Thesis Project Portfolio

Developing Preliminary Point-of-Care-Ultrasound Competency Guidelines for Internal Medicine at the UVA Hospital

(Technical Report)

A Case Study on the Optimal Method of Implementing Point-of-Care Ultrasound in Developing Countries

(STS Research 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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Sociotechnical Synthesis

The portability, versatility, and affordability of Point-of-Care Ultrasound offers a promising alternative to the stethoscope for diagnosis. Many hospitals have yet to transition away from the stethoscope due to a lack of knowledge as to the benefits of the device. This technical project seeks to address the lack of knowledge and establish a protocol for efficient and seamless implementation of Point-of-Care Ultrasound into hospital practices. By creating a protocol for implementation, a replicable strategy can be developed to ensure proper training of the new technology as well as an understanding of how the technology will be utilized in the current workflows of various hospital departments. It is crucial to understand the human and social dimensions that are involved. By considering the perspective of doctors who are comfortable with the stethoscope and may be resistant to change, a system can be put in place to gradually introduce the technology in a way that allows the doctors to learn the new technology before ultimately moving away from the stethoscope. Taking into account the general workflow of hospitals will allow for a better understanding of where Point-of-Care ultrasound can be implemented with the greatest impact. The themes of this technical project align with my research interests and are reflected in my research paper. For my STS research, the writings of Harrison were applied to analyze the current challenges of medical device donation and determine the proper solutions. Harrison et. al describe the resistant nature of doctors towards implementation of new technologies. The Interactive Sociotechnical Analysis (ISTA) framework described by Harrison was used to depict the major areas of risk for implementing the donated devices into their recipient healthcare systems. To conduct the research, case studies of previous attempts at donating medical devices to developing countries were analyzed to determine the successful and unsuccessful strategies that have been utilized in the past. Understanding the shortcomings of previous donation efforts aided in developing a plan to avoid the same mistakes

moving forward. Through this research, I found that the main limitation of medical device donations is a lack of communication between the donor and the recipient healthcare system. By improving preparation prior to donation and providing proper training when needed, a smoother and more efficient donation process could be developed, resulting in increased device lifespan and improved healthcare capabilities. The implication of this technical project and STS research in concert was that a replicable strategy of how to implement and donate new technologies could be made to maximize medical device potential and improve overall patient health.