

Undergraduate Thesis Prospectus

Education in Modern Web Development for the University Community

(technical research project in Computer Science)

The Healthcare Sector and the Failure of

National Health Plans in the United States

(sociotechnical research project)

by

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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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General Research Problem

What are the institutional barriers to optimum service delivery?

Humans create and simplify solutions to problems. This problem-solving is often more effective when people work together. When a problem-solving organization successfully solves a problem, it often grows larger and more well-established. In theory, growth enables institutions to solve problems more efficiently and at a larger scale. In practice, large institutions often become less efficient. Bureaucracy; entrenched ideas, values, and procedures; and conflicting interests often prevent large structures from continuing to innovate and adapt to changing problems.

Institutional barriers preventing optimal solution delivery can be found historically. Certain scholars attribute the failure of new firms in post-liberalization China to institutional barriers, despite such firms showing higher levels of productivity. Older firms lacked the innovation to match the productivity of newer firms, but they had “persistent survival advantages independent of their productivity” (Chang & Wu, 2014). In 2008, the U.S. National Park Service and the United States Forest Service began trying to implement policies promoting the adaptation of ecosystems to changing climates. Such policies often did not come to fruition due to institutional barriers such as “bureaucratic rules and procedures” (Jantarasami, Lawler, & Thomas, 2010). In each case, built-in rules, norms, and advantages prevented the optimal delivery of services.

Education in Modern Web Development for the University Community

How can software development professionals become better prepared during their time at UVa?

This project was conducted within the Computer Science department at UVA. Briana Morrison is my technical advisor for this solo project. Rosanne Vrugtman is my Technical Writing Instructor.

Software is everywhere, and only grows more present in our lives as time goes on. Web software, especially, has grown exponentially in its use as the internet has streamlined the sharing and gathering of information and data. In 2021, 93% of U.S. adults used the internet; 52% used it in 2000 (PRC, 2021). The internet is simultaneously a medium for communication, entertainment, business, and productivity.

Thus, there is massive and growing demand for web developers and software engineers. Web developer and digital designer occupations are projected to grow in employment by 30% between 2021 and 2031 (BLS, 2022a). Software developer, quality assurance analyst, and tester professions are projected to grow in employment by 25% over this same period (BLS, 2022b). Keeping up with the rise in demand and pay for such professions, computer-related majors are currently among the top 10 most popular at UVA (USNWR, n.d.).

UVA and its surrounding community must continue to adapt and improve its available resources to better prepare graduates with the skills needed for these professions. The purpose of this project was to help fulfill this goal. This involved concrete technical skills and problem solving skills. Students became better developers by practicing building with specific frameworks, libraries, and technologies. They were also encouraged to find the best tools for a given task, learn technologies by themselves, debug and troubleshoot applications, and maintain applications.

Other opportunities for UVA students to develop these skills include courses and online resources. UVA BSCS majors must take CS 3240 Advanced Software Development Techniques

(UVACSD, n.d.). In this course, students develop a full-stack web application that does not use modern technologies and architectures. CS 3240 does not require or expect students to use a frontend framework (Sherriff & McBurney, n.d.). UVA also offers the course CS 4640: Programming Languages for Web Applications, in which students develop with more modern full-stack architectures. The course was not offered in the fall 2022 semester (Bloomfield, 2022a) and will not be offered during the spring 2023 semester (Bloomfield, 2022b). CS 4640 enrollment was also limited to a single section with 156 spots during the spring 2022 semester (Bloomfield, 2021). Such courses must be modernized and made more widely available. UVA's Library offers access to O'Reilly for Higher Education, a database with ebooks and online courses about modern technologies (UVAL, n.d.). This resource has no enrollment limits, but involves no in-person instruction or support.

To account for UVA's shortcomings, I volunteered as an assistant instructor for a 10-week, in-person web development course in fall 2021. The course focused on the React.js user interface library but also included an exploration of fundamental web technologies; Firebase, a Backend-as-a-Service (BaaS); and Git/GitHub version control management systems. Students learned and applied these skills through the creation of a semester-long project. At the end of the course, students also built and presented portfolio-ready web application projects. This course was limited to 3.5 hours of class time per week, and instructors assigned no homework.

At the end of the course, students were expected to have the skills to create complex web applications for projects and employment. They were also expected to have the problem-solving traits of successful developers.

The Healthcare Sector and the Failure of National Health Plans in the United States

In the U.S., how have hospitals, pharmaceutical firms, and health insurance companies thwarted nationalized health insurance proposals?

All 330 million Americans need access to healthcare. To supply it, the current U.S. health insurance system involves public payers, private insurance, and individual payments (Herzlinger, 2010). Private health insurance covered 66% of Americans in 2021, while public coverage insured 35.7% (Keisler & Bunch, 2022). In 2021, 27.2 million people, or 8.3% of the population, “did not have health insurance at any point during the year” (Keisler & Bunch, 2022). The U.S. also spent \$10,921.01 per capita on health in 2019, more than any other country (WHOGHE, 2022). Much of the healthcare sector supports the current system without nationalized health insurance, and has successfully prevented a single-payer system from existing (PAHCF, 2019).

Researchers have studied and compared the health insurance options available to Americans. Seidman (2015) asserts that “many problems facing the Affordable Care Act (ACA) would disappear” under Medicare for All. He claims that “every American would be automatically covered for life regardless of employment” and that Medicare for All “would use single-payer bargaining power to limit price increases” and “thereby reduce medical cost.” Herzlinger (2010) advocates for a “consumer-driven healthcare system” where “the government would cease its... intrusions into the practice of medicine.” She asserts that further “government controls” will “dampen innovation” in comparison to reforms achieved through “control by consumers.”

America's Health Insurance Plans (AHIP), a trade association of health insurance companies, claims to favor a market-based approach and opposes Medicare for All. Most health insurance firms would cease to exist if a single-payer system were implemented in the U.S.

AHIP advocates for the continuation of the current health insurance system, claiming that its member organizations advocate for a “competitive marketplace that fosters choice, quality, and innovation” (AHIP, n.d.). AHIP also publicly opposes Medicare for All: AHIP CEO Matt Eyles claims that it is “probably not the case” that “Medicare for All will make things more affordable” (AHIP, 2019).

The Partnership for America’s Health Care Future (PAHCF), an alliance between health insurance, hospital, and pharmaceutical lobbyists, favors “building on... what’s working.” Its claimed goals are to “lower costs, protect patient choice, expand access, improve quality and foster innovation” (PAHCF, 2019). The profits of healthcare industries would likely drop with more government involvement in health insurance. It opposes “Medicare for All, Medicare buy-in, or the public option” (PAHCF, 2019). Besides their website’s statements, PAHCF produces political advertisements arguing against national health plans. A 2020 PAHCF advertisement stated that with a public option, “the average American worker could see their annual payroll taxes increase by \$2,500 even if they like their coverage” (PAHCF).

The Federation of American Hospitals (FAH), a hospital trade association, advocates for the Affordable Care Act, rather than “Medicare For All or a Medicare-like public option” (FAH, 2022b). FAH’s stated mission is to “advance public policy, ensuring patients & communities have access to high-quality & affordable health care.” They value “competitive [and] fair payment for health care services” and “market-based solutions that put patients first” (FAH, 2022a). To argue in favor of strengthening the affordable care act, FAH appeals to the current system’s popularity and scientific backing; their site states that “study after study demonstrates the dangers of abandoning our current approach, favored by a wide majority of Americans” (FAH, 2022b).

National Nurses United (NNU), the nation's "largest union and professional association for registered nurses," favors a single-payer health care system. NNU focuses on using "collective action... with campaigns" to "advance the interests of direct care nurses and patients across the U.S." (NNU, 2018). They claim that a single-payer health care system would "effectively control costs... and assure that everyone has... access to an excellent standard of care" (NNU, 2020). They claim to support the powerless over the powerful, stating that "health care costs and lack of access continue to drive individuals, families, and businesses past their breaking point" and "insurance companies continue to soak-up billions of... dollars as millions of children's basic needs go unmet" (NNU, 2020).

Support for Medicare for All and other national health insurance plans have become more mainstream within progressive politics. Independent U.S. senator Bernie Sanders, who was the second most popular Democratic candidate for the 2020 presidential election, ran in favor of a "single-payer, national health insurance program... with comprehensive health care coverage, free at the point of service." He favors "spending money on... professionals who provide services to people and improve their lives," and claims that the current system wastes "hundreds of billions of dollars a year on profiteering, huge executive compensation packages, and outrageous administrative costs" (FBS, n.d.).

Moderate members of the U.S. Democratic party have also begun supporting national health care plans. The 2020 Biden presidential campaign's platform supported "the choice to purchase a public health insurance option like Medicare," but did not express support for a complete single-payer system. Rather than "starting from scratch and getting rid of private insurance," Biden ran on a platform of building upon the "Affordable Care Act by giving

Americans more choice, reducing health care costs, and making our health care system less complex” (DNC, n.d.).

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