
ComAboard: Reconnecting Commuters

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Abstract

We developed a service, “ComAboard”, to reconnect isolated commuters. Through our human-centered research process, we have identified commuters’ discomfort and boredom during their journey and the need to interact with others. With the ComAboard service design, commuters can draw virtual paintings with other passengers and discuss in Taipei Metro. Our design features not only the real time co-creation but also continued connection for commuters. Through this service, commuters might interact, communicate and have a new relationship with each other. We believe ComAboard can liven up people’s commuting experience and encourage them to rethink about what commuting can be like. We also anticipate that this design can be a means to deliver additional positive values.

Author Keywords

Design; service design; community; commuting; vehicles; place; space; social networks.

ACM Classification Keywords

H.5.1 [Information interfaces and presentation (e.g., HCI)]:
Multimedia Information Systems; H.4.m [Information Systems Application]: Miscellaneous

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Figure 1: (upper) Affinity diagram. (middle) Primary persona. (lower) Empathy map of the primary persona

Introduction

Imagine you are a commuter in Taipei, Taiwan. Sitting or standing in vehicles and having nothing worth doing, you usually text, play games on your phone, or just take a nap, for half to an hour, and you repeat this every work day.

In the Taipei area, more than half a million people commute by mass transportation every day. For most of them, the daily commute is painful and time-wasting. Whatever they do, they get bored with this daily routine, which lead to extra stress and unhappiness [3], not to mention the discomfort due to crowdedness and increasing average travel time [1]. Furthermore, study shows that the overall happiness is affected by satisfaction with work commute [4]. How to better the commuting experience becomes a crucial issue.

On the other hand, Taiwanese commuters, especially commuters in Taipei, tend to avoid interaction with other passengers, by not sitting next to others or focusing on his/her phone. This behavior is natural, for safety concerns, but it has gone too far and has made all passengers isolated. We believe to form a healthy society, individuals need to, or at least have the opportunity to, engage and interact with others, and even form a community, especially in Taiwan, where people are friendly and hospitable.

Our project aims at reducing Taiwanese commuters' stress and even encouraging them to interact with nearby passengers through an experience design. Our target research field is the Taipei Metro, the main subway system in Taiwan that carries about 2 million people per day. With this huge amount of daily users, we believe our design for the commuting experience in Taipei can help relieve their stress in vehicles and rebuild a friendly community for commuters.

Exploratory Research

We used *contextual inquiry* and *field observations* to collect information about our audiences. We went to Taipei Metro stations and hopped on trains to approach commuters. We divided ourselves into groups to get on trains at different times and places and chose several passengers. We then carefully kept track of each move they took. We were worried that interviews might disturb passengers and change their behavior, so instead we observed and recorded their actions in our notebook silently aside until they got off. We asked them some questions about their commute experience if possible. In addition, we wrote down whether they had any interaction with objects in the environment or with other passengers. We went through several iteration to understand the problem deeper.

Analysis, Findings and Design Activities

We first created *affinity diagrams* with data extracted from the contextual inquiry to identify key properties of commuters in Taipei. Through the grouping procedure we found several interesting insights, such as commuters do feel bored during commuting but have limited things to do. Most of them use their cellphone throughout the journey, either texting or playing games, while some people keep playing with gadgets in their bag. In addition, we found that they are unhappy with the environment and rules in a vehicle. Sometimes they have nothing to do and just want to take a nap, but it is difficult to sleep well in a moving train. It is usually not easy to walk around in a train, which makes commuters uncomfortable. Regarding their connection to other people, commuters do show some interest in interacting with other passengers. They would like to meet someone with the same hobbies or someone they want to make friends with particularly in a vehicle as a time killer.

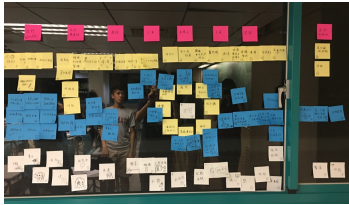


Figure 2: Our experience map

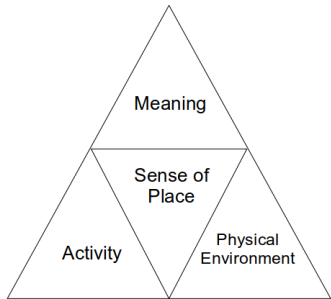


Figure 3: The components that create the sense of place

Based on the findings, we identified the *behavioral and demographic variables* for each commuters we observed. We captured patterns of our potential users. After clarifying details of the patterns, we made two *personas* to define the background, behaviors, and goals of our target audience. Our primary persona is an office worker aged around 28. She commutes by subway, and she often takes buses to visit her customers.

Next, we applied *value proposition* to our primary persona. We analyzed the pains and gains our target audience may encounter during the current commuting experience. For instance, they want to chat with nearby passengers but do not know how to start. We also drew an *experience map* for our persona, trying to examine the details of commuting experience and define our problem more precisely.

Design Concept: All Is About Connecting

After research and design analysis, we found a potential opportunity to build up connection while commuting in Taipei Metro by decorating vehicles. Our design concept has two aspects. One is to build up the connection among commuters, and the other is to build up that between commuters and the space – the vehicles. In other words, we want to transform “space” into “place” [5] [6] (see Figure 3).

It is common that commuters in carriages often do their own business, like phubbing, napping or just spacing out. Although most commuters are in the same space at the same time every day, they have no interactions with each other or the space. For them, commuting is just a necessary yet boring period of time. A report mentions that the monotonous process leads to extra stress and unhappiness for commuters. Study also suggests that social and entertainment activities either increase positive effects or counteract stress and boredom [4].

Thus, we decide to provide an interactive space for commuters in Taipei Metro. We are going to decorate the vehicles in a special way, which may provide commuters opportunities to exchange their opinions. Furthermore, commuters can also join the vehicle-decorating plan on their own, which is the process of place-making [2] and may bring commuters different feelings about vehicles they take every day.

Our Project: ComAboard

ComAboard is not only an art design but also a bridge between the commuters. Commuters will see a canvas in a vehicle displaying its theme, such as “Marine World” or “Christmas”. Free sticky notes are provided nearby. They can pick up one and draw a picture on it according to the theme, an individual one or one that “interacts” with other pictures, and then their work will appear somewhere on the



Figure 4: Our low-fidelity prototype. Users drew on the canvas and wrote their thoughts on sticky notes.



Figure 5: (upper) How ComAboard looks in a vehicle. (lower) A closer look at ComAboard.

canvas. They can also write their thoughts or ideas on another sticky note. Works of different passengers will finally form a big painting. Participants can leave their email to the staff if they want to see the final work. They will receive not only a copy of the big painting but also a link to a private on-line chat room. Collaborators can have further discussion and interaction with each other. Users don't need to worry about being embarrassed or shy under this indirect communication, and it's easier for users to exchange contact information if they want to. With ComAboard, commuters can be connected together in an amusing and easy way, and commuting won't be dull anymore.

ComAboard can be the bridge between commuters and vehicles as well. By decorating using their own paintings, the vehicles are no longer merely a space for commuting. They will be a lively place where passengers can interact with and enjoy.

Considering that it may be inconvenient for passengers to draw on a piece of paper in a vehicle, in our second iteration, we decided to make our service fully electronic and online. We use electronic canvases and ask users to draw on their cell phone.

How it works

An electronic canvas displaying a Quick Response Code (QR Code) that links to a website for the canvas will be placed in a vehicle. When a commuter scans the QR Code and visits the site, he/she can start drawing on his/her phone. Once completed, the picture will be uploaded to our server and then appear on the electronic canvas. Then, the author can submit his/her email if he/she wants to keep track of this canvas and receive a copy of the final painting. He/She can also submit his/her picture anonymously.

Our system can monitor whether a big painting is completed, i.e. the canvas is filled with small pictures. When the big painting is completed, a copy and the link to a private chat room will be sent to all collaborators via email. They can comment or discuss how to better the big painting next time. In addition, authors can set their profile public in the chat room such that other collaborators can contact them in private for further discussion or connection.

The use scenario

Commuters have few things to do when they are on trains. When they are bored with texting or phone games, they may notice the electronic canvas and the QR Code. They can scan the code and get their own small canvas from the website. Following the instructions on the website and the theme of this canvas, they can draw some nice small pictures as a time killer. They can change the color of the paintbrush as well. When finishing drawing, they can see their works appear on the canvas immediately. They may discover someone nearby also drawing on the same canvas. This can be a good opportunity for commuters to start a conversation and even make friends.

Authors can subscribe this canvas using their email. They will first receive a link to the canvas and see what it is like currently. They can also see the previous works on this canvas. When the canvas is filled with different commuters' works, they will receive a copy of the final combined painting and a link to the corresponding chat room. Authors can talk about the painting here. If they would like to, they can meet again at another canvas and draw together. A connection between commuters is naturally formed.

If they would like to know more about our project, they can navigate our website for complete information. Themes of all canvas will be published on the website as well such that commuters can choose a vehicle with the theme they like.

Evaluation

After the design of ComAboard, we went to Taipei Metro stations and conducted evaluation on trains using our concept video and a low-fidelity prototype. We chose passengers that match our primary persona the most as users. For the prototype, we used a plastic cardboard as our canvas. We first briefly introduced our prototype to users and asked them to draw a picture in a block on the canvas. When they finished their work, they pasted their sticky notes on the canvas. They could write down their thoughts or ideas on

another sticky note as well. For the concept video, we introduced our concept and then showed them our video. After testing, we elaborated on our design and collected feedback.

Generally, users have positive attitude toward our design. They consider our system interesting and fresh and are willing to use. We also collected some useful comments:

- Users need introduction and instructions if no staff is near a canvas: Users reported it would be nice if staff

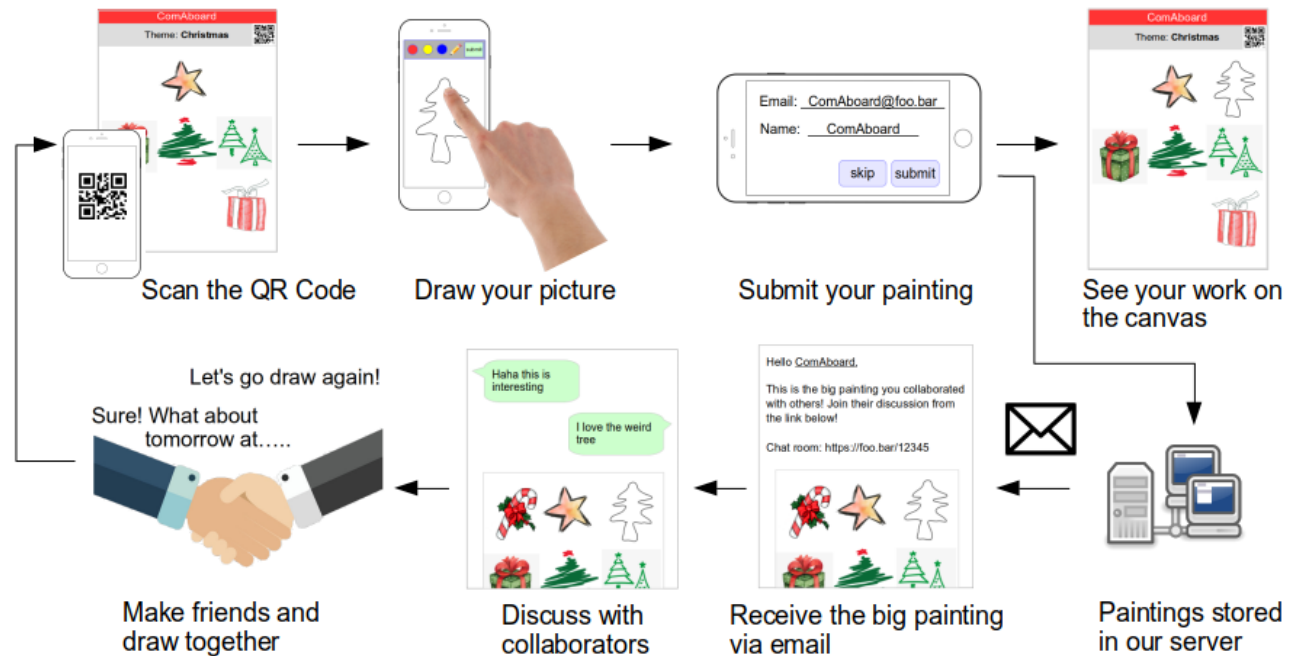


Figure 6: The flow diagram of our experience design

is around and can introduce the project to them. They would feel easier without staff nearby, but an introduction and clear instructions would be necessary. We would add a concise and clear instruction right above our canvas that can be understood in a short time, and ask users to refer to our website for complete information.

- Users suggested that we cooperate with companies for sponsorship: ComAboard can ask users to draw about a certain topic assigned by a company and therefore be used to promote special events. We tend to cooperate with non-profit organizations (NPOs) to help promote their goals and philosophy. For example, if we cooperate with a foundation that cares about the ocean, we can ask users to draw their ideas and imaginations about the ocean. When users received the big painting, they will also receive a report on issues like marine pollution, which can help raise awareness of those issues.

Conclusion

We developed ComAboard, a service that connects commuters and encourages them to interact with not only each other but also the environment. We researched and analyzed the data observed and interviewed, and then gained valuable insights from personas and scenarios to help conceptualize our service. We then built a prototype of ComAboard, which we further refined after evaluation. We hope the service design and technology we introduced can liven up people's commuting experience and connect currently isolated commuters together.

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