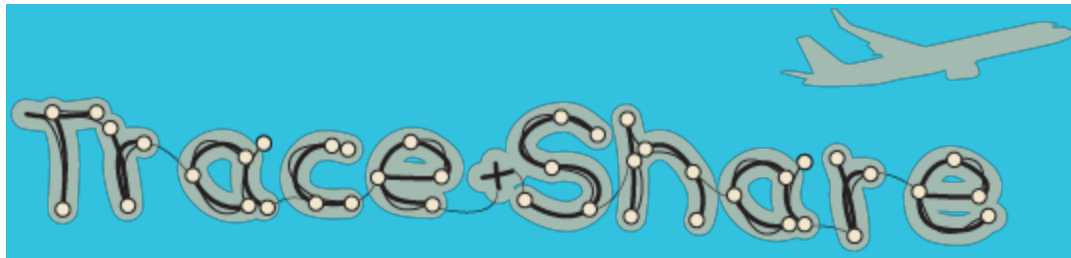


MIMS 2014 Final Project Report



Team members

Wendy Xue

Jiun-Tang (JT) Huang

Eungchan (Chan) Kim

Executive Summary

Travelers use various strategies and tools in attempt to preserve the good memories of a pleasant and eventful trip so that they can be relished and shared with others back home. Numerous commercially available iPhone apps facilitate this task, each has its success and flaws in terms of usability. This paper proposes a new iOS travel app, Trace+Share, that aims to help travelers easily record and share their trip experience, and contribute to their travel party's collective memories. Several user research methods, including online user survey, in-depth user interview and diary studies have been deployed to understand traveler's behaviors of capturing and sharing trip experience. Three iterations of prototypes were created and evaluated by conducting usability testing. The results of the usability testing showed that users considered the app is easy to use, looks attractive, and meets its stated intents. However, the result also revealed that users were in generally concerned about privacy, WiFi availability, and quality of information provided by the app. These concerns will drive future design improvement of Trace+Share.

Table of Content

1. Introduction	5
2. Motivations and Goals.....	5
3. User Research	7
3.1 Online survey.....	8
3.2 Diary Study	8
3.2.1 Recruiting Strategy.....	9
3.2.2 Diary Study Probe	10
3.2.3 Diary Study Response.....	11
3.3 In-depth User Interview.....	12
3.4 Summary of Key Findings.....	13
3.4.1 Survey, Diary Study and Interview Findings.....	13
3.4.2 Primary Persona.....	16
3.4.3 Current User Journey Map.....	17
4. Competitive Analysis of Existing Travel Apps	18
5. Prototype Design and Evaluation	25
5.1 Paper Prototype	25
5.1.1 Evaluation	27
5.1.2 Key Findings.....	28

5.3 High-fidelity Interactive Prototype	37
5.3.1 Architecture Design	37
6. Discussion and Future Works	39
6.1 User's privacy concerns.....	39
6.2 Recommending Contents	42
6.3 Controlling the Quality of Crowdsourced Contents	42
6.4 Consuming Content Offline	43
7. Conclusion.....	44
8. Reference	45
9. Appendix	46
Online Survey Questionnaire	46
In-depth User Interview Scripts	46
Post Diary Study Follow Up Interview Script.....	47
Trip Diary Study Participant Screening Questionnaire.....	49
Flinto Prototype Usability Testing Script.....	50

1. Introduction

Traveling to different places often generates memorable experiences. To record the memories of a trip and to share with other people has been a natural activity for many travelers. People use various tools to perform such activity. Some write old fashioned trip diaries with pen and paper. Some take photos of the sights they see. The generations who grew up with technology, often check-in on social networks such as Facebook or Foursquare using their smartphones. Currently, there are numerous smartphone and web applications available on the market designed to enhance travel experience. However, most of them focus on travel planning and fall short on providing an easy and efficient way for travelers to capture their trip memories holistically. None of them allows a group of travelers to collaboratively record their journey together. To solve this problem, we designed Trace+Share, an iPhone app that helps travelers:

- Check-in at a place they visited with photos they took and comments they made
- Share the check-in with friends so they can add their photos and comments to the collection
- Group check-in to create a trip journal
- Explore their surroundings to find new places to visit using the app's recommendation system

In this paper, we will describe the design process used to arrive at the proposed solution.

2. Motivations and Goals

Our main motivation for designing a smartphone application for travelers comes from the fact that using smartphones to access the internet to get or share information, and to stay connected with family and friends while away from home, has become a prevalent pattern in the United States. Based on a study by the Pew Research Center [1], in 2014, 58% of the American adults own smartphones. Among the smartphone owners, 40% uses their phones to “get recommendations or other location-based information”, and 8% uses phones to “check-in or share their locations”. Smartphone usage among US travelers has a more distinctive purpose . In 2013, TripAdvisor® commissioned the Trip Barometer Mobile and Social trends survey, which revealed that “85% of U.S. travelers reported using their smartphones. 33% of them reported using their smartphones to share on social media, for the fear of missing out on friends' or families' news or make their friends jealous with their travel updates” [2].

We are also motivated to design new user interface for travelers because of disappointing personal experience with existing travel related web and mobile tools. Wendy and Chan are interested in creating travel blogs or itineraries so that they can share their trip stories or make recommendations to friends. However, they both feel that they could not find the right tools to help them reduce the labor required. While there are 343 apps listed under the travel category in Apple’s App Store (on May 5, 2014), most of them are for navigation and trip planning. Only a few are designed to record and share trip experiences. A Google search yielded results that point to more

than 50 journal and diary apps, but none of them are designed specifically for travel. On the other hand, JT is an active user of Facebook and always checks in on Facebook at any new place he visits. He complains about not being able to organize his past check-ins by trip. Furthermore, his check-ins on the same trip are often scattered among other news feed activities he performs on daily basis.

In previous school semester, the team members have worked on another project, Photo Chronicle¹, on which they designed a user interface for tour guides to document tour attractions in their local communities. Photo Chronicle shares many similarities with Trace+Share, except that the primary user is a tour guide and the interface is designed to be used on desktop computers. At the completion of the Photo Chronicle project, the team was motivated to design an interface to enable regular consumers to create contents from mobile devices while travelling. Therefore, the team decided to continue working together and initiated the Trace+Share project.

The goal of the Trace+Share project is to design a travel journal app that removes the pain points currently experienced by travelers. We will use iterative design approaches and produce a functional high fidelity prototype that can run on a iPhone.

¹ <http://bit.ly/photochronicle>

3. User Research

In order to understand what travelers do before and during their trips with smartphones, we conducted a series of user studies. The findings of the studies helped to 1) verify and refine the initial idea; 2) to specify target audiences' needs; 3) to generate primary persona and user scenarios to guide the design. In the following sections, we will describe our research methods and key findings.

3.1 Online survey

We started the studies with a short survey designed to get a preliminary understanding how people plan their trips and whether people share their travel experiences. We used SurveyMonkey to create the survey and targeted smartphone users who are between the age of 22 and 35.

To recruit respondents, we sent the survey link to a few I School mailing lists such as noise@ischool, mims14@ischool. We also posted the survey link on Facebook and recruited the respondents through our Facebook connections. In total, we received responses from 27 people over two weeks. The respondents are primary graduate students and postdoctoral scholars at UC Berkeley. The survey questionnaire can be found in the Appendix.

3.2 Diary Study

We recruited several graduate students who are travelling during the Spring Break to participate in our travel diary study in order to get deeper insights of a traveler's behaviors before, during, and after the trip,

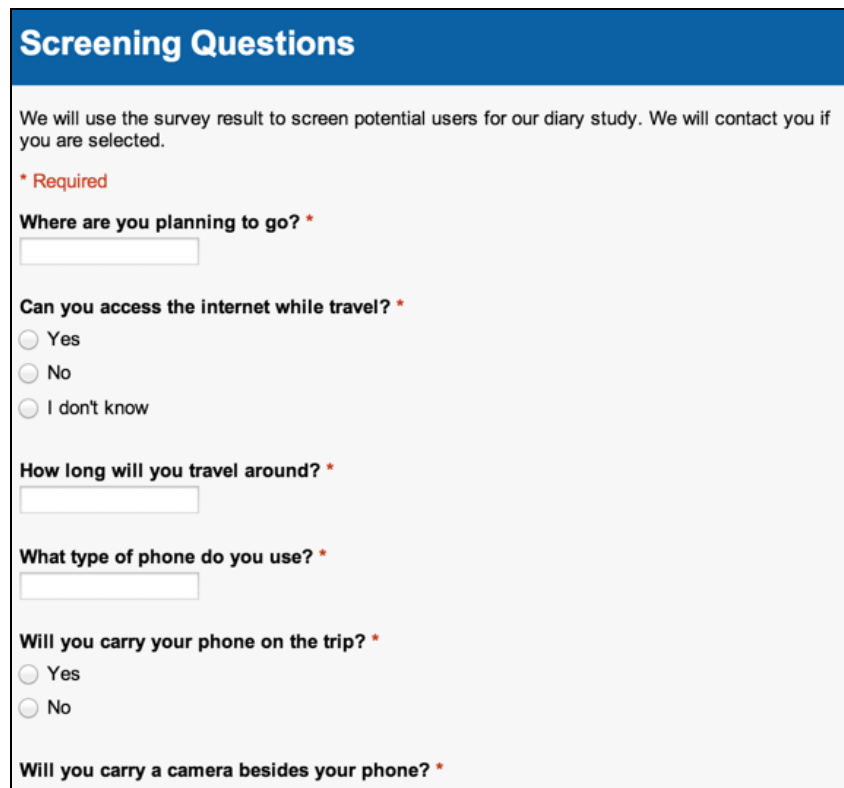
We required the participants to record their daily activities during the trip including their activities on social media, and share with us at the end the photos they took. The diary studies provided us quantitative data such as the number of pictures participants took using their smartphone, the number of pictures they shared with others, the number of times the participants used social media web sites.

The diary studies also gathered qualitative data by asking the participants to answer open ended questions, including why they shared photos or not, how they used social media, and what difficulties, if any, they experienced while doing those activities. We invited the participants to attend an one hour follow up interview at the end of the study.

3.2.1 Recruiting Strategy

Recruiting emails were first sent to several I School mailing lists and a Facebook group. We incentivized the students by rewarding the participants with \$20 Amazon gift card. 11 students responded to the recruiting emails.

We then asked the email respondents to complete a screening questionnaire to select those who match the criteria of the diary study. Figure 1 shows a sample of the questions used to screen the participants. The full questionnaire can be found in the Appendix.



The image shows a screenshot of a web form titled "Screening Questions" in a blue header. Below the header, a paragraph states: "We will use the survey result to screen potential users for our diary study. We will contact you if you are selected." A red asterisk and the word "Required" are displayed. The form contains several questions, each marked with a red asterisk:

- Where are you planning to go? *** followed by a text input field.
- Can you access the internet while travel? *** followed by three radio button options: "Yes", "No", and "I don't know".
- How long will you travel around? *** followed by a text input field.
- What type of phone do you use? *** followed by a text input field.
- Will you carry your phone on the trip? *** followed by two radio button options: "Yes" and "No".
- Will you carry a camera besides your phone? *** (no options are visible).

Figure 1: Sample Screening Questions for Diary Study

Through the screening process, we selected 8 students, including 5 who signed up because of the giftcard compensation, and 3 who signed up as volunteers without seeking giftcard compensation.

3.2.2 Diary Study Probe

We provided two copies of diary study templates to each participants, one digital copy and one paper copy. The paper copy was provided in case the participants do not have access to their computers during the trip. The template included 4 closed-end questions and 4 open-ended questions. We asked the participants to use the template to create a diary each day during their trip and take a screenshot of their iPhone camera roll at the end of the day. Figure 2 shows the template used for the diary study.

Date:	Name:	TRAVEL LOG
1. Write down when and where you have been to today		
Time	e.g. 8am	→
Place	Hotel	
2. Recording your day experience		
How many pictures did you take via phone?		
How many times did you check-in on social media?		
How many times did you write a note about your day?		
3. Sharing your day experience		
If you shared some pictures with any others, how many?		
and how did you share? (e.g. email, SMS, Facebook, etc.)		
4. Optional questions		
What difficulties did you encounter while capturing photos/stories about today's trip?		
What difficulties did you encounter while sharing photos/stories about today's trip?		
What kind of features do you imagine a travel app needs to have to help you record and/or share trip moments ?		
<small>*Please take a screenshot of your camera roll which contains thumbnails of picture taken today. We will ask you to bring it to follow-up interview. If you have any questions, please email at traceshare@gmail.com.</small>		

Figure 2: Diary Study Template

3.2.3 Diary Study Response

At the end of the Spring Break, 3 out of the 5 participants seeking compensation submitted their results. 1 out of the 3 volunteer participants submitted her result. Other participants failed to submit their diaries due to various reasons. Some had changed their travel plans and some were too busy during the trip to complete the diaries.

The 4 participants in the diary study went on trips ranged from 3 to 6 days. Participants took an average of 20 photos a day, mostly of landmarks and nature. 2 out of the 4 participant used both digital single lens reflex (DSLR) camera in addition to iPhone to take photos. One of the participants said he preferred to use the iPhone for easily sharing photos on Instagram and Facebook. The DSLR camera was used for more artistic shots that he would edit and upload onto Flickr after the trip. All the participants recorded the number of photos they took and shared the thumbnails with us during the follow up interview.

3.3 In-depth User Interview

The third method we used to research on users is in-depth user interview. We conducted two rounds of user interviews. The initial round took place after we received results from the online survey. We selected the interviewees among the survey respondents. The goal of the interview was to understand the reasons behind their answers to the survey questions. Three respondents were selected, two of whom for their international travel experience. The third respondent was selected for her frequent

road-trip experience. An interview script was created in advance and was used in all three interviews to ensure the same questions were asked consistently. The interview script can be found in the Appendix.

The second round of user interviews was conducted with the 4 participants of the diary studies. The interviews took place after the participants have returned from their week long trips and turned in their diaries. We followed up on the questions on the diary study template.

3.4 Summary of Key Findings

3.4.1 Survey, Diary Study and Interview Findings

The online survey revealed that 52% of the respondents use travel planning and travel guide websites prior to the trip (Figure 3). 81% of the respondents get recommendations from friends or online reviews to plan for their trip (Figure 4). When asked whether they will research online during the trip for things to do, if internet access is available, 63% respondents answered yes. 46% of the respondents said they do not check-in on social media during the trip, while the rest check in on Facebook, Foursquare, and/or Yelp (Figure 5). 96% of the respondents said they share their trip experience with family and friends. However, 82% of them would only share after they go back home citing reasons including lack of time, lack of internet access, and concerns about safety for revealing their locations (Figure 6).

Do you use any of the following online tools to research destinations for your trip?

Answered: 27 Skipped: 2

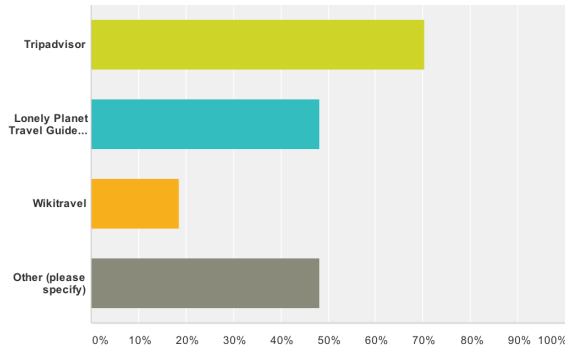


Figure 3: Response To Survey Question About trip Researching Tools

How do you decide where to go and how to spend your day during your trip?

Answered: 27 Skipped: 2

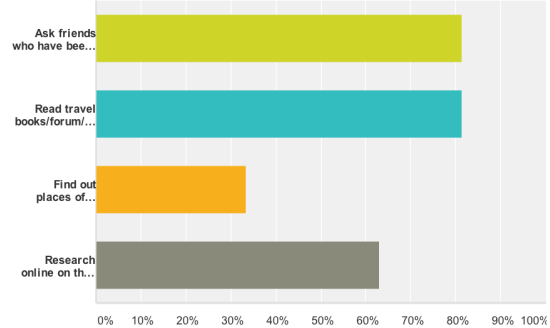


Figure 4: Response To Survey Question About Deciding On Destinations

Do you check-in on social media networks during your trip?

Answered: 28 Skipped: 1

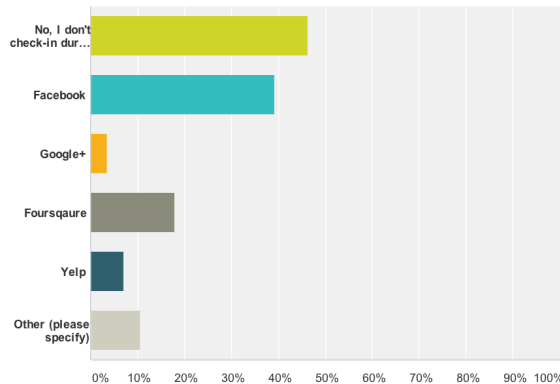


Figure 5: Response To Survey Question About Check-in During Trip

Which do you do more often? Sharing your trip experiences to family and friends during the trip or after coming home?

Answered: 28 Skipped: 1

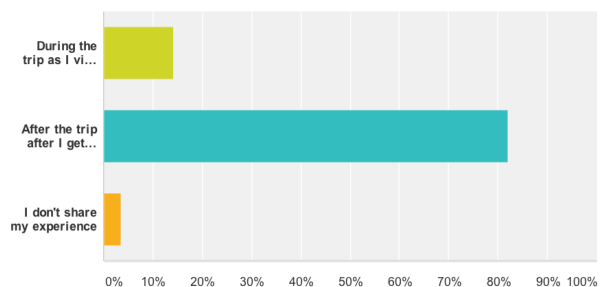


Figure 6: Response To Survey Question About Sharing Trip Experience

Through the in-depth user interviews and the diary studies, we identified the following list of user behaviors and pain points.

Trip Planning

- People seek recommendations on are 1) transportation means, 2) accommodation, and 3) attractions at destinations.
- People use travel review websites because they provide most recent information generated by real users about the destination.

Recording Experience

- Photos are used as a main method to record trip experience.
- People use smartphone camera to capture trivial or funny things that spur-of-the-moment, because they can be reached and turned on quickly.
- People organize their photos into albums and only share those that “look good” with others.

Sharing Experience

- Privacy and safety concerns prevent many people from sharing their current locations.
- Different social media tools are used to share with different groups of audience, based on the relationship they have with the traveler. E.g Facebook for family, Instagram for public, WeChat for friends in China.

Pain Points

- Inconvenient to use smartphone to type texts, or upload/organize large number of photos on social media websites.
- Sharing photos within the travel group is not easy. People use dropbox, email, SD cards to do that.
- Difficult to keep track of the names of the places been to during the trip. Often cannot remember them after the trip.
- Destination review websites do not provide itinerary like information about how to get from point A to point B.
- When travelling with a group, it is easy to record and share individual experience, but difficult to combine them into a group experience.


3.4.2 Primary Persona

Based on the learning from the user studies, we created the following primary persona.



ANDREA is an 27-year-old American Ph.D student.

She loves travel and has been to Europe and Asia for both personal and business trips. She loves to share her trip stories with friends after she gets home. She has thought about writing a blog about her travel, but is too

	<p>busy to organize photos, trip notes and writing long stories.</p>
	<p>Andrea owns an Apple iPhone and likes to use her phone to take photos of food and landmarks and share them on Instagram. Although she frequently posts status update on Facebook , she does so less often while travelling.</p>

3.4.3 Current User Journey Map

The travel diary study helped us create a user journey map (Figure 7) illustrating the process people go through from the beginning to the end of their trips. It revealed several opportunities for user experience improvements, which are listed on the map.

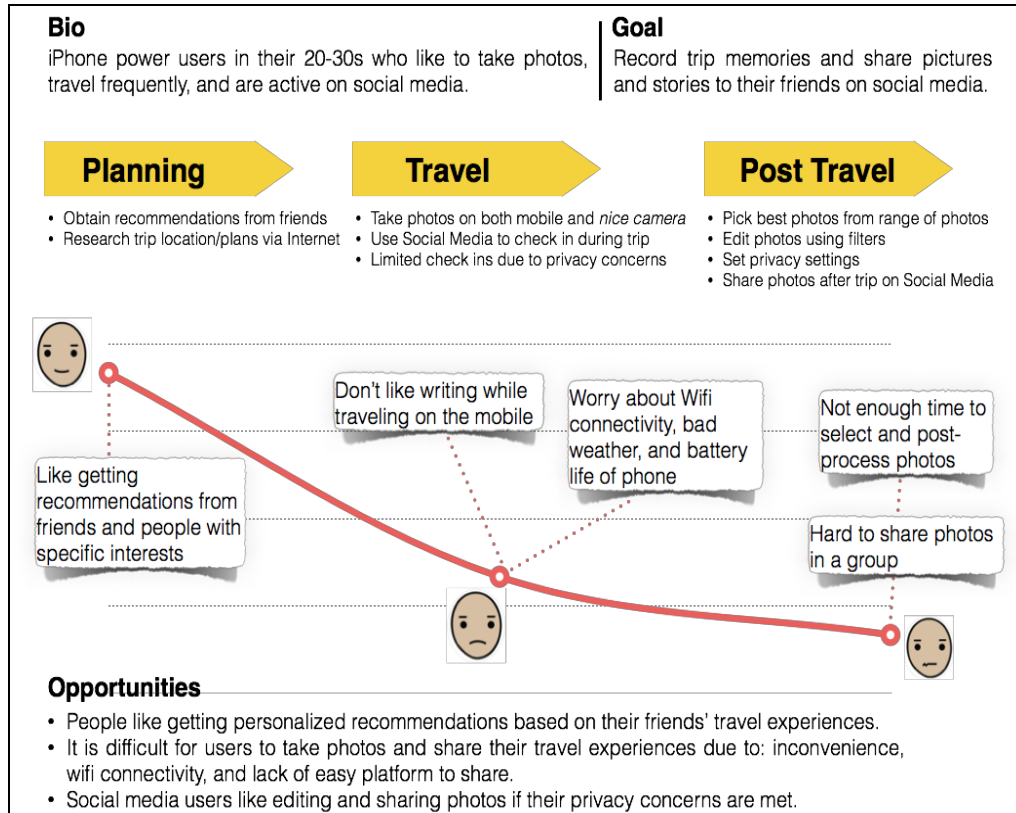


Figure 7: Current User Journey Map

4. Competitive Analysis of Existing Travel Apps

A competitive analysis was conducted among 8 mobile apps that have check-in function or provide travel guidance in a journal format. The goal of the competitive analysis is to:

1. Determine which app users prefer for the purpose of recording and/or sharing their trip experience
2. Determine the strengths and weaknesses of apps or services that provide photo sharing and check ins for travel
3. Determine which features are of highest value to target users

The following 8 mobile apps were selected for the analysis. We believe they are doing relatively well in terms of planning, recording, and/or sharing trip experience, based on Google search result ranking, App Store user reviews, and review articles from various web publishers, including Techcrunch and Wired.com. In addition to travel apps, we also evaluated three most popular social media apps that travelers often use for check-in and sharing their trip photos. We listed their pros and cons in Table 2.









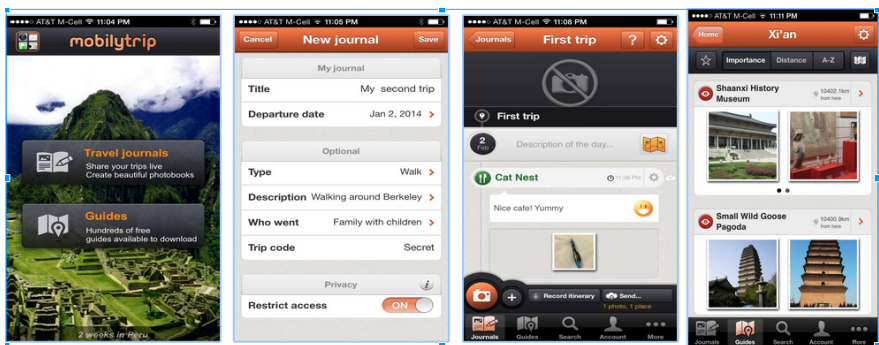
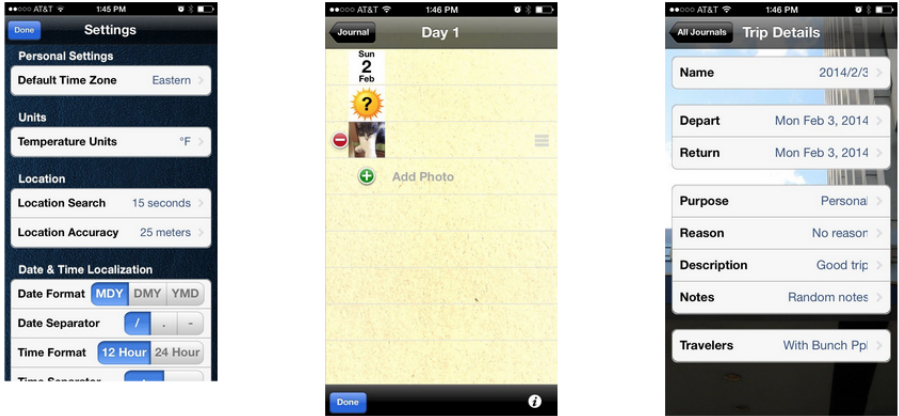

							
Facebook	Instagram	TripAdvisor	Mobility Trip	Kamino	Trip Boss	Trip Journal	Day One

Table 1: Mobile Apps for Competitive Analysis

App Name	Mobility Trip
Summary	Allow user to create journals. Has preloaded travel guides
Pros	Structured data for journal input. Guide has interesting facts from wikipedia and photo. Can select photos and add to specific locations and trips. Privacy setting (public vs. private circle)
Cons	Too much data input to create a journal. Too many details to track manually. Too many clicks to attach a photo to a journal entry. No map to track locations.
Screenshots	

App Name	Kamino
Summary	Designed specifically for walking tour. Must login with Facebook. Curated tour contents recommended to people to follow
Pros	Places are categorized(to eat, see, shopping etc). Tours can be sorted by popularity/location/featured. Shows a map of locations on a tour. Can check-in at tour stops and upload photos. User can rate a tour. Hike summary auto tracks user mobility data.
Cons	Can't create your own hike. Can't check-in at unexpected stops. Cannot add new contents to predefined stops, except user reviews.
Screenshots	
App Name	Trip Boss travel manager
Summary	Designed for creating multi-day trip journals
Pros	Structured data for trip info and journal info, can input weather and photo to journal entry.
Cons	All data require manual entry, even weather temperature. Too much details seem overwhelm users. Cannot pin point specific location on a map or make a reference from map location to journal entry.

Screenshots	
App Name	Trip Journal
Summary	Designed for recording trip information and sharing the experience
Pros	Automatically create trip route based on geo-locations of uploaded photo. Can navigate through the locations, media galleries, and blog entities in chronological order. Coupled with Wordpress/tumblr for sharing.
Cons	Didn't update on iOS 7. Does not have travel recommendations.
Screenshots	
App Name	Day One
Summary	A clean and simple journal app
Pros	Supports several view modes for journal entries such as timeline, photos, calendar.
Cons	Not designed specifically for travel journals.

Screenshots	
App Name	Facebook
Summary	Largest social media site. Allowing user to check-in at locations, connect and share with friends just about anything.
Pros	Can share photos to wide range of family and friends. Privacy settings let users choose who and how much to share. Can caption/status update photos easily. Can use on multiple devices and integrates easily. Can link to other social media i.e. twitter, blogs, etc.
Cons	Hard to upload many photos directly from phone or computer. No photo editing/filters. Cannot share trip diaries. A lot of data input required.
Screenshots	
App Name	Trip Advisor
Summary	Primarily for trip planning and review. "Reviews and advice on hotels, resorts, flights, vacation rentals, travel packages and more"
Pros	Can easily plan trips. User can leave ratings and comments. Articles stating things to do and bests lists. Can view other traveler's photos

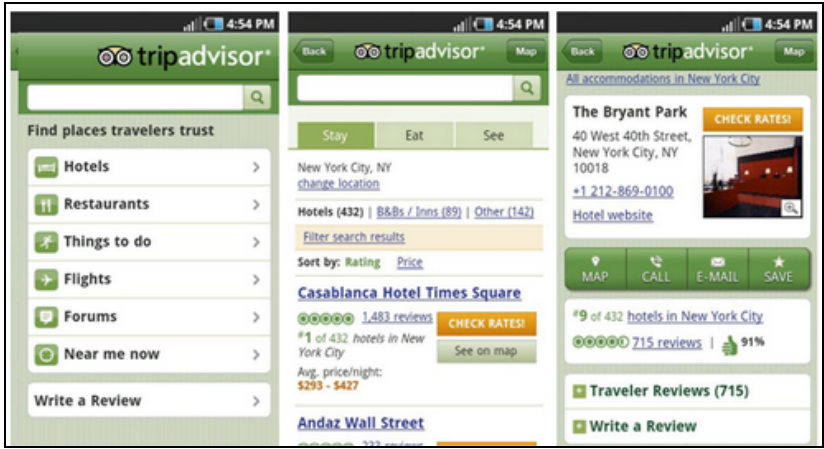
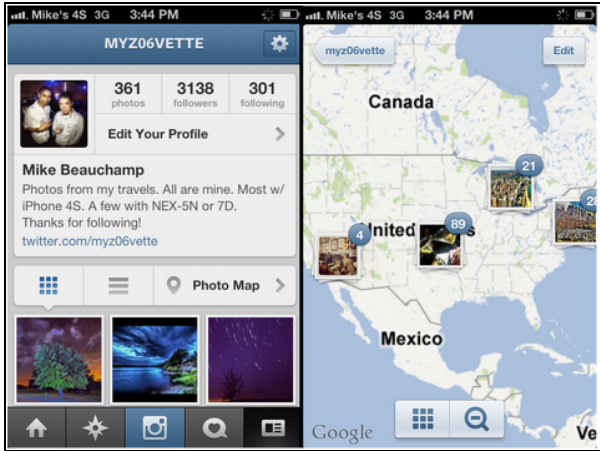
	linked to a specific location. Linked info such as weather, travel guides, things to do, reviews of sites.
Cons	Amount of information can be overwhelming. Need Facebook to connect to friends' reviews. Hard to customize trips. Not easy to share photos due to privacy settings.
Screenshots	
App Name	Instagram
Summary	Branded as “a fast, beautiful and fun way to share your life with friends and family. Capture and Share the World's Moments”.
Pros	Share easily directly from phone. Filters to make photos looks artistic. Location of photos automated on map. View comments from friends easily. Can use hashtags. Can find interesting members through instagram blog.
Cons	Needs fast Wifi connection to work effectively. Caption size is limited. Cannot view ratings of places.
Screenshots	

Table 2. Mobile Apps Evaluation

We scored each app using a set of criteria that we believe are important for travelers: 1) Ease of Journal Creation, 2) Data entry for user, 3) Recommendation of place, 4) Ease of uploading picture, 5) Ease of inputting location, 6) Sharing option, 7) Privacy Setting, and 8) Aesthetically appeal. A higher score was given to an app if the app performs the best compared to others. For example, we scored 5 for Facebook, Instagram, and Trip Journal on sharing option, because they provide multiple outlets such as email, SMS, other social media to share the post with others.

Overall, Trip Journal and Instagram received high ranks (blue highlight). Nevertheless, Trip Journal lacked features such as place recommendations and adequate privacy settings (red highlight). We aimed for Trace + Share to differentiate itself by filling this gap. Table 2 shows the scores of each app against the criteria.

Criteria	Facebook	Instagram	Trip Advisor	Mobily Trip	Kamino	Trip Boss	Trip Journal	Day One
Ease of Journal creation	N/A	N/A	N/A	4	1	3	5	N/A
Data entry for user	4	4	3	3	3	3	4	5
Recommendation of place	3	2	5	2	3	1	1	1

Ease of uploading picture	3	5	3	3	4	3	5	5
Ease of inputting location	4	4	4	2	5	2	5	4
Sharing option	5	5	4	2	2	1	5	4
Privacy Setting	4	4	3	1	1	1	1	1
Aesthetically appealing	4	5	4	3	4	2	4	5
TOTAL	27	29	26	20	23	16	30	25

Table 3. Mobile App Competitiveness Scores

5. Prototype Design and Evaluation

Over the course of the project, we went through three iterations of prototyping. After completion of each prototype, we conducted usability testing to evaluate the effectiveness of the design and made improvements based on the users' feedback. In the following section, we will describe each prototype we designed, the technology used, the key findings from the usability tests.

5.1 Paper Prototype

After conducting preliminary user studies, we quickly sketched the design on paper and presented to users to validate our project idea. We included the following key features in the prototype:

1. Use Trace+Share to check-in at a location and capture the moment by launching the phone camera to take photos.
2. Auto populate the location name and weather information as user saves the check-in.
3. Add friends as the travel party and share the check-in with everyone in the group.
4. Create a trip journal by selecting check-ins into the journal.
5. Display the route of the trip on a map.

Samples of screen designs created on paper are shown in Figure 9.



Figure 9: Sample of Screen Design for Paper Prototype

In addition to the screen sketches, a sitemap was created to document the navigation flow of the design. The sitemap is shown in Figure 10.

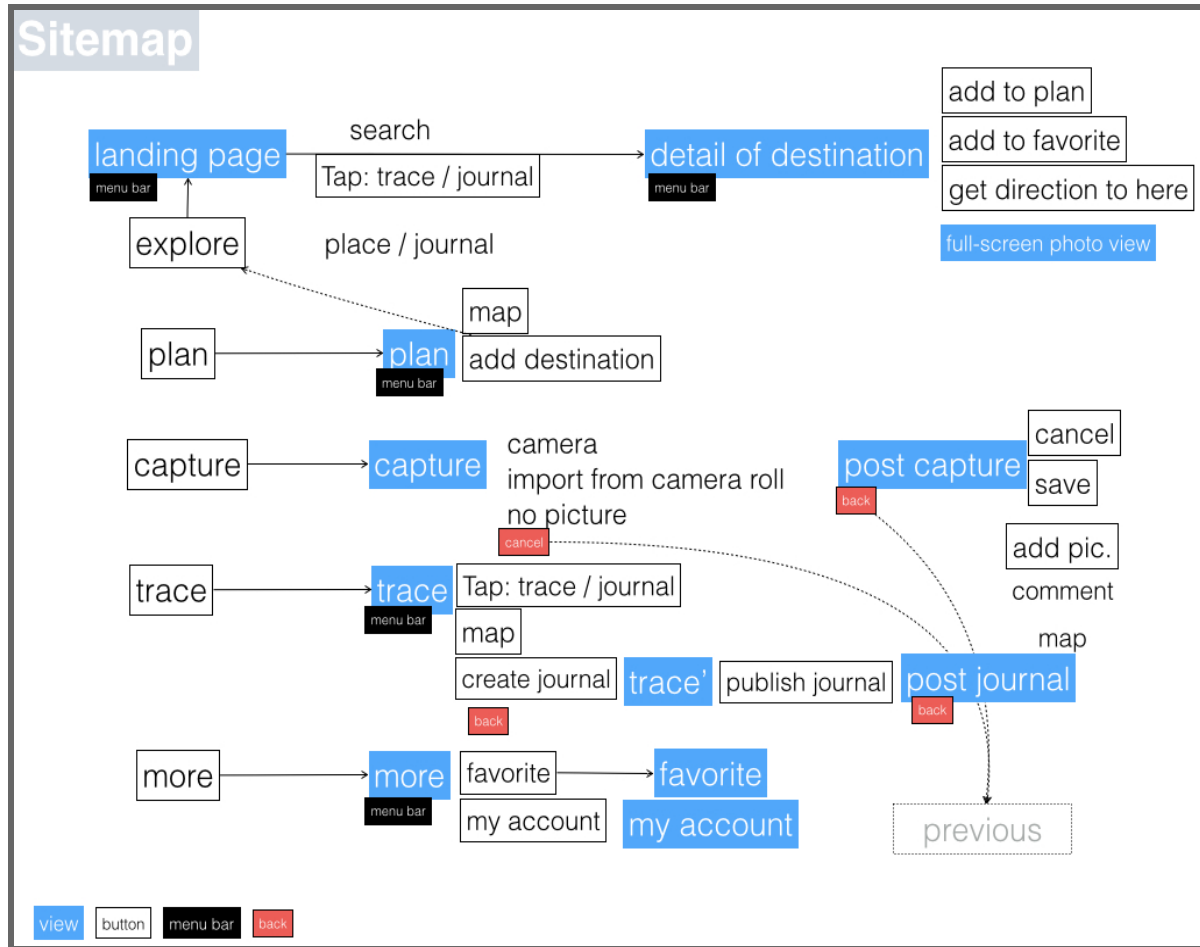


Figure 10: Prototype Sitemap

5.1.1 Evaluation

To evaluate the prototype, we used a smartphone application called “POP” and turned the paper screens into interactive screens on a mobile phone. Using POP, we were able to highlight areas on the screen and make them responsive to finger taps. Therefore, the navigation flow could be simulated on a smartphone. We tested the prototype with 5 graduate and undergraduate students at UC Berkeley.

Samples of screens used in POP are shown in Figure 11.

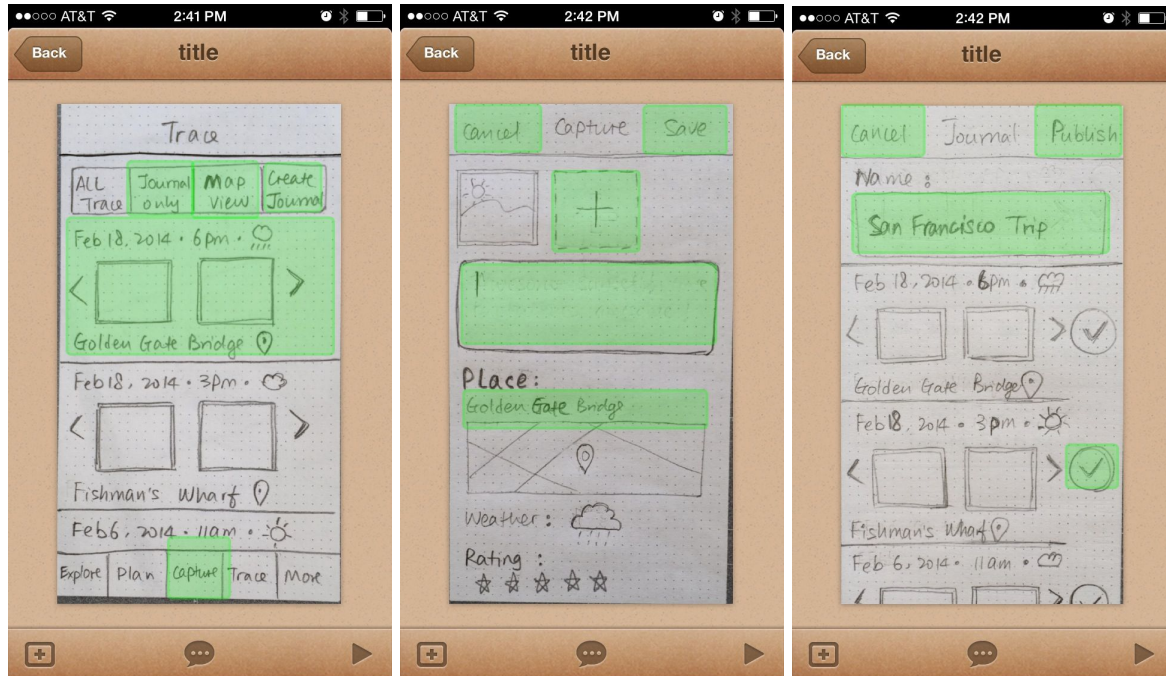


Figure 11. Sample of Prototype Screens Used in POP

5.1.2 Key Findings

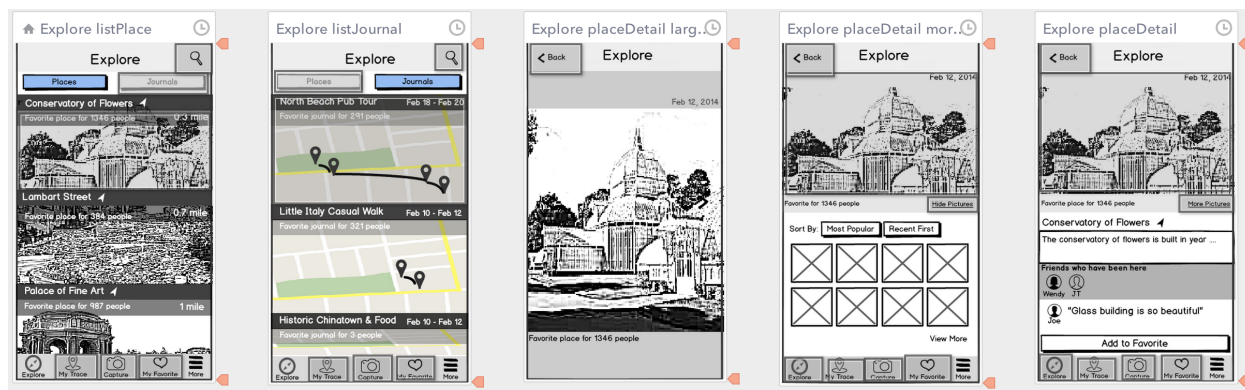
Users indicated that the idea of capturing trip experience and generating trip journals attractive. The design was considered mostly intuitive and navigation flow was simple to follow. The main challenge users found was that the terminology used on menu options are confusing. For example, user did not know what they should expect to see on the Trace screen, and misunderstood Traces as Journals. User also found Plan and Favorite menu being redundant of each other.

The findings from the evaluation helped us make the following improvements over the initial design:

1. Simplified the menu bar options by merging Plan with favorite, and removing More.
2. Add filters on the Explore screen to allow users to filter places from journals.
3. Rename the Trace screen as My Trace and the favorite screen as My favorite in order to distinguish them from the Explore screen which displays public content

5.2 Low-fidelity Interactive Prototype

We implemented the revised design by first drawing the screens using Balsamiq. We then used a mobile prototyping tool called Flinto² to create an interactive low-fidelity prototype that can be downloaded to and installed on a smartphone. Samples of screens designed for the Flinto prototype is shown in Figure 12.



² <http://flinto.com>

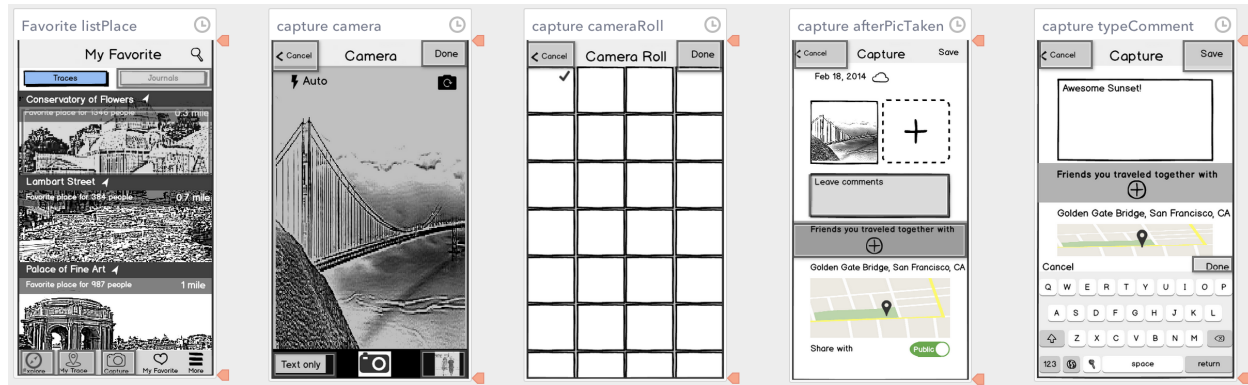


Figure 12. Sample of Prototype Screens Used in Flinto

5.2.1 Evaluation

To evaluate the Flinto prototype, we conducted a series of quick and informal usability testings, followed by a formal and thorough study using the final version of the prototype. The informal user testing was carried out with two to three friends to quickly validate the navigation flows and the look and feel of the design. We iterated over the prototype several times between late February to mid March, before reaching the fifth and the final version (Figure 13).




	TraceShareV5	iPhone	Mar 17, 2014
	TraceShareV3	iPhone	Mar 04, 2014
	TraceShareV2	iPhone	Feb 28, 2014

Figure 13. Sample of Versions of Flinto Prototypes with Date

The formal usability testing was conducted with the four participants of our trip diary study. Six tasks were given to the study participants to perform using the Flinto prototype. The complete test scripts can be found in the Appendix. The tasks were devised to evaluate the design in the areas of:

1. Capture a moment on trip.
2. Create a travel journal
3. Update a previously captured moment
4. Find a nearby place of interest
5. Find journals that contains a place of interest
6. Review your favorite list

We encouraged the users to perform Think-aloud during the testing in order for us to understand their thought processes and any problems they encountered. We videotaped the usability testing process while users were executing the tasks.

Upon finishing a task, the participants rated the difficulty of the task using a 5 point likert scale, 1 being very difficult to execute and 5 being very easy to execute. Overall, users found the app easy to use and the tasks had an average difficulty rating of 3.75. The quantitative findings from the usability test can be found in Table 4.

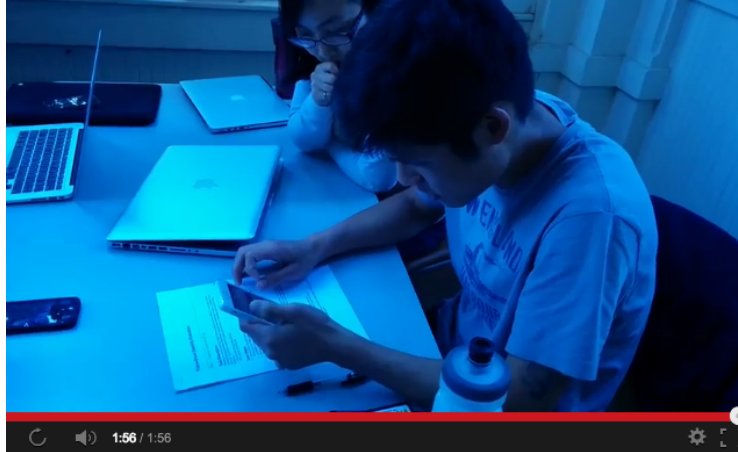
Name	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6
	Capture a moment on trip	Create a travel journal	Update a previously captured moment	Find a nearby place of interest	Find journals that contains a place of interest	Review your favorite list
Average Rating	3.75	3.13	4.25	4	3.25	4.75

Table 4. Quantitative Findings from the Usability Testing

The tasks that users had the most difficulties with were:

- Task 2: Create a Travel Journal
- Task 5: Find Journals that Create a Place of Interest
- Task 1: Capture a Moment on a Trip

Task 2 had the lowest average user rating for ease of use because they found the task instructions were hard to understand. For example, one user said, “ With the add journal screen, I thought I was just creating a new journal. I didn’t understand these things underneath. I thought I could just save it and edit it later. The process isn’t very obvious. For one, I wasn’t sure what a journal is and what it meant to add places.” The video below shows the participant having trouble understanding what the “Add” button on My Trace screen does.



Video 1: User Performing Task 2: Create a Travel Journal During Usability Testing

Link: <https://drive.google.com/file/d/0B-IVdQQ0UCG2dWIdHBQNkFWcE0/edit?usp=sharing>

Users reported the Task 5 being difficult because they found the screen displaying the Journal search results was difficult to understand. When a user performs a search for a place on the Journal screen, a list of journals that contains the place were returned. The returned journals were displayed in their map view, as shown in Figure 14.

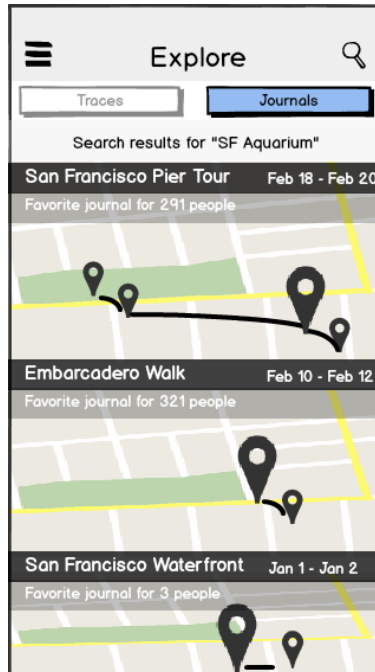
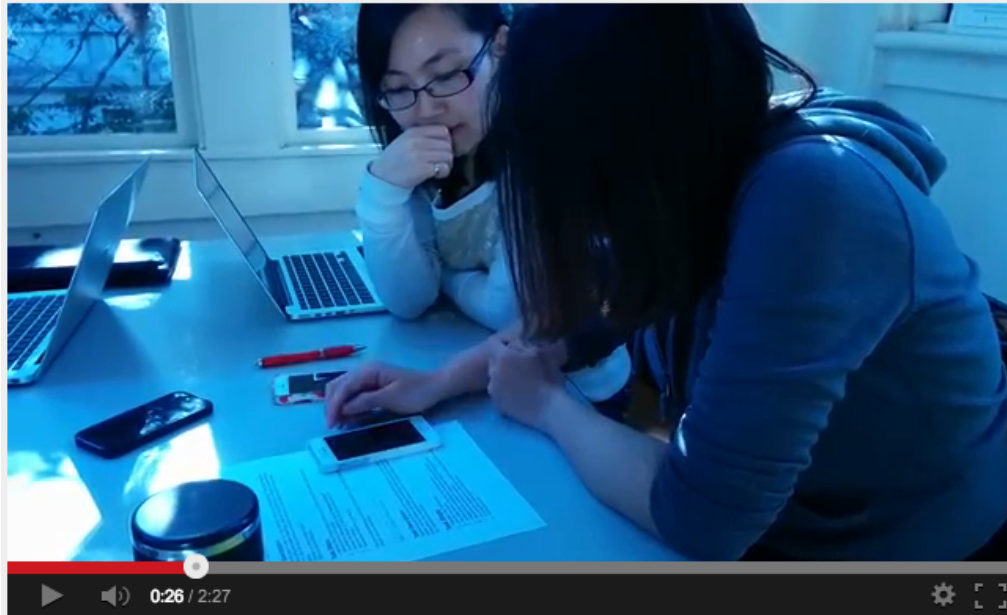


Figure 14: Journal Search Result Screen in Flinto Prototype

The main issue with this design was that users did not understand what the enlarged drop pin on the map represented. Some users did not even notice the drop pins had different sizes. Some users mistook the name of a journal as the name of a place and were wondering why none of them matched the search keyword.

For Task 1: Capturing a trip moment, users were confused about how to dismiss the phone camera screen after they have taken a photo. One user said she expected to save a photo once she pressed the shutter button. She did not notice the “Done” button placed on the top right corner for users to exit from the camera screen. Below is another video showing a participant struggling with Task 1.



Video 2: User Performing Task 1: Capturing a trip moment During Usability Testing

Link: <https://drive.google.com/file/d/0B-IVdQQ0UCG2VzR5NHB0WER5YTQ/edit?usp=sharing>

5.2.2 Key Findings

Terminology continued to be a main challenge for users. The meaning of the term My Trace was still not intuitive to the users and has to be learned by viewing the contents on the screen. Most users were able to understand that My Trace screen contains Places and Journals, after they have navigated to the screen at least once.

Users concerned the most about the privacy settings. Most users wished the privacy options to be more specific. During the testing, users had assumed that by switching “Share with Public” off, the contents were kept to themselves, except that the intended design was to share with anyone who was added to the “Travel Party” list. Users found no value in having the ability to hide friend’s comments before sharing a trip experience or journal to the public. They indicated preferences to have explicit sharing options such as sharing to the public, to their friends, and just to themselves, similar to the privacy settings on Facebook. Users seemed to accept the idea without resistant that a check-in made at a place is shared among the Travel Party. However, users did not anticipate to see a check-in to show up on their “My Trace” screen, if they belong to the Travel Party of the check-in, but were not the creator of the check-in. This indicated that this feature was not intuitive and users must be taught how to use it.

One prominent user behavior was noticed during the testing. When creating a check-in, users often wanted to select existing photos from their phone camera roll, instead of launching the camera to take a photo. When prompted for the reason, users

indicated that they usually just launched the camera from the phone's lock screen to take photos because it was quick and convenient. Consequently, they mostly select photos already taken from the camera roll when creating check-in on social media. Our design has previously defaulted to launch the camera, assuming users would first launch the app, then take a photo, and finally save the check-in. The usability testing proved this assumption was incorrect. Therefore, we later modified the design to let users choose from camera roll by default, and automatically create journal entries using the following information extracted from the photos that were uploaded from the camera roll:

1. location name
2. location geo coordinates
3. date and time

Finally, we found that users do not uniformly agree on certain design choices. For example, some of the users indicated they preferred the star rating system for ranking trip experiences. On the other hand, some users preferred to simply use "Like" and "Dislike" buttons. In order to keep the design simple and not to increase the implementation complexity, we decided to adopt the method of using the number of "Like" for ranking the perceived popularity of photos among users. For the popularity of a place or a journal, we decided to use the number of time user has added it to his favorite list.

Similar to the dispute about the popularity ranking method, users were divided on whether transportation means were valuable information. Based on earlier user research, we decided to incorporate indicators of transportation means for users to specify how they moved from place A to place B during the trip. Later during the usability testing, users said they found little value in the indicator. Their primary concern was that the indicator would give incorrect information unless they have checked in at each place they stop. It was an unrealistic expectation for users to be that diligent. As a result, we decided to remove the feature from the current design (Figure 15). These key findings helped us to further fine tune the app design and produce our high fidelity functional prototype.



Figure 15. Transportation Indicators Being Removed From Flint Prototype

5.3 High-fidelity Interactive Prototype

5.3.1 Architecture Design

For the high fidelity functional prototype, we adopted a web app and iOS native app hybrid approach. The front end of the prototype was implemented using HTML, CSS, custom Javascript, and components from Ratchet³, a mobile prototyping framework. These choices of technology were made based on team member's prior experience. Being familiar with the technology allowed the team to build the prototype rapidly and with more complete functions.

Because the main process flow of the design uses the iPhone camera and camera roll, we had to implement this part of the prototype using Objective-C, the programming language for iOS native app. This proved to be a challenge for the team as none of the team member had prior experience with native iOS app development. However, we were able to climb learning curve and complete the task.

The back end server was implemented using Flask micro framework with Python, connecting a SQLite database for storing predefined and user generated data. We also utilized a Flickr account and Flickr API to store photos, as well as to extract the photos' geo-location information. Figure 16 shows the system architecture of our functional prototype. Figure 17 shows the schema of the database designed to support the user content.

³ <http://goratchet.com>

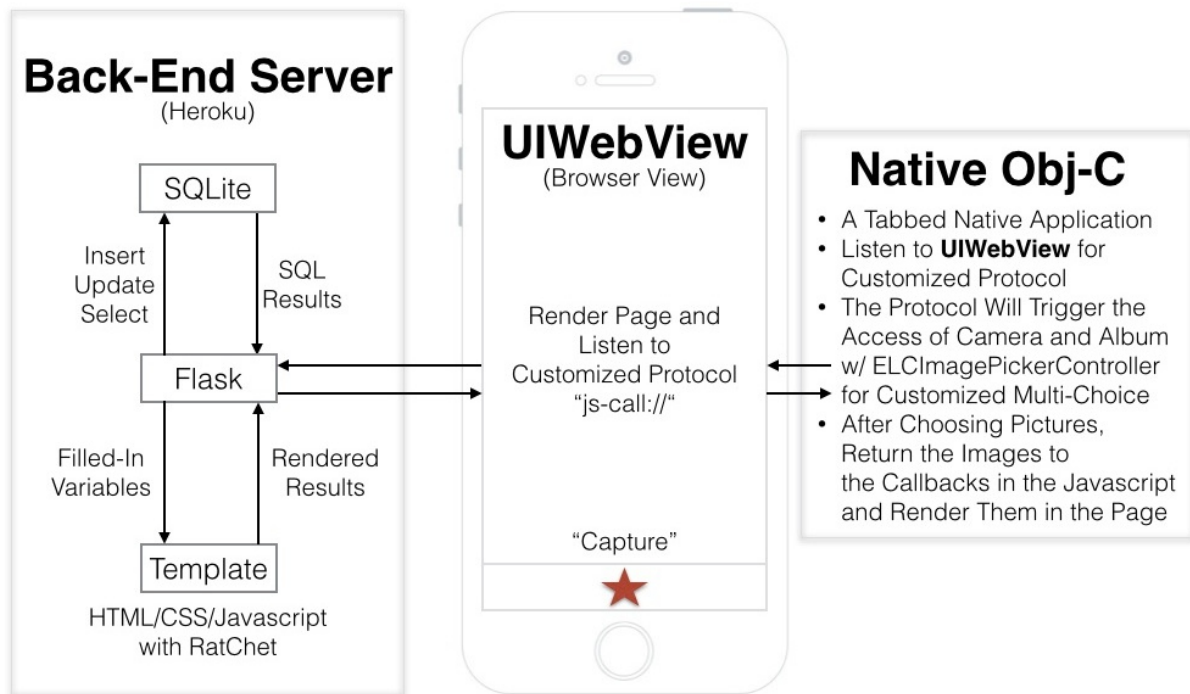


Figure 16: Functional Prototype Architecture

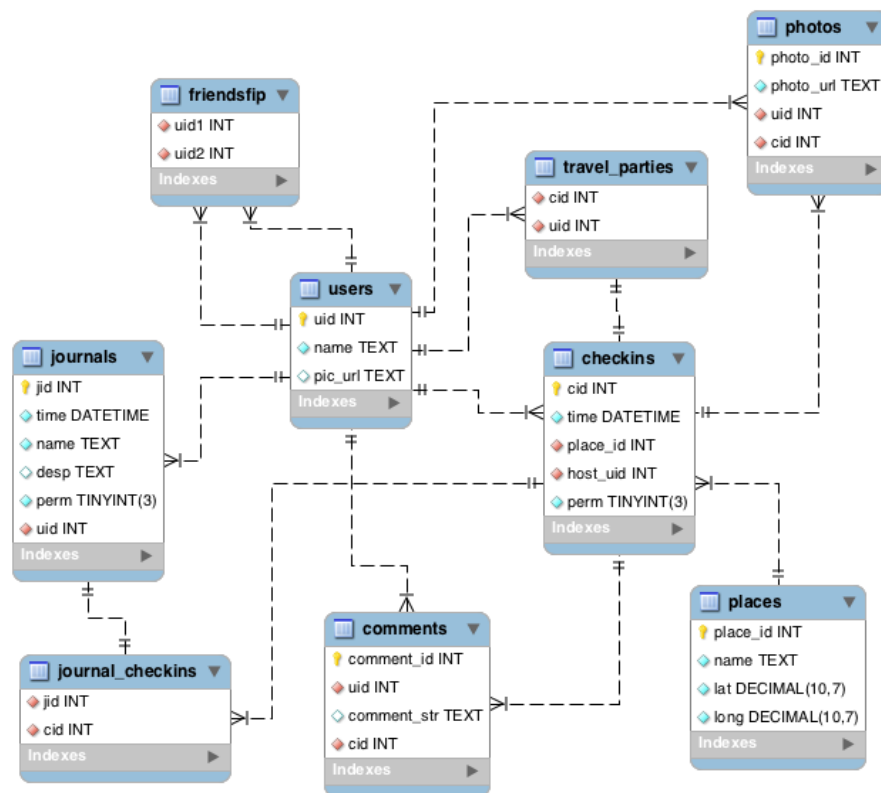


Figure 17: Functional Prototype Database Schema

6. Discussion and Future Works

6.1 User's privacy concerns

As mentioned in previous sections, users voiced major concern about the design of privacy settings. The optimal design would maintain balance among:

- having the maximum flexibility in determining who they want to share the contents with.
- keeping the privacy menu intuitive, simple and short
- adhering to common standards seen on popular apps.

One of Trace+Share's core features that we designed to differentiate it from other travel apps is the ability to generate an experience for the travelling group by allowing each member of the travelling group to collaborate on creating contents. In our design, we allow members of the Travel Party of a check-in to add photos and comments to the check-in, an analogy to using shared document on Google Drive. Although this simplifies for users to share contents among the group, it adds a layer of complexity on who gets to edit or remove what. Several questions were raised by the project team during the design process, including:

- What if the content owner does not want to share with anyone?
- What contents should be shown to the public when a check-in contains contents contributed by the Travel Party and only the owner wants to make them public?

- What contents should be shown to the public when the check-ins contained by a journal are private whereas the journal is public?
- Should we design the ability for an owner to share his content with an individual outside of the Travel Party?

To address these questions thoroughly would require additional user research beyond the scope and timeline of this project. However, we believe this will be interesting areas to gain insights in future in order to continue improve Trace+Share. For the purpose of this project, we made quick trade off between user expectations and implementation complexity, and adopted a simple approach by giving only two options to the user:

1. Share with Travel Party
2. Share with Public

We also designed a notification mechanism for content owners to request consents from the Travel Party to share collective contents. Figure 18 blow illustrates the design decisions being incorporated into the functional prototype.

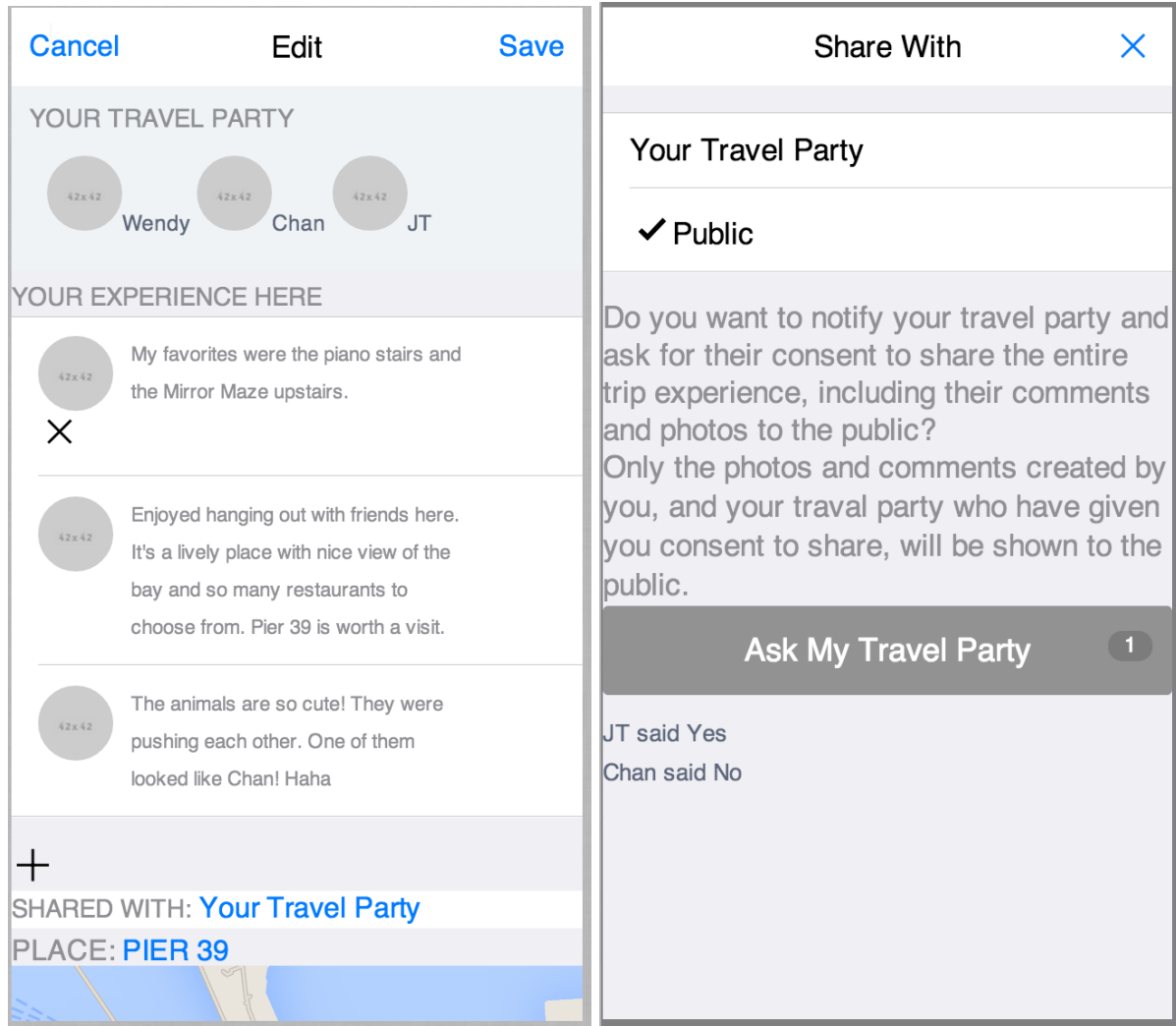


Figure 18: Illustrate Sharing Option Design Using Screenshots from Functional Prototype

Sharing with Travel Party is the default privacy option. It includes the scenario of sharing with nobody but oneself, in which case the Travel Party consists of the content owner alone. By not adding anyone to the Travel Party, the content owner can keep things privately. When content owner wants to share contents created collectively by the Travel Party to the public, he needs to notify the Travel Party. Until the consents have been given by Travel Party, only contents that are created by the owner will be shared to the public. Once members of the Travel Party starts to provide consent, the

portion of the contents created by the person who sends the consent will be released to the public. We felt that this asynchronous request and response mechanism gives both the owner and the Travel Party flexibility in terms of controlling what to be shared to the public.

6.2 Recommending Contents

In current design, the recommendation for new place to visit or new journal to view is made based on two factors: 1) search keyword entered by user, 2) user's current location. For new places to visit, the recommendation list is ranked, by default, by the distance between the place and the user's current location. For journals, the list is ranked by journal's popularity, i.e the number of times a journal has been added to users' favorite list. These mechanisms provide the generic recommendations that do not take a user's interest, travel history and app usage pattern into account. We believe a better recommendation algorithm could be designed in future by continuously learning and analyzing users' behaviors, making adjustments to the recommendation list each time. A smarter recommendation algorithm could also improve the ranking of contents by allowing new content discovery. This will ensure users receive most up-to-date information that is also of high quality according to public opinions.

6.3 Controlling the Quality of Crowdsourced Contents

Because Trace+Share is designed to store and distribute user generated contents, controlling the quality of the contents gradually surface as a discussion point

as the design evolved. Because the prototype focused on the primary use cases of creating check-in and trip journal, we did not design any mechanism for reporting and removing inappropriate contents. However, the team discussed different alternatives that could be used for such purpose. One of the options was to empower user to control the quality of content by themselves by reporting an inappropriate photo being shared publicly, the same mechanism used on websites such as Youtube, Vimeo, and Wikipedia.

Inappropriate photos or comments shared privately may not be an issue, because the content is restricted among a handful audiences who have existing relationships outside of the app. Any dispute over inappropriate contents may be resolved within their own community offline.

6.4 Consuming Content Offline

Our learned from the user interviews that there are many times users do not have access to internet en route. This is one of the challenges we believe will prevent Trace+Share being used during the trip, as journal or place information is not accessible. A plausible future solution to the problem is to allow users to download publicly shared journals or check-ins and access them in offline mode. The project team has discussed two possible solutions. The first is to allow user to save a copy of the content in offline mode and view it in the app. This may require storage space in the app being reserved for offline contents. The size of the in-app storage might prove to be a

limitation on how much offline contents the app allows a user to save. The second option is to allow users to download and export the content in PDF format. The exported PDF can be stored and viewed outside of the app. This option gives users great flexibility in choosing any PDF reader on any kind of device to view the content. However, it might cause the content to lose some aesthetic appeal.

7. Conclusion

Trace+Share is an attempt to improve travelers' experience in collecting information and sharing information during a trip. We deployed a variety of methods to study people's current travel behaviors and worked to address the issues discovered in the process. The iterative design approach has revealed many design flaws for each prototype we made, but led to a series of improvements as well. Although we kept the design focused on documenting check-ins and generating journals, the design discussions open doors to both new questions that require additional research. Flexible but intuitive privacy settings, smart recommendation algorithm driven by user profile, quality control of crowdsourced content, and offline content consumption are some of the most interesting opportunities for future work.

Overall, Trace+Share will provide a delightful experience to users so that they can successfully achieve their main goal to record trip memories and share pictures and stories to their close friends and family.

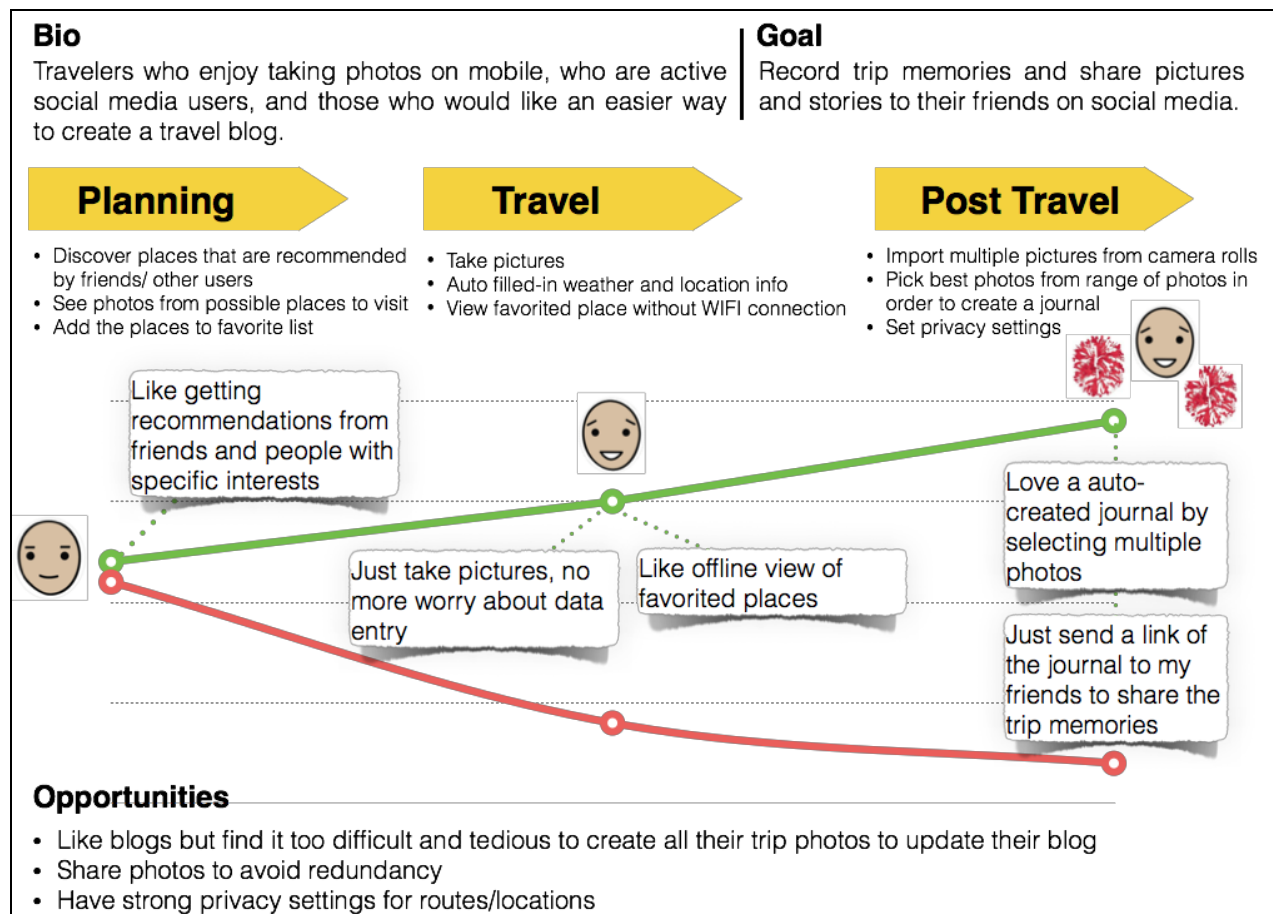


Figure 19. Trace + Share User Journey Map

8. Reference

- [1] "Mobile Technology Fact Sheet." *Pew Research Center Internet Project*, n.d. Web. 1 May 2014. <<http://www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/>>.
- [2] "Social Media, Smartphones & Tablets Now Essential Travel Tools for U.S. Travelers, According to New TripAdvisor Survey of Mobile & Social Trends." *TripAdvisor*, 18 Nov.

2013. Web. 1 May

2014.<<http://ir.tripadvisor.com/releasedetail.cfm?releaseid=808058>>.

9. Appendix

Online Survey Questionnaire

Consumer travel habits

Welcome to Our Survey

1 / 3 33%

Thank you for participating in our survey. Your input is important to us! We are three Master students at UC Berkeley's School of Information. We are designing an mobile app that helps people to collect their trip experiences on the go and turn them into personal tour guides that can be shared with family, friends or the public.

This survey is designed to help us understand potential users' travel interests and behaviors, so that we can make an app that people will actually use.

Next

Consumer travel habits

Basic user demographics

2 / 3 67%

We'd like to get to know you a little bit.

1. What is your first name?

2. What is your gender?

SurveyMonkey Audience

☐ Female

☐ Male

3. What is your age?

SurveyMonkey Certified

☐ 18 to 24

☐ 25 to 34

☐ 35 to 44

☐ 45 to 54

☐ 55 to 64

☐ 65 to 74

☐ 75 or older

4. On average, how often do you travel for pleasure on a multi-day trip?

☐ Weekly

☐ Monthly

☐ A few times a year

☐ Less than a few times per year

Prev Next

Consumer travel habits

Travel patterns

3 / 3 100%

We'd like to understand how do you do trip planning, what do you do while travelling, how do you share your trip experience.

5. Do you use any of the following online tools to research destinations for your trip?

☐ Tripadvisor

☐ Lonely Planet Travel Guide and Travel Information

☐ Wikitravel

☐ Other (please specify)

6. How do you decide where to go and how to spend your day during your trip?

☐ Ask friends who have been there for recommendations

☐ Read travel books/forum/blogs to find out places of interests before the trip

☐ Find out places of interests on the go by asking local people

☐ Research online on the go if internet access is available

Please write a sentence or two about your methods and any difficulties you encountered

7. What kind of information do you care about when deciding whether you should visit a place of interest?

8. Do you check-in on social media networks during your trip?

☐ No, I don't check-in during my trip

☐ Facebook

☐ Google+

☐ Foursquare

☐ Yelp

☐ Other (please specify)

9. Which do you do more often? Sharing your trip experiences to family and friends during the trip or after coming home?

☐ During the trip as I visit places

☐ After the trip after I get home

☐ I don't share my experience

What's the reason behind your answer?

10. How do you share your trip experiences with friends and family?

Prev Done

In-depth User Interview Scripts

Initial user interview for understanding traveler's behaviors (20 minutes)

Interview Prompt:

Thank you for taking the time to do a user interview with us. This will help us understand how people plan their trips and what they do during the trips. Is it OK to record this interview and type up your responses?

(Receive participant's signature for a consent form of recording)

General

1. What kind of trips do you usually take?

Planning

2. How much planning do you do before travelling?
3. What tools and resources do you use while planning the trip?

Recording Experience

4. What is your experience in writing travel journals?
5. Do you use your smartphone during a trip and for what reason?

Sharing Experience

6. How do you share your trip experience with others?

Current Pain Points

7. Is there anything you wish existed that could help you keep or share your trip experience?
8. Have you had any difficulties with existing tools that you use to keep and share your trip experience?

(Wrap-up and Thank the interviewee again)

Post Diary Study Follow Up Interview Script

Interview Prompt:

Thank you for taking the time to do a follow up interview with us. We really appreciate your comments and your feedback would help us improve our travel app. Is it OK to record this interview and type up your responses?

(Receive participant's signature for a consent form of recording)

General

- How was your trip?

Recording

- What would make you more likely to take photos during your trip?
- What would make you more likely to write journal entries about your trip?
- What difficulties did you encounter while capturing photos/stories about trip?
- Would you be likely to use an app on your phone to record your experience or a travel blog? Why?

Sharing

- Which technology or websites do you use to enhance your trip experience? Why?
- What are some the reasons you share your trip experiences using social media?
- What difficulties did you encounter while sharing photos/stories about your trip?

Wrap-up Questions

- What kind of features do you imagine a travel app should have through your experience?

Trip Diary Study Participant Screening Questionnaire

Page 1 of 1

Screening Questions

We will use the survey result to screen potential users for our diary study. We will contact you if you are selected.

Where are you planning to go?*

Can you access the internet while travel?*

☐ Yes

☐ No

☐ I don't know

How long will you travel around?*

What type of phone do you use?*

Will you carry your phone on the trip?*

☐ Yes

☐ No

Will you carry a camera besides your phone?*

- ☐ Yes
- ☐ No
- ☐ I don't know

How many people will you travel together?*

What is your email address?*

Add item ▼

Flinto Prototype Usability Testing Script

Trace+Share Usability Evaluation

Task 1 - Capture a moment on trip

Task Description:

Assume you are on a day trip in San Francisco with three friends Wendy, JT and Chan. You are currently visiting the Golden Gate Bridge. Use the Trace+Share app to capture a moment during your trip. You will take a photo of a place and write down a few things related to this moment, including:

How are you feeling at the moment

Who you are travelling with

Task Steps:

Use the Trace+Share app to capture your current moment at the Golden Gate Bridge by taking a photo of the bridge.

Comment on the moment by saying "Awesome Sunset!".

Indicate that Wendy, JT and Chan are travelling with you.

Save the moment

Review the moment you just saved.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

Task 2 - Create a Travel Journal

Task Description:

Assume you are at the end of your day trip in San Francisco now. You have visited a couple of places, such as Golden Gate Bridge, Fisherman's Wharf, etc, and have captured moments at those places. Use Trace+Share to create a journal of your trip by adding moments captured at San Francisco to the journal.

Task Steps:

Navigate to My Trace screen.

Create a new journal.

Use "San Francisco Pier Tour" as the journal title.

Include Golden Gate Bridge and Fisherman's Wharf in the journal

Indicate that you walked from Golden Gate Bridge to Fisherman's Wharf

Review the Journal before finalizing it

You noticed a spelling error on the comment for the Golden Gate Bridge. Edit the comment to correct the mistake. Return to the Journal.

Publish the Journal.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

Task 3 - Update a previously captured moment

Task Description:

Use Trace+Share app to edit a previously captured moment. Assume you have already saved several moments in the app during your trip to San Francisco, but did not indicate whether you travelled with friends. Now you'd like to add your friends to your trip moments.

Task Steps:

Navigate to My Trace screen.

Find the moment you captured while at "Golden Gate Bridge"

Edit the "Golden Gate Bridge" record and add the following three friends to it:

Wendy

Chan

JT

Save the change

Tell us what else you have observed that you could update on the edit screen.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

Task 4 - Find a nearby place of interest

Task Description:

Use Trace+Share app to search for a place of interest and add it to your favorite list. Assume you are searching for a place called "SF Aquarium", find the place among the search result. Note that the name of the place might not be "SF Aquarium" on its detailed view. This is due to the limitation of the prototype.

Task Steps:

Navigate to Explore screen.

Search for a place called "SF Aquarium"

Review the details about the place if it's returned by the search

Add the place to your favorite list

Tell us what you have observed that you can find out about the place.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

Task 5 - Find journals that contains a place of interest

Task Description:

Use Trace+Share app to search for travel journals that contain information about a place of interest. Assume you are searching for a place called "SF Aquarium", find the journals that contain information about this place.

Task Steps:

Navigate to Explore screen.

Search for "SF Aquarium" among public journals

Review the search result and tell us what you have observed that you can find out from the search results.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

Task 6 - Review your favorite list

Task Description:

Use Trace+Share app to look up information about a place called "Conservatory of Flowers". Assume you have previously added this place to your favorite list while exploring using the app. You now want to review the place's information.

Task Steps:

Navigate to My favorite screen

Search for a place called "Conservatory of Flowers"

Review the details of the place and tell us what you have observed that you can find out from the screen.

How do you like interacting with the app? On a scale of 5, rate the ease of use with 0 as Very Difficult, and 5 as Very Easy.

