Michael R. Schwob
Reflective Essay

While I was generating ideas for my honors thesis, I wanted to focus on a quantitative problem that pertains to the local community. In 2020, a glaringly obvious topic was a modeling effort to analyze SARS-CoV-2 in Clark County. With this topic in mind, I began searching through the Lied Library search engine to find peer-reviewed articles that analyze SARS-CoV-2 on the city or county level. First, I used the quick search option. However, the results were cluttered with papers that were not directly relevant to my topic. At that point, I recalled a conversation I had with UNLV librarian Rebecca Orozco, who informed me about boolean operators in searches. With these operators, I was able to fine-tune my search and locate several papers that discuss epidemic models at the county level; however, none of these papers analyzed SARS-CoV-2.

After hours of going through the Lied Library search engine, *Google Schola*r, *ScienceDirect, JSTOR*, and *Scopus*, I was unable to find an academic paper that discussed a modeling technique to analyze this novel virus on the city or county level. I hit a dead-end, so I adjusted my research topic to “analyzing SARS-CoV-2 with an epidemic Lagrangian model.”

Once I modified my research topic, I used the Lied Library website to locate peer-reviewed sources regarding Lagrangian epidemic models. The results took me to external databases, such as *IEEE Access*, *Elsevier*, and *Springer*. For some articles that were incredibly relevant to my topic, I went through their bibliographies and papers that cited them using Google Scholar.

On the methodological side of my thesis, all of my sources are peer-reviewed and published in highly reputable journals, such as the *Journal of the Royal Statistical Society*, *Ecology Letters*, and the *American Journal of Epidemiology*. I also extended my search to include conference proceedings. These peer-reviewed proceedings come from all over the world. I also cited a software package that I used to execute my experiment. In total, I located over 100 relevant sources and incorporated 33 peer-reviewed sources in my thesis. Progress in mathematics develops relatively slowly; therefore, some of my sources were published as far back as 1984. However, if a particular component of some mathematical framework was advanced, I reported that advancement in my thesis and cited the appropriate manuscript.

I applied my statistical framework to the SARS-CoV-2 outbreak aboard the Diamond Princess cruise ship. Since this is a popular case study for Covid-19, there were many sources from which to pull information. Some of these sources were published in peer-reviewed journals, while others were published on reputable websites, such as *Our World in Data* and *Harvard Health Publishing*. The information I extracted from these sources was solely quantitative, so I did not focus on any qualitative reasoning that could be subject to an economic or political bias. The data that I used in my experiment came directly from Japan’s Ministry of Health, Labour, and Welfare. Since I could not read Japanese, I relied on two translation services to help me read through the articles (Google Translate and Yandex). All of my sources for this application were published within the last two years.

Since the last scoring section for this essay requires me to demonstrate my awareness of different viewpoints, I would like to reiterate that a majority of my sources are from peer-reviewed mathematical and statistical journals. While some methodology is better than

others, none of these methodologies promote a particular viewpoint nor does mine. They merely exist in the form of quantitative reasoning. While these methodologies could be used to argue a particular viewpoint, none of the cited methodological sources make such an argument nor does mine. The data that I obtained for the application does come from potentially biased sources; however, I only used the data in a purely quantitative nature, so no bias was incorporated into my analysis.

I believe that my honors thesis not only provides a novel viewpoint but greatly contributes to the understanding of the advantages and limitations of using an epidemic Lagrangian model. The developed methodology that extends over 14 pages is itself novel and its application, while contributing to a saturated body of literature, is also novel. I was able to develop this methodology due to the work that was published in my sources. Since I extracted certain concepts and made a cohesive framework that builds upon the work of others, I stood on the “shoulders of giants” (Newton).