

## **Thesis Project Portfolio**

**Investigating the Efficacy of Virtual Experiences on Stress Reduction**  
(Technical Report)

**Exploring Educational Institutions in the Role of Community Partners**  
(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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## **Table of Contents**

Sociotechnical Synthesis

Investigating the Efficacy of Virtual Experiences on Stress Reduction

Exploring Educational Institutions in the Role of Community Partners

Prospectus

## **Sociotechnical Synthesis**

For the majority of Americans, life revolves around school and/or work. Whether it is a 40-hour work week, classes 5 days a week, or somewhere in between, seldom exists a US citizen that is not some type of student or employee. Education and work are some of the most commonly accepted paths to contributing to society, financial security, and overall life satisfaction. With such an emphasis on these aspects in life, both individuals and larger institutions are constantly searching for ways to improve productivity and overall success for students and workers alike.

The STS thesis addresses the potential for educational institutions to build social capital in surrounding communities, which can greatly improve success for both students in school as well as employees in the workplace. This section evaluates the success of existing programs at institutions that have attempted to create social capital in the community and the efficacy of applying these methods at other educational institutions. This is done by starting with background research on the creation of social capital and the Theory of Weak Ties, then evaluating various case studies through the lens of social capital creation.

The technical thesis from the capstone team focuses on increasing the success of employees already in the workplace, specifically regarding workplace stress and anxiety. This is done by exploring the combination of Attention Restoration Theory and virtual reality (VR) technology as a therapy for stress and anxiety reduction in the workplace. In order to test this hypothesis, the team conducted research through reviews of existing literature on the subject. This enabled the development of the team's experiment, which samples the stress and anxiety levels of participants through biometric sensors in 6 different conditions, involving urban or

nature images in 3 different virtual or non-virtual realities. This study is set to take place in a continuation of this project by future capstone teams.

The results of the STS thesis provided ample evidence of the positive impacts the creation of social capital can have on neighboring communities of academic institutions. This has not only been a very informative experience personally, but also left me with the desire to incite change in my own university community to reflect the findings of this research. My hope is that future researchers and leaders at major universities continue to look into the effect of building social capital and follow the lead of some of the case studies acknowledged throughout the thesis.

While the results of the technical thesis were halted due to adversity surrounding COVID-19, the experience working in a team to achieve a goal proved rewarding and educational nonetheless. The work put in to create the experiment should not be overlooked despite the lack of final results. The team very diligently met with stakeholders, analyzed existing literature, and constructed the experimental procedures. Because of this, future capstone teams should be able to continue this work and complete the experiment in order to determine the validity of VR technology in the reduction of workplace stress and anxiety.