Proto: Constructing a Solution-Oriented Design Network Amongst the UVa Health System and Engineering Undergraduates
(Technical Report)

The Cutter Incident: An Actor Network Theory Analysis and Problem of Many Hands of the Failure of the Polio Vaccine Network
(STS Research Paper)

An Undergraduate Thesis Portfolio

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By

Sarah Trans

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Socio-technical Synthesis

My technical work and my STS research are connected primarily through the implementation of the design process. The design process is an iterative step by step series that defines and develops a solution, which is the focus of both my technical project and my research paper. However, my technical project explores the successful implementation of the design process while my research paper investigates the failure of the proposed design process. My technical project is a solution oriented prototyping network that employs the design process to produce tangible and measurable results, whereas my STS research paper examines a flaw in the design process, specifically the testing phase, which ultimately led to a public health crisis. Both pieces of work demonstrate the importance of the design process when solving complex problems.

Our technical project is a solution oriented prototyping network connecting design problems in the University of Virginia Health network with engineering students to create local impacts. We recognized the immense untapped potential of UVA engineering students who have the mind and skill set to solve complex problems and identified unresolved design problems faced by healthcare professionals. This opportunity provides students a way to apply the skills and knowledge taught in class to an applicable problem faced by working professionals. Through our network, students can receive professional guidance by clinical advisors as they develop tangible solutions for pertinent design projects. This spring semester, we were able to recruit eight participating members to fill out three project teams. All teams will continue their project into the next upcoming school year with their clinical advisors to develop prototypes of the design solution. We believe students are actively interested and searching for design projects and

professionals have countless problems that can be solved, they just need a network built to connect them as easily as possible.

The research question that I set out in the STS Research Paper investigates the moral responsibility of the actors involved in the administration of a viral polio vaccine. This historical event later became known as the Cutter Incident after reports came in of people contracting polio after the administration of a virulent vaccine manufactured by Cutter Laboratories. In this paper, I applied the Actor Network Theory framework to deconstruct the polio vaccine actor-network in order to identify the role each organizational actor played in the tragic outbreak of polio following the administration of a live virus vaccine to thousands of children. Through an analysis of the problem of many hands, it was evident that each actor was morally responsible. Through the application of the conditions for holding subgroups responsible of causal contribution to the problem, knowledge of the problem, and wrongdoing, it is understood that responsibility for the outbreak should be distributed among the government, the NFIP, and Cutter Laboratories. The collective as a whole failed to identify and rectify the manufacturing flaw in the inactivation process of the polio vaccine until after an outbreak caused 40,000 polio diagnoses, 200 cases of child paralysis and 10 deaths. With this analysis, the reader understands the importance of supervision and oversight by the government and regulatory committees in the production and manufacturing practices of vaccines.

By working on both projects simultaneously, I have gained a more wholistic understanding of the design process. By examining the failure of the Cutter Incident, I have learned the importance of the testing phase of the design process. Regular, periodic testing warrants quality control and ensures that the design parameters meet the metrics of success. The

significance of the testing phase was incorporated in my technical project by teaching students to use risk analysis while testing their prototypes to identify and assess factors that influence the success of their solution.

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