Alight: Enriching Bus Rides with User-generated, Location-based Audio Content
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Submitted to the Department of Urban Studies and Planning
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ALIGHT

Enriching bus rides with user-generated, location-based audio content

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ABSTRACT:
The advent of mobile data, social networks, and sharing economies have disrupted the way we experience place. Whereas many projects of placemaking have focused on a top-down, centralized discourse of landmark-making, I propose that the digital tools available to city planners, urban travelers, and business people allow for a decentralized digital space in which placemaking can rapidly occur.

In this maker-thesis, I have built a mobile app, Alight, which delivers location-specific audio narration to riders of the MBTA’s public bus system. Assembling a team and working iteratively over the course of six months, I have documented how the product was developed and the user responses to elucidate the practice of distributed, digital place-making. Analyzing the responses from these users, I show that using Alight to enhance the experience of a bus ride reveals strong parallels to physical placemaking of event-places.

The Alight app demonstrates important new directions for the practice of urban placemaking. It illustrates how digital tools have become so accessible that planners and designers would be remiss to not begin to leverage the influence they have. The low marginal cost of implementation also provides a new platform through which economic development can happen along transit lines in areas between transit nodes that are not typically frequented. The app’s user-generated content functionality also provides a platform for often underrepresented voices to share their stories of place, history, and community with riders of transit.

This maker-thesis should always be read and used with the app in-hand. This written document only represents half of the output of an ongoing project that will continue to grow. The app can be downloaded on the Google Play Store.

Thesis Advisor: Dennis Frenchman
Title: Leventhal Professor of Urban Design and Planning at MIT
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Although I typed this thing out, the motivation, merits, and making of this thesis was truly a group creation. The following individuals are awesome for the following reasons:

- **Candy** – The world’s best co-founder who brings energy, passion, and people to make ideas happen.
- **Scott** – For jumping on bus, train, and boat to create the first stories for Alight.
- **Andrew** – For the patience and resourcefulness to turn Alight into an app that (almost) anyone can use.
- **Professor Dennis Frenchman** – For ALWAYS opening the door to making a thesis, not just writing one.

In addition, there are several people who have been critical to my MIT journey of entrepreneurship, studies, and living the good life: the DesignX crew for the space and time to make Alight; the Legatum Center for Entrepreneurship team for investing in me and my ideas; my thesis readers and users who gave comments when needed; Brook for sleeping when you do and smiling when you’re not; my parents Ed and Kathleen for being the best grandparents in the world!
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As will be clear throughout this document, this maker-thesis is can only be read in conjunction with the mobile app itself. The app may be downloaded at [www.alightapp.com/thesis.apk](http://www.alightapp.com/thesis.apk) (Android only) or you can find it on the Google Play store. These screenshots of the app will help to orient the reader-user:

**JOIN**

Users keep track of their history and connect with each other.

**FIND**

Search for buses that fit your schedule, interests, and location.

**BOARD**

Easily arrive at the station and know exactly how much to pay.

**DISCOVER**

Listen to a stream of content about the places you pass.

**SHARE**

Record your own stories and add them back to the bus route.
Point-of-Interest Title
Titles are set by the content author. Authors started out as the Alight team, but the tool has now been open to anyone who wants to make a route for the MBTA.

POI Image
Every POI audio clip is accompanied with an image. This image can be swiped left to skip to the next POI and right to go back to previous POI.

“Flag” Inappropriate
As a first step towards curating the user-generated content, users can flag inappropriate content as “Poor Image,” “Inappropriate Content,” “Mislocated Content,” or “Poor Audio.”

Settings
In the “Settings” drawer users can choose Language, Content Theme, Create Content, Take Survey, Help, and Sign Out.

Map View
Users can click this to see a map indicating the location of the POI, the user, and the bus route.

“Like”
Users can “like” content which gets recorded in their user profile and content database. In the future, this can be used to create optimized tours for individual users.

Play/Pause
Each POI is narrated with an 30-sec maximum audio clip.
1) The Audio Story:
Record a 10-20 second story about what they do. As Alight’s bus riders approach the business on their audio tour, they will hear the spotlighted story. Sample audio at: www.alightapp.com/flour.mp3

The “Alight” button flashes only for Spotlighted Businesses. Tapping it flips the photo around to provide more info (screen 2).

2) The Photo:
The best photos for a Business Spotlight:
- VERTICAL ORIENTATION
- Well-lit and feature a person or activity in the location

3) Offer or more info.
This could be text or an image that the Spotlighted Business wants to share with the user.
CHAPTER 1: INTRODUCTION TO ALIGHT

What makes a city iconic?

We think of New York’s Statue of Liberty, Paris’ Eiffel Tower, or Beijing’s Forbidden City. These landmarks anchor the imaginations of visitors, and yet, they do little to communicate the lived daily experience of the people who make up the world’s urban centers. Since the 1960s, planners and urbanists have sought to re-orient the representation of the city from being concentrated in a few monolithic, iconic landmarks to being distributed across heterogenous, shared efforts of placemaking. Urban designer Jan Gehl concisely summarizes this shift in mental model, “First life, then spaces, then buildings – the other way never works” (Gehl 2010). With this lens, cities’ iconism becomes constituted with the dialectic fabric weaving together for example, New York’s vibrant small businesses and Fortune 100 companies; the friction and harmonies between the diverse neighborhoods of Paris; and the shifts of time and space nestled in Beijing’s ancient hutong alleyways confronted with rising towers. The placemaking of cities has become a project of the many people, weaving together their experiences and activities.

Fundamental shifts in technology play an important role in city placemaking. New technology enables multitudes of people to re-present their city to each other and the world. Rather than a small number of people penning a blueprint, clearing a site, erecting the frame, mixing the concrete, and constructing a structure to represent and define place, mobile digital technology allows nearly all individuals to affect our sensory understanding of place. The low-cost of producing and disseminating digital representations of place provides the opportunity for nearly everyone to participate in the making of place. This maker-thesis explores one avenue by which digital technology might allow for participatory placemaking through producing a mobile app that allows users to populate public transit routes with location-specific audio content that can then be delivered to future riders as they pass by on transit.

In this introductory chapter, I outline how I intend for this “maker-thesis” to make a meaningful contribution to the thinking about (and acting on) placemaking in cities. To do this, I first identify a specific, immediate, and actionable problem in placemaking from the point of view from the tourism industry. This focus on tourism does not confine the application of this thesis to that industry, rather the tourism industry serves as an accessible example to understand the fundamental mental shift that placemaking strategies require. After identifying this problem in placemaking, I propose a novel method of addressing this problem by making a potential solution and define the scope of a “maker-thesis” through a driving design prompt. I then locate the components of this design prompt in the bodies of existing arts and literature to demonstrate how the tool I have created could help advance discourse in these fields. Lastly, I describe how a “maker-thesis” is both similar and different from the traditional social-science thesis with a special acknowledgement that “reading” of this thesis should be considered incomplete with experiencing the product that was created for it.¹

¹ Access the Alight mobile app to accompany this document at either: https://play.google.com/store/apps/details?id=com.andrewtakao.alight.
THE PROBLEM: AN OLD KIND OF TOURISM VS. NEW KIND OF TRAVELER

Global tourism is a $1,627 billion industry that grew 5.1% between 2015 and 2016 (IBISWorld 2016). The majority of these dollars are spent in the departure and destination cities around the world. This quickly growing industry represents an opportunity for cities looking for not only as a powerful economic development lever but also the ability to facilitate the cultural, intellectual, and ideological agglomeration needed in an increasingly transnational world. The tourism industry reflects one vector that guides the flows across a variety of ideoscapes, financescapes, technoscapes, ethnoscapes, and mediascapes (Appadurai, 1996). From this perspective, a city has a vested interest in how travelers perceive and engage with it. The often debated “Bilboa effect” (a theory that the investment to build the Guggenheim Modern Art Museum in the city ended up saving the city from economic distress from tourism and cultural cache) is evidence of how the entire world pays attention to how these flows of ideas, finance, technology, people, and media can be concentrated (Moore, 2017; Jacob, 2012). Regardless of whether one believes the Guggenheim saved Bilbao, the discussion around this phenomenon reflects the transnational network in which urbanists now compare cities thousands of miles away from each other.

Traditionally, this has meant providing visitors with a limited and authoritative list of landmark sites and activities to participate in single and defining experience of that city. This funneled tourists’ dollars and interactions into a very narrow part of the city often confined to iconic landmarks, entertainment districts, “tourist traps,” and hotels. Often guidebooks like Lonely Planet or Foder’s attempted to introduce new points-of-interest, but ultimately ended up simply slightly redirecting the tourist traps direction. However, with the introduction of disruptive mobile and digital technologies to navigate and reside in cities, urban designers, entrepreneurs, and local government can move beyond the traditional methods of receiving travelers to their cities.

Today’s traveler seeks to be independent, creative, and courageous in his/her travels. For example, my research of the younger generation of Chinese (“Post-90’s 90 后”) are not only travelling much more, but they have different aspirations for their travels (Wang, 2014). Disruptive services and technologies such as Airbnb, Uber, WeChat, global data networks have empowered the young Chinese consumer to take more control of their domestic and international travel (Kim, Lee, Shin, & Yang, 2017). They express hope for travel that allows them to actively exercise their tech-enabled ability to navigate the world. This post-modern sentiment towards travel is shared with young travelers from many developed nations and is often alluded to with terms such as “backpacking,” “WWOOFing,” “budget travel,” or “gap year” (Cohen, 2008). They desire that their choices expose them to unique experiences that they can grow from, document, and share. Young people travel the world not to arrive at a destination, but to discover the destination and share it instantaneously across their digital social network. This consumer segment is often referred to as “fully independent traveler” (FIT) and has quantitative surveys estimate the segment’s market worth is growing 47% between 2013 and 2020 (Mohn, 2014). Rather

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2 WWOOF refers to World Wide Opportunities in Organic Farming. It is an organization that lists organic farms around the world which will provide free room and board in exchange for labor. It has become very popular way for millennials to travel the world and make intimate connections.
than shell out big bucks for comfy hotels, cushy dining experiences, and crowded tourist traps, young
generations aspire for a tool to satisfy their aspirations for independent travel. This marks an
opportunity for travel that is seeks city experience grown from disparate placemaking activities rather
than landmark tourist traps.

The orthodox approach to provide tourists with passive, pre-planned sightseeing is aging. The Baby Boomer generation had the expendable income to pay for vacations and travel. They could pay travel agents to plan trips across a big and unknown world, and the trust they had in those “experts” would alleviate the stresses of travel (Uriely, 2002). This became a huge market as savvy business people realized these travelers’ desire for certainty and (somewhat ironically) familiarity increased their willingness to pay for services that locals would find too expensive. This turned into what we now call “tourist traps.” Travel books and websites like Lonely Planet, Fodors, and TripAdvisor.com gave its readers a little more agency to choose their route, but they simply created a different “expert” path of travel.³ This infrastructure of tourist buses, restaurants, retail, and landmarks created a comfortable and predictable journey that met the needs of a previous consumers, but it is currently failing to provide the independence and discovery that today’s consumers seek. The increasingly heterogeneous motivations for tourism (Uriely, 2002) results in ever-shifting “consumer segments” (see Figure 1) that would be better served by the heterogeneous nature of placemaking. This discrepancy between new consumer preferences and current urban tourism offerings reveals the possibility for fundamental innovation in urban placemaking for tourism. By identifying one specific traditional tourist service, this thesis aims to demonstrate how it might be re-envisioned through participatory placemaking and digital technology.

Today, most major cities have tour buses or trolleys that corral tourists through the urban environment showing them the places they “can’t leave without seeing” (Figure 2). These buses are the epitome of landmark-centric tourism as chatty tour guide-drivers efficiently shuttle visitors between “can’t miss”

³ I once was travelling in far-West China in a Muslim province called Xinjiang. Using my Lonely Planet guide, I navigated my way through the mountains to a small group of yurts close to the Pakistani border to spend the night. I felt accomplished, unique, and adventurous, until a few hours later a hired car showed up with similar travelers toting Lonely Planets. I continued on my way through the Taklimakan Desert to Turpan, checked into a youth hostel, and found my roommates were the exact same people I had met in the remote mountains near Pakistan thousands of kilometers away.
points-of-interest skipping over many of the local businesses and neighborhoods in between. These tours cost around $40 and usually have just 1 route (www.historictours.com, 2017). However, these tours meet neither the price point nor the desire for independent discovery of the growing number of young travelers. They provide a form of mobility that hides most placemaking efforts made by a city’s businesses, communities, and people. In other words, a tourist visiting Boston in 2017 could very well have the same experience as a tourist in 1987 despite the temporal, spatial, and societal changes.

A placemaking-based strategy to tourism would challenge this notion of tourist mobility when visiting a city. The digital and networked technologies mentioned in the previous section have disrupted what tourists expect from their mobility solutions. Rather than being efficiently shuttled through static, homogenous places, today’s traveler expects difference, uniqueness, and the unexpected that come through placemaking. How might we harness these digital tools and participatory placemaking to provide this value?

This focus on the tourism industry helps to illustrate the need for strategies to use participatory placemaking to craft the images and imagination of our cities. This does not constrain this need to the tourism industry, however. Local residents, businesses, government, and other actors all may participate as both the creators and consumers of a city’s places. The heterogenous and evolving nature of placemaking demands that we are all simultaneously visitors and residents of the urban places that constitute a city.

**DESIGN PROMPT AND MOTIVATION**

Today, young travelers are discovering a new city by jumping on a public bus and riding it to the end (TripAdvisor, 2017), while the scale of this behavior is not clear, it’s appearance in chat boards is worth investigating. This provides a far more dynamic experience of urban exploration and place. For less than $2, these tourists and travelers get to see a large tract of a city that usually includes some famous sites, some residential, and some local commerce. They get a front-row seat to gaze at the city and see things that make their experience truly unique from travelers before them. This practice better meets their needs as a traveler, but there are still unmet needs:

<table>
<thead>
<tr>
<th>New Traveler Needs</th>
<th>Traditional Sightseeing Bus ($1.1 billion market in USA)</th>
<th>Public Bus Sightseeing</th>
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<tr>
<td>Low cost?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Explorative?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Unique?</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

4 Public bus routes tend to string together these three elements due to the economic advantages of bringing employees from their homes to work and to their shopping needs.
Informative? ✓

From this new and increasingly popular consumer behavior, I propose a highly-scalable, deeply-impactful placemaking business opportunity.

Public buses are often criticized for having empty seats for much of the day (whether this criticism is warranted is another discussion) which represents capacity that could be used, and public transit ridership has begun to fall with falling oil prices and rider sharing (Siddiqui, 2018). Public buses create a web across the city, and during the day provide many “front-row” seats that would allow travelers to truly “escape” the tourist trap and discover aspects of the city’s retail, cuisine, people, environment, and culture. Much like sightseeing buses, they offer seated street-level views of the city. And, most importantly, these buses offer a free and existing physical infrastructure for tourism that can be enhanced with digital content.

Taking advantage of this opportunity, this maker-thesis has created a platform, Alight, for delivering GPS-tagged audio, visual, and spatial content that has the potential to disrupt how cities are toured. A traveler will be able to download content specific to a city’s public bus routes. He/she can download the content over WiFi at his/her hotel, board the bus, turn on the phone’s GPS, and listen to stories and explanations of everything he/she is seeing. The GPS data (which is independent from mobile networks so international travelers can use it) will trigger content to be played/displayed that is directly relevant to the user’s location. The key to this app’s initial success will be its ability to create engrossing content that enhances users’ experience of the public bus. Most importantly, as a placemaking tool users will not only be able to consume this content along the route, they can also become content creators themselves as they deepen their exploration of the bus route.

Content-creation is crowdsourced so that a pluralistic form of place-making can occur. Rather than having a single narrator explain the authoritative points-of-interest one passes on the bus, the user hears from multiple voices who are other local and non-local Alight users. The result is a mosaic of voices that provide a very democratic representation of place. From a product adoption and implementation perspective, this also allows for rapid expansion of the platform throughout the world’s cities’ bus systems. The user experience must balance between passive consumption of content and encouraging users to find and contribute their own content. Today’s travelers hope to discover new people, ideas, experiences, foods, products, and places in their travels, and they should be encouraged to do this on the bus. Content provided on a bus-route should make them confident about when they want to disembark, explore, and then add their own content. At the same time, some users will want to kickback and listen to a “podcast” of what they’re seeing, and they should be able to rate the quality of the content to meet their hopes. This is a tricky balance to strike, but platforms like Youtube, reddit, and Quora have demonstrated that users are very willing to both create high-quality content and sift through content to up-vote the best stuff for the benefit of future users.

To fully explore this idea, this maker-thesis start aims to not only realize the above idea with the production of a mobile app and bus-route-specific content, it also iteratively tests the product with potential users to gauge its effect on placemaking and experience of the bus. In other words, my thesis will focus on responding to the following prompt:
How might geo-tagged, digital audio content be created and employed to shape and enrich visitors experience of an urban bus trip?

Engaging with this prompt necessitated the implementation of the above-described mobile phone app. Using this app as a vehicle for design research and testing, I have developed a conceptual method and tool for how digital audio content can be part of placemaking experiences.

LITERATURE REVIEW AND REVIEW OF PRIOR ARTS

Before approaching the design of this mobile phone app, I have oriented this idea across several bodies of academic literature. True to MIT’s cross-disciplinary ethos (and my own City Planning – Business Administration dual degree), I have located this design thesis at the overlapping of three areas of study:

Understanding my maker-thesis from these three lenses, I have conducted an extensive review of relevant literature and studies as well as a comparison to prior arts. The review reveals that the development of this app will make contributions to current discourses in each discipline. (For the purpose of brevity, I have summarized the core discussions across these disciplines and have included the full bibliography at the end of this proposal.)

URBAN STUDIES

I have categorized books and articles related to the design of urban spaces for visitors’ experience and understanding of a city. While not exhaustive of every possible direction in this subject, these studies employ tools from sociology, anthropology, design, and economic development to provide insight into the thesis prompt.
BOTTOM-UP PLACEMAKING STRATEGIES: HOW ARE PLACES CREATED BY THOSE WHO OCCUPY THEM?

A great number of authors discuss how an urban space can be imbued with a sense of specific place with different media interventions (De Certeau, 1984; Lefebvre 1991). For the purposes of this thesis, the primary driver is to understand how urban spaces along a city bus route (especially those that are not yet considered “places” to visitors) might become of interest and develop their own identity. Because I seek to develop a mobile app that not only enhances the experience of a bus route with audio content but ultimately the content will be generated by the user, I have sought out literature that demonstrates how placemaking can happen “organically” or from the bottom-up. A large body of literature has been written on how places have been developed from the top-down with large monuments, museums, or even the changing of a place’s name. These pieces generally point to the national- or municipal-level economic and political drivers that necessitate the perpetuation of a dominant narrative to reinforce existing agendas and thus attracts tourists (MacCannell, 1976). However, a growing body of research identifying places that have grown from uncoordinated community actions. Trevor Sofield et al’s (2017) sociological research of five villages in Tasmania helps to illustrate how communities are able to take creative ownership over their histories to develop consumption-based and experience-based offerings for visiting travelers. Sofield et al call this “folkloric” placemaking. Hou and Rios (2003) also point to how communities can initiate their own placemaking strategies by developing social networks that help frame and eventually institutionalize placemaking activities that can then be commoditized in tourist markets. A common narrative in placemaking literature serves to illustrate how communities’ artists are critical in articulating an identity for a community if the community has the existing practices and/or institutions to come to agreement over the art (Goldberg-Miller, Shoshanah, Heimlich, 2017). In summary, a large body of current social science literature employs qualitative theories (social capital, cultural framing, social mobilization) of placemaking to demonstrate how occupants of an urban space can take agency over creating the “place” using a variety of tactics.

For the purposes of this maker project, I will be designing an app that will allow the production of user-generated content. Ideally, this content will be authored by the individuals located in the communities that buses travel through. This represents the use of networked mobile technology to facilitate the production and agreement over place identity. Most of the existing literature focuses social structures and institutions as the vehicles that facilitate bottom-up placemaking, and thus my thesis offers a new contribution about the capacity of digital audio content produced on a digital platform to nurture organic practices of placemaking.
DIGITAL MEDIA’S AUGMENTATION OF PLACE

Similarly, more and more attention has been paid to how digital media might deepen and/or enhance the experience of an urban experience for tourists. The rapid adoption of mobile smartphones has led to widespread academic speculation and investigation of how visitors to a city might gain an “augmented” experience of place. Most of this research revolves around textual and photographic content mediums being triggered (or unlocked) through visual queues (QR codes) or location information. Yang and Hsu’s (2016) work developing a geo-coded content service for the exploration of a historical sites in Taipei. Similar to this thesis, their app served users with spatially-specific content to evaluate how the visitor-users experience of the place improved. Their findings demonstrated the spatial and temporal relevance of content improved visitors experience and their ability to navigate the area.

Additionally, there are several qualitative projects that have experimented with using overlaid photos (augmented reality) to give visitors a sense of the historical significance of place. Others use social media to leave a sense of community-developed place. These projects have all been enabled by increases in connectivity, processing power, and hardware accessibility and have transformed how tourists experience place.

Digital media spans most of the senses, but the use of audio content to augment an experience of an urban space is mostly absent. Most projects thus far lean towards audio arts installations that become part of an urban environment rather a user-carried audio augmentation of a space’s relationship to its social uses. Lacey briefly discusses how “an installation must consider those businesses and residents who are close by the installation” (Lacey, 2016) but the analysis focuses more on the artistic implications of the environment than how businesses or social relationships might change. This bodes well for the uniqueness of this app’s development and its potential offerings for user-audio-mediated placemaking.

With this context in mind, this maker-thesis envisions a lofty goal of populating all bus-routes with audio-visual content that rapidly updates for tourists and ultimately all riders to consumer, react to, and the produce their own. This suggests an ongoing interactive approach to the media-based approach that allows for dialectic and fluid production of place.

THE PUBLIC BUS AS BOTH CULTURAL AND MOBILE EXPERIENCE

As this app will be built around an experience on a public city bus, we must also understand how the bus is its own place containing its own ability to influence experience and understanding. The city bus itself has played a strong role in several social narratives throughout history. In the 1960’s the bus became a site for civil rights debates about race in the United States. In the 1980’s, the bus became a symbol of class stratification, a vehicle anathema to middleclass aspirations. Today, the city bus is often associated...
with its potential to support environmentally sustainable mobility. The city bus has the capacity to be imbued with cultural meanings and to be a tool for social reorganization.

For the purposes of this thesis, I have found a vein of literature that evaluates the bus’s ability to “span boundaries” so that the rider can experience environments in ways that allow for re-conceptualizing one’s understanding of a place (Lumsdon, 2006) (Romero, 2015). As a passive rider with a direct view of the streetscape, the city bus offers a unique perspective of the urban places. The bus route often traverses a diversity of commercial and residential areas that allow for the passive visual consumption of the city. However, in some articles (Romero, 2015), the addition of content (in this case with a guide) helped to transform the passive visual content consumption into an engaged disposition towards the places being observed. This has clear implications for the format of the proposed app to push bus riders towards active observation of the urban environment they are travelling through. User experience, content length, and display format should focus on stimulating questions and mental exploration of visual observations rather than passive consumption of them.

TOURISM’S EFFECTS ON URBAN DEVELOPMENT

Lastly, tourism has a great potential to increase the spending in a city. Visiting consumers have a higher willingness to pay for experiences and products, yet these tourists are often funneled through existing points-of-interest (POI). Thus, the tourist dollar is not disseminated across a city for equitable economic development (Alhosani, 2014; Rogerson, 2016). An informational interview with Sidewalk Labs’ Head of City Operations, Shaina Doar, (previously Chief of Staff for Rahm Emmanuel’s Economic Council) offered that the most value that of the proposed thesis project would be to democratize the competition for the tourist dollar (Doar, 2017). She offered that most American major cities are looking for ways to encourage tourists to visit “the neighborhoods” that usually don’t make it on the top POI lists. Additionally, several cities’ chambers of commerce are actively marketing new districts in order to attract tourist dollars (Boston Chamber of Commerce, Chicago Chamber of Commerce, San Francisco Chamber of Commerce).

BUSINESS

From a business perspective, the development of the proposed app touches upon several current strains of literature and discussion. To evaluate the viability of this app amongst users it is critical to understand the drivers and obstacles that it be interacting with.

DIGITAL ECONOMY ENTREPRENEURSHIP

The proposed exploration of GPS-enabled audio content via mobile phone falls directly within the popular discourse of the qualities and drawbacks of a digital economy. The rise of the digital economy is characterized by several factors. Digital products and services are aided by: 1) Near-zero marginal production costs facilitate rapid scaling; 2) Networked resources allow for rapid iteration and improvements (often sourced from “the crowd”) to existing products; and 3) Increased processing power can allow for the analysis of “big data” for increased insights into consumer experience and willingness to pay (McAfee and Brynjolfsson, 2017). At the same time, the digital economy presents some challenges: 1) Low-barrier to entry due to low marginal costs can create high competition; 2) The
“network effect” in which increased users leads to increased user value can make the existence of multiple digital service/product providers irrelevant; and 3) The co-opting of digital media’s explosiveness can present viral spreading of untrue content that threatens social well-being.

These strains of thought help prepare my own steps to build the proposed app for the adoption in a larger market place. While this thesis will focus primarily on the development and testing of mobile audio content in Boston with a small number of users, the design of this application caters to its digital strengths for rapid scaling while accounting for the importance of achieving a critical mass to take advantage of the network effects. Additionally, this review of the current streams of discourse in business will help me to position this app for future investment and marketing.

**SHIFTS IN THE SIGHTSEEING TOURISM INDUSTRY**

One of the fundamental assumptions of this these is that tourists’ aspirations for travel in urban places has fundamentally changed from a paradigm of travel between established points of interest to a paradigm of empowered discovery of interesting places. My review of market research on tourist behaviors supports this assumption. “Lifestyle mobility” has been coined as a term to describe a shift from production mobility and consumption mobility (Xu and Wu, 2016). This term summarizes repeated observations of generally younger travelers being driven not by the need to find work, nor the consumption of distant products, but rather by the hope for transformational experiences (Cohen, 2015). These experiences are typified as discovery, exploration, and/or creation while travelling.

This qualitative trend has been further backed up by quantitative consumer research that is tied to mobile media adoption. Kim, Lee, and Young find that 49% of Chinese tourists turn to social media to find more relevant information about their travel plans. Additionally, they find that 53% of these travelers book their travel plans through mobile devices. (These findings are further corroborated in the user testing with Chinese tourists for this app.) These findings combined with statistics that show solo travel and non-traditional services like Airbnb are rising help elucidate a growing trend towards travel that is not anchored in stringing together travel between existing POI. Rather, it shows that impromptu and whimsical travel helps consumers meet their need for identity crafting and unique challenges during their travel.

**TECHNOLOGY**

The final discipline that must be considered is the area that will help to realize the development of the proposed app. While urban studies establish the normative realm in which the app’s offerings can be interpreted and transform, and business helps to create a roadmap for the viability of such an offering, my review of relevant technologies and the challenges they face will help to understand the technical feasibility of what I propose and ultimately seek to make as a final deliverable for this these. I have not been trained as an engineer nor a computer scientist, yet my experience at MIT has exposed me to these fields and often helped me understand the level of detail and depth needed to develop a product that can be impactful and efficient. The last two years at MIT have exposed me to enough programming, hardware fabrication, and other production-oriented technologies to feel optimistic about my ability to develop this app with the aid of the resources at the Institute. With this in mind, my review of the
current relevant literature has revealed two challenging problems that I will sooner or later be faced with.

THE “TOURIST TRIP DESIGN PROBLEM”

One of the most pertinent bodies of literature is one of computation. Currently a great deal of literature has been written about the “Tourist Trip Design Problem” (TTDP) which is posed as a method to algorithmically plan an efficient and enjoyable day(s) for a tourist visiting a city. The problem is surprisingly difficult given the number of variables (time, weather, routes, season, etc) and the possibility for the tourist’s whimsical decisions (interests, demographic, consumption power, etc) (Meehan et al, 2016). There are several variations to this problem that employ different strategies to solve the problem computationally. However, all of the approaches I have reviewed have framed the problem as navigating between anchored points of interest with an optimization goal of minimizing time and cost while maximizing some form of utility. This approach is well-suited for regressions or machine-learning computation, but it does not encapsulate what I propose with thesis.

For this thesis, I understand the problem not as an optimization of existing POI but rather as a statistical problem of discovering undocumented POI. By limiting variability by orienting around existing city bus routes, I seek to find a method to increase the likelihood that a visitor will find a place in which to engage and explore. Audio-content will act as a prompt to gauge users’ interests, and a recommender system will evolve based on the user’s actions to identify which areas can be best served to create more content and create a POI.

REVIEW OF PRIOR ARTS

Lastly, I have conducted an expansive search for existing products that are similar to Alight. To date, I have not found anything that exactly replicates a city-bus-based mobile audio tour. However, there have been many similar products such as GPS-enabled audio walking tours, short-form audio production apps, and mobile recommender systems. I list these products and projects here and then categorize them in the following summary:

<table>
<thead>
<tr>
<th><strong>Detour (Mason, 2015)</strong></th>
<th>City walking tours on your phone that are narrated and well-produced. The app is a paid app in which each tour costs a fee. The app is also exploring options with user-generated content using text-to-speech and AR technology.</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Name</td>
<td>Description</td>
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<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td><strong>Ense (Magdon-Ismail, 2017)</strong>- Social media for audio. Ense aspires to be the “Twitter” of audio content in which users can post audio and interact with each other.</td>
<td></td>
</tr>
<tr>
<td><strong>Anchor (Mignano, 2015)</strong>- Short-form audio content app that plays like a radio that you can swipe through. It provides short (15-60 seconds) audio content that can be categorized. It also provides the ability for individual users to create their own radio station.</td>
<td></td>
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<tr>
<td><strong>Soundcloud (Ljung, 2016)</strong>- An online audio platform from 2007 launched its own app in 2016. Their mission is to “unite the web” by hosting all kinds of audio. They have become well known as a host for aspiring musicians.</td>
<td></td>
</tr>
<tr>
<td><strong>VoiceMap (Manley, 2014)</strong>- A walking tour app in which individuals can make their own tours and choose whether or not to charge.</td>
<td></td>
</tr>
<tr>
<td><strong>UbiquiTO (Amendola 2004)</strong>- “as a “journey companion” for mobile users in Turin, aimed, for the current prototype, at supporting mobile workers helping them to organize their late afternoon and evening in town.”</td>
<td></td>
</tr>
<tr>
<td><strong>GUIDE (Cheverst, 2000)</strong>- This represents one of the earliest attempts to implement “context-aware applications [that] utilise contextual information, such as location, display medium and user profile, in order to provide tailored functionality.”</td>
<td></td>
</tr>
<tr>
<td><strong>CATIS (context-aware tourist information system) (Pashtan, 2003)</strong>- This Northwestern University paper identifies some of the key dimensions to consider in delivering location-specific content: “The elements of context in our work are location, time of day, speed, direction of travel, personal preferences, and device type.”</td>
<td></td>
</tr>
</tbody>
</table>
**COMPASS (van Setten, 2004)**- An excellent, in-depth explanation of the development of tourist recommendation architecture with analysis of the tourist user experiences.

**I’m Feeling Loco (Savage, 2011)**- Mining a user’s social media profile, Savage’s application creates POI recommendations that could fit his/her interests but the author recognizes the limitations of understanding the user’s location and mode of transport.

**Roundware (Burgund, 2008)**- Augmenting the environment with audio. This focuses on museum exhibitions and very location specific applications using their API. Users can explore the sounds of an exhibition and also add their own voices to the “sound-scape.”

Additional TTDP-related apps include the following, but I was not able to locate them as they have either been removed from the internet or app stores:

- Mycitymate (MyCityMate, 2012)
- DailyTRIP (Gavalas, 2012)
- CRUMPET (Poslad, 2001)
- Deep Map (Malaka and Zipf, 2000)
- GeoWhiz (Horozov, 2006)
In summary a review of these prior arts reveals two essential technical challenges help to define the challenge addressed by Alight and other tour apps:

- MacauMap (Biuk-Agahai, 2008)
- Magitti (Bellotti, 2008)

**THE MAKER THESIS: PROJECT DESIGN AND METHODS**

Unlike the traditional social science research theses, this maker-thesis will be oriented around the development, testing, and eventual launch of a viable product. In this sense, the success of this thesis should be determined by its ability to materially respond to the design prompt by demonstrating the possibility for creating geo-tagged audio content for consumption on city buses and its potential for immediate use. The thesis should make a meaningful contribution to the above literature as a potential “data point” to be considered by those researchers, but it does not portend to be an extensive and theoretical academic argument. The development of the Alight app will address the conceptual issues addressed in the design prompt, but the overall success of the thesis project should take into consideration the holistic performance of the app as a usable, enjoyable product. For the reader, this means this document should be considered incomplete with the use of the prototype app that has been iteratively developed over the course of two semesters.

This means I will also be responsible for aspects of the apps develop beyond the scope of the design prompt including: business planning, fundraising, talent recruitment, project management, technological innovation, market research, and entrepreneurship. Thus, it is necessary to clearly demarcate the issues and actions specific to this maker thesis against the other responsibilities of developing an app and launching a startup. The below figure helps illustrate the demarcation in which
the core conceptual driving prompt provides the impetus for the design and production of an app which in turn necessitates the operationalization of human and financial capital:

For the purposes of the thesis, the creation of this app will result in the experience “data gathering” about how sound content can be created, edited, and ultimately curated for an enriched bus experience. The process of developing the app will provide important experience on which to exercise reflection on/in action (Schon, 1991). Additionally, several design thinking techniques will be employed to aid the development of a viable prototype which include: ethnographic participation and observation, focus-group discussions, gamified co-creation with Bostonian tourists, and several “mechanical turk” trials with the builders of the app. There are several illustrations of the iterative design process: ideation → fabrication → test → results → ideation and continued. While this process is often experienced as chaotic, it actually follows a very directional approach:

I have taken several classes at MIT that have helped me practice this approach including: DLab: Design (Edgerton Center), How to Make (almost) Anything (Media Lab), How to Design (almost) Anything (Architecture), DLab: Mobility (Edgerton Center). Although I am the author of this thesis, I will by no means be the only “maker” of this app. App design and development necessitates the participation of people across a variety of disciplines, and thus I have organized a cross-disciplinary team of researchers, designers, and coders to help. Together, we have a team of eight people: Candy Yang (market research

(IΕ School of Architecture & Design, Segovia, Spain)
and business development), Andrew Takao (app development), Icy Deng (user research), Milu Yang (business development), Scott Middleton (content creation management), Jingting Zhang (Chinese content creation), Miles Taylor (English content creation), and myself.

Figure 4: Four of the 8-person team that has come together to build out Alight. This is from one of our UX/UX ideation workshops that I led.

In the remaining chapters, I will make clear which aspects of the Alight app and research were created by myself, which were created under my direction, and which were entirely led and created by other team members.

In Chapter Two, I present the reader with the documentation of how Alight was developed over the course of seven months. This kind of chapter is unique to a maker-thesis in that it provides the reader with insight into how the process of making elucidates the challenges of an end-users experience of place. For the author, this chapter represents large leaps in skillset and epistemology to associate the abstract concept of placemaking and place-experiencing. As learned throughout my time at MIT’s design and making classes at Media Lab, Architecture, and D-Lab, documentation serves not only to reveal this product’s growth, but also to help ease the way for future city planners and urbanists seeking to harness mobile and digital technology in their own interventions. Many tools were both learned and used in the creation of this app including MIT’s App Inventor 2, Android Studio, Adobe xd, Adobe Illustrator, GIT,
QGIS, Javascript, Java, XML, CSS, and HTML. While the stated end-goal to provide a platform for location-specific audio content along bus routes seems clear enough, the process of producing such a platform from scratch reveals a great number of decisions that affect the experience and creation of place. Ultimately, Alight is now available in on the Google Play Store and features 10 different content-filled routes including public buses, MIT shuttle, Boston ferry service, and the trolley. This chapter provides the reader with a detailed technical account of how the conceptual framework for Alight evolved as technological obstacles were discovered, overcome, and/or circumvented.

Chapter Three works in tandem with the second chapter to illustrate how user testing helped inform the iterative development of the mobile app. The user tests primarily focused on tourists visiting Boston and MIT. The Alight team provided them with the app and guided them onto the MIT EZ-Ride Shuttle service to gain their feedback. Biweekly trials of the app as it was developed not only helped guide the feature development and introduction, it also provided important insights into the delivery and interaction with an entirely new format of media: the location-specific, short-form audio clip. Through the review of prior arts, it became clear that Alight is proposing a very new form of media. The weaving together of separate audio clips according to a defined area presents many challenges for both user acceptance and user experience. As will be discussed, while bus riders are generally used to wearing headphones and looking out the window, the kinds of content they would prefer to listen to and how that content is delivered needs a great deal of development. Finally, these user tests also shed light on how Alight users experience the city and the bus.

With the technical documentation and results of the survey shared, Chapter Four provides an analysis and discussion of these results using a framework of “event-places” as described by Dennis Frenchman (Frenchman, 2004). While statistical analysis was not conducted on the surveyed users, the feedback produced important qualitative insights into how placemaking can be enhanced through the production, dissemination, and consumption of digital media. The mobile technologies that have become common place in urban environments do not mean that anything is possible. Users are constrained in their efforts to place-make by several factors including time, money, knowledge, social norms, and pre-existing biases. This observation created clear parallels to what Frenchman has termed an “event-place,” and the qualities of an event-place can be used to understand the impact of Alight on users, the city, and the bus. Using this framework, I explain why certain features are effective and what future features might be introduced to provide users with an experience that shapes their sense of place through use of the app.

This maker-thesis concludes with Chapter 5 by discussing the implications of Alight for the city as a practical means to not only change how tourists travel and explore an urban environment, but how experiences of place articulated and provided for several stakeholders. By developing the principles and guidelines for creating engaging location-specific audio content, I suggest Alight can 1) stimulate economic development traditionally non-tourist area; 2) re-orient public perception of the bus ride experience from its current negative associations to positive associations of exploration, self-growth, and creativity; and 3) provide a new platform by which urban residents and businesses can share culture and stories with “outsiders.” These potential implications can be summarized as:
**Stimulating Economic Development in Unvisited Places:** The Alight app encourages tourists to explore beyond the “beaten path.” As mentioned above, research on consumer trends suggests travelers are searching for methods to have explorative experiences in their travels rather than travelling between establish points-of-interest. Location-specific, short-form audio content may help to encourage these travelers to move beyond traditional tourist traps to neighborhoods and businesses that typically do not benefit from tourist spend. While this thesis will not directly measure the economic impact of tourists travelling to new parts of a city via public bus, it provides the operational framework by which this behavior may be provoked and then measured. This string of inquiry would help push forward the initiatives that local chambers of commerce and municipal economic development departments are engaging in.

**Re-Orienting the Bus Ride from Negative to Positive Associations:** While buses are primarily understood for their instrumental value of moving riders between origin and destination, this project re-presents the bus as a vehicle of content consumption and interaction. By making the time spent on the public bus associated with learning and engagement with the places that are passed, Alight materially changes the experience of bus ridership. As discussed in the above literature review, the experience of a bus ride can have transformative effects on the riders’ disposition to a certain community, business, or history. Unlike the subway which does not provide a direct view of the urban landscape, the bus possesses an underemphasized quality to provide riders with visceral knowledge of navigating the city. This thesis explores how this experience of the city can become a commonly anticipated and valuable aspect of a city bus system. For public transit agencies, this would mark a new approach to marketing and designing their bus systems. Clearly, this thesis does not prescribe the exact approaches they should take but, if successful in engaging riders, the thesis would open and add to a new discourse.

**Amplifying Resident and Businesses Voice:** Finally, the user-generated aspect of Alight is a bit beyond the scope of this maker thesis as I have only served content to bus riders in Boston. However, the ultimate goal of this mobile application is to allow for user-generated content to be served to riders of the bus. This maker thesis will help to establish the principles and constraints for users to generate content that is entertaining for other riders. For example, should the length of an audio recording be constrained and if so how long should it be? There is a plethora of ways to design the creation of audio content for the bus. Ideally, this thesis will help set a precedent for the future of user-generated content and provide a platform for creativity to thrive. By doing this, it will create a new channel by which both local residents and businesses would be able to communicate with any bus rider including the aforementioned tourists that would be passing by.

The implications of this maker thesis are quite exciting. It is my hope that this thesis not only has impact on these academic discourses but also encourages business people and technologists to consider how existing public infrastructure can be enhanced with today’s digital and mobile technology.
CHAPTER 2: THE DESIGNING AND BUILDING OF ALIGHT

Over the past three years at MIT, I have taken several classes outside of both my home departments (City Planning and Business). The most influential ones have been in design and making. These classes demonstrated the importance of creating and sharing documentation of the products we imagine because it is often the documentation that reveals the true thought and discoveries made in the process. By sharing documentation designers and makers not only build upon each other’s work but also access the mental models that guided the final product. While most theses do not include this form of documentation, for this maker-thesis it is critical to show the evolution of tools and conceptual approaches to producing and designing Alight.

In the following sections, I have pulled out key moments in the development of Alight and summarized how different obstacles in making elucidated the challenge of digital-media-based placemaking and place experiencing. For convenience, I have organized the documentation in chronological order using many versions of the Alight app that have been produced along the way. There have been several versions of the app and not all of them have been included here. This chapter, in particular, should be read in conjunction with the final app that accompanies this written document.

This chapter serves to demonstrate three core conceptual buttresses that must be made in the process of digitally-enhanced placemaking. First, knowledge exists within the tools one uses. This knowledge embodied within the coding languages, software, and hardware simultaneously creates new opportunities and constrains them. Second, only by engaging with and using these tools can one discover the knowledge they contain. In this case, I was tasked with choosing coding languages, evaluating the capabilities of hardware, and identifying suitable software to meet design tasks. While review of secondary information and seeking advice was useful, it was necessary to experience how each tool functioned to determine its efficacy in producing Alight as a placemaking mobile application. Put simply, it is better to hold a hammer than to see the hammer when trying to understand it. Lastly, the importance of version control became increasingly clear as more people contributed to the development of Alight. Alight is the product of teamwork. In this chapter, I will always credit when other people on the team created aspects of the Alight app. The organizational challenges of app development require disciplined attention to communication and coordination. These challenges reflect the larger challenge of pluralistic placemaking. If a tool to empower placemaking requires organizational constraints, the placemaking and its dynamic nature will also be subject to constraints. These three abstract learnings are evident in the documentation of Alight’s development, and I point them out when appropriate.

ALIGHT 0

My first challenge in embarking on this maker-thesis was: “How do I make something interactive appear on my smartphone?” As city planners and entrepreneurs are increasingly inspired by the possibilities of technology, accessing the functionality of the smartphone and begin controlling the content on the screen marks an important leap from conceptual imagining to real-world action. While ideas for technology abound in academia, the ability to

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5 A note on version names: For the convenience of the reader, I have renamed the versions of Alight in numerical order. In fact, there are more versions than are presented in this documentation, and I have taken the liberty of jumping over versions that were dead ends or did not differ enough to illustrate key points in the development of the app.
realize them not only helps empower the researcher, it also strengthens his/her communication about their ideas. Thus, the first “version” of Alight was geared simply to address the following challenges:

- How might I create software that works on a mobile phone?
- How might I install that software onto the phone?
- How can I interact with the software on the phone to demonstrate successful production?

Clearly, these challenges are far-removed from the end-goal of creating a location-based audio content delivery platform, but Alight Version 0 marked a fundamental shift from a conceptual idea for a final thesis project to the empowerment to create and test the application of that idea.

**LEARNING TO MAKE AN APP: MIT APP INVENTOR 2**

After starting with online courses to learn to code in Java and XML, I quickly found that achieving my first goal of installing and interacting with an app I made was far out of reach. I consulted with several people with experience developing apps who advocated hiring a developer given my timeline and goals. While I did eventually do this (by version 5), I found it important to still be proficient in how mobile apps are developed and installed. Luckily, on the advice of a friend, I discovered MIT’s App Inventor 2 (AI2), an online program that provides a graphical coding interface for novice app designers. This platform provided a stepping stone into app development and allowed me to accomplish my goals for Alight 0. After exploring the interface and taking two online tutorials on how to use the program, I was able to develop a basic app that could be installed on my own Android phone. App Inventor 2 is an incredibly valuable tool that could allow city planners and urbanists to easily prototype their ideas.

**FRONT END**

The terms “front end” and “back end” are often used when discussing the development of software. These two terms refer to everything that the user can see while using the app (the front end) and everything that the user

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6 Introduction to Java Programming: Starting to Code in Java, https://courses.edx.org/courses/course-v1:UC3Mx+IT.1.1x+3T2017/course/
7 Abelson, Hal http://ai2.appinventor.mit.edu
9 http://appinventor.mit.edu/explore/ai2/tutorials
doesn’t see but is necessary to for the app’s functionality. App Inventor 2 makes it quite clear that while “front end development” is critical to the aesthetic design and understandability of an app, it is not the same as design. Because different mobile phone screens are different sizes, it is important to define visual layouts not in units of measurements such as pixels but in relative units which are described as “density-independent pixels” or dp (“dips”). In the AI2 interface, one is constrained by vertical and horizontal layouts that can be nested within each other to organize different user interface elements such as text, images, and buttons. Whereas a graphic designer might prefer to first illustrate how the interface might look and then detail the mathematical relationship between the elements, front end development begins with the mathematical relationship and results in a display.

However, AI2 helps bridge this discrepancy by providing a drag-and-drop interface in which the user can choose which visual elements are on the screen and codes their relationship in the background. Frustrations often arose when formatting wasn’t as malleable as it might be in design software, but this was helpful in later versions when understanding how different XML containers defined the layout of visual elements. Learning the complexities of front-end development helped to prepare organizationally for the development of the Alight app. In later stages, it was important to differentiate between the graphic design and the front-end coding of that design.

BACK END

Back-end development requires a strong knowledge of several coding languages, but AI2 simplifies this process by providing a graphical “block” coding interface. By providing color-coded puzzle pieces that fit into each other to provide different functionality, users can easily experiment with “coding.” Whereas using a text-based coding language would require a proficient knowledge of the grammatical rules of that language and then a method of testing that code, AI2 allows users to skip that stage and move directly to the functional logic of an app.

As I progressed with the development of the app, this hands-on tutorial of how to think about Alight’s functionality as the product of a series of repeated calculations of sensory inputs and an existing database of constants was valuable in directing the development of the app after the coding for it exceeded my abilities. Knowing at a conceptual level how an app function created an important communication bridge between myself and future
developers. Importantly, this foundational skill can be used across coding languages and mobile phone operating systems.

**BASIC FUNCTIONS**

After familiarizing myself with AI2, I focused on making the simplest of mobile applications to attempt to install on my own Android phone. I decided to simply see how I might create interactive buttons that somehow manipulated an image on the screen. This basic skill would be critical in future development of the app as the user would be expected to engage with the content on the screen in the app.

**INTERACTIVE BUTTONS**

First, I created buttons in the front-end interface of UI, and then moved the back-end UI. The above coding blocks illustrate how developed functionality into these buttons. This visual, block-based representation made it extremely easy to understand how a button's logic worked. For example, the first block clearly says, “When the button called ‘play’ is clicked make the image called ‘Image1’ appear; display the text “get on the bus!!!” in the Label1 area and change the font size to 20dp.” Creating a functional button helped solidify the inner workings of back-end development. After creating the button logic and uploaded the logo media file, AI2 automatically compiles an APK file that can be installed a smartphone that uses the Android operating system. With that, I had created my first app and was ready to start making Alight!
Building a testable version of Alight meant developing several different features and then wiring them together to create an app. In the first version of Alight, I prioritized two fundamental features that would be needed to build out a mobile application: 1) The ability for the app to know it was on a bus route and identify its proximity to points-of-interest along that route; and 2) The ability to respond to a basic set of user commands based on the context of that the phone is in. These core features presented their own challenges which I addressed to get one step closer to enriching the public bus with audio content.

EMULATING BUS ROUTES

One of the benefits of Alight versus a walking app is that by using a bus route to organize and deliver content, the phone has an advantage is predicting the user’s behavior. For the most part, an Alight user on a bus will be moving along one predetermined route facing one direction. He/she can choose to look out of the left window or the right window. Walking tour apps, however, must constantly be anticipating and sensing a user’s unpredictable behaviors (changes of speed, changes of direction, changes of orientation, changes aural soundscape, etc.). The Alight user is a “captive audience” despite being highly mobile and experiencing a wealth of places. This works to the advantage of Alight, but it also means the app must use the existing bus route to its advantage to ensure an appropriate match between user and content delivery. To do this, I addressed several challenges.

HOW DOES THE APP PROVIDE CONTENT BASED ON THE BUS ROUTE?

The first step in developing Alight 1 was to ensure that we were looking only at the places nearby the bus route. This would help limit the processing demands of the phone and ensure that the user would only be treated to content that was accessible along the bus route.

Accomplishing this required downloading the route GIS data from the MBTA. The MBTA’s #47 bus from Central Square to Broadway was selected as a test route and the coordinates of the route were downloaded as a KML
The KML file contains a list of coordinates that make up the route of the bus. When loaded into QGIS it displayed the route, and I was able to identify the sites that fell within view of the bus along those streets. When loaded into the phone, this list of coordinates allows the phone to selected and order the appropriate content for the user to experience. When the app is working at the scale of an entire city, this route data allows for rapid automation of content delivery without expending processing power or constantly re-locating the user.

However, at this point in development with only one bus route, this process was simplified into a manual one. I simply rode the #47 bus and identified POI that was visible along the route. The location of these POI was identified with coordinates that were registered in my camera phone’s GPS when I took photos of them. I then went back to AI2’s backend user interface and manually created a list (right) of the metadata for each POI which simply included the name, the latitude, and the longitude. The list for the #47 ended up with about 20 POI that had been manually entered through AI2. As the development of the app progressed this metadata would become increasingly complex, but this list was the basis for a loop command by which the application regularly checked the user’s location against POI along the selected bus route.

### HOW DOES THE APP KNOW WHERE IT IS IN RELATION TO POI?

After providing the basis for Alight to emulate a bus route, I needed to determine how to calculate the distance between the POI on the route and the position of the phone. This would be important because the application should only deliver audio content that is relevant to the things the user can see outside of the window. This proved to be more complicated than I had expected as the GPS sensor in the phone feeds the phone with latitude and longitude coordinates at a specified time interval, but the distance between degrees of latitude and longitude varies depending on the curvature of the earth. After a long exploration of how distance is calculated using lat/long coordinates, I finally settled by setting the distance of a degree as constants for the city of Boston (111,080.05 meters per degree of latitude and 82,395.15 meters per degree of longitude). In reality, this would not make a large amount of difference, but is worth remembering when deploying Alight in cities farther North or South of Boston. After determining the constants, it was much easier to calculate the distance using the Pythagorean theorem (see above block). From the app’s perspective, every time that the phone received new location coordinates it would go through the provided Route #47 list of POI and calculate the distance between the phone and each of the POI. It would then set prime the POI with the small distance value in the audio player and image display based on the POI metadata’s corresponding name.

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10 [https://geo-massdot.opendata.arcgis.com/datasets/mbta-routes](https://geo-massdot.opendata.arcgis.com/datasets/mbta-routes)
HOW DOES THE APP DEAL WITH CHANGING SPEEDS OF THE BUS AND CONTENT DELIVERY?

A unique aspect of Alight is that the rider is always moving and has no control over his/her speed of movement. Overall this acts as an advantage for Alight as it allows us to anticipate the POI that will come into the user’s path, but it also means that the user does not have the ability to stop or slow down or speed up to fit the rate of content delivery. In response to this challenge, I developed two low-tech strategies.

The first strategy is that knowing the average speed of different buses, one can calculate an approximate radius for POI content delivery to occur. Only when the bus hits that radius will it begin to play the content so that the user will see the POI at the same time the app is narrating about it. For example, if the average bus speed is 6 meters/second and we have a 30 second audio clip, then the radius around that POI should be ~180 meters. Thus by setting the radii around POI and controlling for audio clip length, the app can take an educate guess at when to deliver content.

The second strategy is to give the user some control over his/her audio content. By being able to pause and skip through content the user can make sure that the content is appropriate for the environment he/she is passing. The challenge with both these two strategies is that neither guarantees that user will have a fully realtime narration of his/her bus trip. In future iterations of Alight, this challenge can be addressed with more content of varying lengths and a realtime estimation of when POI will come into view based of current speeds offered through the MBTA’s API, accelerometer data, and/or beacons from the POI themselves.

USER ACTION SCENARIOS

Alight only plays audio when it is appropriate to the place that it is in, but at the same time the changing location of the device should not impact the cohesiveness of the user experience. In the case of the #47 Route, this meant the app needed to constantly measure its distance to the nearest POI and then decided whether or not to offer content to the user. At a very basic level the app needs to decide:

1) Should it load the audio and image for a new POI?
2) Should it interrupt the user with a new POI?

To address this, I created two “If” statements that helped the app determine what to do (illustrated in code blocks below). First, if there was a POI within 200 meters of the device, it should look for the closest POI and prime it for play. If not, it should continue to search. Second, if the user was listening to a POI, the app should continue to search for closer POI but not interrupt the user’s current playback and image (Eventually the app did indicate that a closer POI was nearby, but it would not interrupt the audio). If the user was not listening to a POI, the phone should automatically load the next POI and start playing it. This is more clearly illustrated through a decision tree:

![Figure 6: Each day the average speeds of different buses are calculated at http://bostonography.com/bus/](http://bostonography.com/bus/)
Figure 7: A decision tree to determine how the app should respond to user actions depending on what the app is currently doing.

Figure 8: The different possible user actions based on the decision tree above.
As the app progressed, it became increasingly clear that managing the growing amount of content would become a challenge. The Alight team grew to four people all of whom were now creating audio and visual content for the #47, #1, and MIT Shuttle bus routes (illustrated in the content map below). This growth in content necessitated the creation of a makeshift database more easily keep track of the locations, photos, and sounds along the bus route. This was a shift from creating a “list” of all of the POI through App Inventor 2 to employing a more efficient way of creating and accessing the “tags” for different POI. This represented a new learning opportunity to understand how databases are designed and created to organize data efficiently without overburdening the app with heavy storage needs.

Figure 9: A sample of all of the POI images we collected along different bus routes in Boston. The sheer volume of POI necessitated a new approach to organizing the key information about each POI. To address this, I turned to Google Drive’s API to export CSVs.
PSEUDO-DATABASE WEB INTEGRATION

Rather than creating a visual block list in AI2 for each one of the documented bus routes, I began with spreadsheets on Google Drive that collected basic metadata tags about each POI on a bus route (route, latitude, longitude, and name). At the time, I used a naming convention that would simply use the name tag + a file extension to locate the audio and image files. This was very advantageous because it was much faster to enter POI metadata and it allowed all of the three content creators to participate in the creation of POI via shared Google Sheets.

While this was not exactly a database, AI2 allowed me to treat it as a realtime database with a function that allowed me to convert comma-separated values into lists of POI. By first selecting the route number, the Alight app would then query a Google export API to download a CSV of that route. This was done programatically by 1) initiating an empty “POIList;” 2) prompting a ListView for the user to select a route; 3) querying Google API to export the appropriate CSV; and 4) converting the text from the CSV into the empty “POIList:”

CONTENT CREATION

Core to this entire maker thesis is the concept that digital content can be created about a place, located within a certain geofence, and be delivered to passersby. In order for the technology to work, there must be thought given to how content is created and organized. (The actual themes, narrative structure, and themes of the content will be discussed in Chapter 4 and 5). As mentioned above, by the time Alight 2 was being developed, I had expanded the team to three more people who would be creating content: Scott Middleton, Candy Yang, and Miles Taylor.

This content creation team represented the first baby steps into distributing the workload of content creation from a single author to several authors with the hope that eventually Alight’s placemaking content creation becomes nearly entirely user-generated. Thus, I played the role of establishing the first “standard process” of collecting, storing, and formatting content for Alight with these three team members.
CONTENT PRODUCTION PLAN

I reached out to Miles Taylor very early in the project after learning about his blog that has reviewed every single MBTA bus line over the course of five years. This high school senior has developed a strong passion for thinking about, exploring, and creating media about public transit. After introducing the concept of Alight to Miles, he was tasked with identifying routes that would be appealing to urban travelers exploring the Boston area. Based on his extensive experience, Miles recommended the following routes for content production:

- #4- runs in a loop around downtown Boston
- #439- A scenic drive to a small island
- #1- From Harvard Square to Dudley Square
- #132- From the northern Orange Line to Stoneham, which has both a lovely town center and the Stone Zoo.
- #712/713- Two routes that run in tandem to Winthrop.
- #441/442- Runs in tandem to Marblehead.
- #430- To the Saugus Iron Works, the first iron works in America.
- #120- Runs down Bennington Street, the main drag of East Boston, and serves a statue of Mother Mary on a big hill that offers probably the best free view of Boston.
- #220- Goes to Hingham and you can transfer there to the amazing 714 to Hull.
- #93- This route runs through Charlestown.

Miles' depth of knowledge about even the most obscure bus lines helped to identify priority routes for which to create content. However, with Scott Middleton’s review we quickly identified that it would be easiest to start with bus lines that are closer to MIT and more likely to attract visitors. Additionally, Scott pointed out that the above-ground Greenline, MBTA’s ferry system, and MIT’s EZ-Ride shuttle service could also serve to provide riders with enriched experience of place. Thus, we prioritized the content product:

- #47: Central Square → Broadway. Already made from first trial.
- #1: Harvard Square → Dudley Square. In production.
- #66: Harvard Square → Dudley. Creating a loop experience with the #1.
- MIT Shuttle EZ Ride: A loop around MIT’s campus for the thousands of visitors to enjoy.
- #92: Haymarket → Sullivan Square
- Green Line C and D Loop: Kenmore → Cleveland Circle → Kenmore. Passing through much of commercial Brookline and Brighton.
- Charlestown Ferry: A short boat ride between Charlestown and the Aquarium.
- #120: Maverick → Jeffries Point (East Boston loop).
- #9: Backbay, South End, South Boston.

Miles’ blog and bus knowledgebase is truly prolific. Starting at 13-years-old, Miles has travelled the state whenever he gets free time to review the different bus routes. After completing the MBTA routes, he has moved on to regional routes throughout Massachusetts and Rhode Island. In addition to writing his reviews, Miles also has entertaining Youtube videos of his travels. https://www.milesonthemmbta.com/
With this content production schedule and a growing content production team, it was important to be able to visualize and manage the content we would be creating. To do this, I created Alight’s “Content Creation Process” which was a lengthy 12-step process for individuals to produce and organize content so that it could be easily accessed by the app. This included using a GPS-enabled smartphone to log the latitude and longitude of each POI photo that was taking, compressing photos to save storage space, and sticking to a common naming convention. Knowing from the beginning that this process would need continued improvement, I also tried to build in feedback mechanisms for continual process improvement (Steps 11 and 12): (See Appendix 1 for full process)

With this process in place, the Alight team was ready to begin producing content for the app.

CONTENT VISUAL REPRESENTATION

In order to quickly understand the quantity and distribution of our content along a route, I used QGIS and Google Maps to overlay our geotagged photos with the bus route. By doing this, I was not only able to monitor if a route had enough content to provide a stream of audio narration to a user, but also was able to identify potential content stories without riding the bus.
After testing the Alight 2 (see Chapter 4 for results), it became sufficiently clear that while App Inventor 2 provided enough functionality to test the Alight concept, it would never be able to provide the user-friendly placemaking experience that I was envisioning. As a prototyping tool for non-developers, AI2 represents an extremely powerful tool limited mainly by limited control over its UI and inability to easily combine with other online tools such as Google’s developer suite. The next step would be to begin developing at a lower-level using Android Studio. My forays into this software development kit (SDK) had been quite fruitful as there is a lot of documentation and instruction on how to use this tool to create a mobile app for Android, but I did not have the time or expertise to hack together the Alight app in the time allotted for this thesis (not to mention the budding start-up Alight was becoming).

Instead, I found an aspiring app developer, Andrew Takao, who joined the Alight team. I had developed enough of a conceptual framework using AI2 to work with Andrew in developing the same app as Alight 2 but through Android Studio. “Redoing” this work would mean that we would have access to features that would later prove very important for Alight’s users. The addition of a second person to the app development team also necessitated the reconsideration of how to organize and communicate effectively and efficiently.

**ANDROID STUDIO**
The Android Studio work environment is clearly more complex than the AI2 one that I had been working in. Simply navigating the different frames took a good amount of time to learn. However, the complexity also allows for granular control of the layout and functions of the app. With a whole community of developers using it, there is a great deal of support, online tutorials, and existing code that can help expedite one’s learning and app development. With Andrew, who had begun tinkering with Android Studio, we were able to delegate this end of the app development to him.

An additional function of Android Studio that had been useful even when developing in AI2 was the ability to emulate the Alight app on the computer. By loading the APK file into an emulated smartphone, I could send fake GPS location data to the phone to test the delivery of location-specific content. This proved to be a huge time saver for both me and Andrew because we didn’t need to ride the bus to test the Alight app.

**VERSION CONTROL**

With two people working on the Alight 3 app and much more complexity than AI2, we needed a good way of collaborating and keeping track of changes to the app. To do this, Andrew introduced Git to our workflow which provides a decentralized method of collaboration by which changes and conflicts between different versions are automatically detected through the Git software and can be “merged” by the user. This form of version control also allowed us to rollback the app to previous iterations if anything seemed to stop working. Finally, the ability to create a “working branch” to allow different versions to be developed in parallel and then re-merged later.

**REALTIME DATABASE MANAGEMENT: GOOGLE FIREBASE**

One big challenge was to move away from using Google Sheets to act as a database for our POI and begin using a realtime database that was more robust. Andrew set up a Firebase database that allowed the app to compare in realtime the data existing on the phone and the data on the Firebase server. This enabled the user to select only the routes he/she wanted to download and thus save storage space in his/her phone. It also would later prove useful in beginning to integrated user login and data analytics into the Alight app.

**UI DEVELOPMENT**

An important step in Alight’s development was the ability to have different workstreams in parallel. As Andrew took over the coding for Alight’s front- and backend, I assumed the role of leading the design and conceptual
framework for the app. To do this, I began employing new tools including hand sketches and wireframing software. Because it is much faster to simply draw the geographic shapes and text that make up a user interface than to code it with XML, I took responsibility for the UI development process which consisted of research, hand sketching, wireframing, sharing and iterating.

As it became increasingly clear that Alight sits at the intersection of an audio media, public transit, and trip planning apps, it was quite useful to use existing UI precedents to consider how we displayed decisions and content to the user. I collected a survey of similar app UIs to consider. Below are some of the most influential UI’s from these apps:

<table>
<thead>
<tr>
<th><strong>Google Trips (trip planning)</strong></th>
<th><img src="image1.png" alt="Google Trips Screenshot" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Google Trips app automatically populates trips based on email data collected from your Gmail account. Useful UI features included:</td>
<td><img src="image2.png" alt="Google Trips Screenshot" /></td>
</tr>
<tr>
<td>- Toggle download button</td>
<td><img src="image3.png" alt="Google Trips Screenshot" /></td>
</tr>
<tr>
<td>- Visual photo preview including specific information of the trip</td>
<td><img src="image4.png" alt="Google Trips Screenshot" /></td>
</tr>
<tr>
<td>- Automatic sensing of location</td>
<td><img src="image5.png" alt="Google Trips Screenshot" /></td>
</tr>
<tr>
<td>- Vibrant color-coded trip “cards” to help user explore and select appropriate content.</td>
<td><img src="image6.png" alt="Google Trips Screenshot" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Detour (audio walking tour)</strong></th>
<th><img src="image7.png" alt="Detour Screenshot" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detour produces $8 walking tours for cities around the world. Their features help the user find their preferred tour:</td>
<td><img src="image8.png" alt="Detour Screenshot" /></td>
</tr>
<tr>
<td>- Tour titles include place and thematic content for quick preview.</td>
<td><img src="image9.png" alt="Detour Screenshot" /></td>
</tr>
<tr>
<td>- Preview video helps users to decide whether or not to make the purchase.</td>
<td><img src="image10.png" alt="Detour Screenshot" /></td>
</tr>
<tr>
<td>- A map display using a Google Maps API allows the user to orient and preview the physical mobility – however can be difficult for newcomers to understand scale and orientation.</td>
<td><img src="image11.png" alt="Detour Screenshot" /></td>
</tr>
</tbody>
</table>
**Vamonde (text location-based info)**

Vamonde creates thematic streams of textual posts that can be turned into a walking tour if desired or you can simply enhance your experience of one place:
- Sortable by theme
- Editor curation helps to sort content for easy, virtual exploration
- Photo composition is quite diverse allowing user to feel difference between themes
- Seems difficult for user to decide how to use this content. The flexibility in navigation makes user overwhelmed & disoriented.

**Voicemap (audio walking tour)**

This South African app collects user-generated tours from around the world and either charges a fee to the tour guide to offer the tour for free or collects a $2.99 fee from users:
- Landscape visuals are attractive and exciting; easy to flip through
- Clicking into a tour is overwhelming with a great deal of text
- A rating of the tour is helpful
- Icons are confusing and many
Anchor (audio media)
Anchor aims to provide the platform and tool for “micro-podcasting” using a smartphone. Users can create their own radio channel that you can create and edit through one’s phone:
- Selecting a channel is confusing with so many rows on the screen
- Animated background in the listening screen is attractive for otherwise boring visual
- Swiping between audio is unclear

Moovit (public transit routing)
Moovit seeks to be the “Wayz of public transit.” By collecting user data, they hope to optimize transit riders’ routes:
- Clean method of routing with dark photo of your location
- Selection of bus routes made easier with green highlighting and arrival time
- Confusing to have “Active” and “Non Active” lines, why not just have “Active” lines
- Simple question and minimal search screen is more comfortable than having many choices.

The review the above apps and several others guided the development of Alight 3’s user interface. I first used hand sketching to diagram envision possible concepts. These sketches were rough but helped spur clear communication between me and Andrew as he developed the frontend. Below are some examples of these sketches:
The next step was to crystallize the sketched concepts using Adobe XD which is a very simple wireframing app that uses basic geometric shapes to simulate the UI of a software application. Using the XD app, one can preview the app on a smartphone and even click through certain events to get a sense of how it will feel. This step was very important in creating a clear target for Andrew to aim for when developing the frontend. It was also crucial to help display the full potential or identify potential problems with a visual concept before investing a lot of time coding it:
Before moving on to the next version of the Alight app, I’ll take a moment to share the content creation tool that I developed on the Alight website. Recognizing that it was still difficult for many people to create and upload POI content efficiently, I designed an online form that allowed users to quickly select and preview the bus route, and then upload their photo, audio, location, and more metadata to the database. This represented the first step in beginning to create the foundation for a platform for POI data that could begin to scale. In this section, I quickly review the new elements added to help Alight begin more precisely creating and managing POI data.

### CONTENT META-TAGS

Knowing that eventually a growing body of content should be easily searchable by a number of preferences, I added new tags to the POI entries. These included user-action specific, thematic, and language.

**6. tag your story**

**what does your story help the user do?**
- Window-Watching (Can be observed while sitting on the bus)
- Contextualizing (Can’t be directly observed from the bus but gives idea of the area or culture)
- Alighting (A good reason to get off the bus)

**what theme(s) does your story fit?**
- History
- Shopping
- Food
- Sports
- Famous People
- Architecture
- Art
- Nature

**which language?**
- English
- Chinese/中文

[Submit button]
WINDOW-WATCHING CONTENT

The main kind of content would be the POI that you see while riding the bus. Audio and visuals with this tag would mean that there was a specific location that a user would pass at a specific point. For example, the Baptist Church that the #47 bus passes is considered a POI that would be “watched from the window” of the bus. Ideally this content would be delivered to the user during the moments the user can see the bus. This is the primary kind of content that enables Alight to begin to shift the concept of placemaking and experiencing a place – a form of audio augmented reality. Most of Alight’s content should be this kind of location-specific audio content that can only be accessed by being in proximity to the point-of-interest.

CONTEXTUALIZING CONTENT

This kind of content is also known as “filler” content. It serves to ensure that the user has relevant content to listen to even if there is not a POI located within view of the user. This kind of content helps the user contextualize his/her experience of the bus route. For example, on the MIT shuttle route, Alight provides information about inventions and businesses made at MIT (like Dropbox) or comments on unique aspects of the school’s culture. Another example is on the #1 bus, the history of the route’s development can be shared with the user at any point of the tour. This contextualizing content also helps to orient the user to the entire city.

ALIGHTING CONTENT

Alighting content is location specific content that gives the user a reason to “alight” from the bus and take an action. This kind of content is important to be marked for two reasons. The first is that Alighting Content should be delivered before Window Watching content would be so as to give the user time to decide whether to disembark from the bus. The second reason is to help prepare the app for future analytics of how the content delivered to users not only helps develop their sense of place but also to help understand if and when they begin to participate in those places. For example, on the Route #1 tour, the narrator recommends visiting Dudley Café as a possible alighting as the bus approaches Dudley Square. The ability for the user to decide whether or not to visit this shop is created by delivering the audio introduction before the Dudley square comes into site. In the future, this kind of content could be use to stimulate economic or participatory development of neighborhoods.

THEMES AND LANGUAGES

In addition to user-experience based meta-tags, I included thematic and language tags. The themed tags will be used to help customize experiences of the bus to the interest of the rider. For example, a user interested in architecture would be able to select “Architecture” and hear audio clips only about the structures he/she passes. Additionally, one of the strengths of this form of placemaking is allowing for many styles and languages to contribute to how a place in described and documented. With our Chinese-speaking team members Candy Yang,
Icy Deng, Milu Yang, and Jingting, we began creating Chinese language audio content from Alight 3 and on so that more people could experience the app. In the future, I expect that user-generated content can be in any language so that many voices and perspectives can be heard.
Alight 4 represented the first highly-functional version developed on Android Studio. Alight 3 proved to have many bugs when in use, and we resorted to using Alight 2 (AI2 version) in a user test. Alight 4 was mainly tested on MIT’s EZ-Ride Shuttle which proved to be the most convenient bus to test the app on because it 1) is located right outside our office space; 2) comes every 15 minutes; 3) is free; 4) contains several challenging locations that could help improve Alight’s content delivery ability; and 5) had several nearby visitors to MIT who we could test the app with.

Alight 4 represented a shift from two people (David and Andrew) designing and developing the Alight app, to a bigger team collaboration. As more people began to contribute to and use the app, new challenges were revealed and addressed.
CO-CREATION WORKSHOPPING

The Alight team came together to envision how Alight 4 could work and feel. To do this, we designed a co-creation workshop in which six Alight team members (David, Scott, Candy, Milu, Andrew, and Icy) reviewed the contexts that users of Alight would find themselves in and then brainstormed potential design solutions for the app.

CONTEXT ENVISIONING

The first step in the workshop was for our team to imagine how the user might feel when using Alight at its different screen: logging in, finding a bus route, boarding the bus, listening to the audio, and (in the future) recording their own content. For each screen we envisioned the “who, what, where, when” of the user’s context and identified where certain pain points might be. Each person independently brainstormed elements of the context on post-its during the length of a song and then shared them with the group. In this way, the group members were primed to develop a myriad of creative solutions to for the user in the next stage.

A brief summary of the context for the priority screens revealed some of the key challenges to be addressed. For the Route Selection screen we identified that being able to preview the content that was on the route was a key ingredient in being able to make a confident decision. For the Boarding screen, the anxiety around payment was a big issue as well as determining when the next bus would be coming. For the Listening screen, we found that not only was important to be able to navigate the audio content, but it was much more comfortable for the user to maintain some control over the experience and have access to more relevant content if desired. These challenges helped guide our creative stage of the workshop.
SOLUTION IDEATION, VISUALIZATION, & SHARING

After envisioning the user context, we independently spent 20 minutes paper prototyping the screen that helped to address the context of the users. These prototypes were used as springboards to prompt discussions of how the screen’s UI/UX could help to alleviate the challenges that users faced. These discussions helped set the principles and goals for Andrew and I to develop Alight 4’s features and functions. Just as importantly, it helped to expose the rest of the Alight team to how the app works (and could work) so that their marketing and content creation activities better fit with the app.

USERS

For the first time, Alight 4 provided a user login feature. While it did not provide any extra functionality, this feature provided us with the foundation to begin collecting data that could later be used to optimize the experience of riding the bus.

LOGIN

The login was a simple authentication using Firebase’s user authentication. The implementation of this login allows us to identify the email and username of anyone using the mobile app. In the future, this login can be used to credit content creators for contributing to a bus route’s content. It can also be easily integrated with login APIs from Google, Facebook, Github, Twitter, etc. so that users can seamlessly integrate the Alight experience to their other social media behaviors. The introduction of user login marked an important moment for Alight to become a participatory placemaking platform.

DATA

At the same time, the creation of Alight users provides us with the capability to track user behavior to begin optimizing the performance of the app. Combined with the ability to “Skip” and “Like” content, each user can leave behind a history of his/her preferences that allows the app to better meet their interests in future uses of the app. For example, if a user skips most of the POI with a “history” meta-tag then, then the app can begin to learn that perhaps the user would prefer not to listen to “history” POI in the future. By the same token, if a user regularly “alights” at cafes Alight can make sure to bring future cafes into the user’s content stream. This data analytics is only the beginning. At scale, the mobility and content consumption behaviors of a large number of individuals could very well help illustrate the movement of cities’ tourists and explorers to help guide decisions about economic development and transit needs.
BOARDING AND PAYMENT

Our co-creation workshop revealed the importance of having a “Boarding” screen. One of the biggest sources of anxiety for someone not familiar with riding a bus is when and how to get on. Buses have a bad reputation for being late, skipping over stops, and not accepting certain forms of payment like cash or credit cards. The co-creation workshop developed strategies to address these anxieties.

MOBILE PAY

While not immediately available, many public transit agencies are advocating the move to mobile smartphone pay to board the bus. This would be enabled with an open API that an app could call and then make an exchange through an NFC reader on the bus. By integrating different transit systems’ mobile pay APIs into Alight in a few years, we could greatly reduce the anxiety of bus riders finding change or tracking down a card.

TRANSIT API

To help users find the closest bus stop and know when the bus will arrive, Alight taps into public transit systems realtime bus tracking API. For the MBTA, this is a very simple process of entering a bus or bus stops tracking ID into the API call and receiving the information to be displayed back to our users. Because we know the location of our user, we can help them identify the nearest bus stop and soonest departing bus.
This maker thesis culminates with Alight 5 which has the above features and is available for alpha testing on Google Play. Alight 5 also includes a special “Spotlight” screen that can be used to highlight and provide additional information about a POI along a bus route. The Alight 5 version marks the first version that was tested publicly with anyone who signed up to test.

ROUTE PREVIEW

On the Route Selection screen, users are provided with much more information so they can confidently make the decision to board a bus. This includes a preview of the thematic content on the route. It also includes the ability to preview the photos along the bus route. To help the user feel more oriented it also previews the route the bus will take. By sorting bus routes by distance and popularity, the user also gets more confidence in making his/her decision.
Alight Spotlight was a feature added in Alight 5 version to test the ability for the app to increase engagement with a place along the bus route. For the app, it has the potential to generate revenue through advertising that the local business itself creates. For the local business or POI it offers the opportunity to create engagement with otherwise motoring by bus riders. This offers a unique new approach to create economic value in placemaking. Traditionally, only the hubs had high economic value because riders would disembark and frequent stores there, but by gaining awareness of the places they are passing by riders might gain confidence in exploring other places.

This feature is indicated with a flashing Alight logo in the top left corner of the Listening screen. By tapping the logo, the user is provided more information about the POI including an automatic routing to the place, more photos, and a text description or offering. The Spotlight feature was tested with shops and public spaces along the MIT EZ-Ride Shuttle and the results are shared in the next chapter.
GOOGLE PLAY STORE AND ALPHA TESTING

The defining aspect of Alight 5 was that it could be offered for direct download to any Android user. Previous version had been built into test APK files that could be installed through a USB connection to our computers. It required special permissions be set to put the phone in “Developer Mode” and required the user to confirm the installation of an “insecure” application. By putting it onto the Google Play Store, we moved the app into a secured and pervasively used app market thus making it significantly more accessible to users to experience. That said, Alight 5 was first released in “alpha” test which required a unique URL to be sent to authorized Google users so they could first test the app. This was important because while Alight 5 worked on four models of phones we had in our office, there are myriad models of phones running different levels of the Android OS. By first testing with a smaller inner circle of users, we were able to debug the app before making it fully live.

LOOKING AHEAD: USER-GENERATED CONTENT

One important feature that Alight 5 did not offer was the ability for user-generated content to begin populating bus routes. This is a critical feature for the purpose of a digital placemaking tool. This feature required the creation of a “content creation” screen. While I have designed the basic look and feel of this screen, the implementation of a user database and content management tools represents the next challenge our team must face. Currently, we are aiming for this feature to be available in June 2018. The ability for current bus riders to create their own content will be powerful to test the ability for diverse voices to begin creating a sense of place along bus routes.

CONCLUSION: TOOLS CREATE MORE TOOLS

This chapter is not your typical thesis chapter. It is not typical for DUSP’s Master theses to include detailed documentation of the production of their theses, but for a maker-thesis documentation provides important insight into how the tools employed in the making of the final product informed the knowledge system and decision making of the research. The documentation of production is a practice more common to engineering and design which not only allows for participatory development of a product but a shared epistemological language for the conceptual challenge the maker-thesis has identified. This practice is best exemplified in one of MIT’s most renowned courses, MAS.863 How to Make (almost) Anything. In this class, students are introduced to the tools of fabrication and required to create their own application of these tools to make a product. While the introduction to the tools helps orient the students to the functions of the tool, the actual application of these tools is almost entirely guided by several years of documentation from previous cohorts of the class. Reviewing how students

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12 This class started by Neil Gershenfeld at the MIT Media Lab has not only seen success within MIT’s campus, but it has also been emulated around the world in the form of FabLabs. The practice of documentation is highly encouraged and helps accelerate learning and making. [http://fab.cba.mit.edu/classes/863.17/file/prior.html](http://fab.cba.mit.edu/classes/863.17/file/prior.html)
from previous years have used these tools helps students circumvent common missteps and/or outline their own action plans. By requiring the production of a physical product and the creation of online documentation, this class has created a body of literature that enables each class to continually create novel applications of the same tools. This form of knowledge accumulation and action-oriented sharing is critical to any maker-thesis.

In this case, the simultaneous learning and use of design (eg. Adobe XD, Illustrator, etc), development (App Inventor 2, Android Studio, etc), content production (voice recorders, Audacity, etc) and organizational tools (Git, Google Sheets and Firebase, co-creation workshops, etc) have created a shared foundation on which Alight can become a participatory placemaking tool itself. This documentation leaves a trail of decisions that can be considered, challenged, or copied for future “makers.” Specifically, it shows how these tools can be used for certain stages of development and then replaced in later stages. This chapter also demonstrates the importance of collaboration and delegation of maker responsibilities. Without dividing the responsibilities of design, content creation, and app development Alight would never have been able to be uploaded to the Google Play Store and tested so many times. As Alight begins to produce and serve place-specific digital content to its users, these precepts guide the placemaking and place-experiencing tool that the app provides its users. In the following chapter, I will share how the iterative user testing conducted at each stage of this app’s development helped to create a better experience for the user and ultimately a powerful placemaking tool.
CHAPTER 3: USER TESTS AND RESULTS

Throughout the development of Alight, the user experience has been the core of determining priorities and making design decisions. Chapter 2 discussed the technical tools used to produce the app and its features, but did not share how and why these features were important to address. In this chapter, I share the results of five iterations of user tests that were conducted during the development of the app. The testing draws from principles of “agile” product development in which emphasizes continuous rapid testing and shifting priorities that comes from a short feedback loop (For us, about 2 weeks between tests.) as opposed to a strict lockstep development process. While to some this ever-evolving dynamic can seem chaotic, this approach can help spur forward a self-organizing ethos among the development team and produce a product that is better suited for the end user (Crispin, Gregory 2009).

The diagram below shows my first conceptual framework for user testing. It illustrates, answering this thesis’ design prompt prompted the identification of specific “Areas of Investigation” that could be tested with each iteration of the app. Each area of investigation (content length, production quality, user creation, etc.) was a hypothesis that that area would be important to the end users’ experiences of the app and the experience of placemaking along a bus route. After each user test, the responses could very well cause shifts in the Areas of Investigation as I discovered that users paid more attention to one area and not another. For example, one Area of Investigation not present in the below diagram is the importance of the visuals that are paired with the audio clips for each POI. The user responses push the development team to begin considering the balance between photo size, orientation, subject matter, point-of-view, and preview functionality. With a more agile testing approach, we were able to identify this as a priority early on in the development and incorporate it into future iterations of the app. The below diagram also shows that we were also constrained by our ability to prototype the mobile app. For example, some users expressed interested in using visual augmented reality to enhance their experience but we were not able to incorporate these suggestions because of our own technical approach to prototyping (Chapter 2).

Design Prompt: How might geo-tagged, digital audio content be created and employed to shape and enrich visitors experience of an urban trip?

Areas of Investigation: What dimensions will you evaluate to answer the research prompt?

- Content length
- Production quality
- Content
- Content control
- User creation
- Content relevance

Iterative Adjustment: Speed, Amount, Technology, Environment, Effects, Subject, Lexicon, Presentation, UI, Passive vs. Active, Recording, Editing, Temporal, Location, Context

Product Prototype + User Testing
This chapter shares the results from six tests and explains how they affected the development of Alight and its ability to create digital placemaking strategies. Importantly, these tests do not portend to be statistically significant “findings,” but rather they should be understood as part of a dialectic process of qualitative investigation and product development. Each section summarizes the test’s structure and key impacts to the development process. The implications and shortcomings of these tests will be discussed in Chapter 4.

**USER TESTS 0A & 0B: IDENTIFYING CONTENT ALONG BUS ROUTES**

Before development of the app began (and even before consideration of this thesis), I found it important to substantiate the idea for the Alight app by a) finding more evidence that public buses pass by interesting places that could contribute to the form of participatory, digital placemaking that I envisioned through Alight; and b) gaining some insight into exactly how the aural senses can be engaged being “passively mobile” on a bus in order to influence one’s experience of place. In order to continue down the road of this maker-thesis, I sought to test the relative ease that we would be able to identify and create content.13

First, I devised a simple test to test if a public bus route could be engaging and fun as a method of exploration and learning. To do this, I organized four ethnographic researchers from China Youthology (one of whom ended up helping to build Alight, Candy Yang) and asked them to travel the MBTA’s #57 bus route (Figure 9). This bus route does not pass by the typical Boston landmarks and tourist sites. Rather, it takes its riders from Kenmore Square through Allston/Brighton and into Watertown. Even I wasn’t too sure what there was to discover along this route which made it the perfect test whether content could be uncovered to begin decentralizing the typical Boston tourist narrative located around downtown’s historic landmarks. Three of the four ethnographers had never visited Boston before, but we very open to and capable of identifying how a place can consist of several relative narratives of truth (deconstructivist theory). Thus, I sent them out for the whole day to explore Route #57. To help encourage them on the way, I designed a scavenger hunt in which they split into two teams and were asked to find certain things and certain people. They then would come back to share their findings and the stories of the people they met (Figure 10).

The two teams returned with a wealth of stories that clearly demonstrated that a great deal of urban placemaking potential existed along the #57 – we just needed to provide a good platform for it to be discovered. While the teams, of course, came across Fenway Park, a typical tourist site and part of Bostonian lore, upon embarking on the #57 they began discovering a whole new side to Boston. In particular, the two teams shared photos and stories of the Armenian Museum of America at the end of

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13 Granted my own confirmation bias drove this search, but failure to have found evidence of this would most likely have dissuaded me from pursuing this maker-thesis and mobile application.
the #57 which none of them had expected despite having consulted the authoritative guides to Boston before arriving (Lonely Planet, MaFengWo). They also found an open art studio for women in Allston where they learned about the local art scene in the neighborhood and the narratives of the two middle-aged, female artists who had started the nonprofit. While the number of stories they collected far too many to share in this document, it became quite clear that with sufficient motivation, time, energy, and eye for individuals’ stories, one could populate a public bus route with placemaking content. The next question was how might that content be delivered while listening on a vehicle?

To address that question, I bought tickets for Boston’s Old Town Trolley which takes its riders on a loop around historic Boston while enjoying the bus driver’s realtime narration of a loud speaker. This way of exploring a city perpetuates many of the master, top-down approaches of placemaking by repeating a circuit of downtown Boston and telling a scripted story of the city’s Revolutionary past. The driver himself helps to personalize the tour with his personality and personal anecdotes about Boston. One driver shared that he estimated about seventy percent of the stories he tells are from a script provided by the company and the remaining thirty percent come from his own experiences and his desire to make good recommendations to his audience (which can lead to more tips from disembarking riders). Generally these buses come every 20-30 minutes, and they allow visitors to get on and off as they please. For the purposes of this thesis, these well-institutionalized tours helped to set the precedent for how passively mobile individuals could enjoy location-specific content about the places they passed and even begin to engage with the places through consumption.

At this point, Scott Middleton and Candy Yang had joined the Alight team and the three of us rode the trolley to identify what principles might guide the development of public bus content to help create a new sense of place along the MBTA bus routes. Our participant-observation methodology helped wear the shoes of a visitor to Boston and then reflect on the elements that made it enjoyable and engaging. We found that the experience relied greatly on the charisma and humor of the bus driver. This was an important finding as the drivers are all given a standard narrative that drives most of the content for the bus ride, but the format by which it is delivered is critical in developing a shared experience of place. Reviewing the recording of the drivers’ narration, I developed guidelines for delivering audio content on a bus. Some examples included:

- A maximum of 30 seconds per story, especially when in movement to ensure that the narration matches the location.
- Specific stories of people that happened in a place are preferable to general descriptions of the importance of a place. (For example, one driver shared how a homeless man once stole a light from the Zakim Bridge which made the landmark memorable and humorous).
- Recommendations were common from the bus drivers, especially places to eat and shop (although none of the riders got off at the recommended places).
- Filler jokes and comments could be made when the trolley sat in traffic. These often had little to do with the exact location but were often attributed to being characteristic to Boston.
- Drivers were personable, friendly, and approachable rather than offering authoritative narrations of Boston.

Figure 14: Old Town Trolley tickets cost 39.85 and allow riders to hop on and off for two days.
With this preliminary research demonstrating the potential for audio content to help animate the scenes outside of a bus ride, I had the confidence and fodder to embark upon this maker-thesis. At this point, enrolled in some online app development classes and began exploring different methods to actually experience the most foundational aspect of Alight: place-specific audio content delivery.

Figure 15: Each test in this maker-thesis is along a predetermined bus route. In these preliminary tests, I used geotagged photos to help record the experience and process.

<table>
<thead>
<tr>
<th>Date:</th>
<th>a) October 13th and b) November 16th, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Version</td>
<td>n/a (pre-app development)</td>
</tr>
<tr>
<td># of Testers:</td>
<td>a) n = 4</td>
</tr>
<tr>
<td></td>
<td>b) n = 3</td>
</tr>
<tr>
<td>Key Question(s):</td>
<td>a) Does interesting content exist along a non-tourist bus route? What kinds of stories and POI can be discovered?</td>
</tr>
<tr>
<td></td>
<td>b) What production qualities typify mobile POI content sharing on existing bus tour ride? What content themes are provided on existing bus tours of Boston?</td>
</tr>
<tr>
<td>Test Format:</td>
<td>a) Four Chinese ethnographic researchers were sent along the MBTA’s #57 bus route (Kenmore → Watertown) on a scavenger hunt to collect interesting stories along the line over 6 hours.</td>
</tr>
<tr>
<td></td>
<td>b) The author, Scott Middleton, and Candy Young conducted participant-observation on the Old Town Trolley tour to evaluate the experience.</td>
</tr>
<tr>
<td>Response Collection Format:</td>
<td>a) Story sharing and focus group discussion (see photo below)</td>
</tr>
<tr>
<td></td>
<td>b) Audio recording, handwritten notes</td>
</tr>
<tr>
<td>Key Implications:</td>
<td>a) Interesting content exists along sections of the #57 despite not passing by typical iconic Boston landmarks and sites. The researchers found stories and places of empowered women, refugee immigrants, military, and consumption.</td>
</tr>
<tr>
<td></td>
<td>b) Existing tour buses create a very personal, local feel for riders with a driver who shares very specific anecdotes. The drivers estimate that ~70% of their content is from a script of Boston information and the remaining is their own anecdotes. Stories generally were quite short ~30 seconds depending on speed of the bus.</td>
</tr>
</tbody>
</table>
After developing my first app (Chapter 2, Alight 1), I was ready to see what it actually felt like to be on a public bus route and be informed with information about the places I was passing. In preparation, I had taken several trips on the MBTA’s #47 bus from its first stop (Central Square, Cambridge) to its last (Broadway, South Boston). Along the way I took photos of the interesting sights along the road according to my Content Creation Process (Appendix 1). These geo-tagged photos acted as visual notes of points-of-interest (POI) to continue researching at home and then record audio. These stories were aggregated into the app’s database, and I organized a first trial with myself and three other users who had joined the Alight team: Scott Middleton, Candy Yang, and Miles Taylor.

The goal of this first trial was simply to gain visceral understanding of how the combination of this technology, media format, and riding a public bus changed the riders’ experiences. Departing from Central Square, we were excited to find that the GPS was quite accurate delivering audio content when the POI came into sight. The feeling of hearing the narrator say “On your left you’ll see...” and then looking left and seeing the exact same POI from the exact same perspective as the photo on the phone’s screen was a power feeling. However, this occurrence was not common as it required several different variables to coincide perfectly: the placement of orienting directions in the audio narration, the quality of the photo perspective, the speed of the bus, and the decision of the user to press the “Alight” button to begin playing the audio piece. At times, audio for POI that we had already passed would come up or the traffic would slow so that we would here the same POI recording over and over again. Nevertheless, the overall experience was an engaging and exciting one.

At the end of the experience, I led the team with a structured discussion guide (Appendix 2) to debrief the experience so as to guide our future development of the app and especially the content created for each bus route. The discussion guide was divided into several sections with specific questions prompting the user to think about his/her experience in detail:

- Content Themes
- Content Format and Delivery
- User Experience and Interface
- Content Creation Process

We first individually went through the discussion guide’s questions and took notes on our responses before sharing with each other some of the key aspects. Overall, the discussion revealed that while the experience of learning about the places one passed on the bus was an engaging one (One user shared that she had learned a great deal about Boston that she didn’t know before and was excited for the next route), there was still as great deal of work to be conducted in the way that content was both created, organized, and then delivered in a comfortable and natural way. The app itself needed to be more amenable to user control and easier to load content to. The content ideally would be shorter clips and better organized. These findings were summarized and
then incorporated into the development of the app for our second user test with our first external users on Route #1.

<table>
<thead>
<tr>
<th>Date:</th>
<th>4pm February 9th, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Version</td>
<td>Alight 1 (App Inventor 2 build)</td>
</tr>
<tr>
<td>Bus Route</td>
<td>- MBTA #47</td>
</tr>
<tr>
<td></td>
<td>- From Central Square to Broadway</td>
</tr>
<tr>
<td># of Testers:</td>
<td>- n = 4</td>
</tr>
<tr>
<td></td>
<td>- 75% male, 25% female</td>
</tr>
<tr>
<td></td>
<td>- Ages: 17-31yo</td>
</tr>
<tr>
<td></td>
<td>- Internal development team: David Wang [author], Scott Middleton (content), Candy Yang (content and marketing), Miles Taylor (content)</td>
</tr>
<tr>
<td>Key Question(s):</td>
<td>- What does the experience of location-specific audio content feel like on the bus?</td>
</tr>
<tr>
<td></td>
<td>- How well does the technology (GPS) work to create an engaging user experience?</td>
</tr>
<tr>
<td></td>
<td>- What content production guidelines are needed to create a quality experience?</td>
</tr>
<tr>
<td>Test Format:</td>
<td><em>Participant-Observation:</em> Riding the bus from origin to final stop as a group. Each person was supplied with an Android phone and listened to content created by the team. The ride was followed immediately by a guided discussion at the destination.</td>
</tr>
</tbody>
</table>
Response Collection Format: Guided group discussion (see appendix for discussion guide)

<table>
<thead>
<tr>
<th>Key Implications:</th>
<th>Experiencing location-specific audio content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- The experience of hearing what was directly out of the window as you moved was a great feeling when it worked.</td>
</tr>
<tr>
<td></td>
<td>- Having the photo match the view from the bus helps to orient user to the POI. This could be enabled through narration directions. Photo quality improves the user experience.</td>
</tr>
<tr>
<td></td>
<td>- Users felt encouraged exploration of Dudley Square neighborhood and Broadway.</td>
</tr>
<tr>
<td></td>
<td>- Obscure content felt more like “discovery,” and there was a lot of room for humorous content. It was better for the narrator to seem approachable rather than authoritative.</td>
</tr>
</tbody>
</table>

| Technology        | GPS location was different with different devices making for an inconsistent experience. To reach the best experience would mean fine-tuning the location of the user down to the line of sight so that narration is always visually relevant. |
|                   | A buzzing alert for a new POI was annoying for the user. |

| Content Production Guidelines | There were two kinds of content. One was context relevant describing entire areas that the bus route traversed. These kinds of content gave the user something to search for without a specific, permanent site. For example, one audio piece discussed how Cambridge cars tend to have many bumper stickers on them which prompted the user to look for this. |
|------------------------------| The other was location specific – a very specific POI that would come into view as the bus passed. |
|                              | Different places on the map can allow for different lengths of audio depending on traffic and stop lights. The length of the audio should be under 30 seconds. Long audio pieces became less relevant with a quickly moving bus. |
|                              | The veracity of content could present a future challenge when content was open to many more people. |

**USER TEST 2: MBTA #1**

The second user test was conducted on the MBTA’s Route #1. Compared to the #47, the #1 is much busier serving from Harvard Square to Dudley Square. For this user test, I recruited individuals who had not been exposed to the development of Alight or the content that had been produced for the app. While the users were familiar with the app’s general functionality from the description of it when being recruited, the goal of this test was to get less biased responses from their experience on this bus. For this user test, I supplied them with Android phones with
the Alight 2 version pre-installed and gave them a brief tutorial of how to use the app.\footnote{I learned throughout the process of testing that most of the people in the MIT community were iPhone users so finding Android phones for testing became a big hurdle. In addition, many of the trial users not only need to learn how to use Alight, they were also not very sure about how to handle the Android OS.} We then boarded the #1 bus from 77 Massachusetts Avenue (not the first stop). Because we didn’t board at the first stop, the bus was already quite crowded making for a different environment for experiencing the app when compared to the first trial. We had intended to go all the way to the final stop, but an incident on the bus caused us to stop the trial at the Boston Medical Center. The users had been served \~10 POI recordings by the time we went back to fill in the online survey and have a discussion of the experience.

The online survey\footnote{The survey can be viewed at this link: https://drive.google.com/open?id=11e0HqJtNkgTvIaVFTCf19Bsmg_up8o5i8p2Jffbg0} was a useful tool to help the users collect their thoughts before engaging in a group discussion about the experience. The survey also served to allow me to better understand the individual perspectives of a diverse group of respondents (see below breakdown) before they came to group opinions about the app. The results of the survey seemed to indicated that for individuals who are less familiar with Boston (our Chinese users) they were more entertained and learned more from the audio content that was delivered. These kinds of users appreciated content that was considered obvious or official by the local Boston users in the test. For example, one POI was about the Boston Symphony Orchestra was exciting for a non-local user who had been through the area several times but never realized the history of the building she was passing. The local users, however, felt that the content was contrived and didn’t give them access to truly local information. This was an interesting observation as Alight has been positioned as a tool of shared, digital urban placemaking but these responses illustrated that different kinds of users sought different amounts of depth from the content. While I had originally envisioned much more local voices weaving together a feeling of places, the responses from non-local users elucidated that the traditional landmark POI did serve as an easier point of entry for understanding a place. During our group discussion this tension was embodied in a repeated question, “Who is the app for?” The users were all eager to learn more from our Alight team about who we envisioned using this tool. While I had envisioned that Alight could start by serving tourists, I had hoped that it would be a tool for just about everyone including those who commute on the bus daily and those that don’t ride the bus but wanted to explore the city they lived in. However, this group’s focus on this key question helped illustrate the importance of identifying the different use cases of the application.

For further development of Alight, the users also shared important observations of their experience including the ability to have content themes that fit users’ interests (this would solve the aforementioned tension); having the narrator present a distinct personality rather than an objective presentation of facts; and the ability for users to...
contribute their own content. One repeated point was that there should be more local voices on the app. One user was particularly disappointed that the Alight team had not gotten off the bus to interview people about their experiences. This user advocated that Alight should reflect voices that aren’t often heard in the narrative of the places that we had been introducing. This point was well-taken and helped us decide to begin focusing our next trial on the MIT Shuttle Bus so that we could more easily collect content from local stakeholders and test the experience of a mix of local voices on the platform.

The results from this user test made it clear that I needed to recruit more individuals to help make Alight’s technical platform and content platform. Before the third user trial, I decided to recruit a professional app developer to begin streamlining the app user interface and database management. In addition, Candy and I recruited more content creators to join the team to begin producing content in both English and Chinese so that we could begin with larger scale user trials with real visitors to Boston.

<table>
<thead>
<tr>
<th>Date:</th>
<th>4pm February 23rd, 2018</th>
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</thead>
<tbody>
<tr>
<td>App Version</td>
<td>Alight 2 (App Inventor 2 build)</td>
</tr>
<tr>
<td>Bus Route</td>
<td>- MBTA #1</td>
</tr>
<tr>
<td></td>
<td>- From 77 Mass Ave to Boston Medical District</td>
</tr>
<tr>
<td>Testers:</td>
<td>- n = 4</td>
</tr>
<tr>
<td></td>
<td>- Gender: 50% female, 50% male</td>
</tr>
<tr>
<td></td>
<td>- Rode Sightseeing Bus: 75% yes, 25% no</td>
</tr>
<tr>
<td></td>
<td>- Bus behavior frequency: 50% daily, 25% monthly, 25% yearly</td>
</tr>
<tr>
<td></td>
<td>- Occupations: Student, Executive Director of Nonprofit, Mental Health Consulting, Marketing</td>
</tr>
</tbody>
</table>
- Age Range: 18-74

| Key Question(s): | - Quality of experience versus regular bus?  
| | - What forms of narration were effective?  
| | - What kinds of content were interesting and engaging?  
| | - Assess potential for creating user-generated content. 

| Test Format: | **Ride, Survey, and Discuss**: Respondents who had never used the app before were invited to try the app. They were supplied with an Android phone and taken on the Route #1.  
| | **Response Collection Format**: Online Survey and Group Discussion 

| Key Implications: | **Experience**  
| | - Users ranked their experience of the bus with Alight as above average.  
| | - Range: 6-10, Mean: 7.75  
| | - Lack of user control over audio content was frustrating. 

| | **Narration**  
| | - Distinct personality: Adding personal perspective and experiences helped make the content more relevant to the listener. This could be done through humorous comments.  
| | - Having different narrators created a different kind of experience, but users were divided about whether it was good or not. Possibly allow user to control number of narrative voices. This means having diversity of gender, age, background, etc.  
| | - Too much enthusiasm from narrator felt awkward 

| | **Content Themes**  
| | - The themes were diverse, but users wanted more local voices and non-touristy information. 

| | **User-Generated Content**  
| | - All four users expressed interest in creating content for the app. 

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16 The test was interrupted when the bus ride stopped due to a possible crime that occurred. The respondents were then taken back to MIT to complete the survey despite just riding for a short segment of Route #1.
USER TEST 3: MIT EZ-RIDE SHUTTLE

Two weeks later we began testing the MIT EZ-Ride Shuttle Bus. Scott Middleton has begun developing content for the route after meeting with the bus company to get permission for us to test the app with the many visitors to MIT’s campus. With Alight 3 providing a much more interactive user experience (see Chapter 2) in which the user could control the content he/she listens to and the beginning of “contextualizing content” and “window watching content” and with both English and Chinese content, we aimed to begin conducting user trials with users we intercepted on the street. Because we had not yet uploaded the app onto Google Play Store, we opted to advertise directly to Chinese- and English-speaking visitors who were taking photos of MIT at 77 Massachusetts Avenue and supply them with a loaner phone and a free ticket to board the bus. This spot was also where the EZ Ride Shuttle stopped so it made for an excellent place to find users. We created a poster, pamphlets, and chalk advertisements that presented the app as a free, convenient, and authentic way to explore more of MIT (see Figure 15 for an example of the pamphlet). It proved quite easy to engage visitors in discussions and many were very eager to try the app.

After doing this for two Fridays, we had collected 12 responses from people from around the world. Generally speaking, the results were quite positive. The users had an average Net Promoter Score of 33 which for a first trial with users is quite good. The range of willingness to share with the friend was entirely positive (ranging from 6-10). The users also shared a limited Willingness to Pay ranging from $0-$3. However, because they were using our own phones and filling out the online survey in front of the researchers, it should be noted that there could very well be some bias in this result. Nevertheless, the results revealed that users were overwhelmingly positive about the concept and enjoyed that the app gave them a deeper introduction to MIT. They particularly liked the stories about MIT that they would have otherwise had no access to. This included stories about the MIT “hacks” (technically challenging pranks done by each year by MIT undergraduates) and vignettes into the kinds of shops that students frequent like Flour Bakery. This seemed to be especially true to for Chinese tourists who were visiting had a significant language barrier that was overcome with our Chinese audio content. However, most of the users also complained that the content rarely matched their position resulting in a mismatch between content and what was outside of the bus window. The app was also quite buggy often crashing or repeating the same content over and over. This frustrated users as they could see the potential of the app but the technical bugs made for a less desirable experience.
Overall these trials with first-time users helped to identify many of the technical challenges that would come up with an increasing number of users who were not familiar with the app. These trials helped to identify that it was important to have enough content for users so that they would not hear repeated content. It also revealed that the user interface would need to be greatly improved to alleviate many of the anxieties that occurred in about boarding, payment, orienting oneself to the approach POI, and having an intuitive understanding of how to control the app. These responses helped to prompt the co-creation workshop mentioned in Chapter 2 that set the direction for Alight’s design goals.

<table>
<thead>
<tr>
<th>Date:</th>
<th>March 9th – March 16th, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>App Version</strong></td>
<td>Alight 3 (Android Studio build, Andrew Takao)</td>
</tr>
<tr>
<td><strong>Bus Route</strong></td>
<td>MIT EZ-Ride Shuttle</td>
</tr>
<tr>
<td></td>
<td>15 minute loop of MIT campus</td>
</tr>
<tr>
<td><strong>Testers:</strong></td>
<td>n = 12</td>
</tr>
<tr>
<td></td>
<td>Reason at MIT: 50% sightseeing visitors to MIT, 33.3% current students, 16.6% other</td>
</tr>
<tr>
<td></td>
<td>Gender: 50% male, 50% female</td>
</tr>
<tr>
<td></td>
<td>Age: 18-55</td>
</tr>
<tr>
<td></td>
<td>Nationalities: 50.0% American, 33.3% China, 8.3% Canadian, 8.3% Germany</td>
</tr>
<tr>
<td><strong>Key Question(s):</strong></td>
<td>Experience and likelihood to recommend to friend or family.</td>
</tr>
<tr>
<td></td>
<td>Why kinds of content are interesting and engaging?</td>
</tr>
<tr>
<td></td>
<td>What impression of MIT do the users have after the ride?</td>
</tr>
<tr>
<td></td>
<td>Willingness to pay for the app/tour?</td>
</tr>
<tr>
<td></td>
<td>How was the user experience?</td>
</tr>
<tr>
<td><strong>Test Format:</strong></td>
<td>On-Street Intercept, Ride, and Survey: Visitors outside of MIT’s 77 Mass Ave address were introduced to Alight with a poster and our Alight team. They were supplied with a pre-installed Android phone and</td>
</tr>
</tbody>
</table>
given a ticket to ride the EZ-Ride Shuttle around the campus. An Alight team member accompanied them on the bus.

Response Collection Format: Online Survey

Key Implications:
Net Promoter Score: 33
Impression of content:
- Excited to gain “inside access” to MIT’s stories
- Chinese content was especially useful for provide access
- More MIT context filler content would help to fill in gaps and ensure there was always something new to listen to
Willingness to pay:
- Maybe would pay but very dependent on the quality of the content and user experience
- $0-$3
User experience:
- Users still uncertain where certain POI are located
- Not enough content for a high quality experience
- User controls are still not clear enough

Would you pay for this app? 你会愿意为这个app付费吗？
12 responses

USER TEST 4: MIT EZ-RIDE SHUTTLE

As the development of the app progressed, the EZ-Ride became the main testing vehicle by which we could experiment with new features almost daily. My team and I were able to create new content and features, walk outside of the office, and jump onto the EZ-Ride to test them out. By the end of March, we had a robust new version, Alight 4 (Chapter 2), which gave the user a great deal of control over what he/she heard; had a large amount of Chinese and English content (including filler content and interviews with MIT students); could be sorted by themes; incorporated user sign-in; and ensured that content was never repeated but the user could still scroll
through his/her tour history. As a team, we felt that app was near-ready to be available publicly on the Google Play Store, but first we decided to have a pin-pointed user test with one of our key end users: Chinese visitors to MIT.

From the very beginning of Alight, Chinese users had helped me gain perspective into how a newcomer to the city might find riding the bus enjoyable and educational. This group also represented one of the “beachhead markets” that this app might be available to when released. They represented one of the top three tourist demographics in Boston with over 250,000 visiting in 2017. Because our team was familiar with this demographic and because they often reported wishing they had more access to local and authentic experiences, we wanted to see exactly how they would respond to Alight. Candy Yang connected with a Chinese travel agency which brought a group of Chinese visitors to our office at MIT to try out the app. They were introduced DesignX (the accelerator program Alight had been accepted into) and then handed Android phones to use. Just like User Test 3, the users were taken on the EZ-Ride shuttle and then took a survey to share their experience of app.

As the results summarized in the table below reveal, there was a much higher Willingness to Pay and Net Promoter score for this demographic. While the app certainly had many user-friendly improvements, these Chinese users who were less familiar with how to access MIT’s campus and information were very happy to have discovered information about MIT through Alight. In the survey, several of the users were most excited about learning how MIT community interacted with each other (MIT hacks, student groups, and individual stories from students) rather than “official” comments about MIT (what MIT stands for, when it was founded, etc.). This implication helped us decide to push forward with more personal stories from students at MIT and for the future development of other routes in Boston. This insight boded well for the use of user-generated content as it suggested that individual voices and stories felt more interesting and authentic that the traditional narratives one received about a city. Lastly, the entire group was disappointed to learn that we had not developed an iOS version of the app. Upon reflection, it would have been prudent to spend a little more time at the beginning to learn how to build an iOS application because the vast majority of our potential testers were all iPhone users. With these learnings in hand, we prepared to launch the beta test version on Google Play store for a fifth trial.

<table>
<thead>
<tr>
<th>Date:</th>
<th>2pm March 30th 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Version</td>
<td>Alight 4 (Android Studio build, Andrew Takao)</td>
</tr>
</tbody>
</table>
| Bus Route   | - MIT EZ-Ride Shuttle  
              - 15 minute loop of MIT campus |
| Testers:    | - n = 6  
              - Occupation: 83.4% student, 16.6% doctor  
              - Gender: 50% male, 50% female |

- Age: 24-35
- Nationalities: 100% China
- Phone Ownership: 100% Apple iOS

**Key Question(s):**
- Experience and likelihood to recommend to friend or family.
- Why kinds of content are interesting and engaging?
- What impression of MIT do the users have after the ride?
- Willingness to pay for the app/tour?
- How was the user experience for Chinese users?

**Test Format:**
Organized Ride and Survey: Chinese students from around Boston were organized by a travel agency to test out the app. They were given an introduction to Alight and provided our Android phones because they were all iPhone owners.

**Response Collection Format:**
Online Survey

**Key Implications:**
Net Promoter Score: 66

Impression of content:
- Access to hard-to-know information is highly prized
- Would like to have more recommendations of places to eat

Willingness to pay:
- Maybe would pay but very dependent on the quality of the content and user experience
- $0-$10

User experience:
- Narration felt very formal
- Desired more information about POI, especially authentic, first-person narrative → We decided to start interviewing Chinese users
- Asked for an iPhone version

**USER TEST 5: GOOGLE PLAY BETA TEST**

The biggest step in the development of Alight was making available for any beta tester in the world on Google Play. In addition to making UI/UX updates to the app, I designed a data analytics framework to begin collecting anonymous user interactions with the app. Unlike previous tests of the app, we would most likely never meet these beta users and many of these beta users would not click on the “Feedback Survey” in our settings menu. However, Firebase allows for the tagging of specific events that happen in the app such as when a certain button is pushed or when POI were swiped away. These actions were automatically anonymized and aggregated into the Firebase database so that they could be analyzed for insights into how users actually use the app and even what they might expect when using the app. The interface with
Firebase’s data was not very intuitive, but it had the functionality to export all of the data to a .csv file so that if could be organized and played with in many ways.

Before starting the beta test, I led the team in also identifying key performance indicators that were tied to the app’s performance and user adoption. These KPI were helpful to accurately measure our progress at developing the app and could also be used to better answer the question of distributed, digital placemaking. These KPI are listed in the table below:

<table>
<thead>
<tr>
<th>KPI (To be achieved in 30 days)</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downloads from Google Play</td>
<td>1000 downloads</td>
</tr>
<tr>
<td>User-Generated Content Sign-Ups (people who fill in a form to request to make audio content)</td>
<td>10 people</td>
</tr>
<tr>
<td>User-Generated Content Actions (number of people who actually upload content)</td>
<td>5 people</td>
</tr>
<tr>
<td>Spotlight Emails</td>
<td>20 sends</td>
</tr>
<tr>
<td># users with 5+ min sessions</td>
<td>100 users</td>
</tr>
<tr>
<td>Feedback Surveys</td>
<td>10 surveys</td>
</tr>
<tr>
<td>Media Publications</td>
<td>5 publications</td>
</tr>
<tr>
<td>iOS Sign-ups</td>
<td>1000 sign-ups</td>
</tr>
<tr>
<td>POI Likes</td>
<td>75% of active users</td>
</tr>
<tr>
<td>Bus Rides</td>
<td>75 rides</td>
</tr>
</tbody>
</table>

The app officially launched for public trial on April 27th, 2018. This was also when user actions began being tracked in the app. In order to attract users to download the app, a 50-person email marketing campaign was sent out and the entire team’s own social media networks were engaged. As of May 6th, Alight had accrued 152 signed-up users, 28 of which had signed up after April 27th.

As of the writing of this document (10 days after public release) have not been very revealing. While the app has been downloaded by and users have signed up, the users have not yet tried the app on the bus and thus haven’t

Figure 21: Alight’s monthly users hit 152 users after launching on Google Play. Many of these users have yet to try the app on the bus or create their own content.
experienced the tours. Most of the actions taken by these users have been browsing the available routes for tour and looking at the content creation screen Interestingly, we quickly received three requests from unknown users to create content for the #450 (Boston-Salem), #117 (East Boston), and #110 (Malden-Revere) which weren’t available for content creation in-app (We had only offered routes from #1-100.). This could suggest that perhaps it is the users outside of Boston (away from the popular points-of-interest) that are the most apt to create content for routes that are off the beaten path.

Without enough use of the app, it has been difficult to distill insights from the users. Give the short amount of time since releasing the app on Google Play (10 days), it is likely that users have not had the time to board the bus and try out the app. However, this highlights an aspect of this app that is outside the purview of this thesis: the start-up. As a potential business, Alight is reliant on successful marketing. This implies both identifying the user group most likely to adopt and use the app as well as identifying a channel through which to communicate with them. Currently, the time and energy investment of moving from downloading the app to getting on the bus and trying the app seems hard for users to surmount. This suggests that in addition to the media and traveling channels we’ve contact, approaching current bus riders will be a good method for rapid adoption. Moving forward, more efforts will need to be expended on market research and marketing to gain higher usership.

<table>
<thead>
<tr>
<th>Date:</th>
<th>April 27th- May 27th 2018 (Still in process)</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Version</td>
<td>Alight 5 (Android Studio build, Andrew Takao)</td>
</tr>
<tr>
<td>Bus Route</td>
<td>Open to any downloads for Routes #1, #47, #66, #92/93, #9/10, SL5, Harvard Shuttle, MIT Shuttle, #57, #39, #77, and more.</td>
</tr>
<tr>
<td>Testers:</td>
<td>Open release. Target 1000 downloads.</td>
</tr>
<tr>
<td>Key Question(s):</td>
<td>Alight Spotlight</td>
</tr>
<tr>
<td></td>
<td>Content interests</td>
</tr>
<tr>
<td>Test Format:</td>
<td>Firebase Analytics tracks user behavior</td>
</tr>
<tr>
<td>Response Collection Format:</td>
<td>Data Analytics of user behavior. Structured by event_content, content_type, and id_name.</td>
</tr>
<tr>
<td>Key Implications:</td>
<td>Still being tested.</td>
</tr>
</tbody>
</table>

**CONCLUSION**

By repeatedly testing the app, I was able to get deeper insights into how mobile phone users would expect to experience placemaking. I found that one of the most useful experiences was simply to watch people try to use the app. The position of vulnerability that a “maker” is in when watching a user helps to highlight the shortcomings of the product. This type of observation was by far the most helpful in developing the app’s features and user interface. At the same time, using anonymous surveys and data analytics logging provided deeper insights into how one’s understanding of an urban place can be created, modified, or reaffirmed with digital media. The many comments and actions of surprise when learning about the personal stories of different places (ranging from student stories of MIT to anecdotes of bumper sticker culture in Cambridge) help demonstrate that placemaking can very much be about smaller pieces of content. This content can be packaged into 20-30 second audio clips, but it is also very challenging to sew these clips into a feeling of a cohesive narrative of place. Perhaps this kind of diffuse, incoherent narratives of place better represent the kind of frenetic society we now live in and have come to expect.
With these testimonies, observations, and surveys, the central design-prompt of the *maker*-thesis can be addressed. To determine if and how Alight shapes the experience of place while on a bus, the following chapter will present an analytical framework to interpret qualitative data collected from the user trials.
CHAPTER 4: ANALYSIS AND DISCUSSION OF RESULTS

This thesis posits that a mobile application can transform the experience of riding a public bus by delivering location-specific content to users to accompany what they see outside the bus window. In Chapters 2 and 3, I presented the iterative process by which the app was developed with an ever-evolving set of tools in response to the qualitative feedback from a variety of users on several different bus routes. The building of Alight provided data and knowledge embodied with the tools of its own production. The user trials provided hints and the expectations and behaviors of Alight’s users. However, while making sense of these data points during the process of making this thesis’ product is quite intuitive (The “maker” constantly tinkers with the product in response to data and reflection from trial uses), it is more challenging to locate the entirety of qualitative datasets at a more generalized, abstracted level. To do this, one must establish an analytical framework by which to compare the data and evaluate its importance to this thesis’ core question of how users’ sense of “place” is affected.

This chapter establishes an analytical framework by adapting the dimensions outlined for definition of an “event-place” (Frenchman, 2004). Dennis Frenchman’s article Event-Places in North America: City Meaning and Making provides clearly-defined and in-depth examples “event-places” which “create powerful linkages between physical and social phenomena ... to shape a sense of place and give it meaning” (ibid., 37). This shaping of place is exactly what Alight purports to do, but exactly how this shaping can occur can be best elucidated through the concept of an “event-place.” Frenchman gives examples of “event-places” as being demarcated by a location and time-period on the measure of hours or days, such as Providence’s Waterfire\(^{18}\) and the National Folk Festival in Bangor, Maine. For the purpose of this analysis, I have adapted the concept of an “event-place” to the riding of a bus through a certain geographic area. For example, the MIT EZ-Ride Shuttle bus provides a mobile exploration of the MIT Campus area in about 15 minutes, and I would analyze this experience as Frenchman does an “event-place.” For longer routes, I have selected that a neighborhood such as Dudley Square or Central Square can serve as a proxy for an event-place instead of the entire bus route as users are not expected to take an entire bus route while using Alight. The inherent mobility and relatively shorter time-scale are two obvious differences between Frenchman’s subject of analysis and mine, yet, as will be discussed later, this difference helps to elucidate the challenges that Alight faces in becoming a powerful medium to shape the experience of place.

Frenchman’s article delineates the four key functionings of an “event-place” which I have borrowed to better understand the workings of Alight. They are:

\(^{18}\) Every Saturday, torches along Providence, Rhode Island’s Woonasquatucket River are lit to a variety of different musics for a public audience. This free public event began in 1994 and continues to draw an average audience of 40,000 people.
Each one of these functionings has its own series of qualitative characteristics by which it can be measured. In the following sections, I first introduce the core idea of the event-place functioning and why it is applicable to Alight. I then outline the key characteristics of the functioning and compare it to the data collected in Chapters 2 and 3. I then conclude each section with an evaluation of how well Alight delivers on the functioning and what steps should be considered to improve the mobile app as an “event-place.”

INTERWEAVING FORM AND ACTIVITY

A core functioning of an “event-place” is its ability to allow people to interact with their physical environment (Frenchman, 2004, p. 39). The designing of a space to allow for individuals to not only feel access to it but to also have a motivation to interact allows the individual to change his/her disposition to the place. Frenchman shares the example of how Bangor, Maine’s National Folk Festival’s activities (music, shops, workshops, food, etc.) help to transform the form of the historically industrial area. At the same time, this former industrial area’s form with a river and open, underutilized spaces also defines the festivals “dispersed” feeling with tents and stages scattered throughout (Frenchman, 2004, p. 39). This kind of “interweaving between form and activity” serves as a cornerstone of shaping a sense of place.

This dialectic process between form and activity is critical to understanding how Alight might serve its users as both a digital form of enhancement of space and as an activity of content consumption and creation. In other words, while Frenchman provides examples of how the form of a physical location both influences and is influenced by the physical activity its hosts, I understand that Alight creates a digital overlay of a space and activity that gives a unique sense of place. In other words, as the user rides the bus through a demarcated neighborhood, he/she experiences an event by using Alight to demarcate the form the neighborhood (the place) and prescribe methods for engaging with it (the event). Below, I share responses from our user trials and evidence from the
iterative development of Alight that illustrate how powerful Frenchman’s model is at predicting the importance of this functioning and suggest room for further improvement to the app as a facilitator of “interweaving form and activity.”

TERRITORY

One of the first challenges that Alight faces in creating a sense of place is clearly identifying the boundaries by which one experience’s place. With a sense of edges to an experience, the participant of an event-place develops a sense that it is separated from daily life. Frenchman illustrates how waterfronts often serve as good settings for event-places because they have a distinct edge, and he acknowledges that there can be creativity in how the territory space is made clear to its participants (p. 39).

For Alight users, this kind of demarcation has repeatedly been shared as a need. When the concept is first described before users try the app, many express concerns about identify the territory of the experience. These concerns can be classified accordingly:

<table>
<thead>
<tr>
<th>Type of Territory Concern</th>
<th>Example of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty about entry to space: Because Alight is a tool that blends several spaces (digital, transportation space, and neighborhoods) it is unclear when the territory begins.</td>
<td>When will the bus come? How do I pay? When should I turn on Alight? When should I get off? (User Trial 1)</td>
</tr>
<tr>
<td>Anxiety about unknowingly leaving demarcated space: Largely because of the digital nature of Alight, it is unclear when the experience begins and when it ends.</td>
<td>What happens if I get off of the bus? Will the app have anything more for me to explore? Why can’t this work when you’re not on the bus? (User Trial 2)</td>
</tr>
<tr>
<td>Confusion about the scope of space: Because the app feeds content automatically based on one’s location, the user does not have a perspective of nor the sense of control over the entire set of content mapped over the bus route (territory).</td>
<td>How come there’s now audio playing right now? Why can’t I hear different content? I’ve already heard this audio clip several times! You could provide a map to let people know ahead of time what they will see, like Google. (User Trials 1-4)</td>
</tr>
</tbody>
</table>

These concerns helped illustrate users hope for a defined territory if they were to have a fully immersive experience on the bus using Alight. Their immediate concerns when learning about how the app worked illustrate a challenge that digital placemaking tools will likely always face because they lack physical and tangible indicators of territory.

Nevertheless, the most current version of Alight (version 5) attempts to address this need for a delimitation of space in several ways. These measures are qualitatively supported by testimony from the surveys:

<table>
<thead>
<tr>
<th>Territory Concern</th>
<th>Alight</th>
<th>User Responses and Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## Uncertainty about entry to space

A “board” screen was introduced to indicate the beginning of the experience. This screen shares how to find and get on the bus, but also makes clear that audio content will only be served when the user has found a route, got on the bus, and put on their headphones.

**Version 1 (w/o boarding screen and audio automatically starts):** What should I do after selecting a bus route? Why is the audio already playing?

**Version 5 (w/ boarding screen):** It’s cool that the app tells me how to get to the nearest stop and when the bus gets here. [The user would then press “Board Now” to begin the audio]

## Anxiety about unknowingly leaving demarcated space

The decision to focus on only bus routes greatly limits the exploration space. While many have suggested that the app’s core innovation (location-specific audio content) be used anywhere on any mode of mobility, the decision to focus on bus routes helps define the territory and use case. While the app will still work if you’re not seated on a bus, the instructions and branding have been developed to help users understand the territory to be while seated on the bus.

**Prior Arts Review:** Walking apps of Boston gave users confusion about how to experience the content unless the route was highly prescribed (see Detour App). Thus the bus route’s predictably and relative permanence helped to anchor the edges of the territory.

## Confusion about the scope of space

A preview function was added in which the user can a) see all of the photos of the POI ahead of time and b) see the entire bus route.

User history was also introduced so the user could see where and what he/she already experienced.

Alight also sets a 150-meter radius around the bus route to ensure that content is within view of the bus.

**Co-Creation Workshop:** The team discovered that selecting a route was a big challenge, so they come up with visual ways of previewing a route.

For Alight, the key marker that delimits this experience is whether or not audio content is being delivered. This aural boundary is difficult for users to pick up and thus we have introduced other indicators to prompt the user to understanding this boundary. These features help the user gain a sense of territory that is not normally supported when creating a digital space in a physical place. The app seeks to allow for the user to depart from everyday life to experience places in a new and immersive ways, but to do that boundaries must be established for the user to feel secure.

## INTIMACY

This sense of security also lends itself to the feeling of intimacy for the participant-user. By being in a demarcated experience space, the user should feel “compressed into an activity … because of a sloping topography that allows people to survey a scene as they are gently pulled to its center” (Frenchman, 2004, p. 40) While this sense of
intimacy can be created with physical spaces and the participants of the event, it is much harder to do with a digital app. Currently, Alight’s users do not report any sense of intimacy with the events occurring from the audio content nor the places they see outside of the window. This might be attributed to the extremely short temporal boundary of the event. Unlike Frenchman’s “event-places,” Alight users have a mere 30 seconds of time to be engaged by the POI they are listening to before the bus moves on. This does not allow for the kind of intense focus that provide for intimacy.

This observation from the user trials suggests that more work might be done to enhance the intimacy of the Alight placemaking experience. Conceptually, it would be ideal to have the user be able to “alight” and truly explore the places he/she hears about in the app. This could very well be implemented into the app but would require both a heightened technical function to locate the user and a great deal more content. Alternatively, Alight could also partner with local businesses, public spaces, and communities to create times and spaces for users to “slow down” and focus on a single point on their journey. Finally, another option that one user raised (Trial 3) was that adding more content in text and images for a given POI would allow the user to change her focus from listening to narration to scrolling through more information about the POI. While the physical location would still be behind her as she continued to ride the bus, her attention would continue to be in the digital representation of that place and perhaps facilitate her return to explore that POI in the future.

GRANULARITY

Alight is most successful in achieving a granularity of content that accommodates many kinds of people and interests. Frenchman points out that “events are not monolithic” and should “lay potentials for interaction both within and through the event.” We see evidence of this need from Alight’s trial users:

[I want to hear] More local stories. There should be more stories from the people who actually live in these places. (Trial 2)

My favorite kind of content was from the actual students. It’s cool to hear their stories and perspectives. (Trial 4)

The concept of Alight was built around this concept that the narrative of a place or city is the amalgamation of several snippets of narratives rather than one master narrative. To deliver this experience to user, Alight limits its content to just 20-30 second clips which users are free to “swipe” through so that they might find content that interests them. Additionally, the app categorizes the content so that each bus ride might very well be entirely different. In the future, there are many features that can help Alight achieve a level of granularity that engages a diversity of audiences. These include: machine learning of preferences, increased levels of user generated content, the introduction of audio effects such as background music and sound effects. The biggest challenge for Alight will not be whether or not its experience is granular but rather how users can aptly navigate through the granularity for an experience that is both enjoyable and engaging.

TRIANGULATION

William H. Whyte suggested that a sense of community can be created when two strangers have a third object or activity of focus (Whyte, 1980). This kind of “triangulation” in public spaces helps to build a sense of shared experience that could even act as a catalyst for strangers to begin speaking with each other. This characteristic of a space can be quite easily replicated using Alight when we had groups of users try the app together on the bus. However, Alight adds an additional “vertex” to the triangle by introducing mobile phones as an intermediate
between a landmark/POI and the participants. As shown in the photo below, by knowing that similar content is mediating the experience, the three depicted users create a triangulated space that is simultaneously on the physical bus and the digital landmark outside of the bus.

Figure 23: Digital-physical triangulation is mediated by the Alight app for these three users who are all aware they are within the same “space” because of the app.

The observations how groups of user use Alight creates two important objectives for the continued development of Alight in the future.

First, many users expressed concern about how they might use Alight if travelling with friends. These users were concerned about knowing who else was having a similar experience as them while on the bus. Even if they are not riding the bus with friends, how might Alight create a sense of place by creating a “triangles” between other Alight users? To facilitate this, future versions of Alight might indicate to users when others are using the app at the same time and/or what previous users behaviors have been in the past. For example, one might be riding a bus alone and discover that someone else is also using the app. This discovery could come from both in-app digital queues or from behavioral queues (repeated glances at app and out the window). Establishing these norms of triangulation using a digital medium for physical spaces outside the window will be important for developing a sense of shared community of Alight users.

Secondly, it will also be important for users of Alight to feel a sense of “triangulation” with non-users, especially people that already occupy the spaces they are hearing about. I suggest that this happens by providing users with content that might not have been previously “visible” to them without use of the app but would be known by a local “insider.” For example, on the MIT EZ-Ride Shuttle tour many users felt a stronger sense of understanding after hearing the “Geese” audio recording that describes to users how seasonal flocks of pooping Canada geese help to characterize the experience of an MIT student. This humorous sharing helps non-MIT users gain a shared third vertex with an MIT student that serves to build a sense of relationship between two otherwise estranged groups. Evidence of comes from the several Chinese tourists that have used the Alight app on MIT’s shuttle bus. Many of these users expressed the most interest in the student stories of MIT hacks or the geese because it “made MIT seem less large and unapproachable (高大上).”
MOVEMENT

Alight (version 5) deviates from Frenchman’s definition of an event-place because the users are less free to physically move freely while experiencing the app. This type of freedom of movement was repeatedly asked about from the user trials when testers would ask if they could “hop on and hop off” the bus freely to explore the different POI along the route. This request was especially apparent in users that had no control over the POI playing in the app (versions 1 and 2). However, as the app gave the user more and more control over the playback and content selection, the concerns about disembarking were less about the freedom to move and more about the territory of the experience (see above).

I attribute this evolution to the creation of a space for increasingly free digital movement. Because Alight’s “event-place” is largely a digitally-mediated exploration of the city, giving the user more control over what content to listen to helped create a mental space for movement. Some examples of feature introductions that accomplished this are:

### Features that create a digital sense of movement

<table>
<thead>
<tr>
<th>Play/Pause/Rewind functionality:</th>
<th><img src="image1.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>The ability to control the playback provides an analogous experience to choosing to controlling one’s speed of movement in the physical world. In future version, Alight should consider features such as playback speed to heighten this sense of freedom of movement.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Swiping feature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The swiping feature is powerful tool that many users asked for and then enjoyed when it was introduced. The visual movement of the POI as one swipes from right to left also provide a sense of shifting one’s gaze from one POI to another – not unlike walking from one interesting place to another.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liking feature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>While the liking feature does not have a visceral parallel with movement, I have included it here because it provides the user with a sense of control and influence over their behavior in the app. In the current version of Alight, “liking” something actually does nothing other than change the heart image on the screen to indicate it has been pressed. In the future, these likes will help to curate content and to personalize thematic content for each user.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Alighting” for more content feature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some content features an “alight” button (bottom screenshot) which provides the user with more content about the POI. This content is delivered visually (not aurally) so that the user has the sense of “stopping” to continue his/her gaze at the POI.</td>
</tr>
</tbody>
</table>

While this form of digital movement does provide a perfect substitute for the freedom of movement intrinsic to an “event-place,” this distinction has proved useful in developing app features. Users from the trials clearly desire a sense of control over the direction and speed of the app. While Alight has not yet fully resolved this need, future inspiration can be taken from Frenchman’s illustration of physical-world designs that facilitate movement.
Another, possible interpretation of the freedom of movement characteristic of the interweaving between form and activity is of the user’s ability to move within the bus or before/after being on the bus. The Alight user clearly cedes as certain amount of freedom of movement when he/she decides to ride the bus, but within the bus the user can be free to choose their position for the optimal viewing angles. However, this is more true if the bus is relatively empty. This was clearly apparent between User Trial 1 (the users left from the first stop on the #47 giving them freedom to choose seats) and User Trial 2 (the users boarded halfway through the route on a crowded #1 bus). The first trial experience provided an empowered sense of movement within the bus, and the users even would change seats to get better views whereas the second trial left users standing or finding aisle seats with poor viewing angles. The implication of this observation for Alight’s future development is that providing the user with enough information to choose a less-crowded bus is also a form of ensuring a sense of physical movement in addition to the digital movement discussed above.

**SCALE**

Scale refers to the balance between the size of an event and its place (Frenchman, 2004, p.41). In the case of Alight, striking this balance can be difficult as a single bus route can contain several “events” and several “places.” As mentioned at the beginning of this section, for purposes of comparison, I have selected the “neighborhood or district” as the equivalent of an “event-place” for the user. However, bus routes tend to span several neighborhoods and districts thus giving an intimidating sense of scale. There was not shortage of anxiety about this from our user trials and discussions:

*What if I don’t have the time to ride the whole bus route?* (User Trial 3)

*How do I get back if I ride the bus all the way to the last stop?* (User Trial 2)

The responses received indicated that the large scale of the bus route created uncertainty about the experience. While the Alight team had originally created content to populate the entire route of the buses we focused on, it was not useful to present this to users. When we presented users with a map of all the content along Routes #1 and #47 the scale of the routes seemed to conflict with the intimacy and territorial demarcations discussed above. Similarly, with the Chinese tourists visiting Boston, they expressed not wanting to go the very ends of bus routes, but instead they wanted to travel between landmark destinations that only represented a small portion of the bus route.

This had an important implication for Alight’s messaging. Rather than presenting “bus routes” to potential users, we began to present bookended bus experiences. For example, while we had created content for the entire #1 bus route, it was actually more useful to present the #1 bus tour as travelling between MIT and Harvard, two highly visited destinations. The route in between these two destinations provided an efficient and informative scale of using Alight that was contained largely to just the Central Square district. Similarly, the Alight team began selecting bus routes that could be turned into full loops so that riders could easily return to their departure point. For example, the MIT Shuttle made a loop around campus that provided a suitable scaled experience for its users. This implies that as Alight scales as an app it will be critical to maintain a sense of scale that users find useful and interesting.
SENSUALITY

The last key characteristic of this event-place functioning describes the importance of engaging all the senses (Frenchman, 2004, p. 42). Frenchman shares how olfactory stimulus like burning wood, visuals like costumes, and aural soundscapes of music and laughter help create an immersive and emotional experience for participants. Alight’s use of sound to engage its users (in addition to visual photos and maps) attempts to do this. The use of human voice to share stories of place helps to create a feeling of authenticity and emotional resonance. Users reflected the preference for emotional aural stimulus several times, “I like when the narrator has personality and humor” (Trial 2) and “The audio ... is kinda formal. If it talks in more lively (sic) I think this app would be awesome” (Trial 4). The implication for Alight is that narrative form and disposition is critical in engaging the user. In the future development, the app should consider offering more control to users to not only generate content but enhance the audio with sounds effects, music, and audio filters. Additionally, some users also suggested adding an augmented reality feature that overlays existing POI with more information like historical photos or other data.

SUMMARY

Of the four functionings of an “event-place,” the weaving together of form and activity requires the biggest reinterpretation as Alight creates a digital place for its users to explore physical spaces. Nevertheless, the responses from users demonstrate that the principles guiding design of event-places are directly relevant to the use of the app. By understanding how the territory edges, intimacy of use, granularity of content, triangulation between users and content, freedom of movement, security of scale, and immersive sensuality overlays over the experience of Alight, I have been able to design Alight to be more capable of changing users’ understanding of a place. While this first functioning has clear characteristics that can be translated into technical features in the app, the remaining three functionings focus more on the resulting effect of the app on the user-participant’s understanding of place.

BUILDING SOCIAL CAPITAL

The second key functioning of an event-place is its capacity to allow participants build social capital. This social capital can be defined the number of “connections among individuals ... and the reciprocity and trustworthiness that arise from them” (Putnam, 2001). These connections help to strengthen a sense of community that is critical in placemaking. For Alight, we can ask how this digital experience not only benefits the single user but also helps to create connections that might not have otherwise occurred. Due to the small sample size and limited time of use, Alight users have not directly demonstrated the building of social capital. However, Frenchman outlines three dimensions of an event-place that would indicate that social capital is being built: bridging across social groups, bonding between people, and tendency to volunteer (Frenchman, 2004). Alight’s design and user responses have indications of the potential of all three of these dimensions.

BRIDGING AND BONDING ACROSS DEMOGRAPHICS

“The most interesting story I heard were the stories that I wouldn’t have been able to find online,“ one of the users shared after riding the MIT EZ-Ride shuttle (User Trial 4). The users from this trial where all visiting MIT from somewhere else (largely from China) and was excited to begin to connect with MIT’s students and not just learn about the institution itself. Instances such as this demonstrate the value Alight serves in creating social capital by bridging social demographic groups that might not have had a channel to interact before.
This effect is supported by bus’s tendency to span a diversity of residential and commercial areas in just one route. One comment from the focus-group discussion from User Trial 2 revealed the users’ frustration that that version of Alight had not taken advantage of this opportunity: “I was disappointed in the app. It felt like [the narrator] was just reading from the local chamber of commerce website, but there are so many more stories to be told... Why not have people tell their own stories?” The respondent continued on to describe his disappointment that the transition from Newbury Street to Dorchester on the #1 only offered a “thinly veiled comment that the bus was driving into a black neighborhood” but didn’t have anyone’s voice from that area. This comment was explored in the discussion, and we found that most of the users were most excited by the idea that they might hear from someone they might not have otherwise met. While the team had planned on incorporating the voices of users, this trial helped push the development of the app to actively solicit user generated content from all kinds of people.

The best example of this effort in later versions of Alight was the introduction of the “Voice of MIT.” Because the team did not have the capacity to explore the entire city’s bus routes, we settled for focusing on enriching the content for MIT’s shuttle buses. In addition to researching the more authoritative stories from MIT’s guidebooks, the team went out to interview different MIT community members about their favorite places and stories from their time at MIT. The “Voice of MIT” theme of content gives users the direct voice of students, administrators, teachers, and facilities workers so that a visitor to MIT can begin to feel connected to other groups of people in the event-place.

The concept of “bridging” helps describe the end effect that Alight’s users hope to find when exploring a place on the bus and using the app. To facilitate this, Alight strives to include as many voices as possible and will release the user-generated content feature so that anyone will be able to add their story and voice onto the route.

Additionally, the inclusion of Chinese language represents a direct effort to bridge a group of people that has previously been ignored at MIT. Many groups of Chinese tourists often line the street in front of MIT but there is little to help them connect with the people and stories at MIT. By simply providing direction to the EZ-Ride Shuttle, narration in Chinese from MIT’s Chinese students, and some encouragement, Alight was able to change this experience from a simple photo opportunity to one in which the Chinese tourists took a step closer towards connecting with the MIT community. After being provided with this “bridge,” the next question in how bonding might happen between people involved in the event-place.

Frenchman illustrates that an event-place not only should bridge different groups but strengthen communication and relationships through improved bonding (Frenchman, 2004, p. 43). The respondents from the user trials did not make any direct statements about engaging with people due to the app. This is largely due to the short span in which they tried the app. Nevertheless, there are certainly ways that Alight could better encourage bonding which
can be taken from User Trial 0a when I organized a scavenger hunt for the respondents to find stories along Route #57. By giving these respondents a task to find certain items and ask people certain questions they ended up bonding with people from many different neighborhood in Boston including artists in Allston, military members at Fenway, and an Armenian woman in Watertown. This suggests that by gamifying the Alight experience, the app would not only help to bridge the user with other people but also give impetus for these people to communicate with each other. One could imagine that a user of Alight might hear a story from a locally-generated user and then be given the opportunity to meet up either online or offline. Or, perhaps bus riders using Alight could also pose questions to the people in the areas they pass through to answer and then add back to the route. In this way, users begin to connect on a deeper level and cultivate social capital.

**VOLUNTEERING VS. COMMERCIAL INCENTIVES**

Frenchman explains, “The depth of volunteer effort is a good measure of local social capital” (Frenchman, 2004, p. 43). Alight has been structured to encourage such local volunteerism in the form of user-generated content. While its current version only provides audio content produced by the Alight team, the end-goal relies on the volunteer production of local content. This remains a challenge and an important indicator of the app’s ability to succeed as a tool of urban placemaking (as well as a business).

The first attempts to do this have occurred by providing financial incentive to local businesses to attract additional foot-traffic from the buses. By providing content businesses like Flour Bakery, the MIT COOP, or Clover could be able to build awareness of their products and make more sales. However, Frenchman also warns that the commercialization of event-place production can be a risky decision illustrating how Disney Corporation has made a business out of “packaging local events and parades” for places but these events failing to create community. Without volunteering content to be shared on Alight’s platform, the app risks becoming an advertising channel rather than a place for local and non-local visitors to strengthen community. Looking ahead, Alight will need to create key performance indicators (KPI) that help measure and compare the number of volunteer content and interactions versus commercially-incentivized ones. These KPI could include the ratio content types, the number of interactions, and the cost of a single user-generated post. Such KPI would help the app’s managers ensure that volunteer content is creating enough social capital value for users to build community.

**SUMMARY**

Alight builds users’ social capital by bridging and bonding different people through a common experience of a place. By providing the direct voices of the community, listeners are offered the opportunity to connect to people they otherwise would have felt estranged from. To further support the volunteer creation of this content and opportunities for bonding, the next versions of Alight must feature a robust user-generation content tool and use
set of KPI to keep tabs on the kinds of content being generated on the platform for different routes and neighborhoods.

**EVOKE MEMORY AND CONTINUITY**

Alight’s use will always be in the context of existing narratives that have come before it. Frenchman makes a similar point that an event-place cannot be independent of its historical context, and that “good event-places gain additional meaning by being agents of collective memory” (Frenchman, 2004, p. 44). He gives an example of the yearly “Calgary Stampede” festival which is remembered with chuckwagon races to evoke the memory of the past event. Key to this functioning as an event-place is that the participants are not simply passive recipients of this history but rather take part in remembering and crafting its narrative. For Alight, providing a good balance between existing historical narrative and facts and allowing the users to participate shaping that narrative themselves.

**CONNECTION TO THE PAST**

One of Alight’s biggest challenges is creating a feeling of cohesiveness and continuity between the stream of 20-second audio clips that the user hears. Users’ testimony revealed they appreciated the access they were given to the POI from hearing local voices, they didn’t express appreciation for a connection to the past. Currently, offers a “History” theme for its content. With enough relevant content, users would be able to hear history-specific content, but this is not enough for a sense of continuity with the present. Twenty seconds is not a lot of time to tell a single story that connects the past with present scenery outside the bus window. Currently, Alight shares historical facts about the MBTA, the construction of different buildings, and events that happened in certain places, but it struggles to give the user a sense of connecting his/her present situation with that history.

Frenchman’s examples of event-places that create continuity between past and present mainly are recreations of past events: a wagon race illustrative of a stampede from before, décor that harkens back to a previous time, or rituals passed down from centuries before. For Alight and its future development, this provides possible inspiration for new features. Alight could consider providing highly-curated tours narrated by individual authors whose goal would be to draw the relationship between past and present. (Imagine Barack Obama narrating his experiences while at Harvard Law and sharing his knowledge of American history!). Alternatively, some users have expressed a hope for augmented reality in which old photographs and recordings could be overlaid on POI that are passed. (Imagine hearing Martin Luther King Jr’s final public speech at the Boston Commons playing as the #SL5 bus passes by.). In the more near-term “history,” Alight could also offer the histories of previous users and the experiences they’ve had while exploring a bus route with Alight. By appreciating each user’s unique experience has value to be shared with ensuing users, Alight would help build a sense of continuity within the digital place in the app.
COLLECTIVE MEMORY

One of the most commonly appreciated POI content was the “MIT Hacks” piece. Users who rode the EZ-Ride Shuttle past MIT’s Great Dome would be treated to a history of the many different student pranks that MIT students have done. Many of the user surveys ask for more stories like this one. These users appreciated the fact that this tradition happened every year and was part of a shared understanding of the quirky culture at MIT. Responses such as this demonstrate how continuity can be derived from a gaining access to collection of similar memories. In this case, the students never performed the same student prank nor have the students known previous years students. Nevertheless, the ritualistic collection of these events gave rise to a memory that is shared. By providing users with a glimpse into this shared memory both visually and through story-telling, the user can begin to understand what being an MIT student might be like and even perhaps begin inquiring of people on the bus and at MIT about previous events that can be seen along the route. In this case, Alight serves as a stimulus for users to explore their own position (on the bus) in relation to the collective memories they are passing.

EMBODIED STORYTELLING

One of the subtler lessons to be learned from users’ comments and their ability to find continuity between their Alight experience and the places they pass is one of presentation. Many of the users made comments about the different narrative styles of the short audio clips. Several users mentioned that they did not like the more official, authoritative recordings instead preferring personable, friendly recordings. Upon further analysis of the differences between these kinds of recordings it became apparent that certain word choice was the key difference between these two kinds of recordings. For example, instead of using the third-person narrative (On the left will be ... It was founded in...”), users tended to like the second-person and second-person narrative (“You are passing one of my favorite places... What do you think?”). By addressing the user as a participant in the recollection and asked to respond to the POI, it allowed the user to be part of the story. This created an immediate sense of continuity between the users use of Alight and whatever might have happened at the POI. One simple example of this is the introduction of Storrow Drive on Route #1. Rather than simply stating that Storrow Drive has very low overpassing bridges that sometimes knock the tops off of tall trucks, the narrator says “Watch out for the low bridges! A few years ago a tall truck carrying scissors hit the bridge and scissors spilled everywhere causing not a few flat tires. Hopefully your bus won’t be too tall!” These kinds of narrative choices are important because they allow for continuity without the need for long-winded explanations of causality and connections to the present.

Looking ahead, however, Alight could struggle with initiating an entirely new kind of narrative form as it pushes users to create their own content. Users might need to practice a different form of storytelling in order to fully enrapture their audiences. However, the history of digital media has shown us that it quickly evolves and adapts to the needs of its users and audiences (Twitter’s 140 characters, Instagram’s 1x1 aspect ratio, Youtube’s live streams etc). Rather than dictating the narrative form, Alight might ask how it can unlock users’ creativity by constraining just a few elements.
SUMMARY

Frenchman describes how “narrative event-places can bridge time and space” in ways that an everyday urban experience does not (Frenchman, 2004, p. 45). When one sees the many people on buses and subways with headphones plugged into their ears listening to music and podcasts, they too have been bridged to another time and space. However, the content that these riders are enraptured rarely have anything to do with the location they occupy. Alight aims to anchor this aural experience in a location – the stories of past events, the monuments of history, and the trails of past users. Users have indicated an appreciation for the content that helps to enhance their perspective and understanding by giving them access to an ongoing narrative of place. By including users in this narrative through collective memory and embodied storytelling, Alight can better deliver a placemaking experience and tool to its users.

RESONATE WITH THE CITY (AND BUS!)

The last key functioning of an event-place is its ability to give the participant the sense of a greater meaning that is associated with the city as a whole. While this is a difficult dimension to measure and identify, it is critical for the development of Alight. Alight not only has the potential to shape tourists and locals’ understanding and sentiments toward a city, but it also has the potential to shape the users understanding of the public bus. The users from the trials have indicated a greater sense of understanding of Boston’s diversity and an increased excitement about riding the public bus.

“THE CITY HAS MORE TO OFFER THEN I THOUGHT!”

One user from Trial 2 finished the tour of Route #1 feeling like she had discovered a whole new city. The bus ride taken her right passed her apartment and began to describe the history of the Boston Symphony Orchestra and its importance to the United States’ history of classical music. This user had lived in Boston for two years, but she never knew that she lived around the corner from an important musical nexus. She expressed a sense of new pride that she lived where she did and suggested she might take some more time to go explore the area. Examples like this show how the experience with Alight can not only help buttress a sense of identity with the city, but also enable a deepening and broadening of this identity for its users.

Frenchman suggests that this is characteristic of “good event-places [which] are more than local; a greater community embraces them” (Frenchman, 2004, p. 46). For both locals and visitors using Alight, the small stories dotting the bus routes can (and should) give a sense of the character of the entire city. This character need not be entirely illustrative of the city’s traditional reputation but can evolve given how users share content and stories. One example of this is from User Trial 0A, when one team ended up discovering the Armenian Museum of America at the end of the #57 bus.

Figure 28: After chatting with a representative from the Armenian Museum of America at the end of the #57 bus, one respondent commented that she had a new understanding of Boston and US history.
These two respondents had never known about the Armenian genocide nor did they know about the many Armenian refugees that have since settled in Boston. For these two bus exploring women visiting from China, their conversation with the woman at the museum helped grow their understanding of Boston. While previously their imagination of Boston consisted of Ivy-league students, Irish immigrants, and Revolution-era icons, this experience helped create a new kind of resonance and understanding of the city of Boston. “I never knew about this genocide! I didn’t know Boston had Armenians. It’s really good that they can have that museum. More people should go” (Trial 0A, focus group discussion).

Alight will rely on the distributed production of audio content to give users a mosaic-like feel of the entire city. This mosaic simultaneously allows the user to draw generalized impressions about the city while experiencing location-specific stories and interactions. Based on examples such as the ones above, I expect that certain stories will provoke user responses that could change the entire hue of the city’s reputation and feel. In future development, Alight’s backend dashboard could begin to measure the holistic impression that users and content creators are making of a city by aggregating and analyzing these stories and experiences. By identifying the connection between singular and specific experiences with the entire city, Alight could very well serve to buttress civic identity and initiatives.

MAKING THE BUS FUN

One of the most noticeable impacts that Alight had on its users was an expressed opinion that using Alight made the bus more fun to ride. The public bus has had a bad reputation for lack of safety, timeliness, and cleanliness. Many of these negative stereotypes are driven by assumptions about the class and race of the riders (Hess, 2012). While Alight focuses on specific stories and bus routes, Frenchman’s suggestion that good “event-places” resonate with the greater city can also be applied to individuals’ impression of the greater transit system.

Users from Trials 2-4 reported that their experience on the bus the bus with Alight was better than other trips on the public bus that they took:

| Compared to other trips on the public bus, this trip with Alight was: 1 (much worse) ... 5 (the same) ... 10 (much better). |
|---|---|
| Average (n= 22) | 7.5 |
| Range | 5-10 |

While the focus of Alight’s development has been more on the locations and the delivery of content along bus routes, there are several features that could make riding the bus more convenient such as bus arrival predictions, an interactive map to show the bus route, and instructions on how to board. However, I believe the improved experience on the bus can be effectively summarized in this graphic:

<table>
<thead>
<tr>
<th>Instrumental Value</th>
<th>Experiential Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal Bus Trip</strong></td>
<td>YES – Users are taken from point A to point B for a low cost.</td>
</tr>
<tr>
<td><strong>With Alight</strong></td>
<td>YES- Users are taken from point A to Point B.</td>
</tr>
</tbody>
</table>
By making the bus ride not just about transportation but also about having a gainful experience, an Alight user is more likely to consider and engage with the experience of riding the bus instead of disengaging from it. While this hypothesis would need to be further investigated with empirical data, my own observations of the users made it clear they were much more “awake” to the bus experience. Even when the technology failed and made for a bad app experience, these users continued to express that their experience of the bus was better than usual. For transit systems and cities, this could suggest that rider engagement on the bus could help improve its reputation. More research should be conducted to gauge the generalizability of this observation.

SUMMARY

The resonance that Alight creates for the city and the bus hints at the potential uses the app would have for city planners. Frenchman’s “event-place” framework helps illustrate the ramifications for the city as a whole, and the experience with Alight suggests that it is not only the city but other macro-scale institutions (such as a bus system) that can be influenced. For Alight, this framework helps to draw out the potential social value that the app will have for a variety of stakeholders including city planners, transit, and public-facing officials. As Alight continues to develop, including these stakeholders in the design and deployment of the app will enable for faster adoption and impact.

SUMMARY AND CONCLUSION

In conclusion, Dennis Frenchman’s framework for evaluating “event-places” has proved to be a fruitful lens through which to understand progress of Alight’s development and the responses from the user trials. While it is not perfectly analogous, as Alight’s users are not constrained by time and space in the same way as an event-place, the use of this tool provides a rubric by which to measure the qualitative data that was collected through focus-group discussion, participant observation, and surveys. By understanding Alight as providing an “event-place” in the form of a digital space in which users are provided with an activity to engage with the sights outside their window and opportunities to get off the bus, I have been able to develop recommendations for future feature of Alight (listed below).

While an “event-place” is not the only way by which to understand Alight, its ability to clearly describe the reactions and desires of the users creates the framework by which to imagine how digital placemaking can happen. As a placemaking tool, Alight is still challenged to prove that it can help users build social capital, evoke memory and continuity, resonate with a greater city, and interweave the form and activity in a way that is effective for practitioners can make confident decisions about. Nevertheless, this analysis has opened up a door of possibilities for low-cost digital placemaking activities that leverage existing underused city resources: buses. In the following final chapter, I will conclude with a discussion of implications of Alight could have for the city, city planners and designers, and for the bus.
1. Interweave Form and Activity
- Boarding screen
- Previewing function
- User history browsing
- “Alighting” choice
- Bus routes scoped by destination
- Aural sensory engagement

To introduce:
- Browsable text and visuals
- Adjustable playback rate
- Machine learned preferences
- Music and sound effects
- On-bus socializing queues
- User sharing and questions

2. Build Social Capital
- Local voice feature
- Chinese language access
- Alight commercials
- User-generated content

To introduce:
- Gamification
- User vs. Commercial Generated content KPI

3. Evoke Memory and Continuity
- Celebrity narration and storytelling
- 2nd-person and 1-person storytelling

To introduce:
- Augmented reality
- Previous user footstep history
- Constraining media creation to unlock creativity

4. Resonate with City
- Ensuring inclusion of entire city
- Providing user-generated content for diverse content selection

To introduce:
- Aggregate interactions to arrive at fully city summary
- Partner with city stakeholders

Alight’s features across the 4 “event-place” functionings
CHAPTER 5: IMPLICATIONS TO CITY, TRANSIT, AND BUSINESS

This *maker*-thesis bookmarks a significant step in the progress to create an innovative, digital placemaking tool. This document along with Alight (version 5) combine to explore how location-specific audio content can change the experience of a bus ride. The reader/user of this thesis has been provided a perspective of the technologies and literature that locate this thesis within an on-going discourse at the nexus of place-making, location-based media technology, and agile product development practices. After reviewing the existing arts and literature, Alight has the potential to advance how audio augmented reality and user-generated content might allow for a new form of placemaking that has arisen due to fundamental shifts in the technological, social, and political landscapes (Chapter 1). This review of secondary literature provided the motivation to produce a mobile app, Alight, to iteratively explore the opportunities and constraints city planners would encounter in developing his/her mobile app. The documentation of this process reflects the “maker” approach to this thesis. The epistemology embedded within the tools of designing, producing, and testing Alight elucidated how a digital experience (the consumption of audio content specific to location) can shift a person’s experience of place (Chapter 2). The results from repeated qualitative user tests and surveys produced analyzable data (Chapter 3) that was then evaluated against a framework for “event-places” to identify areas of success and shortcomings of the app (Chapter 4). In this final chapter, I propose the next steps of this maker-thesis beyond the scope of this academic thesis. As a maker-entrepreneur, I identify how Alight can continue to scale using the learnings from this thesis to gain traction within the new media industry. I then change to my urbanist hat to consider how Alight, as a distributed, digital placemaking tool, would impact the city and those who inhabit it.

THE MAKER-ENTREPRENEUR HAT

To be effective and sustainable, Alight needs to work as a product. As a product, users need to start using Alight and continue using it into the future. Currently, with Alight Version 5 that has been launched onto the Google Play Store resulting in only tens of downloads which is not enough to sustain on-going content creation nor enough to warrant continued operations and management. To address this, the following section identifies the areas that will need continued work for Alight to succeed at growing to and sustaining a level of scale that can impact distributed, digital placemaking.

As the following diagram shows, the core of being an effective urban placemaking tool relies on developing the technology to the point where it is seamlessly functional and delivers an amazing user experience. There are additional features, content creation, and development goals that did not fall within the scope of this 8-month thesis project but will help to better equip Alight to have this core ability. One level above the technological development is the ability for Alight to succeed as a start-up. Even if the technology works, the correct mechanisms must established to nurture an organization that can effectively deploy the app to the world’s cities.
TALENT: THE TEAM

Without talented people, Alight would not exist. In order to deploy the app and grow it, it is necessary to have people with both the skills and passion to share Alight with the world. Over the course of this thesis, I have begun building a team of individuals who have and can continue to help get this app in the hands of more users. During this time, three clear functional groups have been established: App Development and Design (Andrew Takao, David Wang), Content Creation (Scott Middleton, Miles Taylor, Jingting Zhang), and Market Research (Candy Yang, Milu Yang, and icy Deng). These functional groups have come together to bring Alight to launch in Boston, yet as we move forward it is clear that more people would be needed to grow and sustain Alight.

In order to grow and sustain, Alight will have several more functional groups that will be needed to support the growth of the app. For the technical functional area, a bigger team would be needed to 1) develop for Android, iOS, and a web-based app; 2) build the database infrastructure for all of the world’s bus systems; 3) manage and coordinate workflows of different projects; and 4) process data analytics and content analysis. This technical team would ideally consist of 5-6 developers and a technical project manager to coordinate them. A robust technical team would allow for the faster introduction of features and a shared problem-solving studio to address bugs as they arise.

For the content functional area, our team would make a significant shift. Firstly, Alight would focus on creating higher quality audio content to seed key bus routes with content. This could take the form of working with production companies and voice actors to create immersive environments that establish a precedent for content
within the app. Secondly, and more importantly, the content team would need to set a clear framework for all user generated content. Currently, we have a limited themed content method of organizing content, but as Alight scales content curation will be critical for the users’ end experiences so that content delivery is cohesive and absent of abusive language or fake information. This could represent a monumental task depending on the amount of user generated content and could require 5 content managers per city.

Lastly, the market research functional team would need to broadly expanded to include marketing, business development, public relations, and finance. It is likely that each one of these would be its own team. However, the key goal of all of these teams would be to establish channels to communicate the value of Alight to a) users, b) local businesses, and c) key strategic partners. To do this, they would also need enough resources to reach all of these channels which would be the role of the finance arm. These teams would be tasked with the big challenge of coordinating a network of various stakeholders.

MARKETING: STAKEHOLDER MAPPING AND USER ENGAGEMENT

The Alight app aligns with the goals of a diversity of different stakeholders. For tourists, it represents a new way of exploring a new place. For daily riders, it could represent a new way of experiencing and engaging with their commute. For the public transit system, it offers the possibility of increased ridership and a new use-case for the bus. For the city, Alight provides a platform for new voices to contribute to the urban narrative and political discourse. For neighborhoods and districts, it could provide a way to attract economic development. For technology, Alight plays a role in the development of augmented reality development as well as user route planning. There are myriad stakeholders that must be mapped, strategically prioritized, and tactically engaged to allow for Alight to capitalize on potential synergies:
The above diagram represents the different categories and examples of stakeholders that Alight needs to be aware of as the app develops. Importantly, Alight must identify which of these stakeholder groups to address first in order to maximize the apps potential to garner support and increase user adoption. To do this, we will use a stakeholder strategizing tool for each one of the stakeholders (Figure 30) to identify how and when to address each of these stakeholder groups. For example, the interest of the MBTA in Alight’s success seems to be quite high as the MBTA tweeted about Alight’s launch on April 28th, but conversations with a leadership level person at the MBTA revealed that the MBTA might not have much influence over a) if Alight can access the MBTA’s resources like money or advertising and b) MBTA riders’ interest in the app.

After tweeting about Alight’s launch on a Saturday, the app only received 20 visits and of those visits only 8 signed-up. In such a case, we would categorize the MBTA in the upper-left quadrant so we would “keep them completely informed” in case they do shift right on the graph. Conversely, a business like Google Trips would provide huge amounts of influence in the form of expertise, data, and financial resources, but currently Alight is not an “interesting” start-up to them because we do not have many users, advertisers, or a significantly differentiating technology. They would fall into the lower-right quadrant, and our actions would be geared towards shifting them upwards on the chart and being ready for when that happens. As Alight progresses, as detailed plan of how to strategically identify and prioritize these stakeholders will be critical to the apps ability to gain a critical mass of users and our own influential position as a urban placemaking tool.

Figure 30: Sample stakeholder strategizing tool from https://www.smartsheet.com/
FINANCE: BUSINESS MODELING

Throughout the course of making Alight for this thesis and as a start-up, mentors and consultants have asked the question, “How are you going to make money?” For them, this was the central question because without some form of revenue even the best idea and the technology to support will fall flat on its face. To date, Alight has raised grant money from MIT’s DesignX and Sandbox funds, but it has not yet proven a method of generating a stream of revenue to support the capital and operating costs needed to maintain and grow the app. Now that the app is fully functional, it will be critical to be able to project the revenue potential of this app and establish a timeline for this revenue. These projections will be the key factor in whether Alight is able to persist as a way to experience the bus. Along with the Alight team, I have identified four potential business models to begin generating revenue summarized in the graphic below:

The above summary has been refined throughout the course of the development of this app, but all four business models have their own challenges. With the minimum viable product in hand, it is now much easier to communicate how the app works, so I will be able to better explore the viability of each of these business models. The next steps in evaluating these business models will be to assess the total size of the market, the cost of customer acquisition, and the amount of investment in time and money needed to see revenue being generated. Establishing estimates for this will allow Alight to either raise money or begin generating income to sustain the current team which has been “bootstrapping” until the launch.

TECHNICAL DEVELOPMENT: NEXT STEPS AND FEATURES

While the majority of this thesis was focused on developing and testing an app that enabled bus riders to experience narrated content while riding the bus, there is still a great deal of features that remain to be developed to make the product more user-friendly. Making the app more user-friendly will directly contribute to growing the userbase and the spread of Alight. The key features that should be developed are:
1. **Functionality for Apple iOS**
   Currently Alight is only available on Android. The choice to develop in Android was largely due to the convenience of learning the development skills on App Inventor 2 and Android Studio, but in retrospect, developing for iPhone users would have been a better choice to spur user adoption. While testing, Alight was constantly challenged to find users that could use the app, but that vast majority of testers were iPhone users. Redeveloping the app for iOS will open up a much larger market of users in Boston.

2. **User-Generated Content Tool**
   Right at the end of this thesis, we released an in-app content creation tool for any user to make his/her own content. However, even with this tool, there is still a great deal of UI/UX design iterations to make the experience easy and convenient for users. Because Alight is creating a completely new form of short-form, location-based audio media, the users will need a tool that is both intuitive and creativity-inspiring. This tool should provide the right balance of constraints and enablers for users to begin defining this new media format for themselves.

3. **Personalization Algorithms**
   Currently users can “swipe away” and report media that they do not like. They can also choose themes that they prefer to hear while exploring a bus route with Alight. The next step will be to introduce machine learning algorithms to begin to distill each individual’s preferences based on his/her in-app behaviors rather than their stated preferences. This will not only require machine learning, but it will also require a more effective system for tagging the kinds of content along a bus route.

4. **Scaleable Database**
   Currently Alight can offer content for buses in the MBTA system as well as the MIT and Harvard shuttle buses. However, expanding this database to other cities and transit infrastructures remains a time intensive process. A potential user in Egypt would not be able to create content for his/her bus in Cairo without Alight’s team spending several days scraping data into a database. An important next step for Alight’s development would to either automate or standardize a process for quickly and effectively managing massive sets of transit and user data so that it can be scaled throughout the world. One possibility for this would be partnering with other organizations that are already doing this like CityMapper, Google Maps, or Moovit.

5. **Social Media Integration**
   One key insight from our user testing revealed that users appreciated the personal stories along the bus routes. The analysis of Alight’s capacity to serve as an “event-place” also suggested that the ability to connect on a personal level with other users would help to create a sense of community and placemaking. To do this, Alight can integrate with existing social media platforms like Facebook or WeChat to allow both local and nonlocal users to begin building direct connections with each other. This functionality will be critical to encourage a sense of ownership and authenticity for placemaking.

6. **Advertising Functionality**
   Currently, Alight offers an “alighting” function which spotlights businesses along bus routes and provides users with additional media and textual information. However, these “alightings” do not provide any more functionality that potential businesses would find valuable for advertising. To make this a valuable product, Alight needs to offer the ability to create content and
incentives for users to visit these stores. Additionally, a dashboard to measure the effectiveness of an advertisement would be useful to demonstrate the value of Alight to local businesses.

Producing a minimum viable product for Alight in six months for this thesis has challenged me and the team, and it has allowed for a great deal of learning-through-doing as discussed in Chapter 2. Now that the app is available to anyone to try as a thesis project, the next step will necessitate making the app commercially-polished so that Alight can gain a critical mass of users so that thousands of pieces of content are constantly be generated, curated, and consumed each day. Only when this level of use is attained can one be sure of the potential of the tool as a distributed, digital placemaker.

This maker-thesis has pushed the boundaries of placemaking as an urban research, as a technologist, and as an entrepreneur. By focusing on the making, this thesis and its continued development has exposed the interconnectedness of an academic inquiry with the other forces of business, engineering, and design in order to sustain its exploration of the research question. As this thesis concludes, the above steps provide the fodder not just for a start-up but also for broader and deeper understanding of how its users can participate in placemaking through a mobile smartphone.

THE URBANIST HAT

Ultimately, this maker-thesis provides a first-hand account of how a city-planner can harness existing technologies to impact the urban environment in an innovative and potentially more effective way. Alight has been presented as a method for democratizing the process of placemaking. By both incentivizing users to ride the bus to explore points-of-interest far from the beaten path and enabling individuals to represent their community, business, or culture by producing content for bus routes, Alight purports to shift from an urban master narrative to discursive urban narratives. If successful, the many voices on buses throughout cities would weave together a sense of place rather than dictating a single urban identity – “The Big Apples” instead of the “The Big Apple.” At scale, this transition has significant implications for how city planners can think about economic development, urban mobility, and civic engagement.

HOW MIGHT URBAN ECONOMIES CHANGE

From Networking Nodes to Noding Networks

Transit-oriented development has grown as a principle for stimulating and guiding economic development in cities (Tabuchi, 2010). This perspective emphasizes the multiplying effect of agglomerations of capital, knowledge, power (Fang et al, 2017), and cultures (Black et al, 2016) to a specific area designed with a transit station. By concentrating investment, political willpower, and enabling innovation, these areas serve as “nodes” of development. Many case studies have been performed to demonstrate the positive effect of these TOD nodes (Renne, 2016; Bukowski et al, 2013; Chorus, 2014), and thus city planners and designers have often identified these nodes as levers for economic development.
I offer that Alight illustrates the possibility that street-level transit can actually create nodes of economic development along the entire network the communities and businesses being passed can access the riders passing by. This idea is not new (McMahon, 2013; Jaffe, 2013), yet Alight provides an additional tool to unlock the value of street-level view for riders. By providing audio content to enrich the experience of the entire bus network, Alight allows the bus rider gains more knowledge of the resources, people, and experiences in between the major stations. Furthermore, these potential POIs are empowered to not only share visual stimulus (a street-side advertisement as seen in Figure 27) but also provided with the means to directly speak to and connect with the user.

If Alight proves to be successful at increasing awareness of the shops and events along a bus route (in addition to the station nodes), the city will have a new tool with which to consider the economic development of underdeveloped areas. Alight could serve as a low-cost tool to convert bus ridership into local foot traffic for local economics. Rather than investing in capital intensive TOD nodes, the city planner could consider equipping local economies with the means and skills to open up a new channel of advertising to the buses passing them by. This would imply working directly with local chambers of commerce, business owners, and community organizations to empower them to tell their story in a way that attracts paying visitors from the bus.

**HOW MIGHT URBAN MOBILITY CHANGE**

**From Bus Stigma to Bus Pride**

The bus experience has been stigmatized as being unsafe, unreliable, and unclassy (Hess, 2012). Regardless of one’s perspective of this assertion, Alight possesses the potential to offer experiential value in addition to the bus’s existing instrumental value of transportation. It can do this by unlocking value in characteristics intrinsic to the bus. These characteristics are the ability to see the streetview while travelling and the ability to deviate from routes or create new routes without intensive capital investment. These qualities are not currently emphasized by planners but could offer cities additional value if combined with Alight.

Unlike subways, buses provide views of the street that allow riders to observe the streetscape and orient themselves to the layout of the city. Alight proposes that this quality can make a bus ride preferable to a subway ride as the user can be engaged by the scenes he/she passes. Instead of riders “tuning out” the bus ride with their earbuds, they can now “tune in” to the city by putting in their earbuds. For planners, the implications of this shift in perspective could lead to a different approach to bus rides. At the most surface level, the transit agency could consider what kinds of content it would like to deliver to riders (many of whom have cut themselves out from speaker announcements with their own headphones). The transit agency could use Alight to inform riders about changes in schedule, approaching stops, and transit agency news. The delivery of this content should be seen as enhancing the user experience of the bus and places it passes, not just delivering logistical information. For example, approaching stop announcements could be accompanied with explanations for why and when the stop was placed there. Many people have experienced a funny driver on the subway or bus, and this can greatly improve the engagement of riders. Transit agencies have the opportunity to provide this experience for every bus trip.

At a deeper level, transit agencies could understand Alight as a data collection and analysis tool that leverages the relative flexibility of bus routes. This insight of the flexibility of bus routes, often called “microtransit,” has driven private companies to see if they can optimize bus routes based on users’ preference and destinations (Bliss, 2017).
The ability to operate microtransit rests in the ability to collect and analyze granular rider data and accurately forecast demand. While Alight does not explicitly optimize bus routes, the data that it produces could be harnessed to develop more accurate predictions of ridership preferences. For example, if a higher concentration of user-generated content is popping up in a certain area on Alight, a transit agency or company could analyze the drivers of this content and adjust the bus route and schedule accordingly. This might be particularly true for managing crowds at irregular events such as demonstrations, sports team celebrations, and holiday celebrations. Realtime big data analysis of Alight’s content could help predict the destinations of these crowds and allow for on-the-fly routing of buses. This shift in using rider-generated data to capitalize on the relative flexibility of the bus could help improve the perception of the bus’s convenience and timeliness.

As Alight users grow, it will be worth transit agencies and planners considering the role the bus has to play for a city’s riders. By adding experiential value to the bus trip, the bus might be able to shed its stigma and become the preferred method for navigating the urban environment.

HOW MIGHT URBAN NARRATIVE CHANGE

From Guide Books to Guide Authors

As discussed at the very beginning of this thesis, authoritative narratives of cities have long been the approach for travelers and residents to explore the city. However, several signals have illustrated a move from the authoritative narrative of place to a more discursive experience of an urban narrative. For example, Lonely Planet’s success as a travel guide in the 1980’s and 90’s was largely due to its ability to provide travelers with unique, of-the-beaten-path experiences. Rather than writing about the must-see, must-go places, Lonely Planet author’s suggested that independently travelling could lead a new discoveries and stories which its authors shared and updated (Wheeler, 2017). As the internet came of age, online travel agencies like TripAdvisor.com began to digitize the stories of city exploration with particular success of their user-generated content. These every-updating reviews and suggestions for travelers to a new city suggested that their users had trust in local and authentic experiences of others (Kim et al, 2017). These online conversations suggested that urban narratives were the result of dialectic narratives of places. Finally, the advent of “check-in” apps in the late 2000’s, like Foursquare or Yelp, have helped shift the understanding of narrative beyond textual and oral discourse to new medias such as video, photos, and social media (Bagloee et all, 2017). The success of these products marked a stark shift in the understanding of the urban narrative from a singular, authoritative city identity that could be represented by a collection of landmarks to a collection of discursive experiences that belonged to diverse groups of urban residents. Rather than looking for guidebooks to explain the city, everyday travelers were becoming the authors of their own urban exploration and discoveries.

As the trend for the “co-creation” of experiences reflects itself in studies of travelers’ preferences (Binkhorst, 2009), Alight can offer a unique platform for a distributed approach to placemaking for visitors. Firstly, Alight provides a stage for all of a city’s people to share their stories with people who visit. This has not always been the case as sharing one’s voice with visitors would have required investment of time and money. With Alight, one can leave a recording of a story for anyone to discover. What’s more, Alight also encourages visitors to participate in the documentation of places. Finally, with a properly designed mechanism for user-curated upvoting, Alight offers a type of democratic storytelling in which the most sentiments and ideas take precedent to represent a place. For the city planner and urbanist, this can be an extremely powerful tool.

One of the most difficult tasks for city planners is to gauge the opinions and needs of diverse communities that live and work within the city. Public participation in planning meetings is often limited by individuals own time and energy constraints, and even for those who do participate, meetings can often be conducted in bureaucratic and inaccessible language. There are many barriers to community participation in urban planning. However, a tool like
Alight allows for people to comment on the state of their communities and neighborhoods. To gather opinions of the community in their own voices, a planner (or any interested party) could simply travel to the area and explore the audio recordings and images of the authors of that area. With enough local authors sharing their opinions on the platform, planners could gain more representative insights into the opinions and interests of different areas of the city. These voices could then be incorporated into the future planning and development of the city so that it better reflects the needs of its own residents and businesses.

At its core, Alight possess the capacity to allow for a diversity of voices to participate in the making of place. The digital space created by the Alight app affords room for a new form of distributed placemaking through individual stories. These voices can be a better estimation of what the city is and what it desires to become. While there are many steps left in the development of this app, its adoption by users, and its capacity to inform city planners’ considerations and actions, this maker-thesis serves to illustrate how they can take advantage of existing technology to creatively and iteratively pursue an inquiry.
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**APPENDIX**

**CONTENT CREATION PROCESS 1.0**

Content Creation Process

Version 1.00

**Read Me First!**

This document is a continuously evolving document that standardized the process by which we, Alight, create content for bus routes around the world. It’s important for us to standardize this process because we will ultimately be creating the framework by which the world enriches public bus routes with their own content.

This process will also need to be **continually improved upon.** Which means that our PHASE 1 of content collection at Alight will actually mean producing two things each time you birth something great for a bus route:

1. Some awesome content to be embedded within the app.
2. Improvements to the creation process for the next time you OR the next Alighter makes some content. This improvements should a) make it easier, b) make it faster, or c) make the content better.

So it’s pretty important that you make comments and edits to this document. It’s also pretty important that you make your changes to this document super-duper clear, so that when we bring on new Alighters to create content, they can follow your process.

**What’s going to happen to this process over its lifetime?**

**Too Simple:** This process will begin too simple. It will miss important details. It will fail to save you time. It will be frustrating that the person who made the process forgot this or didn’t foresee that. You’ll find yourself creating new rules, workarounds, and methods. It will be very important for you to add those changes to this document.

**Too Complex:** As the process gets new rules, new changes, and new methods, it will become crazy frustrating. It will feel like that there are a million voices and a lot of irrelevant details. You won’t want to use this process because it’s infuriatingly detailed and time-consuming. When this happens, it’s important for you to figure out how to simplify the complexity and write a commonsense rule (a heuristic) for those after you to follow blindly.
A Brilliantly Wise Process! If the above two happen, we'll eventually have created what makes the “secret sauce” of a Dream Team organization. We'll have these seemingly simple rules which allow us to create lots of awesome content and quickly give it to the millions of bus riders around the world! This is alone would make us the world’s most valuable bus authors.

The Basic Steps
1. Ride the bus.
2. Take geotagged photos of interesting things.
3. Select top 10-30 photos.
4. Put the photos into a new Google Album.
5. Add photos to our shared Google Map.
6. Do some research and collect ~10 interesting stories that relate to the locations of your the photos.
7. For each of the stories fill out this Points of Interest Google Sheet with the NAME, LONGITUDE, LATITUDE (note that each bus route is a new sheet).
8. Record <30 second stories on your phone in a QUIET place.
9. Name each recording with the EXACT SAME NAME as the Google Sheet.
10. Upload recordings and photos to the route’s Content Folder.
11. Make improvements to this Content Creation Process.
12. Email the team that there’s more content to experience and try out!
Step 1: Ride the Bus (or get someone to do it for you).

Goal: Our goal is to have 10 stellar bus rides by the end of May, 2018. This means we need a great deal of well-produced content.

Method: To do this, we need to become experts about these routes. We need to pretend that we’re Alight’s future users and will be doing exactly what they will be doing in the future. Riding the bus, helps us as content creators understand the reality of what can be seen, felt, and heard from your seat on the bus. (Note: It may be possible for us to create content without riding the bus and looking at other resources, but the current process requires riding the bus.)

Tips:
- Sit on the right side of the bus for good photos.
- Stay on the bus for the whole ride and note the things that can be seen from your window.
- Make note of difficulties, dangers, or discomforts that our users might encounter.
Step 2: Take geotagged photos.

Goal: Take notes of what can be seen from the bus ride and create visual representations of each route for others to explore.

Method: Take photos of the things you can see outside the window. Before getting on the bus make sure that you have GEOTAGGING enabled on your camera.

Tips:
- Make sure you’ve got a full battery. GPS and camera can use a lot of power.
- You don’t need to take many photos of everything but it is good to make sure you take a photo every 1km or so.
- Turn on GEOTAGGING in our phone. To check if your photos have their geotag, take a photo, open the photo on your phone, and then look at the details of the photo. You should see the location information.

iPhone: 

Android:
Step 3: Select top 10-30 photos.

Goal: We don’t want too many photos, especially bad ones.

Method: Go through your photo album and delete the ones that aren’t helpful.

Tips:
- For each “point-of-interest” just have ONE photo.
- Try to distribute your POI across the entire length of the trip.
- Photos of the inside of the bus are not very useful.
- Having the name of the POI in the photo is nice to have.
Step 4: Put the photos in a Google Album.

Goal: In order to add your photos to our map, they need to be in a specific Google Album.

Method:
- “Create New Album"
- Name the album the Route # and Date

Tips:
- It's very easy to upload directly from your phone to Google if you download the Google Photos app.
- Make sure you're doing it over WiFi to save data.
Step 5: Add photos to the Google Map.

Goal: To have a map of photos that show the MBTA routes we’re creating content for. This helps to show where content will be.

Method:
- Open the shared Google Map.
- “Add Layer” for your own photos.
- Name your layer with your name and route number.
- “Import” your photo album to the layer.

Tips:
- It’s possible to upload the MBTA’s routes and stops to these maps too.
- In the future, we might just have one map for each route because I believe you can only have 10 layers of content.
Step 6: Do some research on the POI and collect ~10 stories.
Goal: Find stories for the bus route!

Method:
- Using your photos, you can find a lot of information about the different parts of your bus route. Google Images has a cool function where you can search using your photos. To use this you just drag your photo into the search box.
- Look at the Google Map and find interesting places like parks, shops, landmarks, etc. Usually Google will label bigger points of interest.
- Do some searching online to learn more about your photos. Wikipedia is super helpful.
- Look at the city’s own documentation about art and buildings. For example, Cambridge has an awesome Public Art website that maps all the public art and gives the history and suggests activities.
- Ask friends or local Bostonians for the story!

Tips:
- You don’t need a million stories!

Public Art Map
Step 7: For each POI story update the Google Sheet.

**Goal:** This is to make sure that all of the data for each POI is collected to be put into the app.

**Method:**
- Go the [Google Sheet](#).
- Give your own short name.
- To find the Latitude and Longitude, you can view the photo of the POI on the [Google Map](#).

**Tips:**
- Doublecheck that your photo is really in the right place on the map. Sometimes the GPS doesn’t record an accurate place.
- Note that you should not include the “,” or space in the latitude and longitude. Only the numerical value.

![Google Sheet Example](#)
Step 8: Record the story under 30 seconds.

**Goal:** This is what we will use to test if it’s fun to ride the bus with the tour.

**Method:**
- Using your phone to record is fine!
- Find a very, very quiet place to record.
- Speak loudly as if you were speaking to someone across the room from you.
- Be standing when you record! This makes your voice sound more confident and strong.
- Feel free to play with your voice with all kinds of sounds. In other words, That will sound better!
- Record the stories in the order you would see them on the bus. This allows us to sort the files easily.
Step 9: Name your recordings

Goal: This is really important. In order for the app to find the correct recording, it needs to be named correctly.

Method: Copy the exact name you have in the Google Sheet and change the name of the file to that exact same name.

Tips:
- Make sure that the file names are exactly the same.
- Avoid using punctuation (; ; _ / * etc)
- If you recorded the files in order of the bus, you can then quickly rename them in the same order of the excel.
Step 10: Upload the recordings and photos to the Content Folder.

**Goal:** For now, we will have a central database of recordings on Google Drive so that we all quickly access the content and put it into the app. (In the future, we will need to set up a better database for this)

**Method:** Find the correct route in the Content Folder and drag your files into the folder.

**Tips:**
- If you have time, it’s helpful to compress the photo sizes to <25kb. I use Caesium to do this quickly.

![Image of Google Drive folder]

- #47 scavenger hunt photo  
  yang yanjing  
  Dec 28, 2017
- #47 audio and thumbs (david)  
  me  
  Jan 21, 2018
- #47 Content Pond  
  Scott Middleton  
  Jan 20, 2018
- #47  
  me  
  Jan 21, 2018
Step 11: Make this process better!

**Goal:** Eventually this process will be the framework by which we empower Alight’s users to create their own content for the app. This will only happen if we become experts at doing this ourselves!

**Method:** Make actual changes to this document. Don’t just find the problems or oversights. CREATE the solution and add it in. If you didn’t follow part of the process above, think about why you didn’t and how you would change the process. If you did things that are written but that would be useful next time, add them in.

“I would not give a fig for the simplicity this side of complexity, but I would give my life for the simplicity on the other side of complexity.” - Oliver Wendell Holmes Jr.
Step 12: Email the Team

**Goal:** Because we’re still a small team and because content is one of our big goals, it’s great to celebrate your content contribution and your process improvement by sharing it so that we can all learn from it. Also, David will put the content into the prototype app!

**Method:** Send an email. Tell us what you did. Tell us what worked. Tell us what didn’t work. Share your ideas. Everyone else, read it and respond!
SURVEY FORMS

TRIAL 1

App Review #1 (2/9/2018)

Participants: David, Candy, Scott, Miles
Route: 47

Experience Review
1. Interesting Content?
   a. What content worked? What didn’t?
   b. What content was missing as you were riding the bus?
   c. What content made you want to “alight”?
   d. What questions about content did you have?
2. Content Format and Delivery?
   a. How was the volume?
   b. What style narrator did you like?
   c. What narration styles/habit did you not like?
3. User Experience and Interface?
   a. Did the photos help?
   b. Would a map help?
   c. Was it good to select when to listen? Or would it be better to just listen with pressing buttons? Swiping?
   d. What could be added? Subtracted?
4. Content Creation Process?
   a. How much time did you spend doing this?
   b. What have you changed?
   c. What did you do differently but not change in the document?
   d. How can we make this process faster, better quality, and easier?

Other Check-Ins
1. Tech Team Hires?
2. Content Creation Plan?
3. Market Research Plan?
4. Tech Creation Plan?
5. Business Creation Plan?
6. Mentor Update?
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<td>* Recruit tech team</td>
<td>* Trolley Intercepts</td>
<td>* Find financial models of audio advertising (radio, podcasts)</td>
<td>* Test Content Creation process with focus group</td>
</tr>
<tr>
<td>* Grow content team</td>
<td>* MIT Tourist Intercepts</td>
<td>* Explore financial models of mobile payment</td>
<td>* Develop easy audio recording technology (filters, sound effects, editing, etc)</td>
</tr>
<tr>
<td>* User test with prototype</td>
<td>* User test with prototype</td>
<td>* Advertising test with individual stores</td>
<td>* Incentive scheme for content creation (gamification)</td>
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<td>* Content Creation (10 routes)</td>
<td>* Identify events for sharing and sign-ups</td>
<td>* Meet with local Chamber of Commerce</td>
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<td>* MIT Shuttle Content Creation</td>
<td>* Animation video and likes</td>
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<td>* Develop full wireframe</td>
<td>* 47 pilot route</td>
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alight!

(ONLINE FORM AT: www.tinyurl.com/y6wa9dx)

Thank you for trying out alight! With you, we're going to make riding the bus and exploring the city easy and exciting. After using the app, please take a moment to help us record your experience and thoughts! First let's start with some basic information:

* Required

1. Age *
   
   Mark only one oval.
   
   [ ] 15-24
   [ ] 25-34
   [ ] 35-44
   [ ] 45-54
   [ ] 55-64
   [ ] 65-74
   [ ] 75+

2. Gender *

   Mark only one oval.

   [ ] Female
   [ ] Male
   [ ] Prefer not to say

3. Occupation *

4. How often do you ride the bus? *

   Mark only one oval.

   [ ] Never
   [ ] Yearly (1-5 times per year)
   [ ] Monthly (1-5 times per month)
   [ ] Weekly (1-5 times per week)
   [ ] Daily (every day)
   [ ] More than once per day
5. Have you taken a sightseeing tour bus in the last ten years? *
   Mark only one oval.
   ☐ Yes
   ☐ No
   ☐ Maybe

6. If yes, when and where have you taken these buses?

---

**Your alight Experience**

7. When did you use the app? *
   Example: December 15, 2012

8. Which bus route did you take? *

9. Compared to other trips on the public bus, this trip with alight was:
   Mark only one oval.

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   Less Enjoyable | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | More Enjoyable

10. What made factors made the trip less/more enjoyable?
11. How did the narrator(s) voice and delivery of content make you feel? (check all that apply and add your own) *

Check all that apply

☐ Excited
☐ Curious and interested
☐ Bored
☐ Annoyed
☐ Funny
☐ Frustrated
☐ Apathetic
☐ Nervous
☐ Happy
☐ Confused
☐ Safe
☐ Included
☐ Excluded
☐ Motivated
☐ Open-Minded
☐ Other: ____________________________

12. What did you like most about the narration?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

13. What could be improved about narration?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

14. What was the favorite story you heard? Why? *

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________
15. If you tried two different versions of the alight app, which one did you like better? Why? 
Mark only one oval.

☐ alight1

☐ alight2

16. Why did you like that version better? What specific features did you like?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

17. How might the alight app provide a better experience for the user?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

18. Would you be interested in using alight again? 
Mark only one oval.

☐ Yes

☐ No

19. Would you be interested in creating content for a bus route? 
Mark only one oval.

☐ Yes

☐ No

20. If you answered yes to either of the above two questions, what is your email so we can contact you?
alight User Survey / alight用户调查

Thank you for trying out alight! We're still designing this app and developing this start-up! We'd love your comments and ideas about your experience!
(version 14bddd8f)

1. **Reason for Visiting MIT 你来MIT的原因是**
   *Mark only one oval.*
   - Sightseeing and tourism 旅游观光
   - Current student 我是这里的学生
   - Passing by 我只是路过
   - Meeting 来开会
   - Prospective student 我将来这里读书
   - Others 其它
   - Other: ____________________________

2. **On a scale of 1-10, how likely is it that you would recommend using alight to your friends, family or business associates?** 从1很不愿意，到10非常愿意，请选择你把alight推荐给别人的意见程度?
   *Mark only one oval.*
   
   1  2  3  4  5  6  7  8  9  10

3. **On a scale of 1 to 10, how much did you enjoy the content?** 从1很不喜欢，到10非常喜欢，选择你对你听到的内容的喜爱程度
   *Mark only one oval.*
   
   1  2  3  4  5  6  7  8  9  10
4. **What story or stories from the app are memorabie to you? Why?** 在这个应用里面有让你印象最深刻的故事？为什么它让你印象这么深刻？

5. **What kind of stories or information would you like to hear?** 你还想听到什么故事/信息？

6. **On a scale of 1 to 10, how well did the app work?** 从1很不好用到10非常好用，请说说这个App给你的体验如何？
   *Mark only one oval.*

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7. **What could be improved about the design or technology?** 关于这个APP的设计有什么可以提升的地方吗？

8. **Would you pay for this app?** 你会愿意为这个app付费吗？
   *Mark only one oval.*

   - Yes
   - No
   - Maybe

9. **If yes, how much would you pay?** 如果愿意，你会愿意付多少钱呢？
10. What suggestions, ideas, or questions do you have for Alight? 你还有什么建议、想法、或者问题吗？


A little about you! 帮我们多了解你！
We will keep all of this information anonymous and private. 我们会保证尊重你的隐私。

11. Age 年龄


12. Gender 性别
   *Make only one oval.*
   〇 女
   〇 男
   〇 Other:

13. Occupation 职业


14. Nationality 国籍


15. What kind of phone do you use? 你用什么系统的手机？
   *Make only one oval.*
   〇 Apple 苹果
   〇 Android 安卓
   〇 Other:

Powered by
Google Forms
USER TEST 0: THE SCAVENGER HUNT

THE OFF THE BEATEN PATH SCAVENGER HUNT

BOSTON, OCTOBER 13TH 2017

LIANGLI, SUMMER, PRIMA, GAB, CANDY, DAVID, SCOTT, DAPHNE

THE IDEA AND THE GAME

Every year 230,000 Chinese travelers come to Boston. They generally do the exact same thing: take a photo at Harvard, buy something from a chain store at Faneuil Hall, and eat an overpriced lobster.

However, we know that culture, history, consumption, cuisine, and people extend beyond the “beaten path.” Today’s young traveler is independent, creative, and courageous. They understand that traveling is not about the destination but the experience of getting and being there. For us, travel is discovery of place, of people, and of purpose.

Rather than going to the typical Boston tourist traps, what might happen if teams of ethnographer-travelers got on a bus that local Bostonians take every day and travelled to the very end?

Today, we’re going to find out. This envelope contains the rules, tools, and tasks for a scavenger hunt along either Bus Route #1 or Bus Route #57. This scavenger hunt is designed to help us discover people, places, products, food, and stories that most travelers from China would never know. It’s also designed to be fun and help you see Boston from the view of an everyday person – a bus rider!

Most of the day will be spent exploring the bus route, but at the end we will celebrate your team’s discoveries with a home-cooked meal at David and Candy’s house. There will be some new and old friends to hear your stories. And, there will be a very cool prize for the winning team.
SCHEDULE

9:00-10:00  Morning Greeting @ MIT Media Lab
10:00-16:00 Scavenger Hunt (don’t forget to eat lunch!)
16:00-18:00 Rest and Preparation @ Cambridge Innovation Center
18:00  Dinner and Award Ceremony @ David and Candy’s House

THE ROUTES AND MAPS

We have selected two bus routes that your team can choose from: Route #1 or Route #57. Both of these routes have long histories in Boston and cover some very interesting territory.

Route #57 is a “key bus route” that runs East-West. It started in 1969 when it replaced an on-street trolley in Boston. It runs every 12 minutes taking people from Kenmore Square (famous for Boston’s baseball team) to Watertown (a historic American town that now has a large Armenian population).

Route #1 started in 1962 and helps many students and professors get to school as it starts at Harvard, passes by MIT, and ends in Boston’s South End, a neighborhood with classic Boston tenement architecture. The area has gentrified a great deal in the last 10 years but still remains quite diverse.

RULES

- **Complete Tasks and Photograph Them:** To be completed, a task must be photographed (in an attractive way). When you finish a task:
  - Send the photo to the WeChat group.
  - Send the Task # to the WeChat group.
• **6 hours:** Team will have 6 hours to complete as many tasks from the scavenger hunt as they can. You do not have to finish all the tasks, but you should try to get the most points!

• **Cell phones:** You CANNOT use your cell phone to find answers to tasks. You will need to cite your sources for those answers! You CAN use your phone for everything else.

• **GeoTag:** If possible, please TURN ON the option to “geotag” your photos. (Mark the location of where you take them)

• **Stay near the bus route:** Tasks must be completed within 500 meters of the bus route.

• **Talk to strangers:** Meeting local people can open up new stories and possibilities. Some of the tasks require meeting and talking to people. Always, be polite and tell them what you are doing. If they don’t want to participate or take a photograph, please respect that.

• **Be safe:** If you feel uncomfortable in an environment or situation then leave. You can always walk away or call an Uber. And give David a call! Also, stay warm if it’s cold out!

• **Have fun:** This is a game!
## TASKS

### THE BUS ROUTE
1) The FIRST stop of the route. (50 points)
2) The LAST stop of the route. (50 points)
3) A photo of the front of the bus when it arrives with your team. (5 points)
4) A selfie on the bus (5 points)
5) What would make this bus trip more enjoyable? *** (15 points)

### SHOPPING
1) Something that is made in BOSTON (5 points)
2) Something that is made in CHINA (5 points)
3) A store that begins with the letter “B” (5 points)
4) The weirdest store*** (15 points)

### EATING
1) What is a typical Bostonian food? (7 points)
2) What is a food that a Bostonian has never eaten? (7 points)
3) A local Boston beer (5 points)
4) An American candy (5 points)
5) The most interesting story about Boston’s food*** (15 points)

### PLACES
1) A park (5 points)
2) A public building (5 points)
3) A bathroom (5 points)
4) A church (5 points)
5) A town or city limit sign (5 points)
6) A funny sign (5 points)
7) The most interesting piece of architecture*** (15 points)

### LOCAL CULTURE
1) Logos of five of Boston professional sports teams. (10 points)
2) Which American president(s) are from Boston or near Boston? (10 points)
3) What is Boston’s nickname? (10 points)
4) What does “wicked” (邪恶) mean in Boston? (10 points)
5) What is the “Green Monster”? (10 points)
6) Weirdest thing about Boston*** (15 points)

### PEOPLE
1) Find someone who has lived in Boston their entire life. (10 points)
2) Find someone who just moved to Boston. (10 points)
3) Find someone who was not born in the USA. (10 points)
4) Find someone who wants to go to China someday. (10 points)
5) An interesting story about someone else *** (15 points)

BONUS POINTS
(you can find as many as you want!)

1) A pigeon (1 point)
2) A Red Sox hat (1 point)
3) A squirrel (1 point)
4) A sign in Chinese (1 point)
5) A lobster (1 point)

***These tasks can only be awarded to ONE team. At our dinner, we will have three judges who determine who wins.

DINNER AND THE AWARD

After a rest, we’ll have dinner at ~6pm at David and Candy’s house. We will share your photographs and listen to the stories that you have collected. Please come ready to share the best stories of the day. We will also discuss how this might become a fun and big business 😎

Oh, and for the winner, there is an award!