

**Collecting Publicly Accessible Virginia Court Data into a Searchable and User-Friendly Database**  
(Technical Paper)

**The Impact of Telecommunications Technologies on Social Mobility during the COVID-19 Pandemic**  
(STS Paper)

**A Thesis Prospectus Submitted to The**

Faculty of the School of Engineering and Applied Science  
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements of the Degree  
Bachelor of Science, School of Engineering

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Fall, 2020

Technical Project Team Members

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  
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## **Introduction**

The technical project that I plan to work on in the Spring is tentatively called the VA Court Data project. This project involves helping build a system that collects publically accessible Court Data into an easily searchable database, under the auspices of UVA's Law School's legal Data Lab. Ideally, this will assist people involved in the legal industry better access information in an organized and efficient way, which will save money and hopefully improve the accuracy of the data-gathering process.

However, this project is not without ethical concerns. Because this project plans to handle private or sensitive information (as it is within the legal industry), incorrect information or unhandled security could be disastrous. For example, though the source data is intended to be all publicly available data, there are concerns that this data is not entirely accurate and propagating false data through the system without proper safeguards could lead to ethical issues and harm people's lives unfairly. In addition, given that the legal system in this country is not infallible and can itself perpetuate inequality, this project could lead to further policing and another layer of marginalization of underprivileged populations like lead to employers discriminating against people in this database. These are all ethical concerns that will be addressed during ongoing work on this project.

My STS prospectus will explore a different topic. For my STS research paper, I plan to study how social mobility is impacted by the rise in telecommunication technologies during the COVID-19 pandemic. In addition, I will explore how demographic factors like age, gender, educational qualification, etc. impact mobility. I will do this by conducting a series of surveys and collecting a mix of qualitative and quantitative data.

The technical subject of the STS prospectus and the technical topic for the Dept. of Computer Science is not related.

## Technical Topic

Many different industries are transitioning to digital organizational solutions to store, organize, and collect sensitive data. Particularly, utilization of digital libraries is on the rise within the legal, medical, and academic areas. Prospective research has been done in determining what makes a system effective and useful.

Elliot & Kling have conducted a study arguing for organizational usability as a useful metric, which is defined as “the mix between a computer system's design and an organization's characteristics such that the system can be effectively integrated into the work practices of members of the organization and is socially accepted by them” (Elliot & Kling, 1996). Our project aims to achieve high organizational usability as this will, ideally, be a useful tool for attorneys or paralegals to conduct their research in one collective database. It should be an additional tool for stakeholders to incorporate into their routine, so ease of use and user experience will be a high priority.

It will be very important to keep these ideas in mind as my team members and I conduct our research on this topic. While the details of the research project are so far unclear in terms of who my student teammates will be, the professor I am working with, Jack Davidson, has outlined some goals of the project.

These goals are improving the web user interface; developing tools to check data quality; building back-end applications; improved scraping of legal web sites. The technical skills involved in this project include user interface design, Django, Python, Amazon AWS, etc.

I was interested in this project initially as it seemed to have a purpose in serving the public interest in terms of assisting the legal system and making it easy to conduct legal work and research. This could help keep us safe and ensure the law is being properly carried out in the long run. I believe it is important for any technology to ultimately serve the public good, and this project seemed like it would have overall positive impacts.

However, as noted before, this project could also lead to some ethical concerns. Due to the information we are planning to handle being very sensitive, privacy and accuracy of our data scraping algorithm will be of the utmost importance. We will also need to take care to ensure that the tools we use to edit or upload the data are secure, and that nobody will be able to maliciously upload false information to get others in trouble or falsely accuse them of having committed crimes.

In addition, it is important to note that the legal system is not always fair. The goal of this project is to increase fairness and equality, but we risk exacerbating problems in the current system. Hopefully, as long as we keep in mind the importance of validating sensitive information and prevent security breaches or malicious users, we can avoid these issues.

This project has not yet been completed. As I am working on this project for my CS 4980 Capstone Research, I will begin working on this project with a team of other students in Spring 2020. I plan to sync up with my research professor in December, and then will be assigned a team at the start of the term.

# STS Prospectus

## Introduction

As the COVID-19 pandemic continues, we are seeing a dramatic shift from in-person workplaces to telecommuting and work-from-home. It has been speculated that the transition to a virtual workplace will allow people to move away from crowded urban areas. However, these are options are open to everyone.

Experts think that people will move away from metropolitan centers if they can work permanently from home anywhere, due to cheaper housing, proximity to family, etc. This could cause changes in social demographics across America, with people becoming less reliant on large metropolitan areas for career or work.

In addition, these effects will be exacerbated by unequal teleworking opportunities. Especially post-pandemic, as large numbers of people are suffering from losing their jobs, these negative impacts are disproportionately affecting underprivileged communities (Kochhar & Passel, 2020).

The pandemic is accelerating the shift towards telecommuting becoming commonplace, possibly within the next decade (Hernandez-Morales, Oroschakoff, & Barigazzi, 2020). This combined with the rise in utilization of telecommunications software may drive this sizeable shift in mobility.

This topic is significant, particularly in the field of STS, because it combines technology with societal change. Due to changes in technology allowing telework to be more prevalent, it has the potential to be a positive change as it could revitalize rural areas and relieve pressure from urban areas.

## Research Question

My research question will examine how social mobility is changed by the utilization of telecommunication technologies (Zoom, Amazon Chime, WeChat etc.) during the pandemic. I will focus on how demographic factors like age, gender, educational qualification, and income influence the accessibility, choice and use of telecommunication technologies, and how the deployment of technical resources impacts social mobility.

My hypothesis centers around the idea that different social groups have different levels of mobility. Someone's educational background likely impacts what industry they work in, which impacts whether they can move freely. Similarly, different industries are overrepresented by people of certain races, so race should be considered. It is also important to consider the technical factors, as the rise of telecommunications software that allows for virtual conferencing is what enables certain industries to transition to work from home. Therefore, this question should be considered an STS problem.

## Literature Review

Overall, the current body of literature that exists on this topic is relatively new. However, there is a good amount of data on employment during COVID-19.

The first are concerned with which jobs are hardest hit due to COVID-19 by industry. One source studies vacancies to draw conclusions about which types of jobs are in demand. Specifically, it finds that “Essential retail took a smaller hit, while leisure and hospitality services and non-essential retail saw the biggest collapses” (Forsythe, Kahn, Lange & Wiczer, 2020). Another source investigates the same questions but approaches the data by surveying firms and employers (Campello, Kankanhalli & Muthukrishnan, 2020).

Different occupations and industries also have different remote work capabilities. Another study done by NBER finds, “professional occupations were more likely to shift toward working from home and had fewer people laid off” (Brynjolfsson, Horton, et al., 2020). This is supported by another paper that finds “remote work is much more common in industries with better educated and better paid workers” (Bartik, Cullen, et. al, 2020).

This is important, as other research has shown that COVID is accelerating the adoption of remote work – but, not all occupations have the same capability for it; industries that cannot adapt may be disproportionately harmed.

In addition, many sources investigate whether inequality in race, gender, level of education, etc. determine to what degree employment prospects are impacted by COVID-19.

One source finds that “New-hiring cuts are most pronounced in local labor markets lacking depth, in low-income areas, and in areas with greater income inequality” (Campello, Kankanhalli & Muthukrishnan, 2020) which indicates that low socioeconomic status may be amplified by COVID’s effects. Pew Research finds that significant differences exist between populations: women, white or asian, and those with advanced degrees are far more likely to be in jobs that can be teleworked compared to their black or Hispanic, male, or less-educated counterparts (Kochhar & Passel, 2020).

COVID-19’s effect in increasing the prevalence of remote work is well researched. A paper in the *Journal of Vocational Behavior* states that COVID-19 has led to a “broad shift to working from home” (Kramer & Kramer, 2020). This adoption of remote work may affect urban areas. As Politico speculates, “The end of the office would transform the urban landscape. Workers, unshackled from their morning commute, will be free to gravitate to suburbs and the countryside” (Hernandez-Morales, Oroschakoff, & Barigazzi, 2020).

However, the thesis of my research paper centers around the idea that not everyone is afforded the ability to move away from urban areas. Some sources have already begun investigating how mobility is impacted: one paper, published by NYU Stern, theorizes that underprivileged communities are disproportionately affected by COVID (Coven & Gupta, 2020).

My research aims to take this one step further, and investigate the long-term effects that COVID-19 will have on the capability of people from different backgrounds to move. This will be unique from the current literature since I plan to focus specifically on mobility and take into account desire and incentives. So, while the others just look at labour data, I want to take into account other dimensions that may impact mobility outcomes (like if people have no incentive or desire to) that may obscure COVID’s impact.

## **STS Framework and Method**

I plan to examine the problem through one STS Framework: Hughes's perspective on socio-technical systems. He breaks these systems into system builder, technological momentum, and reverse salient components, and then examines the interactions between them.

I've defined the system as telecommunications software like Zoom, Amazon Chime, etc. The system builders include the engineers, company leaders like the founders and shareholders. The technology industry is known for high growth and innovation, creating a complex system that has a reputation for hiring top talent, being willing to change, and always improving.

As for the social, political, and technical means of constructing the system, in America, capitalism and the tech industry are very closely related. America encourages innovation and capital growth through tax breaks, specialized immigration pathways for highly-skilled workers, etc. The system reflects capitalist values like constant growth and creation of economic value. The ones that shape the system are the shareholders and upper leadership; their goal is to create the most value for the company and enrich themselves.

Most of the users of the system, the students and workers whose schools or workplaces mandate usage of telecommunications software, do not get a direct say in how the system is shaped. Because they are forced to use a particular product, dissatisfaction with the product could be masked; they are required to participate in the system.

We can also observe different technological styles of similar technology development in this case. One example is WeChat, a technology that is dominant in China.

China is similar to the United States in that they both encourage economic and technological growth. However, the cultures in these two countries are different. It seems that in Chinese culture, people are more willing to accept impactful government oversight. WeChat is officially supported by the Chinese government and more integrated in Chinese life. America, by contrast, has many competing technologies without official endorsement of one by the government.

The primary reverse salient is that many do not have the newest devices, and cannot handle the hardware requirements of telecommunications software, which slows down its adoption. Full adoption of the system is reliant on a majority of users being able to run the software. Especially in education and government systems, users are known to be behind in modernizing.

However, in recent years we have seen a push towards modernization in many government entities. In addition, consumption culture has sold Americans on having up-to-date technology. This culture will likely lead this reverse salient being diminished eventually. This is one example of a social means that is leveraged to increase the social adaptation of this technology.

## **Methods for Data Collection**

I plan to utilize surveys and interviews for my data collection method. I will design a survey to send out to recently graduated students from UVA. These surveys will ask for demographic information like their occupation, race, gender, etc. In addition, I will ask for their ability to move, desire to move, the remote work capabilities of their job, etc. To find respondents, I will solicit emails from recently-graduated students from UVA's administration.

Quantitative data I will collect includes demographic information such as race, gender, age, yearly income, and educational background and qualification. Qualitative data that I plan to collect are individual's feelings of mobility, as well as their moving history.

I am aware that conducting interviews is more time-consuming than finding survey responses. Therefore, while my surveys will focus on quantitative data, I will also take the time to analyse qualitative data that I receive through this data collection method.

However, these methods have potential bias. Because I will be sending out these surveys and interview questions, I will likely receive the most results from my personal circle, which could skew the results towards my demographics. In addition, survey participation is highly voluntary.

I will try and counteract this bias by looking outside of my own connections by seeking assistance through UVA or online forums. By outreaching in different ways, I am more likely to receive more data points that best represent a random sample.

## **Timeline**

Tentatively, my current timeline for conducting my research paper is:

February 2020 – Formulate survey and distribute widely (friends, family, internet, UVA listservs, etc.) by Week 2

March 2020 – Finish collecting data by Week 6 and perform data analysis during Weeks 6 — 8

April 2020 – Complete first draft of research paper by Week 10 and final draft by the end of April, Week 12

## **Conclusion**

The worldwide COVID-19 pandemic has exacerbated a dramatic shift from the in-person workforce to the prevalence of telecommuting that we see today. With the utilization of telecommunications software like Zoom, Amazon Chime, WeChat etc, this is likely to continue. This could lead to migrations away from large urban centers and an increase in social mobility in those whose jobs have shifted to telecommuting. However, working from home is not an option that is available in equal degrees to all social groups.

I plan to investigate how ability to work from home and thus social mobility differs between social groups like different races, genders, ages, etc. and how the COVID-19 pandemic and telecommunications software have impacted inequality in these areas. I expect to find that more privileged social groups, like those with higher educational qualifications or white Americans, will also have a higher degree of social mobility over their less-privileged counterparts, and these differences will be more prominent compared to those who are not in jobs that can be telecommuted.

As telecommuting or remote work becomes more popular and commonly accepted, it is likely that we will see a shift in regional demographics across America. This could mean a revitalization of the American heartland and a decrease in the power of urban areas, as jobs might not be constrained to particular geographic areas in metropolitan cities. This could lead to a change in political and as social power in America.

My contribution will differ from studies that have been performed before in the following ways: I plan to take into account motivation data through the form of surveys and interviews instead of looking simply at statistical data, which other researchers have already done.

Overall, the research question I plan to investigate is highly complex. I also plan to touch on how the larger socio-technical system of American capitalism that these actors are constrained within

may inform these choices. The way that telecommunications technology interacts with the current societal power dynamics is highly multiplicitous.

The complexity of this issue, as well as its connection to both sociotechnical dimensions, is an exciting STS problem I am excited to conquer.



## Bibliography

Barrero, J. M., Bloom, N., & Davis, S. J. (2020). Covid-19 is also a reallocation shock (No. w27137). National Bureau of Economic Research.

This journal article was published by the National Bureau of Economic Research, which is a reputable nonprofit research organization. It looks at future projections of the labor market and job losses as a result of the COVID-19 pandemic. It is interesting in that it also looks at the short-term impacts and compares the rate of hiring to layoffs. It also ends with providing policy recommendations to combat the reallocation shock.

Bartik, A., Cullen, Z., Glaeser, E., Luca, M., & Stanton, C. (2020). What Jobs are Being Done at Home During the Covid-19 Crisis? Evidence from Firm-Level Surveys. The National Bureau of Economic Research. doi:10.3386/w27422

This journal article is also published by the National Bureau of Economic Research. It looks at the prevalence of remote work during the COVID-19 pandemic and also looks at expectations for whether or not remote work will persist post-pandemic or return to in-person work. Much of this research was done by conducting surveys from firms across a wide variety of industries, providing comparative data on the correlation of education, higher pay, etc. with the ability to transition to remote work.

Brynjolfsson, E., Horton, J., Ozimek, A., Rock, D., Sharma, G., & Tuye, H. (2020). COVID-19 and Remote Work: An Early Look at US Data. The National Bureau of Economic Research. doi:10.3386/w27344

This journal article is also published by the National Bureau of Economic Research. It reports the result of a survey done on a random representative sample of the US population that asks about employment outcomes and remote work capability. It differs from the previous source in that it surveys workers instead of employers or firms/corporations, so we can examine unemployment factors as well. In addition, it compares employment outcomes across states as well as the effects that industry makeup of state economies may have on them.

Campello, M., Kankanhalli, G., & Muthukrishnan, P. (2020). Corporate Hiring under COVID-19: Labor Market Concentration, Downskilling, and Income Inequality. doi:10.3386/w27208

This journal article is also published by the National Bureau of Economic Research. It looks at data analysis done on job-vacancy postings to examine the effect of COVID-19 on the US labor market in terms of which types of jobs and in which industries have been cut down and which have persisted. It compares these employment outcomes across industries and regional areas.

Coven, J., & Gupta, A. (2020). Disparities in mobility responses to covid-19. NYU Stern Working Paper.

This paper was published by NYU Stern, which is a well-known business school that publishes trustworthy academic research. This paper examines post-COVID-19 responses by racial and economic demographic factors in New York City. For example, it finds that higher-income residents were more likely to leave the city while residents from low-income, Black, and Hispanic areas were less likely to shelter in place. This is particularly relevant to my prospectus, as this paper shows that these differing levels of mobility across demographic factors are exacerbated by COVID-19.

Elliott, N., and R. Kling. "Organizational Usability of Digital Libraries in the Courts." Proceedings of HICSS-29: 29th Hawaii International Conference on System Sciences, 1996, doi:10.1109/hicss.1996.495299.

Forsythe, E., Kahn, L., Lange, F., & Wiczer, D. (2020). Labor Demand in the time of COVID-19: Evidence from vacancy postings and UI claims. *Journal of Public Economics*. doi:10.3386/w27061

This paper was published by the National Bureau of Economic Research, which is a reputable nonprofit research organization. It differs from the other sources by looking only at job vacancy data provided by the Bureau of Labor Statistics and a private company, Burning Glass Technologies, as opposed to comparing new postings vs closed positions. It compares this data by geography and industry, which is of interest to my research paper.

Glaeser, E., Gorbach, C., & Redding, S. (2020). How Much does COVID-19 Increase with Mobility? Evidence from New York and Four Other U.S. Cities. *The National Bureau of Economic Research*. doi:10.3386/w27519

This paper was also published by the National Bureau of Economic Research. It investigates the effect of geographic mobility on the spread COVID-19 using data collected from Atlanta, Boston, Chicago, New York City, and Philadelphia. This is an interesting comparison because my paper plans to research the effects of COVID-19 (among other factors) on geographic mobility, while this paper looks at the reverse, which may help me compare the causative effects.

Hernández-Morales, A., Oroschakoff, K., & Barigazzi, J. (2020, August 03). The death of the city. Retrieved October 16, 2020, from <https://www.politico.eu/article/the-death-of-the-city-coronavirus-towns-cities-retail-transport-pollution-economic-crisis/>

This article was reported in Politico, a newspaper that primarily covers American politics. This is an interesting piece about how teleworking has affected urban areas, with people moving out of large metropolitan areas due to the availability of remote work. It makes the claim that this movement is due to telework and not COVID-19, while my research paper will examine both as factors, so it is a very relevant source.

Kochhar, R., & Passel, J. (2020, August 26). Telework may save U.S. jobs in COVID-19 downturn, especially among college graduates. Retrieved October 16, 2020, from <https://www.pewresearch.org/fact-tank/2020/05/06/telework-may-save-u-s-jobs-in-covid-19-downturn-especially-among-college-graduates/>

This article was published by Pew Research, which is a well-reputed think tank based in America that conducts empirical research on politics, social science, etc. This article confirms what many were already suspecting about telework shifting towards the norm, with most of the positions lost being positions that could not shift to remote work. It looks at labor statistics and classifies certain occupations as being able to be teleworked compared to ones that require direct human contact or physical work, then compares the percentages of who is in those jobs across demographic groups like sex, race, and education level. This comparison is very relevant to my research, as I wanted to investigate how these demographic factors affect ability to move.

Kramer, A., & Kramer, K. Z. (2020). The potential impact of the Covid-19 pandemic on occupational status, work from home, and occupational mobility. *Journal of Vocational Behavior*, 119, 103442. doi:10.1016/j.jvb.2020.103442

This article was published by the Journal of Vocational Behavior, which is an academic peer-reviewed journal that conducts research on career development and choices. This article therefore centers the impact of COVID-19 on perceptions of remote work and on different occupations. In addition, this article touches on occupational inequality, which is a very relevant topic for my research paper.

Lyttelton, T., Zang, E., & Musick, K. (2020). Gender Differences in Telecommuting and Implications for Inequality at Home and Work. doi:10.31235/osf.io/tdf8c

This paper was written by authors from the Department of Sociology at Yale University and the Department of Policy Analysis at Cornell University. It examines the disproportionate impact that COVID-19 has had across both sexes both occupationally and in terms of housework, and the issues that this may have for gender equality. Though it does not talk about mobility specifically, I believe it is still relevant to my research paper.

Sato, Y. (2007). Systems Engineering and Contractual Individualism: Linking Engineering Processes to Macro Social Values. *Social Studies of Science*, 37(6), 909-934. Retrieved November 7, 2020, from <http://www.jstor.org/stable/25474556>

What the Surge in Working From Home Means for Big Cities. (n.d.). Retrieved October 16, 2020, from <https://www.usnews.com/news/cities/articles/2020-06-29/how-teleworking-may-accelerate-the-shift-away-from-big-cities>

This article was written by the U.S. News & World Report, which is a media company that publishes a wide variety of news content. This article speculates on how remote work may affect metropolitan areas, with people being incentivized to move away due to rising housing prices and the availability of telecommuting. This article covers interviews done with workers who have had the ability to do so and produces anecdotes for why they have decided to make the move. Overall, this is a thorough secondary source that provides a high-level overview of the subject of my research paper.