Thesis Project Portfolio

Software Defined Microwave for Network Analysis

(Technical Report)

Integrating Media Studies Into the STS Curriculum

(STS Research Paper)

Enriching a Computer Engineering Degree Through Media Studies

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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Table of Contents

Sociotechnical Synthesis

Mass media is transferred and consumed in a variety of ways on a variety of different devices. My STS and technical projects focused on media, however, my technical project was solely for radio communications. At the same time, my STS research paper involved integrating all forms of media into the STS department to improve the study of technology. My technical project was to create a software-defined radio that was programmed to work as a vector-network analyzer. This device up until now was expensive and non-programmable. My STS research focused on what the STS curriculum can learn from Media Studies, not just from the department at UVA, but from Media Studies research all over the world. From both of these research papers, I hoped to enrich my Computer Engineering degree with both technical and nontechnical research concerning media.

In my Technical research, I looked into using a National Instruments Software Defined Radio set to produce the intended behavior of a Vector Network Analyzer. Vector-network analyzers are expensive devices that are necessary for scanning radio waves from all frequencies in a range, making them a prerequisite for any research in radio technologies. Unfortunately, these devices cost upwards of $100,000 and can only be used for scanning radio waves. Through my research, I helped develop a new device with a cost around $10,000 without losing much accuracy and allowing for the components to be reused for other experiments (as the radio can be reprogrammed at will). My work on the research will help expand the ability to conduct radio research to organizations that previously could not afford to buy vector-network analyzers, increasing the size of the field of radio research.

For my STS paper, I researched the relations between STS and the field of Media Studies, looking into what STS could learn from Media Studies and how they could be combined. I

focused on where they were comparable to see how their different perspectives assisted one another. In my research, I discovered that Media Studies departments across the world already utilized STS concepts and theories such as Actor-Network Theory and that previous dialogue between the two developing fields had already occurred. In almost all cases, the most significant difference between the two was the fact that STS focuses on an Engineer's perspective of technology and its effects. At the same time, Media Studies gives almost a birds-eye view into all strata of society. I concluded in my research that to provide both of these perspectives, it would make sense to create a combined field of technology study to allow students to have a very well-rounded education on the development and effects of technology.

Over the past year, I was fully engrossed in the study of media, both its creation and relations with STS. My technical project helped the furthering of radio technologies, which can, in turn, benefit all media. At the same time, my STS thesis covers ways of improving the relationship between the STS and Media Studies departments so that the significant impact Media has on STS can be adequately taught. I have learned a great deal about media from almost every perspective, and I believe what I have discovered will help improve both the production and study of media for years to come.