional affects that legislation can have on people in America.