An Analysis of the Societal Impacts of Systems Engineering Techniques to Deliver Client Recommendations

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Introduction

My STS research paper focuses on the University of Virginia's University Physician's Charlottesville clinic operations and systems engineering-driven approach to creating recommendations that improve operations. This sociotechnical thesis will follow a similar trend and analyze the societal impacts of the systems engineering techniques used in the analysis and the resulting recommendations made to the client. This sociotechnical thesis serves to clarify the scope of the research paper. In doing so, I will help others understand the significance of the findings in the context of primary care facilities in the United States and abroad.

Project Summaries

There are two significant components of behavioral analysis in this thesis. The first component of behavioral analysis is utilizing simulation in human-related systems. While industrial processes such as the manufacturing of vehicle parts and other everyday items have used simulation for years, there has been difficulty using simulation to analyze the flow of people in systems like primary care facilities. This hesitation in utilizing simulation in human-driven systems comes from the tendency for people to act unpredictably in certain situations, creating an outlier in analysis. However, some researchers might delete this vital data point since it does not fit in. Especially in larger health systems like hospitals, these random events can compound each other, leading to complex adaptive systems that traditional simulation programs are incapable of recreating. While these complex adaptive systems did not threaten our analysis, anyone looking to expand the findings from this study to larger systems should be wary of these drawbacks of simulations.

Not only should researchers limit the scope of simulations, but those looking to predict future results should understand that the simulation's strength comes from the reliability of the data. To quote an old saying on Wall Street, "Past performance is not always indicative of future results." This quote serves as a reminder that the best recommendations may fail if a new global pandemic starts, some natural disaster causes significant injuries in the Charlottesville area, or Charlottesville suddenly becomes a new hub for retired persons. Instead, researchers should create analyses to accommodate this difference. For example, the conclusion from the research report indicates that a one-to-one nurse-to-provider ratio was the most optimal. However, if a disaster struck Charlottesville and left hundreds injured and needing primary care, that ratio might change to allow the patient more time with the nurse.

Conclusion

The use of simulation limited the results and recommendations from my research. Also, the fact that past performance is not indicative of future outcomes limited the scope of the research paper. Instead, a nuanced approach with careful consideration of behind the recommendations, adjustments for local needs, and hesitancy to extrapolate these recommendations beyond the limited scope of the group's research will prevent unnecessary damage. Ultimately, the group gave recommendations tailored to the UVA UPC primary care. While future researchers may want to extrapolate our results, they should do so cautiously, ensuring proper patient treatment and that each patient receives the care they need promptly should always be the top priority.