

The Effect of Covid-19 on Construction Labor Productivity at the New Student Health & Wellness Center

(Technical Report)

Post-Pandemic Impacts on the Average Employee: Understanding How COVID-19 Reshaped the American Workforce

(STS Research 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

Brant Flici

Fall, 2022

Technical Project Team Members

Hayden Hunter

Alexander Maleski

Ryan Naddoni

Jackson Quinn

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

Signed: Brant Flici

ADVISORS

Dr. Joshua Earle, Ph.D., Department of Engineering and Society

Diana Franco-Duran, Matthew O'Malley, Department of Civil and Environmental Engineering

Introduction

The COVID-19 pandemic shook the world like never before. It tangled perceptions of fairness and showed many that personal time and well-being are crucial. Labor fluctuated in an unprecedented manner, as some fields were pushed entirely out of work, while other industries, like healthcare, faced an all-time high demand. Nearly everyone quickly realized that the traditional style of work that many had become accustomed to would indefinitely change.

In this post-pandemic world, it is essential to investigate how everyday labor was impacted during that time, which is the aim of the technical portion of this paper. The technical question being investigated is the effect that the COVID-19 pandemic had on construction productivity at the new UVA Student Health & Wellness Center (SHWC). My civil engineering capstone team is working with Barton Malow Co., the lead contractor on the project, and in conjunction with numerous outside parties (UVA, subcontractors, etc.) to understand what occurred on the project. This semester, the group produced a thorough and transparent report articulating our conclusions regarding the impact of COVID-19 on the SHWC project. The methods used to provide recommendations and develop the report are introduced in the technical section of this report. Furthermore, the team has the eventual goal of producing an outlined framework for a platform that allows contractors and subcontractors to better track on-site labor.

Additionally, it is critical to examine how the average employee's wants and needs have shifted post-COVID-19, as many employees chose to leave their careers or never come back after employment was reoffered in cases of layoff. Many aspects considered essential and valuable in the workplace have shifted outside the stipulation of just being paid fairly. It was a time when stress was high, and health was on everyone's minds. Workers shifted their focus

toward other metrics of value in the workplace, such as work-life balance, positive workplace culture, and cleanliness and safety. “Employees are rethinking their purpose—they are searching for meaning, not activity” (Osibanjo, 2022). As time passed, many began to weigh their options and consider if employment was legitimately worth it, which begs the question, how can the companies of today value and care for their employees beyond just pay? In the STS portion of my research, I aim to explore this question deeply to understand how companies can better retain and recruit employees in the post-pandemic era.

In the following sections, I will discuss both the technical and STS portions of my research and how I will proceed with acquiring relevant resources to best answer both research questions. The next section discusses the technical area of my studies, which is analyzing the effect of COVID-19 on construction labor productivity at the new Student Health & Wellness Center.

Technical Project

COVID-19 substantially impacted the construction industry and affected all construction projects in some way. Barton Malow, the general contractor on the new Student Health and Wellness Center (SHWC) at the University of Virginia, wanted to know the impact that COVID-19 had on labor productivity at the newly opened project. Labor productivity can be challenging to track and measure on large-scale projects, as many labor-intensive activities occur simultaneously. The hardships regarding labor measurement were extremely profound during the pandemic, a time when the construction industry felt a noticeable hindrance in being able to communicate effectively between trades and the general contractor. Two main methods of analysis were used to study the obstruction that COVID-19 had on communication: a review/breakdown of relevant construction documents relating to the SHWC project (i.e., RFI’s,

Manpower Summaries, Monthly Reports), as well as extensive interviews with the relevant parties and stakeholders in the project.

Overall, the Barton Malow team performed moderately well, given the unprecedented situation. The project never had to shut down due to rising cases stemming from the project site, and manpower surprisingly increased during the pandemic with little to no increase in worker safety incidents. However, a lack of communication between stakeholders led to a significant drop in quality which Barton Malow had to spend the next ~1 year correcting. Given these findings and the potential for another pandemic, the team is working towards a proposition for the future, with immense recommendations addressing and preventing these issues from persisting. Regardless of the threat of a future pandemic, it is paramount that communication and labor metrics are adequately tracked and recorded, especially in an industry where labor is as crucial as construction. Moving forward, the team will develop a prototype application, supplemented with a detailed and in-depth discussion section, which will better facilitate tracking labor productivity on future construction projects.

In the team's findings (both from data analysis and interviewing), it was apparent that numerous intermittent complications arose from COVID-19. Some of these obstacles directly resulted from the COVID-19 pandemic, such as occasional absences of trade laborers and even entire trade forces being off-site for days. Other shortcomings were less obvious but are profoundly observable through analyzing the data of the SHWC project. As mentioned prior, communication was highly impaired in the wake of the pandemic. Between navigating state health policy, on-site safety recommendations, and balancing the more traditional construction demands of scope, budget, and timeline, there was an incredible amount of stress on the entire

SHWC project, which was reiterated by nearly every party interviewed. The burden of COVID-19 became incredibly clear as soon as data analysis began; however, after conclusively interpreting everything, the effect of COVID-19 on the SHWC project is nearly immeasurable. There was a never-before-seen change in many of the defined metrics of the construction project (i.e., downward spike in flow of RFI's (requests for information), changes in scheduling, shifts in manpower). Ultimately, Barton Malow navigated the field of uncertainty resulting from COVID19 relatively well, which is undeniably an impressive task, considering the construction industry relies heavily on predictability, safety, and risk aversion.

Science, Technology, and Society Project

Labor, at some point, is virtually part of every single person's life. In some capacity, almost every adult has worked at a time in their lifespan. In essence, it allows a society to churn continuously, enabling each member to sustain a sense of fulfillment, purpose, and direction. Ideally, it is a win-win situation and one of the simplest and oldest transactions. The work gets done, and the worker gets paid. It is how things have always functioned, even before currency and the modern ideas of what constitutes "payment." In this post-COVID social climate, working and getting paid does not seem nearly as enticing or rewarding as it used to be for the average working citizen, as many have walked away from their careers. Ultimately, the question that needs to be further addressed is how the companies of today can prove that they value and care for their employees beyond just pay.

When COVID-19 first began, it was the first time in which every single person on earth felt the effect of something together, simultaneously. Many elements of everyday life changed and will never be the same. The first thing that was noticeably and drastically different in most

people's lives was their work. The labor force took a hit like no other. Many industries were exhausted far more than usual, most notably the healthcare field, while other spectrums of employment saw a record number of layoffs (i.e., restaurant, hospitality, and airline services). For those who continued to work in fields where online functioning was not feasible, there was a constant threat to safety and comfort for many, particularly those who personally had or had a family with health conditions. Work became stressful and scary for many, and for some, it started to feel unrewarding or not even worth it. As a result, many Americans stepped away from their work entirely, and employers began questioning how to retain and recruit talent. With labor shortages still being an issue nearly three years after COVID, it has never been more challenging for the average employer to have a genuine grip over their employees. Now, the general temperament of employers is to keep employees happy and fulfilled.

My research will focus on understanding how employees' needs have shifted and what employers are doing to accommodate this shift. To clarify the scope of my research, I plan on using actor-network theory (ANT) to better understand the explicit factors that are relevant within the workplace and influence everyday dynamics. As Bruno Latour articulates in his 2005 work *Reassembling the Social*, each actor in the actor-network is subject to an immediate reaction another actor takes action that disrupts the synergy of the network. Latour articulates this point in the section titled "No work, no group" by saying, "However, the situation is entirely different for ANT because neither society nor the social exists in the first place. They have to be retraced by subtle changes in connecting non-social resources. Thus, every choice of a departure point will lead to the drawing of a completely different animal, fully incommensurable with the others" (Latour, 2005, p. 34). Considering that labor is vastly complex, socially influenced, and intrinsically alive, it is irrefutably one of the most important actors in the workplace's social

network, just like the boss and employee. Identifying additional actors in the workplace through ANT and understanding the magnitude of impact that each has on the network is essential for exploring how the companies of today value and care for their employees. Additionally, I am using the ideals and perspectives of two sources that were explored in class, which are Karl Marx's "Capital – Volume I" and Cathy O'Neil's "Weapons of Math Destruction", as I believe both have offered key insights into labor and how it integrates with our product-driven economy and data-focused society. After the pandemic, people began to realize the inherent complexities of labor. In order to discuss the shifting labor in the workplace, I will begin by acknowledging the roots of it in my paper, as this is essential to developing my points and answering my research question. Marx's ideas are crucial to articulate the historical implications of labor and its impact on society. Similarly, I think that O'Neil's discussion of how numbers and statistics can be harmful is highly relevant for understanding the data associated with COVID-19's impact on the labor force. Both will be highly useful resources as I continue my research.

To begin researching "How the Companies of Today Value and Care for Their Employees Beyond Just Pay?" I plan on conducting a comprehensive literature review in the UVA library with keywords such as "labor", "post-pandemic", "corporate culture", etc. Most of the preliminary research was conducted using references external to the UVA library database, in order to encapsulate a broader lens on the issue and bring in a more diverse array of expertise. Moving forward, the focus will be on narrowing down the truly relevant and helpful sources and trying to synthesize and recycle as much of the vital information as possible.

Labor is not a very simple concept at all. It is a highly intersectional matter that is influenced by several factors. Yet, it is one of the few things that are a part of most people's life. The labor force is undeniably the flame of the American economy, yet the laborer has often been

left in the dark. Now, nearly three years after the COVID-19 pandemic, the country is still seeing shockingly high levels of labor shortage. By understanding the shift in mentality that has occurred in the general worker, the employer can begin creating a corporate culture that celebrates the employee and treats them as more than a salary. My research aims to figure out how the average employer can a desirable and irresistible work environment for their employees, regardless of the threat of another COVID-19.

Works Cited and Key Texts

Babapour Chafi, M., Hultberg, A., & Bozic Yams, N. (2021). Post-pandemic office work: Perceived challenges and opportunities for a sustainable work environment. *Sustainability*, 14(1), 294. <https://doi.org/10.3390/su14010294>

In the article by Babapour Chafyi et al. (2021), data was collected from two qualitative studies in Sweden completed during the COVID-19 pandemic. The article discussed the pros and cons of remote and hybrid work on office workers from a health and well-being perspective. The findings of the article were that there were many benefits to remote work including improved flexibility, increased autonomy, improved job satisfaction and better work-life balance. Some of the negative impacts included social and professional isolation, working longer hours due to inability to step away from work and decreased interaction with leaders. It was determined that a hybrid option for working offered the best results by allowing to minimize the negative impacts and promote positive outcomes. Lasting expectations for organizations to offer remote and hybrid work are likely to be ongoing post-pandemic and will be important to attract and retain employees in the future.

Caruso, C. (2022, November 17). *COVID-19's Lessons for Future Pandemics*. Harvard Medical School. Retrieved December 2, 2022, from <https://hms.harvard.edu/news/covid-19s-lessons-future-pandemics>

Centers for Disease Control and Prevention. (2022, August 16). *CDC Museum Covid-19 Timeline*. Centers for Disease Control and Prevention. Retrieved October 11, 2022, from <https://www.cdc.gov/museum/timeline/covid19.html>

Khalid, K., & Nawab, S. (2018). Employee participation and employee retention in view of compensation. *SAGE Open*, 8(4), 215824401881006.
<https://doi.org/10.1177/2158244018810067>

This article was written pre-COVID-19 but provides a glimpse of changing needs for employee retention in the changing workforce in Pakistan. The article analyzes different employee participation practices and the effects on employee performance and retention. The article defines employee participation as the ability for employees to take control in their work and be involved in decision-making. This can take both direct and indirect forms. The study outlined four types of employee participation including delegation, consultation, worker director and worker union. The study found that all forms of employee participation had a positive result on employee retention. The study stated it offers useful insight to employers that this strategy can be used for successful employee retention across several different industries.

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. New York: Oxford University Press.

Latour's *Reassembling the Social* is incredibly relevant to the research, considering the extent of ANT's role in the workplace. Latour provides a highly in-depth and coherent analysis for understanding ANT, therefore this source is highly useful. The workplace is irrefutably one of the best examples of an Actor-Network, thus using Latour's concepts will be inevitable.

Marx, K. (1887). *Das Kapital, Volume One: The Process of Production of Capital*

Marx's *Das Kapital* is a critical resource to analyze when considering the capitalist system, which is highly relevant for both the technical and STS portions of research. This

will serve as an essential source for researching and the discussion of labor and how it has been impacted by COVID-19 in our capitalistic society.

New York State Government. (2020, October 23). *Guidance for determining whether a business enterprise is subject to a workforce reduction under recent executive orders*. Retrieved October 16, 2022, from: <https://esd.ny.gov/guidance-executive-order-2026>.

O'Neil, C. (2017). *Weapons of math destruction*. Penguin Books.

The author eloquently summarizes the dangerous effect that numbers and data have on society. Specifically, O'Neil explains that our attempts to constantly quantify and put metrics on topics has further divided us and only increased disparity and inequality in society. She explains that data and algorithms have inherently violent effects even if used with positive intention. This is particularly relevant for my technical research, as it is very clear how data has a direct impact on the metric of success in construction.

Osibanjo, R. (2022, February 27). *The post-pandemic workplace: 5 shifts every leader must make*. Forbes. Retrieved December 15, 2022, from <https://www.forbes.com/sites/richardosibanjo/2022/02/27/the-post-pandemic-workplace-5-shifts-every-leader-must-make/?sh=107b5b974fc1r>

The author summarizes a shift in the power from employer to employee in the postpandemic workforce. Osibanjo outlines changes that have occurred in the workplace that required employers to be open to change to meet the way workers view work in a new environment. Some examples include the desire for purpose and meaning in their work. The author specifies strategies that employers may use to satisfy the changing

needs of the employee by communicating how the organization is contributing to social, government or environmental issues. The article also suggests that leaders should be open to shifting their vision to match employees and increase engagement. It is suggested that leaders encourage workers to have a voice and allow input in decisions that affect their work to promote collaboration between employer and employee.

Panneerselvam, S., & Balaraman, K. (2022). Employee experience: The new employee value proposition. *Strategic HR Review*, 21(6), 201–207. <https://doi.org/10.1108/shr-08-2022-0047>

This article focuses on the concept of the employee experience and the emerging importance of creating a positive employee experience for organizational success. The article defines the employee experience as the cultural, physical and technical environment and how it impacts the positive perception by the employee of the workplace. Positive employee perception leads to increased employee engagement that has been determined to improve productivity, increase safety, improve customer satisfaction and decrease employee turnover. The article also discusses the changes to workplace expectations post- pandemic such as the desire for connection, increased flexibility, open leadership practices and meaningful work. The article calls on leaders to embrace the employee experience to see success in post pandemic workplaces.

Penn, M. (2021, August 23). *Statistics Say Large Pandemics Are More Likely Than We Thought*. Duke Global Health Institute. Retrieved December 2, 2022, from <https://globalhealth.duke.edu/news/statistics-say-large-pandemics-are-more-likely-we-thought>

Smith, L. (2022). *Supply chain issues and impacts on builders: What caused these shortages and what are potential solutions?* Retrieved October 25, 2022, from <https://law.pepperdine.edu/surf-report/posts/supply-chain-issues-impacts-builders-shortages-solutions-lindsey-smith.htm>