The Current Woes of Charlottesville Bus Transit

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

The public transit scene in Charlottesville is currently unsatisfactory. The two main flaws with Charlottesville public transit is its poor system for tracking buses and its unappealing bus stops. Currently in Charlottesville, if a user wishes to know the current location of their bus, they would have to track it down by downloading a third party app. The issue with downloading a third part app is that Charlottesville currently has several buses, all which have their own apps for tracking. This causes a great inconvenience to a user, as many do not wish to spend several minutes on their phone determining whether or not taking a bus is time efficient. Also when choosing to take public transit, users are can be greeted with a minimalistic and aesthetically lacking bus stop. Therefore, many choose just to disregard using the bus, even when it would be a more safe solution, such as when commuting home late at night. Having to deal with a collection of these aspects creates transit scene which is unappealing to myself and many other users.

Within the past six years the overall amount of users of Charlottesville transit have sustainably diminished. After a steady downward trend of losing users, Charlottesville has reported that the current amount of Charlottesville area transit users has decreased by 25 percent since 2015(Charlottesville Area Transit). I believe that some important factors to this loss of users are the concerns with the current bus system I have pointed out.

On the other hand, a city which handles its bus stops and bus tracking system drastically better is San Francisco. Over the past summer, I was interning in San Francisco for three months without a car and interacted with its public transit scene very often. In this paper I will thoroughly highlight the problems in Charlottesville's bus transit scene and show how San Francisco has solved these problems. If Charlottesville were to follow in San Francisco's steps and improve the bus system, they can create a climate which is more attractive, convenient, and

prosperous for its users. The following section delves deeper into what scholars believe poor public transit can cause and how it can be improved.

Literature Review

Scholar Loukaitou-Sideris claims that aspects of poorly constructed bus stops lead to more likelihood of crime. She argues that bus stops with poor lighting, low visibility, and territorial symbols have higher crime rates. Bus stops which are near an escape route for potential criminals, such as alleys or parking lots also are more enabling for crime. Deterrents to stop crime at bus stops include being close proximity to surrounding establishments and police stations, adequate lighting, and devices installed at the stop (Loukaitou-Sideris, A. ,1998). .

In another literature "Crowding in Public Transport: A Review of Objective and Subjective Measures", Li and Hensher identify the two main factors of users using public transport being trip time reliability and crowding. Surveys have also shown that users say dealing with overcrowding on a daily basis "substantially impacts their quality of life"(Li, Hensher, 2012). By linking overcrowding on transit to stress, Li and Hensher portray how continuous dealing with crowding puts individuals in a cycle of dealing with stress and having their health be impacted negatively. The illustration of this cycle can be seen below.

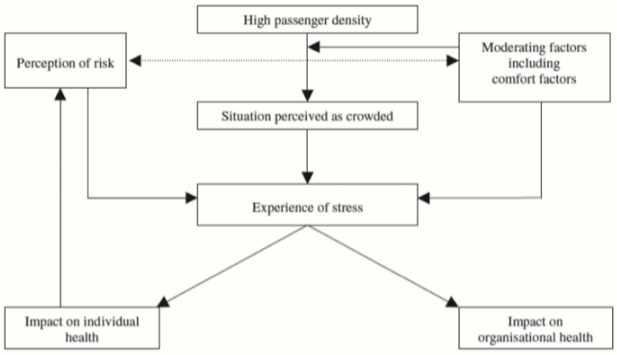

Figure 1: Model of crowding, stress, and health (Li, Hensher, 2012)

More recently, scholars have investigated the potential benefit of incorporating IoT solutions into bus shelters. Wachira and Karthik argue that new IoT devices implemented in bus stops provides a better experience for users as well as for businesses and public transport providers. By implementing displays, bus stops can relay information about local events or announcements to the commuter. By combining sensors and data analytics, a commuter can also receive real time updates on the traffic flow of their current commute. Other enhancements are using energy saving lights, screens, and heating systems for bus stops (Wachira, Karthik, 2016). If implemented in Charlottesville, these IoT enhancements could effectively mediate the two main issues presented before. With these enhancements, Charlottesville bus stops would not only be more attractive, but would also help users track their busses location without the need of their own device.

Scholars have shown that under developed public transit systems can lead to locations that are more likely to be a hotbed for crime and a transit scene which locks its users in a cycle of discomfort. Whereas "smart" investments in public transit have shown to be beneficial to not only transit users, but local businesses and transport providers (Wachira, Karthik, 2016). By dramatically molding its transit scene, Charlottesville can create a transit climate which its users enjoy, and are not bothered by relying on their local busses.

Actor Network Theory:

To discuss the relationship between different factors in the climate of Charlottesville public transit scene, I make use of the Actor Network Theory Framework. According to scholar Kathrin Cresswell, the actor in the Actor Network Theory is defined as a "source of an action regardless of its status as a human or non-human" (Cresswell, 2010). Through this theory, actors

all impact each other in a cycle. There is no actor which is an exception to this rule; including technology. Non-human actors such as technology and government policies are products of the interests of human actors and/or the environment which they are a part of. This environment could include actants such as geography and natural environments.

The Actor Network Theory states that social factors are created through a "sum of non-social phenomena"(Cresswell, 2010). Or in other words, social effects are created by a combination of a network of non-human factors. This thinking is used by the Actor Network Theory to find the root of these social effects, and how the actors which are a part of it work. If any of the existing actors where to change, or the actors were to be added or removed from the network, the Actor Network Theory "assumes that… the whole network would be affected… as social reality is assumed to be both complex and fluid" (Cresswell, 2010). Therefore Actor Network theory assumes at events have "many mediators". An example to help further understanding the Actor Network theory, in context to our subject, could be something as simple as realizing that the discomfort Charlottesville transit users feel is not completely due to one actor. It is due to collection of actors such as poor bus stops, inconvenient tracking systems, and routes buses take.

I make use of this theory to help understand the data I have already collected. Using the actor network theory, one could boil down the current state of the Charlottesville public transit scene to its actants/actors. Major actants in the Charlottesville Transit scene are the funding for Charlottesville transit, the walkability Charlottesville has, and an already barely adequate transit system in place. These actants are very influential as they all are factored in understanding the current state of Charlottesville transit. Though all actants mentioned are not completely negative, they lead to a transit system which is unattractive, yet adequate. If a Charlottesville resident has

no alternative way of commuting other than public transit, then they can rely on the public transit, even though it may be unattractive. Charlottesville also has good walkability, as if someone wanted to get somewhere without dealing with public transit, then walking would not be a dreadful idea. Finally, if Charlottesville also had a plethora of funding, then we would see more positive changes in the transit scene.

I believe those three actants are the most influential in this particular network because they are what I believe is hindering change in the Charlottesville public transit scene. Granted, the transit scene in Charlottesville is not horrendous, and that's why there is no real call for an uplift for it, yet if any of those three actants were to change into actants which help facilitate a transition to a better public transit system, Charlottesville would be much closer to taking action than it is currently.

San Francisco vs Charlottesville Bus System :

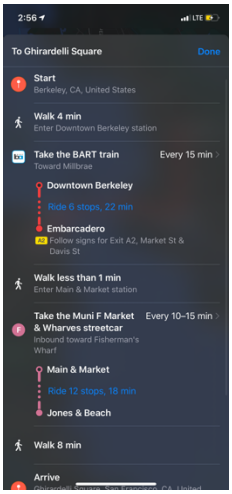

Figure 2: Sample Bay Area Itinerary

Figure 3: San Francisco Smart Bus Stop (Hi-tech San Francisco Bus Stops courtesy Solar Energy)

A city which has a successful "smart" transportation system is San Francisco. In San Francisco, inhabitants have the ability to use apple maps to create routes which take into account all three major transit systems (MUNI, BART, Caltrain) in order to create the most efficient route for the user, as shown in Fig. 2. Once at a stop, the user is then offered a plethora of options to trace transit such as displays and announcements. For example, in the off chance that a user does not have a phone, they could simply go to a bus stop in San Francisco, look at a map to see the line they would have to take, and press a button at the bus stop which tells the user the routes incoming buses are taking as well as their expected time of arrival. The bus stop which they wait at is also most likely one of the roughly 1100 "smart" bus stops implemented which are aesthetically pleasing, well lit, solar powered ,and installed with WIFI (Hi-tech San Francisco Bus Stops courtesy Solar Energy).

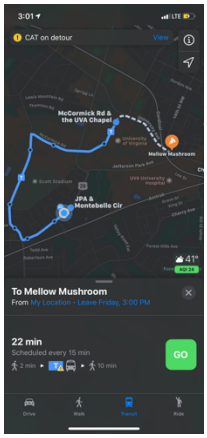

Figure 4: Apple Maps Disregarding the Rider buses for CAT

Now let's compare the convenience of San Francisco's bus tracking system to that of Charlottesville. If one wants to use a bus in Charlottesville, they would have to download and get accustom to two new apps to trace both bus systems (Rider and CAT). In comparison with San Francisco, where users can just use the default maps app on their phone to track transit, managing two apps on a daily basis can be exhausting. If one were to choose not to download any apps, they could still use apple maps to create a route which uses the CAT buses, but not ones which uses buses currently on Rider, as shown in Fig. 4. Either way, without either apps the only known alternative to tracking a bus is by reading a piece of paper at the bus stop which has the estimated time a bus should arrive, instead of giving real time estimated time of arrival.

Figure 5: UVa Bus stop during peak traffic hours

Figure 6: Downtown Charlottesville bus stop

Figure 7:Barracks Road bus stop

In comparison to the “smart” bus stops San Francisco has implemented, Charlottesville bus stops are unimpressive. Figures 5 through 7 above show photos of three bus stops located in the three most popular destinations in Charlottesville. Those destinations being Downtown, the UVa campus, and the shopping center at Barracks. The bus stops in the downtown and Barracks Road location are completely aesthetically lacking. Both bus stops are formed by just a singular sign on the side of the road. The bus stop at barracks, being one of the more popular bus stops I have seen in Charlottesville, has no benches for those waiting to use. The stops on the UVa and Barracks are also completely packed during peak traffic hours. Given a choice, it is not

unreasonably for users to stray away from bus transit if they would have to use one of these stops. This difference of bus stops and tracking systems allows one to understand how someone can be more open and willing to rely on public transit in San Francisco, instead of Charlottesville.

Discussion:

I argue that Charlottesville's diminishing number of transit users can be linked to these unaesthetic bus stops and poor bus tracking system. Thinking Charlottesville can completely remake its transit system to resemble San Francisco is unrealistic. This does not mean trying to mediating Charlottesville's transit system would be in vain. A great route Charlottesville can take to solving its problems is by introducing IoT devices into bus stops which tell the user when the next bus is coming. This device can simply be a LED screen which displays the route of the next bus coming and its current estimated time of arrival. This estimated time of arrival would be fetched by the bus through the same system Charlottesville currently has in place for CAT and Rider. This would allow potential transit users to decide whether they want to use a bus by just walking by a bus stop and glancing at a display. This would be in contrast to the current situation where Charlottesville users would stop walking and take around a minute on their phone to decide whether taking the bus would be worth it.

Right now many of my colleagues and I only use public transit in the off chances that we must due to situations such as weather or late nights, and/or just conveniently running into a bus which is on a useful route. If Charlottesville were to make this addition of LED displays with the ETA of its buses to its bus stops, along with any others potential viable solutions, Charlottesville would move toward a creating a public transit scene which users comfortably utilize in their

everyday lives, in contrast to the one which users only use in situations of extreme dependence and/or luck.

Conclusion:

Throughout the research, I have presented how the current public transit scene in Charlottesville is lacking. I have also presented how scholars promote IoT enhancements for transit, link underdeveloped bus stops to crime, and delve into the relationship between poor transit experiences and stress. With disappointing bus stops and a messy format of tracking buses, users of public transit in Charlottesville use public transit as something they use when they must, or when the stars align and the correct bus randomly appears in front of them. They are deprived of a transit experience which promotes convivence and ease, and are left with one that just gets the job done. For Charlottesville to make a transit system which promotes the well-being of its inhabitants in every way, they must address their mediocre public transit system.

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