

Thesis Project Portfolio

**Ukraine Food Crisis: Understanding the Impacts of War on the Global Supply Chain and
Applying to Future Events**
(Technical Paper)

**Zoom Out: How the COVID-19 Pandemic and The Ensuing Implementation of Virtual
Learning Has Affected The Learning and Social Abilities of School Children**
(STS Paper)

An Undergraduate Thesis

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

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

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Spring, 2022
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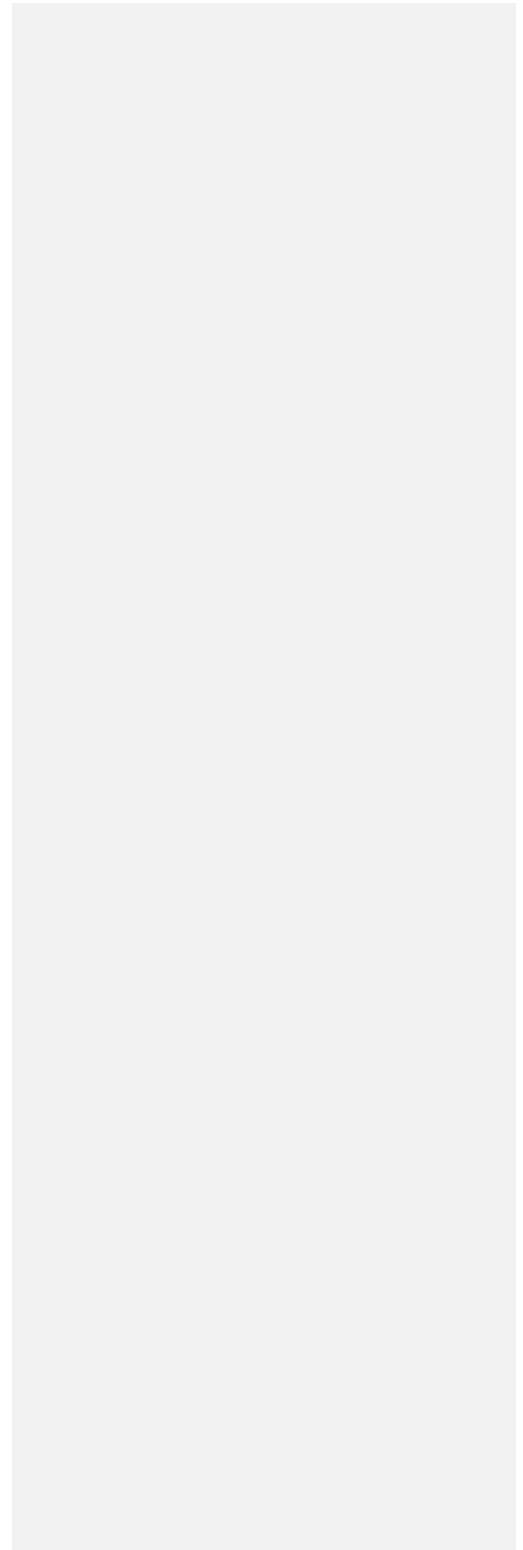
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Executive Summary

Ukraine Food Crisis: Understanding the Impacts of War on the Global Supply Chain and Applying to Future Events

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Prospectus



Executive Summary

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In March of 2020, the world shut down due to the prevalence of COVID-19 in what can only be described as unprecedented. Businesses closed, schools ceased learning, people stayed inside. Three years later, society is still trying to both reconcile what happened, how people reacted in the moment, and the long ranging effects that the pandemic continues to have. Some of the bigger effects are the ones that were felt by the economy and academia. In the first project in this portfolio, a technical report analyzes the ramifications of the Russian invasion into Ukraine, with a specific emphasis on the stresses on the food and energy crises. An important piece to this analysis is the context in which it is being done. The coronavirus pandemic throttled the global supply chain, and global commerce was just beginning to recover when Russia invaded Ukraine in February 2022. This act of military aggression set into motion some parallel supply chain impacts that can be compared to those felt after quarantine began in 2020.

The second project in this portfolio is an STS research paper that focuses on how the COVID-19 pandemic affected academia. Schoolchildren were forced inside and lost weeks of schooling initially. Administrators were forced to come up with new technology-based curricula with little notice and preparation. The balance between advancing the learning of all, while remaining equitable to all is one that was not mastered before the pandemic, and still leaves room for improvement. It is clear that children being forced to only attend class via online meeting platforms was a lesser learning experience and had vast negative consequences both in terms of academic advancement and social literacy.

The focus of the technical report is to understand the impact that a military invasion has on a major global food exporter and the countries that it supplies. Ramifications of the pandemic, extreme weather, and the energy crisis laid the groundwork for surging food prices, and Russia's

invasion of Ukraine exacerbated this issue. The decrease in the production capabilities of Ukraine as a result of the conflict with Russia caused massive disruptions in the global supply chain.

The technical report uses the Russian invasion into Ukraine as a case study, compiling datasets on topics such as changes in global GDP, agriculture, energy, and research about Ukraine's crop production and food supply, to understand how potential future military aggression could impact global supply chains. The end goal of the technical report is to have an understanding of how to prepare for future global catastrophe and be proactive in mitigating food and energy crises around the world.

The coronavirus pandemic changed the way in which people communicate. Specifically in academia, the shift to online learning has lessened the learning experience for students of all ages and widened the equity gap among schoolchildren. The question this research paper investigates is, in what specific ways have school curricula changed for the worse? how have the social skills of schoolchildren people been altered? Just how bad is the equity problem in schools? The framework that aids in this analysis is Thomas Kuhn's theory of paradigm shift.

The coronavirus pandemic was a stimulus that jolted society and marked the rise in many different communication technologies and studying those impacts through the lens of a paradigm shift opens the door to historical comparison with other paradigm shifts that have happened through history. Optimally, this research will conclude with a better understanding of how social skills have been changed, and what educators and scientists can suggest to augment the social interaction that has been stripped as a result of the pandemic.

Working on both of these projects at the same time has provided an interesting perspective on the impact that the pandemic has had on the world. It is easy to fall into the trap

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of identifying the smaller, more present inconveniences that impacted the everyday lives of everyday people. What is harder to understand and dissect are the deeper systemic issues that were magnified by a global shock to the system. Socioeconomic status was as important as ever, even though modern society is supposedly set up in a way that it should not be. In terms of looking back on the pandemic three years later, it is beneficial to see what lessons were learned, and how society decided to glean certain aspects of the pandemic, and what issue people chose to ignore. The pandemic and the Russian invasion into Ukraine are not going to be the last two global issues that have long reaching impacts; it is crucial to the future generations that society looks at these periods with a productive and wide-reaching lens.

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