REDESIGNING HEALTHCARE.GOV: ENHANCING SYSTEM RESILIENCE AND USER ACCESSIBILITY

HEALTHCARE.GOV AND SOCIOTECHNICAL BARRIERS: AN ANT APPROACH

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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

The Affordable Care Act (ACA) sought to tackle a significant challenge within the United Nations' third Sustainable Development Goal: ensuring healthy lives and promoting well-being for all (United Nations, n.d.). A pivotal aspect of this initiative was the launch of Healthcare.gov, designed to streamline access to health insurance for millions of Americans. During the 2023 open enrollment period, Healthcare.gov facilitated access to coverage for over 16.3 million individuals, with 13.8 million of those securing coverage through the platform (CMS.gov, 2023). However, the rollout of the platform was marred by considerable challenges, including website crashes under high demand, design flaws that complicated user navigation, and significant privacy concerns, leading to an overall budget escalation from the initial $93.7 million to a staggering $1.7 billion (ABC123, 2016). These issues not only hindered the user experience but also obstructed the ACA's goal of providing equitable healthcare access for all Americans.

In response to these challenges, I propose the development of an improved Healthcare.gov platform that enhances scalability and is more user-friendly, thus providing greater value to stakeholders by improving accessibility and reliability. This technical project requires a thorough understanding of the diverse sociotechnical context that influenced the platform's original shortcomings. Therefore, understanding how these interconnected factors contribute to effective healthcare access is crucial to this project's success. To explore this context, I will employ the Science, Technology, and Society (STS) framework of actor-network theory (ANT) (Cressman, 2009) to analyze the interplay between technical and social factors that led to the difficulties faced by Healthcare.gov. This includes examining the lack of effective

communication among various development teams and how these social interactions impacted the project's outcomes.

Because the challenge of creating a reliable and accessible website is sociotechnical in nature, it requires attending to both its technical and social aspects to accomplish successfully. In what follows, I set out two related research proposals: a technical project proposal for developing the platform for improved scalability and user interface, and an STS project proposal for examining the social dynamics, including communication barriers and coordination issues, at the time of the Healthcare.gov launch failure. By integrating insights from both projects, this work seeks to ensure that Healthcare.gov effectively serves its purpose in promoting equitable access to healthcare.

Technical Project Proposal

The current healthcare IT platforms often face significant challenges related to usability and scalability, which can greatly hinder effective patient engagement and provider efficiency. Existing systems frequently suffer from outdated designs that do not accommodate the increasing demands of users seeking timely and reliable access to healthcare services (United States Digital Service, 2016). Consequently, this has resulted in long loading times, system crashes, and a frustrating user experience. The inadequacies in both the front-end and back-end architecture clearly indicate that a comprehensive redesign is essential for fostering greater user satisfaction and ensuring system reliability.

To improve upon current designs, the new platform will adopt a modern, user-centered approach that prioritizes intuitive navigation and accessibility. Existing platforms typically present complex interfaces that can overwhelm users, particularly those with limited technical expertise. Evidence from usability research suggests that simplicity and clarity in design lead to a

more effective and satisfying user experience, as confirmed by Nielsen Norman Group's findings that streamlined interfaces help users complete tasks more accurately and quickly (Nielsen & Budiu, 2021). By employing user experience (UX) research and iterative design methodologies (Interaction Design Foundation, 2024), the new system will feature a streamlined interface that simplifies interactions and enhances usability.

In addition to UI enhancements, the project will focus on developing a scalable backend architecture that leverages microservices. Current systems often struggle to handle peak traffic, leading to slow response times and system outages (Dolfing, 2023). By designing the platform with a microservices architecture, individual components can operate independently, allowing for greater flexibility and responsiveness to user demands. This modular approach not only ensures that the platform can scale effectively with the increasing number of users but also facilitates easier maintenance and updates without disrupting overall system functionality.

The project will be structured into four main components, each utilizing specific technologies to ensure efficient development and integration. The first component, the front-end website, will be built using programming languages such as HTML, CSS, JavaScript, and Bootstrap, aimed at creating an intuitive and visually appealing user interface. The second component, the back-end data services hub, will be developed using the Java programming language and will integrate with external data sources through RESTful APIs, ensuring seamless data flow. The third component will focus on the enterprise identity management (EIDM) system, also implemented in Java, which will be crucial for ensuring secure and efficient data retrieval from the back end. Finally, the hosting infrastructure will be established using Amazon Web Services (AWS) for cloud hosting, providing the scalability and robust performance necessary to support user demands. After the completion of these components, thorough testing

will be conducted to ensure the system meets user needs and functions reliably under various conditions.

The value of this redesigned healthcare IT platform to stakeholders is multifaceted and profound. For patients, the enhanced user interface will promote greater engagement with their healthcare data, enabling them to track their health, schedule appointments, and access medical information with ease. This increased accessibility can lead to improved health outcomes, as patients become more proactive in managing their health. For healthcare providers, a more reliable and responsive platform means they can deliver better service to their patients without the frustration of technical issues (Piper, 2013). Streamlined workflows will allow healthcare professionals to focus more on patient care rather than navigating cumbersome technology.

Furthermore, the redesign will also benefit administrators by providing robust data analytics capabilities. With a scalable architecture, the platform can handle vast amounts of data, enabling healthcare organizations to derive insights from patient interactions and operational performance. This data-driven approach can lead to improved decision-making and resource allocation, ultimately enhancing organizational efficiency and effectiveness in delivering quality healthcare services. By addressing these critical issues, the redesigned platform aims to create a more efficient, user-friendly environment that supports both patient and provider needs in a rapidly evolving healthcare landscape.

STS Project Proposal

The initial rollout of Healthcare.gov serves as a compelling case study for examining the intricate relationship between technology and society. This platform, central to the Affordable Care Act's (ACA) mission of providing universal healthcare accessibility, encountered significant challenges that hindered its effectiveness. These challenges were not merely technical

but were deeply rooted in a complex interplay of social, organizational, and technical factors that collectively shaped the platform's trajectory.

At the heart of the issue were the design requirements imposed by federal standards, which prioritized security, user data privacy, and eligibility determination for health coverage over user experience (Office of Inspector General, 2016). While these standards were crucial, they often conflicted with agile development methodologies that could have allowed for a more adaptable and responsive system. This regulatory environment forced the technical architecture to focus on compliance over user experience, a decision that significantly contributed to the platform's shortcomings and user dissatisfaction.

Previous analyses of Healthcare.gov have largely concentrated on these technical failures and rigid policy directives. However, such perspectives tend to overlook the broader sociotechnical dynamics at play. For instance, the role of government contractors, who were tasked with integrating the platform with state healthcare exchanges, was constrained by contractual obligations that emphasized rapid deployment over iterative testing. This pressure limited their ability to address emerging system flaws and fostered an environment where communication and coordination were severely lacking, further complicating the project's execution (Lee & Brumer, n.d.).

The consequences of these oversights are profound. Without a comprehensive understanding of the social dynamics and communication barriers among key actors—such as CMS leadership, government contractors, and policymakers—future projects risk repeating similar mistakes. A deeper exploration of these interactions is essential to uncover the root causes of the platform's failure and to inform the development of more effective strategies for large-scale technology implementations that are both robust and user-friendly.

To address this gap in understanding, this proposal applies the Science, Technology, and Society (STS) framework of actor-network theory (ANT). ANT is a theoretical and methodological approach that examines the interactions between human and non-human actors within a network, emphasizing how these interactions shape technological and social systems (Cressman, 2009). In the context of Healthcare.gov, ANT provides a lens to analyze how various actors, including technical components, policies, and organizational structures, contributed to the platform's challenges and eventual shortcomings.

A key concept within ANT is translation, which refers to the process by which actors negotiate and interpret each other's roles and requirements (Callon, 1986). In the case of Healthcare.gov, translation helps explain how policy goals were transformed into technical specifications, often resulting in a mismatch between the intended user experience and the system's design. For example, the emphasis on security and privacy led to a rigid technical architecture that prioritized regulatory compliance over user adaptability. This concept of translation highlights how different actors' interests, such as policymakers' focus on compliance and contractors' pressure for rapid deployment, were "translated" into decisions that ultimately hindered the platform's flexibility and scalability.

Moreover, ANT encourages us to view technical components as active participants in the network. The choice of a monolithic architecture, for instance, can be seen as an actor that interacted with human decision-makers and policies, influencing the platform's ability to handle complex user interactions. This perspective allows us to understand how technical decisions, often driven by social forces and resource constraints, impacted the platform's robustness and adaptability, leading to repeated system failures and user frustration.

By focusing on these interactions and the concept of translation, ANT reveals the misalignments and communication gaps that contributed to Healthcare.gov's challenges. This analysis offers a new perspective on the case, arguing that a more cohesive sociotechnical approach, emphasizing better-coordinated project management and the incorporation of agile development practices, could have mitigated the platform's issues. To support this argument, the proposal will analyze information from primary sources, including reports from the Office of Inspector General and case studies on Healthcare.gov's rollout. These sources will provide insights into the interactions among actors and the technical decisions that impacted the platform's performance.

Conclusion

This project combines technical improvements with an STS analysis to address key challenges in healthcare platform design. The technical project will develop a more scalable, secure, and user-friendly system that enhances the healthcare enrollment experience by addressing issues like interoperability, user experience, and load-handling capacity. The STS project, drawing on actor-network theory (ANT), examines the interactions between CMS leadership, contractors, policymakers, and technical teams to uncover how these dynamics contributed to Healthcare.gov’s initial issues. These insights into the influence of social and organizational factors on technical outcomes highlight the importance of clear communication and alignment across actors. By integrating these findings, the technical design gains a sociotechnical foundation that emphasizes adaptability, stakeholder feedback, and balanced design priorities, resulting in a platform equipped to meet both current and future demands for healthcare accessibility.

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