**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)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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# I. General Research Problem: Designing for the Benefit of Every User

*How can web designers ensure all users are accounted for in the design of their product?*

Since the beginning of the Information Age in the late 20th century, the digital world has expanded exponentially. Communications travel at a fraction of the time of the postal service through email or SMS, working online saves gas and provides all the comforts of your home environment, groceries and clothes can be delivered straight to your door, and each of these positive tradeoffs of the virtual world have only been further amplified by the pandemic. However, while this increase in digitization has drastically enhanced user convenience, this rise in digital implementation continues without concrete rules and expectations on what the digital world should look like (De George, 2001). This lack of clearly-defined legislation has sparked numerous debates on privacy and data collection for online products, but many users don't consider the equally important issue that precedes product use: software design and development.

User-centered design (UCD), broadly defined as a design process in which designers focus on user needs, is a relatively new, but crucial concept in software development. In several studies, UCD has been proven to increase user satisfaction and product usability, in turn boosting company sales while reducing time and cost on software updates and help desk responsibilities (Vredenburg et al, 2002). While implementation of this design process provides these impactful benefits and more, it also encompasses a variety of different user groups and design features, and oftentimes the most essential users and/or software elements are lost when trying to produce an effective user-centered product with a short turnaround time. This can then present issues with

the functionality and usability of the product, as well as issues with equal opportunity and equal access.

For my technical topic, I will focus on a commonly occurring issue in the realm of product functionality and usability: software onboarding. The issue with software onboarding refers to any product with a manual set-up that requires greater domain expertise or understanding of the product than an average user has. Poor software onboarding presents problems for designers, as the confusions in onboarding typically counteract the time and cost conservation benefits of UCD.

For my STS topic, I will focus on a commonly occurring issue with equal access: web design accessibility. The definition of web accessibility has evolved greatly throughout the Information Age, but the underlying issue remains: individuals with physical and/or mental disabilities are not being accounted for in design. Many companies maintain the mindset that the cost of accommodating users with disabilities outweighs the benefit of accessible design, despite studies proving the exact opposite effect, that accessible design reduces long-term software development costs (De Andrés et al, 2010).

In addressing the issues with software onboarding and web accessibility, I hope to uncover common misconceptions and design malpractices in user-centered design while presenting researched suggestions to these issues in order to create a more well-rounded means of UCD practice.

## II. Creating a User-Centric Onboarding Process for Network Automation Software

*How can the onboarding process and/or workflow of a software affect a user's experience with the product?*

Cloud-based networking, although a relatively new concept in the realm of computer networking, has risen in popularity rapidly. This modern utilization of the cloud allows companies to, with a select few essential details, operate and scale their network in a fully autonomous manner with a simplistic user interface to monitor and make any manual adjustments where needed (Infoblox, 2022). However, companies that are selling software products that allow for this automation of network management are struggling with ensuring their users can utilize the full capabilities of their software due to the setup and onboarding processes.

Software onboarding is a complicated system for the user, as many onboarding processes require technical expertise or understanding that isn't necessary for the product itself. This often creates user confusion or prevents the user from fully implementing the benefits of the product, which leaves users uncertain about their initial setup and what features should be implemented to ensure the greatest utilization of the product. Networking software companies are currently combating these issues with well-trained and informed professional services teams, but this solution is temporary and does not ensure a stable, long-term fix. The software companies want their clients to be able to fully implement the perks of the product without extra cost or confusion, and in order to do this, their interfaces must be re-evaluated with the user in mind to ensure a clearly defined workflow and onboarding process.

In order to address this necessary redevelopment of onboarding, my capstone team is working with our client to address their product's faults in onboarding by getting to the root of the problem. We are working to gather user requirements and pain points from our client and their customers, in order to understand current system failures, we are clearly defining the necessary steps in the system workflow, to establish clear communication and expectations, and we are visualizing and prototyping this reconfigured system, to provide a usable, long-term solution for the client. While most of this will be completed through working with the client and their software, we also will ensure to research similar companies and their software to understand the competition and the methods that others take to establish an effective product. At the completion of this project, we hope to not only improve our client's customer experience with their product, but to address concerns of onboarding with a variety of digital products. This, in turn, will improve usability, enjoyability, and accessibility of software and lay a precedent for organization of future networking technologies.

## III. The Evolution and Effects of Accessibility in Web Design

*How have the definition and expectations of accessibility in web design changed over time and how does this affect users with disabilities?*

Over the course of American history, a number of minority groups have had to fight for their basic human rights. Women fought for their rights in the Women's Suffrage Movement, Black Americans fought for their rights in the Civil Rights Movement, but Americans with disabilities are still fighting for their rights in the Disability Rights Movement. This movement

for individuals with disabilities has grown and adapted since its conception in the 1960s, making significant steps towards change with the adoption of national laws and guidelines (ADL Education, 2022). However, with the rapid expansion of and dependence on technological development, these individuals find themselves still demanding to be treated as equals.

Web accessibility can be best defined as the ability of "all people, particularly disabled people, [to] use websites in a range of contexts of use, including mainstream and assistive technologies" (Petrie et al, 2015). This definition is not as obvious as it may seem, though, as these authors gathered over 100 sources to develop this definition. This issue to define web accessibility primarily stems from the lack of concrete legislation on web accessibility. While the Americans with Disabilities Act (ADA) has been clearly interpreted in terms of physical barriers, the act provides no insight on expectations for virtual barriers, and the ADA stands as the sole modern law on inclusivity of individuals with disabilities in public spaces (Sapega, 2020). This ambiguity of legislation, paired with the belief that designing for accessibility will cost companies more than their standard design practices, has led to an environment where the guidelines and expectations of accessible design are heavily blurred (De Andrés et al, 2010). Thus, often times companies exclude individuals with disabilities in their design planning and considerations. This then begins a positive feedback loop: as individuals with disabilities take action and sue companies on the grounds of not being able to access the information on their websites, the Department of Justice does not have a clear precedent to rule on, and thus is able to rule in favor of companies that are openly utilizing inaccessible technology, setting the web accessibility movement back several steps. In order to fully understand where web accessibility is today and why, I am going to analyze the history of this accessibility movement and some of

the most current web accessibility lawsuits in order to uncover common themes and provide insight for moving forward.

*Background*

The first piece of legislation that was established in the accessibility movement was the Rehabilitation Act of 1973 (Sapega, 2020). While this act didn't provide a thorough basis for future legislations, it did lay the land for accessibility expectations for federal agencies in terms of employment, financial assistance, and technology. More specifically, the Rehabilitation Act worked to prohibit employment discrimination of individuals with disabilities, discrimination of financial assistance based on disability, and discrimination of access to information technology (AskEARN, 2022). 17 years later, the Americans with Disabilities Act was established, essentially duplicating the Rehabilitation Act but with regulation inclusions for any "place of public accommodation." This hugely bridged the gap in Americans with disabilities' unequal access to commonplace locations, as businesses from libraries to restaurants had to implement ramps and other assistive infrastructure to ensure a non-discriminatory environment (Clark et al 2020). Then, in 1998, the Rehabilitation Act was amended to expand upon section 508, where web accessibility was first denoted. This emphasized that anyone interested in business with the Federal government could not proceed unless their digital assets were accessible, creating the first real step towards clearly defined web accessibility. However, the Rehabilitation Act remains legally bound only for these federal agencies, so many commonplace websites that society depends on in our day-to-day lives are still not required to design with accessibility in mind.

*Literature Review*

Although no legislation has formally denounced web inaccessibility, the Department of Justice (DoJ) has had to deal with this grey area of the ADA due to individuals with disabilities suing companies with inaccessible software. Since the initial adoption of the ADA, these digital accessibility lawsuits have skyrocketed, totaling approximately 10,000 lawsuits annually as of 2020 (Vu et al, 2020). One of the most prominent cases, Robles v. Domino's Pizza, went on for five years on the basis that Domino's website and online ordering capabilities were not accessible for Robles, who relies on a screen reader for his vision impairment (Southeast Center, 2019). The Supreme Court ruled in favor of Robles in this case, as he was able to gather the facts and hard evidence to prove his case, but many other Americans with disabilities have not been so lucky, as is the case for Cullen v. Netflix and Earll v. Ebay (Vu et al, 2020).

With the number of lawsuits on digital accessibility consistently rising, the DoJ finally published a statement in March 2022 to clarify Title III (the public-facing section) of the ADA (U.S. DoJ Civil Rights Division Disability Rights Section 2022). This statement very thoroughly explains the purpose of web accessibility, examples of virtual barriers, the entities these expectations apply to, and the steps to follow for improvement. While this still leaves ambiguity with entirely virtual businesses, it is a significant step forward for individuals with disabilities gaining equal access to digital information and resources.

*Methods*

While improving and promoting web accessibility will be an ever-evolving struggle, analyzing the events throughout the history of the accessibility movement and understanding the issues that individuals with disabilities are commonly facing in their use of technology will allow society to have a clear understanding of the situation and provide empathy and insight on how to

move forward. Thus, in my STS paper, I will strive to gather and reflect on past federal and state legislations, Supreme Court rulings, and commentary from individuals with disabilities to promote this understanding and work to create a clear path forward in American web accessibility.

## IV. Conclusion

In my research on web accessibility, I hope to learn more about the state of accessibility in America and how this has changed over time in its legislation, rulings, and effects on individuals with disabilities. This, paired with my technical work in the restructuring of software onboarding and workflow, will help me ensure that barriers in design become clearly established so that moving forward, all users are accounted for in the design of digital products in order to make user-centered design truly all-encompassing.

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