**Exploring Immersive Micro-Vacations and Their Efficacy on Multiple Biometric Markers and Productivity as A Novel Therapy for Short- and Long-Term Stress and Anxiety Management/Reduction**
(Technical Paper)

**Exploring the Economic Impact of Educational Institutions in the Role of Community Partners**
(STS Paper)

A Thesis Prospectus Submitted to the

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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# Introduction

This document contains perspectives on economic opportunities and maintaining the mental health of employees established within the workplace. The STS thesis portion of this paper looks into why and how educational institutions can establish themselves as community partners with a focus on the resulting growth of social capital in neighboring communities. I will explore what programs are already in place within the Charlottesville community and analyze the practicality of different approaches to employment training and placement for low income citizens. I will assess how these programs are supported by the ideology of social capital development and the importance of nurturing weak ties for economic opportunities and success in low income classes. Continuing with the theme of workplace challenges and conditions, the technical portion of this prospectus is based on the research around the efficacy of attention restoration theory in the workplace, specifically the use of virtual reality (VR) to reduce stress and anxiety. The study being conducted places subjects in a client-provided booth for a 10 minute "micro-vacation". Prior to the study, subjects are given an abbreviation of the Trier Social Stress Test in order to create a baseline stress level. Within the booth, the subject wears a VR headset with images and sounds of nature scenes. This is compared to two control environments, one in which the subject will be presented with 2D nature scenes and one in which the subject will view a grey space without any nature. Quantitative data collection includes biometrics such as heart rate, blood pressure, and galvanic skin response. This data will augment the qualitative data collection conducted through a variation of the Profile of Mood States (POMS) survey.

**Technical Topic**

Due to rising costs of medical and pharmaceutical treatments, employers are seeking innovative ways to manage healthcare expenses for employees and their dependents. Studies show that 42% of employees report feeling stressed at work, leading to 15-30% greater healthcare costs. However, a much smaller portion of employees (~22%), report being able to cope with stress very well (Colligan & Higgins, 2006). Many people in the workplace struggle to manage their stress on a regular basis, thus impeding productivity and overall workplace satisfaction. Given this current situation, many employees cannot depend on their own capabilities and instead require some external aid to help reduce stress and increase productivity. Therefore, a solution that would reduce workplace stress and increase productivity would appeal to both employees and employers.

The technical project will explore the combination of Attention Restoration Theory and virtual reality (VR) technology as a novel therapy for short- and long-term stress reduction and anxiety management. Previous evidence of biometric data support that VR environments can be successful in reducing anxiety (Gorini & Riva, 2008). Traditional treatments for stress and anxiety include medications, therapy, or self-care techniques such as meditation. However, these treatments may be expensive and time consuming, and are not quick outlets for everyday stressors such as those found in the workplace, such as running meetings and presentations. Readily accessible digital technologies, such as VR technology, are better suited for improving mental health in a workplace setting. Study participants will undergo VR micro-vacations through a virtual reality program provided by Even Health that guides them through various settings in nature. This is designed to implement Attention Restoration Theory, or the theory that nature will restore the ability to concentrate, thus reducing stress and anxiety and promoting

productivity (Ohly et al., 2016). This theory is a validated approach to reducing stress in clinical settings as well as improving productivity and mitigating stress and anxiety in the workplace The goal of this project is to mitigate the rising cost of healthcare for both employers and employees through implementation of innovative technologies in the workplace that ultimately help individuals build emotional strength and better manage stress and anxiety throughout their lives.

First, a literature review will be completed to understand previous research and studies conducted in this area of study. This will help the team to understand the metrics to be collected and the tests that should be performed to evaluate the efficacy of the virtual reality intervention. Once this information is gathered an IRB protocol will be drafted detailing the procedure of the experiment. Pilot testing will then be performed during the months of November and December. The study will be conducted in the basement of Olsson Hall at the University of Virginia during the months of January through February. After giving informed consent, study participants will complete a task prior to the experiment that induces minor stress or fatigue. Examples of such tasks might be a puzzle, math problem, or multi-tasking activity. The participants' biometric data that measures stress will then be collected. Such metrics will be gathered through heart rate variability sensors, blood pressure gauges, and the measuring of galvanic skin response. This preliminary test will serve as baseline data to ultimately measure the efficacy of the therapy on participants. The participants will then be immersed in the VR booth for 5-8 minutes, where they will select a restorative environment of their choosing from 2-3 given options (i.e. beach, lake, mountaintop). Participants will be guided through a micro-vacation in which they will have the ability to experience their chosen virtual environment. Physiological changes in patients and biometric markers will be monitored and measured throughout the therapy. Afterwards, the participants' biometric data will again be collected for comparison of pre- and post-stress levels.

Likewise, a post-stimuli task will be given to measure and compare productivity. Possible independent variables to change involve the use of a stool or chair, the use of VR or not, and variation of the VR scenarios.

**STS Thesis**

Currently, 20% of families in central Virginia live below the poverty line, and Charlottesville ranks in the top 25 metropolitan cities with the largest wage gap (Sommeiller, 2018). For many of these people, unemployment is a main factor in their inability to provide for themselves and their families. This is a stark contrast to the population of the University of Virginia, just a short drive away from downtown Charlottesville. A prominent research university, widely recognized in academia with millions of dollars annually in endowments, professors often make upwards of 6 figures and students get offered internships and jobs from the best companies in business, technology, and finance. Why does this severe gap exist between UVA and the surrounding community? This phenomenon is not exclusive to UVA and Charlottesville; well-established educational institutions all across the country are wildly successful while doing little to nothing to contribute to the surrounding community, at least not successfully.

I will be investigating how educational institutions can establish themselves as community partners in order to facilitate the growth of social capital in neighboring communities, and what that social capital can do to create self-sufficient individuals that contribute to a thriving economy. As colleges and universities are beginning to establish programs in this domain, the increasing trend for educational institutions is that focusing solely on education is no longer sufficient. The current research has been evaluating how Piedmont

Virginia Community College's employee preparation and job placement program, Network2Work, has been contributing to the development of social capital for people within the Charlottesville community. My research is to dive deeper into the goals and impacts of these programs in relation to the idea of the "smart city", specifically focused in the economic domain, through the lens of social capital creating job opportunities for low-income citizens facing various barriers to enter and be successful in the workplace. Additionally, I will look into if and how these programs are linked to education and how institutions such as UVA can learn from the success of programs like that at PVCC and elsewhere.

Social capital is the actual and potential resources available to an individual, facilitated through a series of connections and social networks. In communities impacted by poverty, low or no social capital is associated with negative outcomes such as lack of safety, lack of trust, little to no public resources, and exacerbating the status quo of inability to move up within society or improve one's current situation. According to Lukasiewicz, there are three types of social capital: bonding, bridging, and linking. Bonding is the closest of ties, formed between homogeneous people and communities. Bonding social capital provides social support, allowing people to "get by" on a daily basis. For example, a family member providing financial support to someone whose resources have been depleted. While this type of social capital is beneficial for day to day support, it only enables horizontal action, which does not help overcome poverty, but rather reinforces the status quo. Bridging and linking social capital are somewhat weaker ties between diverse groups and external resources, such as an institution separate from a community or people from different backgrounds. These forms of social capital allow for vertical action, or breaking the status quo and "getting ahead" (Lukasiewicz et al., 2019).

Bridging and linking social capital is where Network2Work focuses for employer-employee connections. I spoke with Frank Squillace, director of Network2Work, Piedmont Virginia Community College's employee preparation and job placement program, to get a better idea of how they are addressing the disconnect between employers and potential employees in Charlottesville. The main issue in Charlottesville with job matching stems from the barriers that many low-income citizens face that prevent them from being successful in an occupation. Examples of these barriers include proper training, access to transportation, and the ability to provide childcare while at work. Many traditional employment matching programs are not aware of these barriers and therefore do nothing to address them. Without properly addressing these barriers, many of these potential employees will not be successful in the job and will quit or be fired within as little as a week of starting. Job matching is more than just obtaining the position, it is being able to succeed in keeping the position as well, changing the cycle of barriers which enforces dependencies and prevents self-sufficiency. Network2Work recognizes these barriers and aims to address these by "reverse engineering" the traditional job market system. Before even beginning the job application, the program takes care of the potential employee by addressing barriers through state government funded job training, child support, health care, and grants for car repairs, work equipment, and any other miscellaneous necessities. By putting more time into the client upfront, they are set up to be more successful in their job in the long run.

Once Network2Work has tackled the barriers facing potential employees, they aim to find the best match between employee and employer. The strategy is to utilize "connectors," contacts within the community that are socially in touch with who is looking for a job and where their skills could best be utilized. These are often people like church pastors, social service workers, and other community members who have been trained in how to connect them to the

program. This strategy is supported the social capital framework and the theory of weak ties, stating that weaker ties (such as bridging and linking social capital) are more useful in creating opportunities than strong ties (such as bonding social capital) with whom we feel the closest and are most similar to (Granovetter, 1973). Diverse people provide the most impactful opportunities because they are bringing something new or not previously accessible to the table. According to Squillace, Network2Work has a success rate of 85% to 95%, meaning the percentage of people who enter the system and complete the program, resulting in some type of job placement. While the program was only established in 2017, it has currently created $8.7 million in wages, a number that shows great progress and no signs of slowing down any time soon. By linking people with limited resources to those with more readily available resources and connections, more opportunities become available and thus there is greater success for employees getting into and staying in the workplace.

Looking forward, research still needs to be done on how more educational institutions can establish themselves as community partners in order to facilitate the development of social capital. My future research will include further evaluating UVA's role within the community, ongoing documentation of other programs that have established themselves as community partners, and exploring the efficacy of establishing programs like Network2Work at other educational institutions.

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