Measuring Airport Similarity to Create a Towering Decision Aid

(Technical Paper)

The Takeover of AI in Sports

(STS 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 of the Degree

Bachelor of Science, School of Engineering

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Fall, 2019

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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

Last year during exams I was sitting in Alderman Library, sweating, tired, and anxious, thinking about the insurmountable exam I was taking tomorrow. Sitting in a hard-wooden chair, staring nervously into the fluorescent light that was flickering above. I almost felt as though the room I was in detained any sort of confidence I had, making me anxious and weary. I was shocked by how much I wanted to leave this space, one I thought should be a place to get away from the constant alertness that is present in our society today. I started to ponder how these architectural components around me, impacted my sense of self.

We define contemplation as the enhancement of self-regulation (SR) as the ability to notice and effectively manage thoughts, emotional responses, and behavior (Bruce, 2018). The religious studies scholar Louis Komjathy in his book *Introducing contemplative studies* emphasises the general characteristics of contemplative practice to be 'attentiveness, awareness, interiority, presence, silence, transformation, and a deepened sense of meaning and purpose (Pyati, 2019). Students at the University of Virginia often time use public gym facilities or private practices in Charlottesville in order to release their stress by conducting contemplative exercises such as yoga, meditation, or breathing exertion. But, is it possible to create a study space, with specific structural components, that allow students to find this contemplative consciousness?

The focus of our contemplation study will be a single room within Dr. Germano's project to build a contemplative center for UVA students. Dr. Germano is the Executive Director of the Contemplative Sciences Center and is focused on the exploration of contemplative ideas, values, and practices involving humanistic and scientific methodologies, as well as new applications in diverse fields. I will be diving into the architectural components of this space and how we can start to realize how these components affect our sense of self, and our interactions around us. The common theory today is that there is a hard divide between collaboration and individualism, but we are going to investigate how people's sense of self influences the interactions they have around them. I will be exploring beyond the scientific studies of how some of these architectural elements benefit humans' physical and mental state, and dig further into how they truly make people feel about themselves and their interaction with others and objects around them. How do spaces in our lives change the way we understand ourselves? And How can we use this understanding in order to create a room that pursues these goals of contemplation? I will attempt to comprehend how architectural elements can influence both ones sense of self, and the idea of collaboration. I am inviting my reader to look beyond scientific studies about architecture that exists today, but to try and realize how these physical elements truly make us feel about ourselves and the interactions we have.

Airport Control Towers

Validating the need for new air traffic control towers

Air Traffic Control Towers (ATCTs) primarily serve to prevent collisions between aircraft and other hazards, and have a clear benefit at larger airports with commercial carriers. For airports in class D airspace, where most general aviation, charter and executive flights, and flight training occurs, the benefit of an ATCT becomes less clear. The Federal Aviation Administration (FAA) has several criteria in determining whether or not a new tower should be built, the most important of which is a cost benefit model detailed in FAA-APO-90-7. The criteria used in this model are vastly outdated and are biased against smaller airports in class D airspace.

There is a need for a new system for determining the benefit of an ATCT specifically for smaller airports in class D airspace. My capstone team will develop a new model that establishes the benefits of ATCT for primarily Class D airspace. The primary goal of our project is to quantify the benefits that an Air Traffic Control Tower would provide to a Class Delta airport. 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 Delta to build an ATCT. Some areas of focus are safety, financial, customer experience, and environmental benefits. We don't anticipate that our project will examine the cost of the ATCT and will be combined with a separate analysis to produce a benefit-cost analysis of installing an ATCT. The method of analysis can be used by the client for other fields of interest.

The final project deliverable for the client will consist of three separate parts. The first document will be a briefing that gives a short overview of the purpose of the project and the work that was done to accomplish it. The second part consists of a final technical report that goes into more detail about the project, the methodology behind it, and the results it produced. The last part of the deliverable will be a model that, when used, can quantify the benefit of having an air traffic control tower at an airport that currently lacks one. This model will be accompanied by other documentation that supports the analysis and reasoning behind the model.
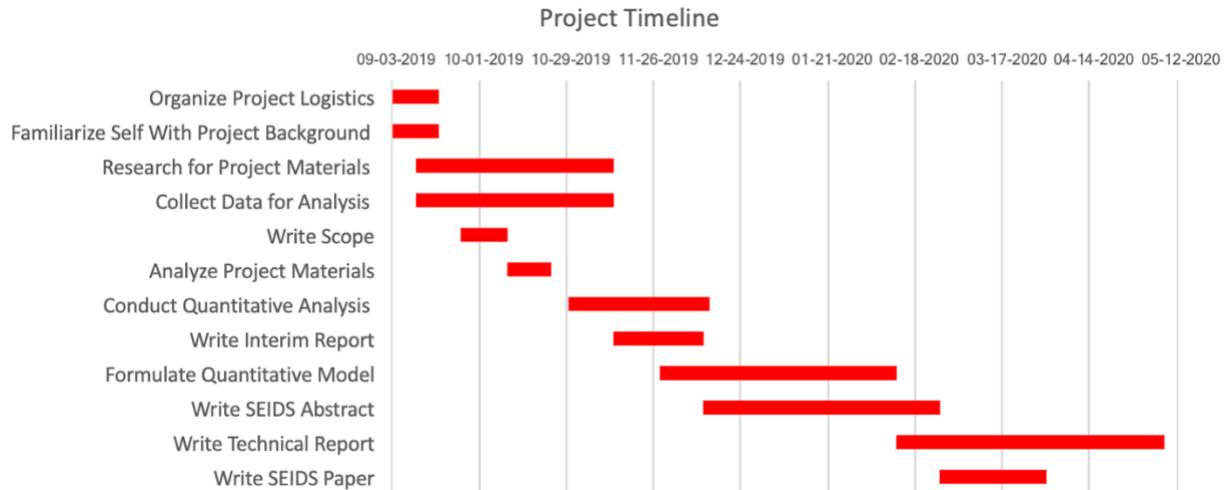
Project Timeline

Visualization that shows our project timeline and the components needed to be completed.

During the course of this project we will be working with the FortHill Group which is primarily an aviation consulting group. During the course of the year we will consult with them to gain insights and knowledge about ATCT's and other relevant information. Our project is focused around safety and efficiency, and how ATAC's can either positively and negatively affect these variables. Through the course of the year we hope to develop a system that can effectively quantify these elements and improve the efficiency of aviation across the country.

Architectural Design

Understanding how architectural components can impact our sense of self

The philosopher Byung-Chul Han describes our current age 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). There is currently a lack of understanding and integration of contemplative practices in collaborative spaces at the University of Virginia, and due to the many experimentally proven benefits of these practices, this is a considerable area of necessary improvement. Ajit Pyati, faculty of information at the University of Western Ontario, asked the question "with psychosocial maladies related to the information age (e.g. overload, burnout, distraction, etc.) becoming more disturbingly evident by the day, what role can public libraries play in alleviating these concerns?"(Pyati, 2019). Factors such as a lack of diverse safe spaces on grounds, a need for personal and emotional safety, and widespread mental & physical health stigma that negatively affects students, are facets that need to be addressed at the University of Virginia. It is virtually common knowledge that architectural components such as natural light and plants can increase the mental state of individuals, but what people and architectural designers don't necessarily understand is how these arrangements impact ones sense of 'self' (Verma, 2017).

How does architectural space design impact our sense of 'self'? In order to truly design a space that reveals contemplation, it is imperative that we can justly understand how these features change the way we understand ourselves and how we can use these architectural components to create a strong sense of self. A sense of self is defined as one's perception of oneself and an awareness of who you truly are within the world. Each person's sense of self is directly related to how they feel about themselves, their levels of self-esteem, and their confidence or lack thereof (Buckley, 2019). I invite my readers to look beyond the common scientific studies of architectural components in relation to mental health, but instead to explore how these elements can change and impact this sense of self. By understanding how architecture can affect ones sense of self, we can better plan a space that elicits contemplation.

Does this idea of sense of self also impact the interactions we encounter? Not only must we start to realize the sensations we ourselves feel in specific spaces, but when considering our awareness of self we must also ponder on our relationships. Christine Congdon explained in her article Balancing "We" and "Me", there's a natural rhythm to collaboration. People need to focus alone or in pairs to generate ideas or process information; then come together as a group to build on those ideas or develop a shared point of view. The more demanding a collaboration task is, the more individuals need punctuating moments of private time to think or recharge (Congdon, 2014). How does this sense of self that we are investigating influence group collaboration? We are moving away from this common idea that individualism and collaboration are two completely separate entities, and are exploring how the two are intertwined throughout space. By understanding this blurred line between individualism and collaboration, and how the idea of

space can influence this, we can better design a space that elicits contemplation and a strong sense of self. My framework stems from this idea of one's sense of self, and how we can use that understanding of self in order to elicit collaboration and contemplation. I will examine how many groups of individuals feel about themselves in different settings and perceive how architecture affects ones sense of self; I will then use this understanding to recognize how our sense of self influences interactions and collaboration.

Since my studies are attempting to enlighten my reader about sense of self, rather than display scientific facts and studies, almost all of my research and data collection moving forward will be from personal interviews. I have spent time researching common architectural elements that currently exist and how these elements have scientific effects on individuals, but now I am going to personally explore diverse spaces such as current libraries, churches, gyms, meditation sites, and larger scale collaborative spaces like WeWork. I will spend ample amount of time in these spaces, examining people's expressions and interactions, trying to learn how people react in these different architectural spaces. I will also conduct many interviews with both professionals who work in these spaces and other common users in order to gain insight as to how these spaces make them reflect about themselves, and how the specific architectural design affects the way they live and think.

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