Social OneBusAway: Connecting Teens Using Social Technology and Public Transit

Abstract
The goal of this project is to understand the public transit needs of teenagers and to create technological solutions that encourage teenagers to have a more positive and practical social opinion toward public transit. In our research, we focused on teenage trip planning and social interaction while using public transit. We distributed a survey and conducted two focus groups with high school students in the Puget Sound area. We also interviewed one public transit expert for the transportation provider perspective. Results encouraged the implementation of a SMS (Short Messaging System) and an interactive smartphone application. To evaluate the results, we created low fidelity prototypes—such as computer drawn wireframes—and conducted a usability evaluation.

Keywords
Public transit, bus, teenagers, social technology, mobile device

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.
Introduction
Public transit is a form of transportation that allows teenagers to travel cheaply and quickly, though sometimes teenagers prefer to travel by car because of its shortcomings. OneBusAway—an online bus finder tool—attempts to relieve the issues with bus arrivals and departures by informing users the approximate times that a particular bus is either arriving or leaving. This paper discusses the possibilities of creating an extension to the OneBusAway application that will encourage teenagers to use public transit more despite public transit’s shortcomings. We hope to design an application that connects teens using social technology and public transit.

Literary Review
Public Transit and Teenagers
From our research, we discovered that teenagers preferred to travel via personal car. In a research study conducted by the Transit Cooperative Research Program (TCRP), 73% of the participants said that their most preferred mode of transportation was the personal car while 55% of the participants preferred public transit [4]. Our research also showed that teenagers depended on adults for travel. Results from a similar study supported our findings by indicating that social groups and social media are an important aspect to a teenager’s life [2] and social connection and communication are fundamentally important to teenagers [5].

Data Gathering
We decided that the most effective method to gather teenagers’ thoughts and opinions regarding the current public transit system and OneBusAway—an online bus finder application—was to visit local high schools; where large concentrations of teenagers gather on a regular basis.

First, we conducted one focus group at a local high school in the Puget Sound area. Later, we returned to the same high school to distribute a survey. For the focus group, we invited eleven high school senior
students, to join us in discussing their experience with public transportation and their mobile communications behavior. From the eleven subjects, all but one owned a cell phone. We also introduced and demoed OneBusAway for the students. None of the participants in the focus group had prior knowledge of OneBusAway and OneBusAway’s functions greatly impressed them. After the focus group was completed and the qualitative results analyzed, we created an anonymous survey and returned to the high school to distribute the survey to a larger group of students. We were able to obtain quantitative data from 61 survey respondents.

**Data Analysis**

**Focus Group Data**

From the focus group, we discovered that high school students receive low exposure to online bus riding tools such as OneBusAway; however, the students believed that such tools could potentially be very useful for travel planning. The students also revealed that riding buses was a liberating experience because the activity allowed them to stop relying on family members for transportation. We found that the students preferred to ride the bus with friends because they can socialize and provide navigational assistance to each other; but after the students obtained their driver licenses, they stopped riding the bus.

Most of the students in our focus group preferred to communicate by using their mobile phones for texting rather than for making phone calls. Some students explained that for long conversations, they tended to use phone calls; while to obtain short information or quick answers, they tended to use texting.

**Survey Data**

**Riding the Bus**

We found that 50.85% of the responding students indicated that they “rarely” or “never” take the bus while 49.15% showed that they “sometimes” or “always” take the bus. We also discovered the following from those who said they “sometimes” or “always” take the bus: 93.48% said that knowing when the next bus will arrive is important; and, 82.98% said that when they do ride the bus, they ride with friends.

We also noticed that 65.96% of our respondents cited “not having a car” as a reason why they rode the bus.

**Trip Planning**

We found that 66.67% of respondents implied that they never use any trip planning websites or applications. However, 60.98% said that they “plan ahead” if they are riding with friends. Respondents also revealed that the most common methods they “often” or “always” use for trip planning were analyzing posted schedules available at bus stops (57.78%) and asking friends for travel recommendations (47.73%).

**Mobile and Social Context**

We learned that most respondents owned regular cell phone (which we define as cell phones with only basic capabilities such as calling and texting). 55.74% of respondents owned regular cell phones while 27.87% owned smart-phones (which we define as cell phones with basic capabilities and more—such as internet service, mobile applications, etc). 11.48% of the respondents admitted that they do not have a cell phone.
We asked respondents to describe how they would communicate with friends when they are planning to get together for social gatherings:

<table>
<thead>
<tr>
<th>Percent (%) Respondents</th>
<th>Communication Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.66%</td>
<td>Text Messaging</td>
</tr>
<tr>
<td>55.74%</td>
<td>Voice Calling</td>
</tr>
<tr>
<td>39.34%</td>
<td>Personal Face-to-Face Communication</td>
</tr>
</tbody>
</table>

Table 1: Displays the percent respondents who use a specific communication method for planning for social gatherings.

We found that for 80.33% of our respondents, their social lives involved the same social group most of the time. Furthermore, according to our survey:

<table>
<thead>
<tr>
<th>Percent (%) Respondents</th>
<th>Size of Social Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.86%</td>
<td>2 – 5 People</td>
</tr>
<tr>
<td>34.69%</td>
<td>6 - 8 People</td>
</tr>
<tr>
<td>12.24%</td>
<td>9 – 12 People</td>
</tr>
<tr>
<td>10.20%</td>
<td>13 or More People</td>
</tr>
</tbody>
</table>

Table 2: Displays the percentage of respondents who interact with a specific social group size.

Finally, 48% of the respondents that do not ride the bus said that they are “likely” or “very likely” to ride the bus if they can ride with friends.

**Design**

Using the data collected and analyzed from the first focus group, we designed two wireframes—one reflecting a SMS (Short Message Services) interface and the other an iPhone application.

We created a SMS wireframes because a high percentage of teenagers from our study use text messaging as their most common communication method. The reason behind the iPhone application is because we believe that technology is moving forward at a rapid rate and smart-phones will soon be the dominate device in the near future.

For the first wireframe, we decided to design an extension to the current OneBusAway application by creating a socially inviting feature that uses a “friends list.” We decided a “friends list” was necessary for the social aspect of OneBusAway.

Figure 1: The “Friends” tab displays the friends list and displays friend information such as the friend’s current route plan, current bus, and current location.
Next, we designed a system for regular mobile phones. The second wireframe details an online interface where users enter their information and have the system return that information when requested while the users are traveling.

Users setup travel information on a website via the user’s OneBusAway account. New users must register their phone number, create a password, and provide an email address. Each account has bookmarks which refer to the mobile texting for OneBusAway.

Users are able to use the trip planner by texting the stop number, the bookmark nickname, stop number to stop number, bookmark to bookmark, or vice versa.

We considered implementing a social system for regular mobile phones, but it is extremely difficult considering the limited text-based functionality regular phones have. Thus we took the feedback we received from the first focus group and decided to make an improved trip planner for the regular mobile phones.

**Wireframes Evaluation**

**Usability Focus Group**

After finishing the wireframes, we had the opportunity to return to the high school and present them to the participants in the previous focus group. The wireframes received positive feedback in general for good flow and logical content. However, the participants were able to identify a few flaws in the reasoning of our mental model of the system.

The participants were enthusiastic about the social aspect of a “friend list” system and agreed that it would be better if it merged with an existing social networking service such as Facebook. They also addressed a number other minor functionality issues that seemed to conflict with teenage behavior, such as using email as the primary mode of managing contacts. The participants indicated that they seldom use email as a major medium of communication and it made more sense to use a phone number based account for managing contacts.

For the regular mobile phone wireframe, the participants felt that the design flowed well and was intuitive to use. However, the wireframe had a number of minor issues that detracted from the overall experience. The main problem seemed to be purely
semantic; users felt that they misunderstood certain terms in the context of the system only until we explained the definitions. Other issues included the ability to search a route number and return a map highlighting the route and the bus stops it serves.

In addition to the high school focus group, we also presented our wireframes to a public transit expert. The expert agreed that a "friends list" feature was a great way for teenagers to socialize and that the incentive of possibly "busing with friends" may encourage more teenagers to ride the bus, thus boosting teenage public transit ridership. The expert also suggested that we should consider the possibility of incorporating "secondary split routes" into our trip planner. A secondary split route results from the event where friends riding on the same bus for the first portion of the trip later "split up" to ride on different buses for the second portion of the trip.

**Conclusion and Future Work**

To teenagers, riding on public transit as a potential social activity is favorable. Most teenagers feel that riding with friends can greatly influence their decision to use public transit. As a result, we created a method for teenagers to socialize via public transit. We designed two mobile wireframes that received positive feedback. In the future, we plan to create high-fidelity prototypes from our wireframes and conduct usability tests on our prototypes. We would like to implement a working version of our prototypes and merge the implementation with the OneBusAway application.

**References and Citations**


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Appendix

Other References


More iPhone Wireframes
More Regular Mobile Phone Wireframes

OneBusAway

OneBusAway

NEXT