

Prospectus

ACQ-SYNC: A Novel Framework for Increasing Workplace Productivity and Collaboration for Contract Acquisition Personnel

(Technical Report)

Analyzing Charlottesville Transit: Investigating Modes of Public Transit in Charlottesville and Their Effect on Resident Mobility

(STS Research Paper)

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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

From the late 1990s leading into the start of the current decade, a large portion of the developed world experienced a technological revolution of sorts. The number of ways to increase productivity and entertainment multiplied yearly in the form of new devices. However, despite the stark uptick in technological innovation and its presence in the common household and office, society arrived at a point where it became fair to question the usefulness of all these devices (Barrett, 2009). If the amount of technology available increases, but level of productivity and satisfaction from it begins to decrease, then is our technology truly as intelligent as we think it is? How can we leverage innovation and the use of technology in a way that interacts with people?

This document investigates the usefulness of ergonomics in the application of technology through two different projects. In the technical report, there is a greater focus on the development of a user-friendly and interactive project management interface to increase productivity, reduce worker stress, and create an environment for a more collaborative work setting. In my STS Thesis, I begin to examine the inner workings of public transit in Charlottesville. The design, efficiency, and usage of the various transit systems available to students and resident of Charlottesville will be compared to that of similar municipalities and universities. In addition, this study will begin to study the use of smart city and people-centric designs in transit and routing along with their potential integration into the Charlottesville area.

Technical Topic

Assisting the United States Federal Government with their needs in the form of a large variety of goods and services has become one of the largest industries in the world (WatchBlog, 2019). In the fiscal year of 2017 (FY2017), the United States Federal Government awarded over \$0.5 trillion in contracts to various vendors to produce on behalf of the Federal Government.

As one can imagine, with \$500 billion on the table for an industry of corporate vendors to take hold of in exchange for their business, there is a fair amount of competition to gain the government's approval to perform a limited number of tasks on their behalf. Before any work is done, however, government contracting agencies will present their various solutions and offerings to the Federal Government as part of their strategy to attain a contract. The most favored of these acquisition strategies will be awarded the contract and the winning vendor has secured themselves a slice of the \$0.5 trillion pie that the Federal Government has to offer in that given fiscal year.

Federal Contracting has been a multi-billion-dollar industry for decades on end (Suciu, 2018). This industry is a particularly unique one because the presence of the market itself has no end in sight and also due to the fact that there is one consumer. With a constant consumer and a stable—if not increasing—market, the use of archaic techniques and technologies in the contract acquisition process is commonplace in the industry and has developed into a plague on the system entirely. Currently the contract acquisition process can average anywhere between 12-24 months. In an industry where allocation of funds is dependent upon political bodies and agendas that can drastically fluctuate every 24 months, contracts can be terminated before they are acquired.

Government contracting agencies place the responsibility of managing and executing the acquisition process in the hands of their acquisition personnel. The acquisition process can vary greatly from contract to contract, but one thing that remains constant between all acquisitions is a large number of moving parts, requirements, and intricacies. The highly complicated nature of the acquisition process makes the learning curve for new acquisition personnel hires extraordinarily steep. Even for experienced acquisition personnel, the variability between contracts can still lead to issues that prolong or dismantle the acquisition process.

Currently, no tools, software, or frameworks exist for the purpose of streamlining this arduous process for acquisition personnel. Although training measures are in place to ensure acquisition personnel understand the basics of what responsibilities and tasks must be managed in order to successfully acquire a contract, hands-on-experience cannot be simulated. The limited tools available that facilitate communication, organization, and task orientation are unlinked and uncoordinated. This technical project explores the possibility filling in the crucial gaps between available technologies and providing assistance to acquisition personnel in ways that are currently unmet all in a manner that is user-friendly, socially encouraging, and innovative.

This technical project, known as ACQ-SYNC, is a framework for a mobile device and webapp software that would cater specifically to the needs of our client's acquisition personnel. The goal of ACQ-SYNC is to accelerate decision-making process of acquisition personnel by breaking down the tasks that are required of them and combining various communication and organization technologies into one framework that can be simultaneously interacted with by an acquisition team and other peers in the client's network. It will reimagine the acquisition experience for users by embracing the nonlinearity of the acquisition process and encouraging active communication, status updating, and peer mentoring among the client's personnel. Overall, ACQ-SYNC will accelerate the acquisition process, build confidence in company personnel, and create an environment of shared knowledge and collaboration for personnel.

STS Thesis

How can Charlottesville utilize smart-city strategies and innovations to develop an optimal transportation system for its citizens?

Literature Review

In the past five years, Charlottesville Area Transit (CAT) ridership has plummeted by roughly 25% from the 2.4 million passengers who used the system in 2014. By the end of Fiscal Year 2019, ridership is expected to report a drop of an additional 100,000 passengers, another 4.2% (“Bus service may require big changes,” 2019). In the past year alone CAT has altered and discontinued routes, reduced services, and have dealt with revenue discrepancies stemming from a fare collection system introduced in 2014 that has not performed as efficiently as expected (Bayne, 2014). As Charlottesville’s population increases in both residents and students at the University of Virginia, the potential for unique interactions and successful engagements between students, faculty, and organizations between UVA and the Charlottesville community continues to build as well. However, the potential for these types of engagements is limited by the lack of access students have to the community and vice versa. The University of Virginia has its own its own internal transit service. However, this University Transit Service (UTS) is mostly limited to transporting students around Grounds. This system starkly contrasts the university and city interactions between other colleges, such as Vanderbilt, where the university’s public transportation system is coordinated with that of the Nashville area (“Transportation Services,” n.d.). Despite the number of options available in Charlottesville, it is worth investigating whether there is truly any overlap in areas these transit modes service, or if there are gaps that limit that confine riders to specific parts of the Charlottesville area. With the aforementioned transportation issues in the city of Charlottesville in mind, it is worth investigating if Charlottesville’s transportation is up to par with other smart cities. How can the city of Charlottesville leverage its relationship and proximity to UVA and also utilize smart city tools and techniques in order to best build a transportation system that enables growth and opportunity in the city?

Framework

This study will heavily be reliant on the SCOT framework in order to first understand how the community’s needs should shape the potential implementation of any solution. The study will utilize the SCOT framework to analyze multiple aspects of community interaction with current transportation systems in the Charlottesville area. Additionally, this framework will be used to analyze the interactions that comparable communities have with unique solutions that might be beneficial to the Charlottesville area. Ultimately, the goal of using the SCOT framework is to facilitate a proper investigation into the problems occurring with the mobility of Charlottesville residents and lay the foundation for the development of a true bottom-up solution tailored for the community.

Methods

The study will be investigating trends in critical demographic information regarding wealth inequality, car ownership, and transportation mediums used by residents of Charlottesville. In 2017, 7.7% of Charlottesville commuters reported they utilized public transit as their main mode of transportation. This figure is surprisingly comparable to counties in Northern Virginia with higher population densities and closer proximity to dense urban centers, such as the District of Columbia (Hudson, 2017). It is evident that, as recently as 2017, Charlottesville residents were utilizing public transit as frequently as slightly larger municipalities. This study will investigate if these figures demonstrate any trends or fluctuation over the past decade and how that might correlate with the recent decline in CAT ridership. This study will also be examining household income and business trends by region in the Charlottesville area. An understanding of data trends in the aforementioned areas would could answer critical questions regarding the true state of individual mobility in the city of Charlottesville.

In addition to investigating transit data trends in Charlottesville, this study will also be analyzing how the University of Virginia's interactions with Charlottesville compare to similar University/City interactions from an accessibility standpoint. In speaking with leaders of various Contracted Independent Organizations (CIO) at UVA who often engage with the Charlottesville community, I gained a better idea of how students feel about their ability to engage with the Charlottesville community. Few of the students I spoke with spent a significant amount of time during their undergraduate careers away from Grounds. Many cited a lack of reliable accessibility to the Charlottesville area early on as a main reason why they never felt inclined to engage with the city more. Since first-year students are not permitted to have cars on Grounds, students are completely reliant on other modes of transportation to get around Grounds and Charlottesville. Once the habit of remaining entirely on Grounds is established, these students expressed how they felt less inclined to change even when they had their own vehicles following their first year. These students also expressed similar concerns with regards to CIOs they were a part of. With larger groups, coordinating community work or engagement is often difficult for UVA students, who often times find the crossover between using public transit at UVA and in the greater Charlottesville area unreliable and confusing. Further analysis of colleges and Universities with alternate transit setups, such as Vanderbilt, is also necessary to better understand if student interactions with the host city of their college/university are scarce nationally or if the issue is unique to UVA. By investigating Nashville city ridership, population car usage, and overall mobility, the study will have a baseline urban comparison to use as a reference to Charlottesville's transportation utilization.

Future Investigations

The last part of this study will focus on innovative methods, beyond the conventional means, to solve the aforementioned transit and mobility issues in Charlottesville. Following the conclusion of the primary studies mentioned in methods, this study will begin to analyze how to further utilize the SCOT framework to develop innovative solutions. These future investigations will be centered around multiple research and technology start-up case studies that look to improve transportation in Charlottesville and beyond. One potential case study for these further works is a current study at the University of Virginia that is investigating ways to utilize heterogeneous transportation systems under disruptive events. Many urban centers have static responses to disruptive events, such as construction, weather, and disaster. Homogenous methods of responding to disruptive events are extremely inefficient given the lack of real-time data utilized to act appropriately (Yuan et al., 2018). As Charlottesville progresses towards its smart city goals, especially with the expansion of the University of Virginia and constant construction in the city itself, it is reasonable to question whether CAT responses to disruptive events have been detrimental to the service itself.

Another potential case study focuses on how other smart cities in the United States utilize smart routing technologies to assist in guiding them to their destination. These smart routing technologies are widely available through apps like Google Maps and can perform basic routing operations such as avoiding heavy traffic. However, these smart routing technologies can also guide commuters to their destination by mapping out their path utilizing combinations of transit methods. Though, smart routing capabilities are not only limited to finding the shortest path. The broad spectrum of what smart routing technology could consider when guiding a user can include safety, special attractions, services, disruptions, social proximity to other destinations, familiarity with neighborhoods, and other factors (Hendawi et al., 2017). Given the concerns expressed by UVA students regarding how confusing transportation can be in Charlottesville, personalized routing could not only increase CAT ridership, but also encourage student interactions with the city of Charlottesville.

By utilizing case studies like those mentioned above, a new framework for smart and community-focused technologies could be developed to further benefit the Charlottesville community.

Appendix (Technical Topic Figures)

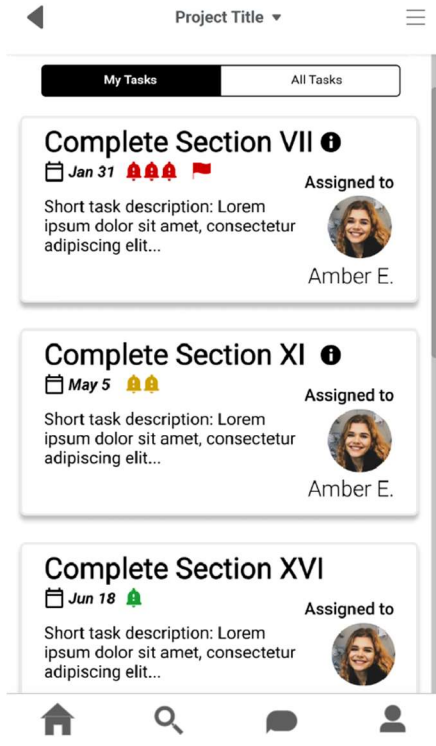


Figure 1: Display of task assignment screen for user of ACQ-SYNC.



Figure 2: Display of personalized user information display in game-like orientation.



Figure 3: Display of ACQ-SYNC feature which allows user to search for peers by skills and department.

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