Improving the Voting Experience for those with Disabilities

The Representation of the Black Experience in Computing

A Thesis Prospectus
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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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Introduction

As technology continues to intertwine itself into the actions of humans, it becomes more important to analyze how these technological systems and products serve us. Do certain systems support some people more than others? This question is of great significance to various marginalized groups, including but not limited to the Black community, Asian American community, and disabled community, who have and will continue to face exacerbated challenges as a result of historical obstacles. While technology systems possess the power to elevate these communities, they also have the capability to advance these obstacles.

My technical project and STS project both analyze the lack of representation of marginalized communities in technological systems. In my technical project, I identify the lack of voting resources for those with disabilities and propose the development of a software system that matches disabled people to polling locations with the best resources to accommodate their needs. Similarly, in my STS project, I analyze the work practice of UX designers as they develop design elements for products and opine on the concept of "designing for all", particularly insofar as how it pertains to the Black experience.

Both projects heavily reflect the consequences of the concept of "configuring the user". As Woolgar states in his article titled "Configuring the User", "our preconceptions about the nature and capacity amount to a process of configuring its user, where "configuring" includes defining the identity of punanitive users, and setting constraints upon their likely future actions" (Woolgar, 1991, p. 61). As described in the socio-technical portion of the prospectus, disparity usability in interactive design for minorities is largely due to a lack of a true understanding of the user (Hermeking, 2006). User experience researchers, whose primary role is to analyze and inquire about the needs and work activities of users (Konstantakis, 2020), rely on preconceived

notions of marginalized groups, like the disabled and Black communities, rather than gaining an understanding of the needs, wants, and composition of these communities. Much of this is due to a lack of understanding of the true essence of culture, as a professor in the Computing Department of the Open University in the U.K. more specifically defines, “Culture is not only about what people say, think or express, is also the material dimension that frames and mediates what people do” (Nocera, 2022, p.14). The consequence of this action is that the needs of these communities are not represented accurately in design; what we see is the values, beliefs, and culture of Western countries continue to permeate into the perception of other countries and cultures (Cagiltay, 1999). For the Black community, in particular, this is demonstrated by design that focuses solely on Black trauma and struggle, but refuses to explore the other aspects of Blackness that are more wholly defining of the community.

In my technical project, I attempt to use my knowledge of my intended user within a marginalized community to create a software system that better addresses the needs of the disabled community. Throughout this process, I will design a system that is inclusive for all, by constructing a view of the user that is well researched and broad in scope.

Technical Topic

After analyzing the various ways in which computer interfaces can either benefit or hinder the daily experiences of marginalized groups, I decided to explore, analyze, and propose changes to the systems put in place for those who are disabled, particularly as it pertains to voting. As one of the most impactful and important rights for American citizens, voting is seen as the primary opportunity American citizens have for promoting change in their local, state, and federal communities. Despite the great emphasis placed on voting, however, there still remains a

large community of voters whose needs are commonly overlooked when it comes to the system of voting — those with disabilities (Selker, 2005). Within the past two decades, there has been an increased push for systems put in place that provide an effective and comfortable voting situation for those with disabilities. However, "there is an enduring concern about the divide in political participation between disabled and non-disabled citizens and the democratic implications of this inequality" (Bastien, 2020, p. 218)

For my technical project, I will create a software system that will enhance the voting environment for disabled voters, helping to ensure that these voters have all of the information required to cast an informed vote and allow them to participate in a verification process that is secure.

The first part of this system will include a database where all of those who need specific accommodations can register their needs ahead of time and be matched to a polling site with the correct equipment and materials to accommodate these voters. This database will also be of great use to workers in polling sites. These workers will then be able to receive an accurate estimate of when voters who need accommodations will be coming to their polling locations, ensuring they are prepared which will then help the process to be more efficient.

The second part of this system is an audio linked algorithm (created specifically for those with impaired vision who may not be able to read their ballots. that reads aloud the information on the ballot and verbally relays the results to the user votes. Intended to be used with headphones, this algorithm gives disabled communities the ability to engage comfortably in voting while protecting their privacy. Although this technology will be developed with the idea of helping those whose hearing is significantly impaired, this inclusive mindset will also benefit those outside of the disabled community, as Newell and Cairs argue in "Designing For the

Extraordinary User". "To underestimate the importance of design for persons with disabilities is to remain unaware of the lessons and benefits it can offer and the ways in which these lessons can be applied to the general population" (Newell, 1993, p.12).

Because this project depends greatly on technology and audio sources, it will be imperative to take the proper precautions to ensure that this system is secure. To do this, I will consult with various professors in the cybersecurity and networks departments, in addition to performing my own research about processes that ensure voting equipment is secure. The knowledge I gain through my socio-technical topic about the current practice of UX designers will help me to create a product for my technical project that takes into account the lived experiences of members of the disabled community.

STS Topic

Human Computer Interaction (HCI) is a field centered on analyzing and attempting to improve the way that humans interact with computers and other forms of technology (Clemmensen, 2020). In contrast to other fields involved in the development of software systems, like contextual analysis, software engineering, and maintenance, HCI has a direct influence over how the user feels before, during, and after using a product. This concept of "how a user feels", frequently described as User Experience by computer scientists and designers, is quite significant, and something that computer scientists and researchers are more interested in due to the increased prominence of technology in recent years.

The primary concern of UX designers (those who work with software developers to couple requirements with an interactive interface) is increasing the usability of products. Usability, a broad term used to describe the ease at which a user is able to learn about and

interact with a system, is highly dependent upon various attributes of the user, including ability status, experience with technology, economic background, and ethnicity.

As technology has become increasingly widespread, we've seen a simultaneous increase in the diversity of audiences that interact with technology on a daily basis. Although there is an obvious need to produce technological systems that cater to users of all different backgrounds and cultures, we've observed that developers have been slow to produce interfaces that provide high usability for all audiences (Rehm, 2009). In Designing For All - Catering for Culturally Diverse Users, an article in the International Journal of Computer Science and Information Technology, the authors emphasize the importance of the relationship between culture and technology, stating "As culture influences the way in which people interact in general, culture will also influence the way in which people will interact with computers" (518). Following the logic of this claim, if culture greatly influences the way that we interact with technology, developers and designers should strive to understand various aspects of cultural backgrounds in order to produce experiences that are usable for all. This unfortunately not a reality for the Black community and has directly contributed to an incomplete, disappointing experience coupled with low levels of learnability, natural mappings, and consistency across platforms.

The Black community, in particular, following George Floyd's and Breonna Taylor's deaths, have pushed for a reframing of the Black experience in HCI and Design. "We challenge the notion of trauma-laden work that only stands to validate tropes and position Black scholars as numbers for diversity efforts, and instead suggest that HCI's engagement with the Black experience better embrace our humanity," Christina Harrington states during a conversation about the Black experience in research culture (2021, p. 23). These scholars, among many other Black scientists in computing, feel frustrated with the lack of focus on designing computing

systems for Black people, by Black people. Instead of creating products whose design accounted for the Black experience as a whole, UX designers created systems that focused on the trauma that members of the Black community faced.

Research Question & Methods

This idea of the spectrum of usability, and how it differs specifically for those in the Black community, was the primary inspiration for my thesis question: How is the Black experience with computing informed by the obstacles and lived experiences of the Black community, and how are these experiences represented in the design of technology systems?

To analyze my thesis, I will be doing case studies, literature reviews, and a discourse analysis.

An important part of my research will be understanding the perspective of Black users as it pertains to design. To do this, I will perform a discourse analysis on an article titled "Designing for the Black Experience" – a text that recounts the interviews of three Black women whose main research interests span the fields of HCI and design. In this analysis, I will focus on how the difference of the identities and experience of these authors (Black scientists in computing vs. White scientists) inform the conclusions made in the writings. Having both of these perspectives provides me with an understanding of the current design process for UX designers and how it encompasses or does not encompass the Black experience while simultaneously providing a first-hand account of how Black designer do or do not see themselves represented in the User Experience space.

I will also be performing a literature review on various texts to better understand the current methods that UX designers utilize. Learning this current practice will help me to form a

basis for ultimately concluding if these processed serve marginalized communities, and if not, how this process could be improved. This method should prove to be very helpful in both my technical and STS approaches to improving technology systems for marginalized communities.

Conclusion

Design is a powerful construct, one that is especially illuminated in how technology systems are constructed. The way we design products carry immense weight in how they make people feel and the opportunities with which they provide people. Throughout my thesis, I will use study and analyze the current methods surrounding design and the opinions of Black scientists on the inclusivity of the space. This will provide me with the necessary background to produce a product in my technical project that prioritizes culture and the needs of the disabled community in the design process.

As we progressively weave technology into our everyday lives, it is pertinent that we prioritize designs that are accessible, usable, and representative of as many people as possible. It is imperative that HCI researchers and designers base their studies on the true culture and breadth of a group of people – who they are, what they care about, and what they need, rather than a sole Westernized perspective. My findings will hopefully provide some guidance for improvement in the HCI field, while also encouraging urgency in making positive changes to the current work practice.

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