LINERY

Skip the line

INFO 360 D Autumn 2016

Problem Statement

For many university and college students, there is a feeling that they are constantly running out of time typically due to poor time management. Between attending classes, participating in educational activities, and commuting, the average college student only has about an hour each day to eat and drink (Bureau of Labor Statistics). According to the College & University Consumer Trend Report, more than half of students (54%) purchase food and beverages on campus at least twice a week, and 35% purchase these items off campus. With such limited time dedicated to eating, there is a significant problem of not knowing where to go get food that fits within your schedule.

To gather more information about this problem, we conducted research through interviews and contextual inquiries with several college students at the University of Washington. In order to gauge whether the decision lies upon what the person is craving to eat or the quickest vendor to purchase food in, we asked, "Where do you usually go to eat?", "How do you decide where to go?", and "What is your typical day like?". To get a better understanding of the problem, we observed students during their breaks between class and followed their decision making process from walking to a food vendor and back to class. We found that students struggle with the unpredictability of wait times in line at food vendors on campus. The wait time in line is a significant factor in the decision of where to buy food when time is limited. At the University of Washington, one can either eat on campus, which can be very convenient and accessible for students who might not have time to pack their own food, or walk off campus and eat at a sit down restaurant. However, when in a bind for time, how could one know how much time they would need in order to buy food? In one of our interviews, a participant stated that he is often unsure about whether he should take the risk to walk to the Husky Union Building, a cafeteria that is far from his class, to buy food or if he should settle for a bagel from a nearby espresso shop in order to be on time for class.

Our design seeks to solve the very relevant problem of not knowing how many minutes one must allot to wait in line so that the student can spend more time being productive and waste less time waiting in busy lines when there are shorter lines elsewhere. To address this problem, felt the best approach would be to create a straightforward smartphone application that will display the live wait times of food options on campus. The focus of our design will be on the interaction of the user and the application, making sure they can quickly access the information they need in order to choose where to get food.

Scope

The solution for our problem is a simple application called "Linery" that will display the live wait times of nearby food options. As part of the information we gathered from our research, the distance to the food vendor is almost as important as the waiting time since both walking to the destination and waiting in line takes up the time they have to eat. Thus, having the distance option can heavily impact the user's decision of where to go. Having only 2 pages, list and map view, allows the user to quickly gauge the waiting times at vendors around them.

During our design process, we examined similar applications that also provide live information and found components that will and will not work for our target audience. By doing so, it was clear which designs were out of scope. For example, we initially considered making our application based on user input and making it a self-regulating system with a complex point incentive program. However, after prioritizing time as the most valuable to the user, we decided this was a distraction from the main function, so we removed this feature. This also eliminated the need for users to sign up for an account, which is time consuming on the first use and can discourage people from downloading and using the application. Many applications have an option for the users to provide feedback, which is another feature that is out of scope for our solution. Having features like crowd sourcing data, creating user profiles, and leaving feedback would not make our applications simple and intuitive for all users to use.

Lastly, our design does not address external sources that our app uses, such as SenSource, a company that makes 3D people counters and sensors, and retrieving data from the Google API. The device that we are using for our information needs to be mounted a certain way at each location, which is out of scope and is something that we will not be designing. All of this is far beyond the design specifications for our solution as it is technical and does not add greater understanding of how Linery works.

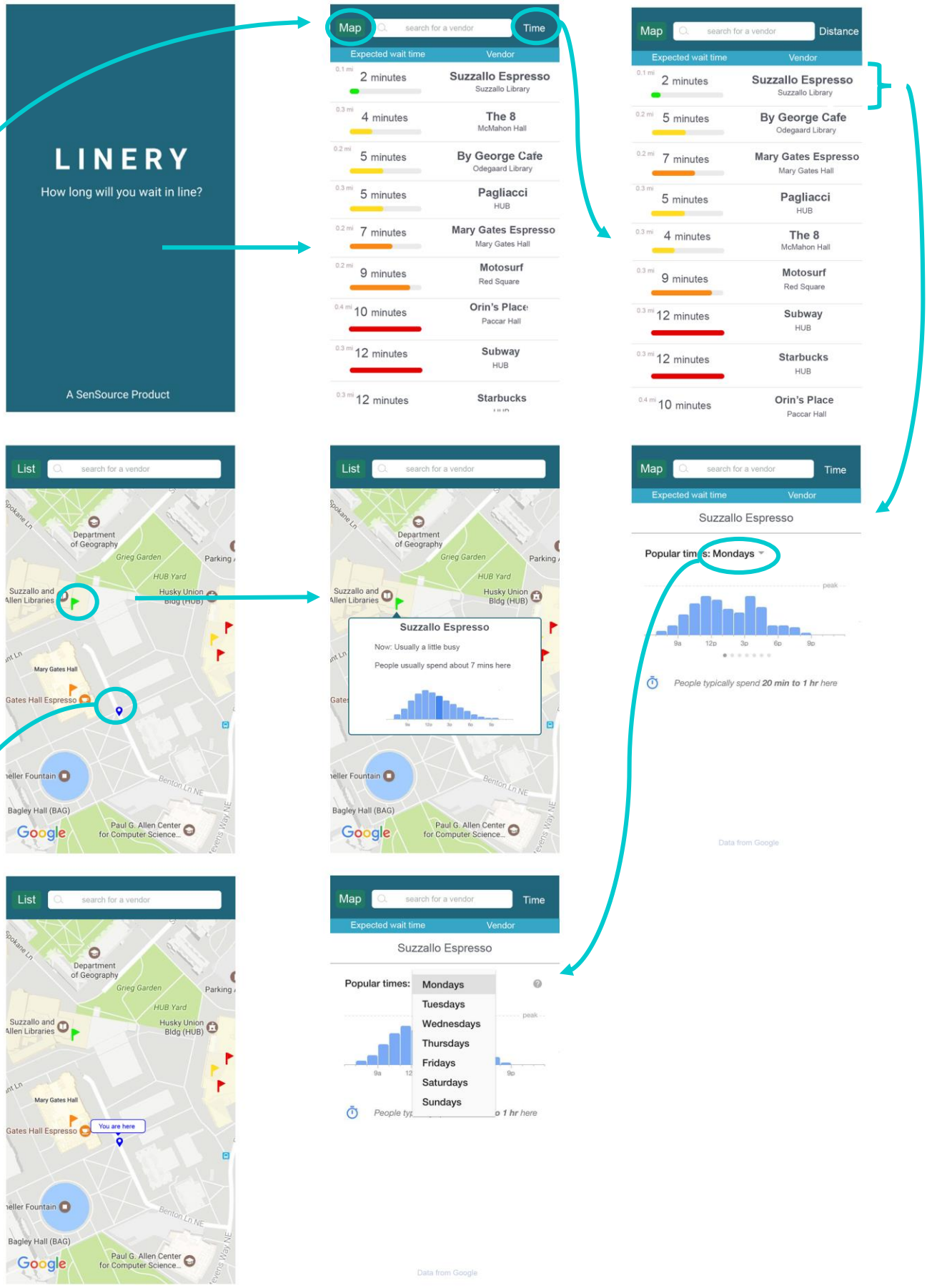
Solution

In order to solve our problem, we decided to partner with SenSource. The hardware we will be using is from the company is called ClearCount 3D, which is mounted on the ceiling above the vendor with Ethernet connection and uses a directional sensor that guarantees 95% accuracy on people traffic. With its powerful dual lenses, it creates a 3D view with depth perception to precisely calculate people walking in any direction. Along with this device, the vendors are able to view data analysis and reports by SenSource's Vea Analytics software. Vea is able to calculate the average wait time customers wait in line during any given period that our smartphone application, Linery, will use. The data is stored in frequently updated and secure servers. Our application will then take this real time data and display it on our List View and Map View screens shown below. This will give the customers the necessary information to help them decide where to eat when in a hurry.

While SenSource's primary customers are shops and restaurants, in and out of mall complexes, the company has been looking for ways to expand their customer base to universities around the country. The University of Washington is a large and diverse campus in a busy city. SenSource saw this as a prime experimental location to implement their ideas. SenSource hired us to design an application that would implement their technology in a way that would be beneficial to both the campus and to SenSource. As this is a beta version of Linery, SenSource has agreed to provide the 3D counters for all vendors on the University of Washington campus (there are 39 vendors). In addition to this, the University of Washington agrees that this resource would greatly benefit its students, as it recognizes that this will save them time to purchase food.

A ClearCount 3D people counter will be installed by every food vendor at the University of Washington so students can always look up how long they must wait in line if they were to buy food anywhere on campus. This solution ameliorates the problem of not knowing how long a line is until after arriving to a vendor and seeing the line in person. This will allow students to achieve their goal of buying food as quickly as possible and to avoid wasting time in long lines.

Our application's design complements the on-the-go lifestyle our target audience of college students experience every day. During our rigorous user testing sessions, we discovered that participants valued a minimalistic interface, which is why we decided on a simple white background with a gradient of colors as signifiers for the wait times and for maximum readability. Linery contains three main components: real-time estimate of how long each line is, a sortable list and map view for nearby vendors, and additional information from the Google Places API. Our design aims to give the user streamlined information to aid them in choosing a place to purchase food and drinks when time is limited.


LINERY
How long will you wait in line?
A SenSource Product
Map
search for a vendor
Time
Expected wait time
Vendor
2 minutes
Suzzallo Espresso
Suzzallo Library
4 minutes
The 8
McMahon Hall
5 minutes
By George Cafe
Odegaard Library
5 minutes
Pagliacci
HUB
7 minutes
Mary Gates Espresso
Mary Gates Hall
9 minutes
Motosurf
Red Square
10 minutes
Orin's Place
Paccar Hall
12 minutes
Subway
HUB
12 minutes
Starbucks
Map
search for a vendor
Distance
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Mary Gates Hall
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Pagliacci
HUB
4 minutes
The 8
McMahon Hall
9 minutes
Motosurf
Red Square
12 minutes
Subway
HUB
12 minutes
Starbucks
HUB
10 minutes
Orin's Place
Paccar Hall
List
search for a vendor
Department of Geography
Grieg Garden
HUB Yard
Suzzallo and Allen Libraries
Husky Union Bldg (HUB)
Mary Gates Hall
Gates Hall Espresso
Bagley Hall (BAG)
Paul G. Allen Center for Computer Science...
Google
Suzzallo Espresso
Now: Usually a little busy
People usually spend about 7 mins here
Map
search for a vendor
Time
Expected wait time
Vendor
Suzzallo Espresso
Popular times: Mondays
peak
9a
12p
3p
6p
9p
People typically spend 20 min to 1 hr here
Data from Google
You are here
Popular times:
Mondays
Tuesdays
Wednesdays
Thursdays
Fridays
Saturdays
Sundays

Application Screens:

Loading Screen

We wanted to keep the loading screen as simple as possible. Once the user opens the application, a short description is displayed under the application name to help further understand our goal, which is to know how long each line is at any University of Washington food vendor in real time. At the bottom of the screen it also states that this is a SenSource product to clarify where our main source of data comes from.

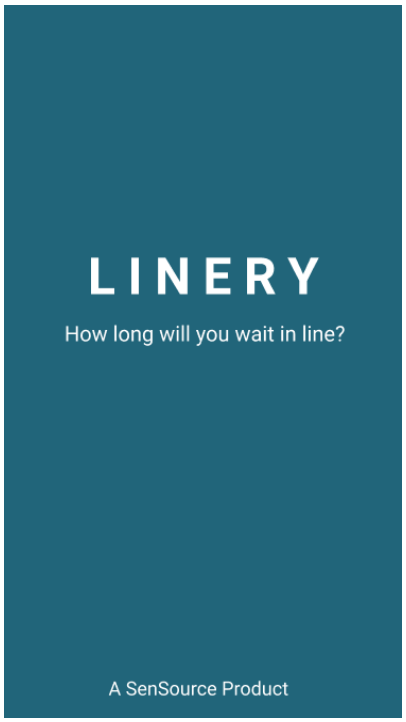

Figure 1 Loading Screen

List View

Figure 2 is the main and default view of our application - it is sorted by shortest time (in minutes) at each vendor. We chose to make the list view the default, as opposed to map view, because it is the most streamlined way of displaying the wait times if the goal is to choose a vendor with the shortest line when time is limited.

Features on this page from top of screen to bottom of screen:

- **The search bar:** At the top of every screen (**Figure 3.b**), we included a search bar so users can quickly type in a specific vendor in mind to find out how long they might wait if they were to line up there.

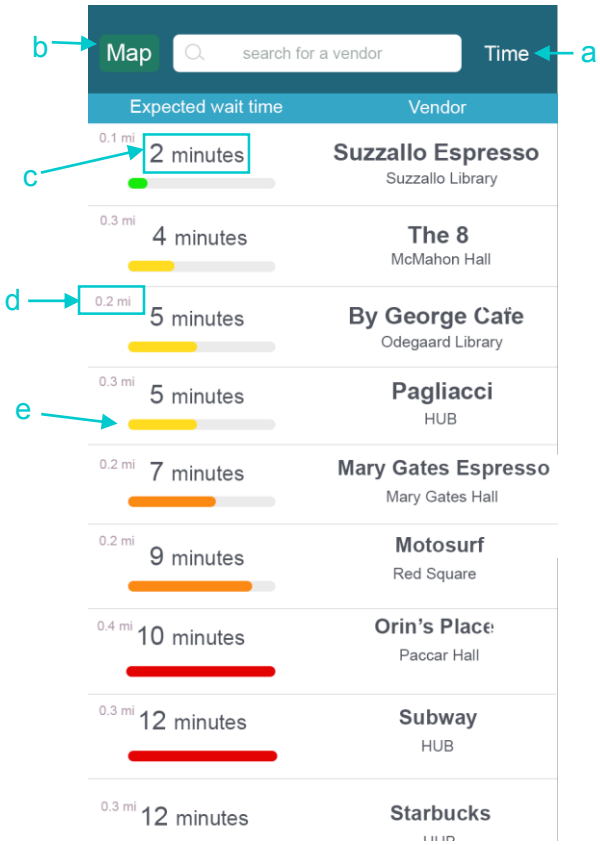

Figure 2 List View – Sorted by time

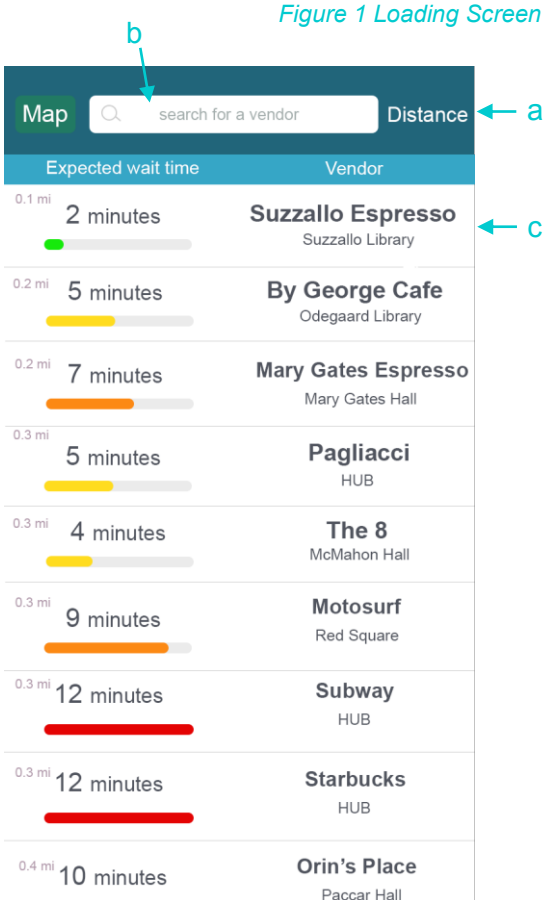

Figure 3 List View - Sorted by distance

- **Distance vs. Time Sorting:** The text to the right search bar in **Figure 2.a** and **3.a** allows users to sort the order the vendors can be listed by. They have the option to sort by shortest time in line (**Figure 2**) or by shortest distance from current location (**Figure 3**). In both sorting modes, distance is shown in a light gray text (**Figure 2.d**) that provides the distance information without drawing attention away from our main focus of wait times. This sorting mechanism was a suggestion from many of our test users, and it gives users more control by giving them more options, as this was a very popular request we received from almost every test user we spoke with.

- **Mode Indicator:** To change between list and map mode, the user can tap on the button to the left of the search bar (**Figure 2.b**). When the word "Map" is shown on the button, this is telling the user that they are looking at the List View of vendors and wait times, as opposed to Map View, and vice versa.

- **Wait Time Numbers:** The list displays live wait times for the line at each vendor on campus. In order to obtain this information, we will assume there is a ClearCount 3D counter at every vendor on campus. The information gathered from the device will be reflected, as can be seen in **Figure 2.c**; by default, the order of vendors will be organized from shortest wait time to longest wait time. These minute waits time are numbers we will receive from Vea's analytics queue metrics technology derived from data from the 3D counter. We originally wanted to color coordinate the numbers based on how long the wait time would be. However, we found that this design would exclude color blind users from the benefits our application provides. Therefore, we ultimately decided to make the numbers black but added a color coded progress bar (**Figure 2.e**). These progress bars are readable in 2 ways: by both color and length. A short green bar for a short wait of 1-3 minutes, medium length yellow bar for 4-6 minutes, longer length orange bar is 7-9 minutes, and red was for a long wait 10 minutes or greater. We chose these particular colors to emulate traffic lights. In western cultures, people typically interpret green to be good or "go," yellow would indicate "maybe" or "take caution," while red usually signals "bad" or "do not go."

- **Vendor Name and Location:** Since our target audience are college students who are on the go, we wanted the default page to solely provide the crucial information without the user doing anything, but we also realize users may want to know more information. For example, a user is able to see the real time wait at a coffee shop but

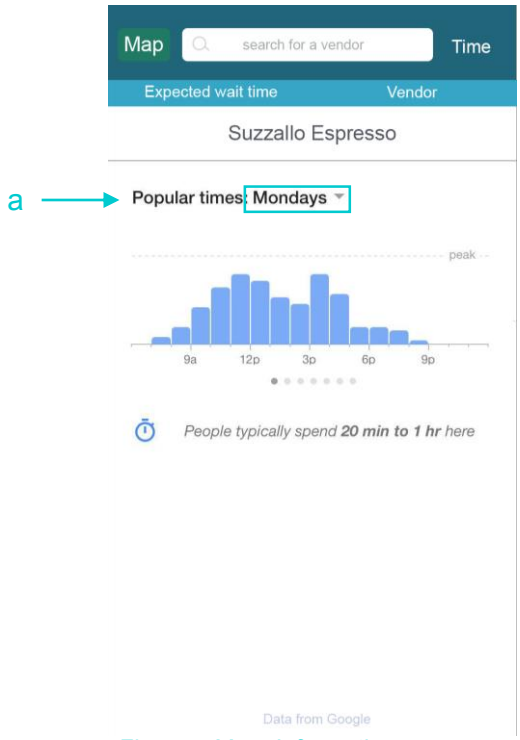

Figure 4 More Information

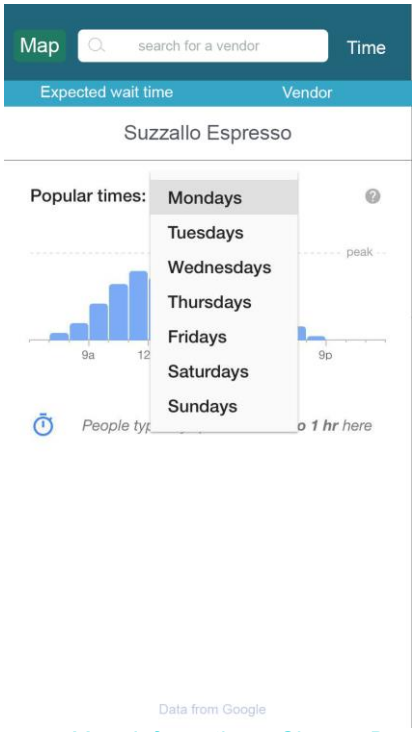

Figure 5 More Information – Change Day

wants to know how busy it is later in the day. This user can tap on the option (**Figure 3.c**), which will slide up an additional screen (**Figure 4**) that displays a histogram of how busy a place is at a certain time from the Google Places API.

Map View

The map view screen (**Figure 6**) is the alternative view of vendors and their wait time if a user wishes to view locations in this format as opposed to the list view. The distance a user is from a particular vendor has a significant influence on their decision of where to buy food, so we thought it would be useful to give users the option to clearly see what is around them at any given place on campus. In map view, users can see where they are in relation to every vendor on campus. We found that many of our test users want the additional option to be able to see things in a more tangible way than provided in list view. However, if users find the map view unnecessary, they can choose to solely use the list view. We made the decision to remove the sort function on the Map View, since there is no list to sort by. We decided to place flags to indicate every vendor on campus. The color of the flags are reflective of the way we chose colors for the number of wait time on the List view screen. The user's current location is displayed as a dark blue teardrop shaped icon (**Figure 6.a**). We felt this icon is a familiar and common shape for users to quickly find their current location.

As outlined in **Figure 7**, when users click on a flag (**Figure 6.a**), a popup will display data from Google Places about how busy the vendors are at different times, based on previous history that Google has collected.

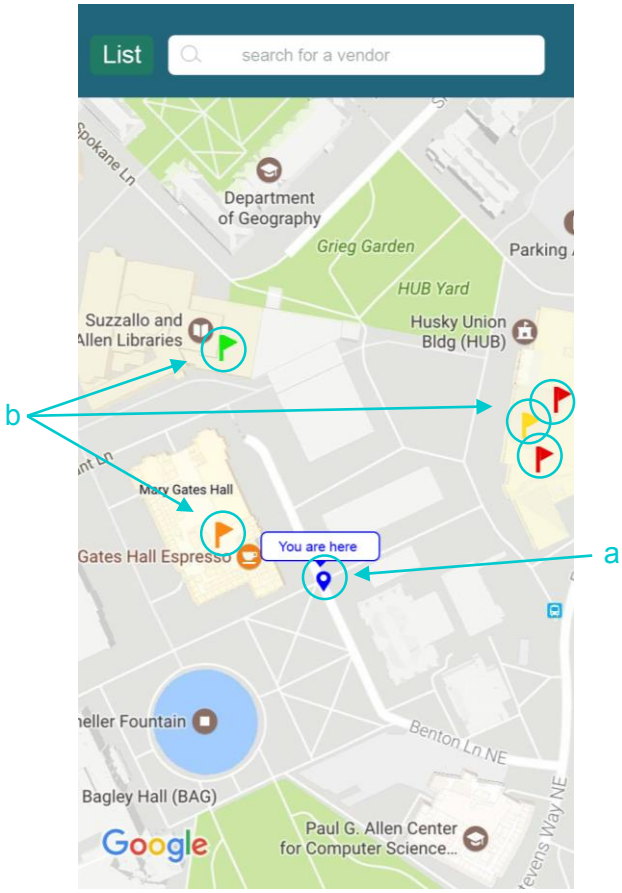

Figure 6 Map View – Current Location

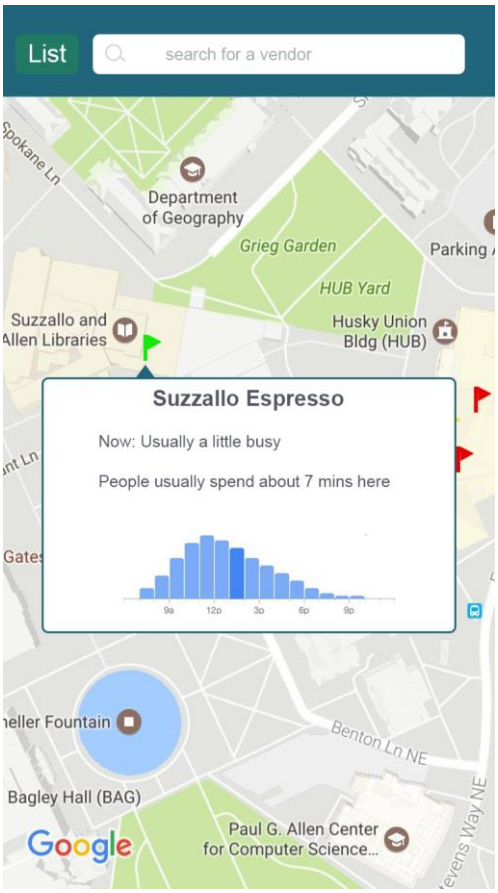

Figure 7 Map View – Vendor Information

Limitations

Admittedly, our application fails when certain criteria is not met, such as the targeted users, accessibility needs, and reliable data. Linery was not designed to support a broader spectrum of users outside of average Informatics student persona, who we tested on. This person would be a student from Washington state (74% of our university's students are residents of Washington) whose family is at least prosperous enough to pay for their child's tuition or to loan their child the tuition until they can pay it back (University of Washington Office of Planning and Budgeting Fast Facts). Throughout the user testing stages, our users were primarily design students in the Informatics major, who grew up using technology in a middle class setting in America. Our application is designed for the relatively privileged people we used to test our application on, but if we were to expand our project with time, we would conduct user tests on a broader group of students. We would include students studying other majors, students from vastly different countries, ranging financial backgrounds, and students who have not been using iPhones and Androids from a young age like we have. With that in mind, requiring a smartphone to use our app in order to access live wait times is limiting.

In terms of accessibility, color blind users might have a harder time distinguishing the colors on our screens, so these users will still be able to use our application but may get less advantage from our application than users with regular eye sight. While our application does not provide any accessibility features, iPhone settings cover many universal accessibility features users can use, like VoiceOver. As a result of this, our application will not be useful for those who are illiterate or who cannot read English, as it does not come in other languages. Along with the limitation of languages comes the added difficulty of understanding distance if one did not grow up using miles as a measurement. Our distance view (**Figure 3**) will be less informative for foreign users. In addition, our map view will be less useful for users who cannot read maps (they could simply use the list view, but they are limited in the way that they can only use that view).

Since our application is designed to straightforwardly provide live data on queue wait times, users who are unfamiliar with the University of Washington campus may find the application less useful, as we do not provide information about what kinds of food each vendor sells. These kinds of users, like first year students, might find it harder to use our application because they will not know what kinds of food each vendor listed in our application will have until they arrive to the destination, unless they take the time to check online beforehand.

Lastly, there are a few factors that are out of our control due to the nature of our application's dependence on SenSource technology. Linery depends on Vea's Analytics software and SenSource's hardware to gather real time data. If either is not working, our application will not work. Or if their information is incorrect, then our information will also be incorrect, since our application reflects their data. We also cannot tell users how long they will wait after they have ordered due to food prep time unpredictability (depending on what they ordered, speed of prepping for chefs) since it is out of our control, and it is not something that can be measured with our technology. Ultimately, our design fails if students have enough time to not worry about how long they will wait in line, since they would not care about the information our application is gathering.

These are the certain situations in which our design will not work due to a number of inherent user limitations and features we chose not to include due to limited time to research further. At this time, we are limiting our project to cover University of Washington campus vendors only, since it is an experimental project. If the project proves to be useful and efficient in the way we hope, we will expand to other campuses in the future.

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