Measuring Airport Similarity to Create a Towering Decision Aid
(Technical Report)
**Exploring the Possibility for the Integration of Contemplation in Academic Environments
to Enhance Collaboration**
(STS Research Paper)

A Thesis Prospectus Submitted to the
Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Mason Jordan
Spring 2020

Technical Project Team Members
Austin Anderson
Toby Hansford
Sragdhara Khakurel
Chris Marshall
Michael Quinn
Katherine Taylor
Amy Xie

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

Cody Fleming, Department of Systems and Information Engineering

Sean M. Ferguson, Department of Engineering and Society

Introduction

Throughout my years at the University of Virginia, contemplation and mental health have always been concepts that professors and mentors have touched on; however, they are often superseded by the excessive amounts of work that are then placed upon students. Whilst sitting in the all-encompassing dreary atmosphere of Alderman Library in the past couple of years, I read numerous articles explaining the academic benefits of leaving time for physical activity, contemplation, and sleep. However, I could never imagine that there was time to incorporate each of those luxuries in addition to completing schoolwork to my best ability. Instead, I have found that when I am stressed by my work load, I tell myself that I will need to focus on the work and put off my mental and physical health. The stigmatized separation of mental health and academic work along with the pressure to be perfect have led to a distressing increase in cases of students burning-out. Byung-Chul Han describes us as a "'burnout society', with many of us in a constant state of doing and achieving, all the while feeling constantly unsatisfied and unfulfilled" (Pyati, 2019). Students are burning-out because they feel the need to be perfect in their academics and are not incorporating mental health into their daily lives.

When students take time to be mentally well, they are better able to collaborate and more efficiently produce superior work. Studies have shown that "contemplative practices are being deployed to deal with some of these psychosocial concerns and can be quite effective at an individual level" (Pyati, 2019). Therefore, incorporating a contemplative space into the academic spaces at the University of Virginia will allow students to integrate contemplative elements into their learning styles. When addressing contemplation, we are looking at "the enhancement of self-regulation as the ability to notice and effectively manage thoughts, emotional responses, and behavior" (Dorjee, 2016). Given the need of a space that will allow

students of all backgrounds and interests to thrive, we face the challenge of creating a space that incorporates both contemplation and collaboration. Through our research on creating an environment that is best for human behavior, we decided to focus on diversity, collaboration, architecture, and health, so that we can best develop a space that embraces the values of inclusion, healthfulness, contentment, and productivity. The purpose of this paper is to consider the benefits and controversies around mindful practices in contemporary United States education in order to determine if it inspires these values and should be incorporated into this space.

Technical Report: Measuring Airport Similarity to Create a Towering Decision Aid

How can a new model be created to best quantify the benefits of Air Traffic Control Towers in the class D airspace?

Air Traffic Control Towers (ATCTs) have a clear benefit of preventing collisions and allowing for more efficient flights at larger airports with commercial carriers. However, what remains unclear are the overall benefits of Air Traffic Control Towers on class D airports, where most general aviation, charter and executive flights, and flight training occurs. The Federal Aviation Administration (FAA) is currently responsible for determining if they will grant an airport the funds to build and operate an Air Traffic Control Tower. They currently determine whether or not they will fund a new tower based on a cost-benefit model detailed in FAA-APO-90-7. This model was last updated in 1990; and therefore, the current criteria are vastly outdated and biased against the class D airspace. This makes it extremely difficult for small airports to obtain funding for a tower. However, smaller airports are in need of these

towers as they not only lead to increased safety and efficiency, but they also economically benefit the surrounding community. The economic benefits directly result from additional commercial and corporate planes that will fly into the airport when towers are implemented. The goal of my capstone team is to create a computer model that will analyze and quantify the benefits of Air Traffic Control Towers, specifically in the class D airspace.

I will be working with Austin Anderson, Toby Hansford, Sragdhara Khakurel, Chris Marshall, Michael Quinn, Katherine Taylor, and Amy Xie to create this model for Fort Hill Group. We will not be proposing any changes in the design of the tower, airplanes, or technology. Rather, the initial focus will be on formulating a system to consider if it is beneficial for a smaller airport of Class D to build an Air Traffic Control Tower. We are gathering information from experts, datasets, and visits to the Charlottesville and DC airports in order to gather information and create this model. When looking at the benefits of an Air Traffic Control Tower, there are numerous stakeholders that need to be considered: the FAA, Personnel, Airports, Passengers, and pilots. Each of these stakeholders are going to experience different levels of benefits and costs for each metric considered. The metrics that we are currently observing are the incident rate, delay rate, amount of radio calls before and after tower construction, economic outcome studies, environmental impact studies, and casualties and injuries. We do not anticipate that our project will examine the cost of the Air Traffic Control Tower and will be combined with a separate analysis to produce a benefit-cost analysis of installing an Air Traffic Control Tower.

The final project deliverable for the client will consist of three separate parts. First, we will provide them with a briefing document that gives an overview of the purpose of the project and the work that was done to accomplish the project. The second portion will be a final

technical report that goes into more detail about the project, the methodology behind it, and the results it produced. The final deliverable will be a model that can quantify the benefit of having an Air Traffic Control Tower at an airport that currently lacks one. The model will be accompanied by other documentation that supports the analysis and reasoning behind the model. The Gantt chart below shows each step and how we plan to process through the project.
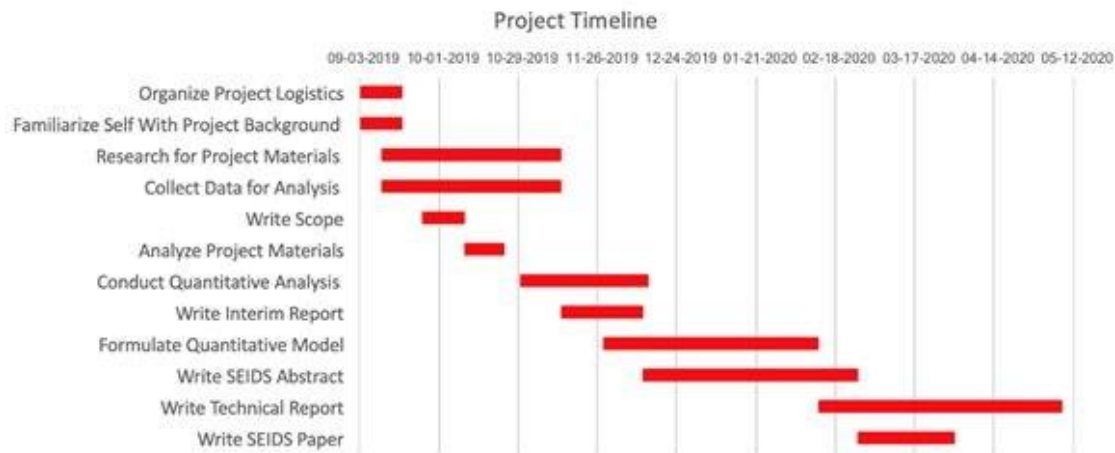

Figure 1: Gantt Chart

STS Research Paper: Exploring the Possibility for the Integration of Contemplation in Academic Environments to Enhance Collaboration

In recent years, there has been an increase in discussion on well-being and how better mental health leads to better work. Studies have shown that there are beneficial opportunities for the health, safety, educational progress, and moral development of students to coincide. Margaret

Kern writes, "Peterson (2006) contended that schools are ideal institutions to provide these opportunities and he called for schools to expand their focus beyond academic learning to also include the promotion of character and well-being" (Kern, 2019). The goal of my research group is to create a space at the University of Virginia that helps establish a shift toward the adaptation of a positive education approach through incorporating contemplation and collaboration. Amidst the integration of spatial design and programs that will help all students flourish, we decided to consider the impact of mindful training in contemporary United States education. *Multicultural Approaches to Health and Wellness in America* states that yoga and mindfulness allow one to contemplate using inward focus and side effects include "enhanced concentration and performance speed" (Gurung, 2019). However, the use of yoga in the United States is controversial. Some believe that it is no longer a form of mindful training and has been translated from a religious ritual to a product. Others believe that religion is embodied in the practice and therefore should never be a requirement. In considering incorporating mindful practice methods into our space, we first need to understand the gap between the students that reject these practices and the students that desire to include it in their learning environment. Therefore, as an element of our study on designing a contemplative space, I am studying the inclusion of mindfulness training in contemporary United States education, its impact on learning, as well as its resistance.

As mindfulness and yoga have been incorporated into academic environments, there has been opposition from multiple viewpoints. One argument is that yoga pushes religious aspects onto those who are only seeking the secular benefits. In the book *Debating Yoga and Mindfulness in Public Schools*, Candy Gunther Brown examines the use of yoga in secondary level education and whether religion is actually left out of the practice of yoga in public schools.

She says, "Participants who expect and want only secular benefits from yoga and mindfulness report what they describe as "religious" or "spiritual" experiences, and longer-term, more intense practice correlates with changes in self-identification and affiliation" (Brown, 2019). Inspired by Brown's work and research of the religious effects of yoga on students in secondary education systems, I am going to study to understand the effects of mindful practice in higher education, using the University of Virginia as an example. Another argument comes from the standpoint that yoga and mindful practices have become too westernized and secular. In the United States, mindful practices only seem to be readily available to those willing to pay large sums of money in non-academic environments. Instead of incorporating the wholesome intentions of mindfulness and contemplation into an inclusive environment, there has been a marriage of mindfulness and capitalism that has overruled the Buddhist roots and social ethics such as right livelihood and right speech (Pyati, 2019). In his work, *Public Libraries as Contemplative Spaces: A Framework for Action and Research*, Ajit Pyati explores how mindful practices are most effective when they incorporate the values from which they were created. Using this work for guidance, I will additionally explore the values and background of mindful practices and the benefits that they provide to students' successes.

In order to conduct this study, I will use the SCOT framework to explore the social groups that are relevant in the use of the space that is being created and how they interpret mindful practices. My research explores who is practicing mindfulness in the United States and what motivates them. Stakeholders of the space at the University of Virginia will include students and faculty who will have different perspectives on the use of mindfulness in an academic environment. SCOT will allow me to consider their different interpretations of

mindful practices, whether that be as a Buddhist practice, a form of stress release, mind training, fitness, or any other perception that a stakeholder may bear.

The perspectives of the target users are especially important when designing a space because we desire to apprehend their needs. In order to acquire the viewpoints needed in analyzing the question of mindful practices in contemporary education, I aim to first conduct targeted surveys. These surveys will ask for demographic information including gender, nationality, ethnicity, religion, and education department. This data will help to understand the question of who desires to incorporate mindful practices and who is hesitant about it. After acquiring background information, the survey will ask questions about how they define mindful practices, if they desire to incorporate them into their education, what they believe setbacks of yoga and mindful practices to be, and if they believe that it will help them to create better work and collaborate better with others. After examining the answers and how they correspond to some of the demographic data, I will interview people of specific demographic groups to see if I am able to uncover personal experiences and gain greater insight on the controversies and benefits of incorporating mindful practices into the collaborative space.

I will continue my research on incorporating mindful practices in a collaborative space throughout the Spring semester, in which I will draw information through extensive research, surveys, and interviews with University of Virginia students and faculty. I am hopeful that this space will become a collaborative space that also allows students to be individually accepted and represented. My research will help establish how we are able to incorporate mindful awareness into this space while taking each stakeholder's perspective into account and considering the gap between their beliefs. This contemplative and collaborative student center will become a space where all students feel comfortable and included in order to flourish and create their best work.

Bibliography

Brown, C. G. (2019). Debating Yoga and Mindfulness in Public Schools: Reforming Secular

    Education or Reestablishing Religion? [The University of North Carolina Press].

    Retrieved from https://flexpub.com/preview/debating-yoga-and-mindfulness-in-public-

    schools

Dorjee, D. (2016, November 17). Defining Contemplative Science: The Metacognitive Self-

    Regulatory Capacity of the Mind, Context of Meditation Practice and Modes of Existential

    Awareness. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5112249/.

Gurung, R. A. R. (Ed.). (n.d.). Multicultural Approaches to Health and Wellness in America [2

    volumes]. Retrieved November 7, 2019, from

    https://books.google.com/books?hl=en&lr=&id=OY6dAwAAQBAJ&oi=fnd&pg=PA125&d

    q=why+eastern+societies+use+yoga&ots=QNea8qnxUM&sig=BZ2ahSqpfNZyIZkZQu23t

    NzqAl8 #v=onepage&q&f=false.

Kern, M. L. (n.d.). A multidimensional approach to measuring well-being in students:

    Application of the PERMA framework. Retrieved November 7, 2019, from

    https://www.tandfonline.com/doi/abs/10.1080/17439760.2014.936962.

Martin, G. A. (n.d.). *Faa Contract Tower (Fct) New Start and Replacement Tower Process*. *FAA

    Contract Tower (FCT) New Start and Replacement Tower Process*.

Pyati, K. P. A. K., Faculty of Information and Media Studies, & University of Western

    Ontario. (n.d.). Public Libraries as Contemplative Spaces: A Framework for Action and

    Research. Retrieved November 7, 2019, from

    https://www.tandfonline.com/doi/full/10.1080/24750158.2019.1670773?journalCode=ualj2

    1.