

Research report:

Information Needs and Mobile Devices

in California's State Parks

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Executive Summary

California State Parks Foundation (CSPF) and 36 Views are partnering to build a series of tablet apps for California State Parks. CSPF and 36 Views asked us to conduct formative research for the app. From conversations with key stakeholders, we concluded that the app's primary purpose should be enhancing the experience of park visitors who currently use tablets or smartphones. Based on previous research, we know visitors want more information before and during their visit. Thus, we investigated what kinds of information current park visitors need before, during and after their visit along with their attitudes towards receiving that information with tablets and smartphones.

We found visitors were able to satisfy some of their information needs using existing tools. This includes discovering recent events and current park conditions using social media and choosing and researching with guidebooks and social media. However, visitors struggle with the current tools for researching, learning, navigating and locating.

Visitors use tablets before, but rarely during their visits to parks. Therefore, depending on the need and phase addressed by a feature, some features are appropriate for both tablets and smartphones and others just for smartphones.

We suggest a tablet or smartphone app provide:

- a list of state parks, searchable by which is nearest to the visitor and the kind of activities (e.g. hiking, biking, camping) they offer.
- a list of activities available at each park filtered based on time of year.
- a map which identifies hiking trails.
- a park conditions feed and subscription service.

- text, photos and illustrations that help visitors acquire knowledge about an area.
- badges to record each park visit.

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Introduction & Background

California State Parks Foundation (CSPF) and 36 Views are partnering to build a series of colorfully engaging, constantly updated tablet apps encompassing all 278 California State parks, sold as individual editions on a subscription basis. CSPF and 36 Views asked us to conduct formative research for the app, focusing on a sample of parks: Angel Island State Park, Torrey Pines State Park, Point Lobos State Natural Reserve and Baldwin Hills Scenic Overlook. This project was funded by a discretionary grant from CSPF.

About California State Parks Foundation

CSPF is “the only statewide independent nonprofit organization dedicated to protecting, enhancing and advocating for California's magnificent state parks” (CSPF n.d.). They fundraise, give grants to parks and conservancies, advocate for parks at the state legislature, facilitate volunteer opportunities and sponsor youth programs.

In 2011, CSPF released their *Vision for Excellence for California's State Parks*. This document describes “a vision of excellence for the state park system in the 21st Century, shared by the public and key park stakeholders, and makes recommendations as to how best to overcome barriers to excellence and promote that vision” (CSPF 2011, p. 9). To make state parks more relevant, it recommends they “utilize technology to support and enhance in-park experiences (i.e., audio tours/pod-casts, mobile apps for park use, etc.)” (CSPF 2011, p. 25).

Following this recommendation, CSPF partnered with EveryTrail (a trail guide app developer) to create the CalParks mobile app. The app allows iPhone and Android users to find parks near them, read about their highlights and history, see park maps and share their park photos on Facebook or Twitter. The app is not available for tablets; 36 Views suggested CSPF contract with them to build tablet apps for state parks.

About 36 Views

36 Views builds tablet apps for parks, museums and aquaria. Their apps tell stories using text, pictures, video, maps, animations and illustrations. They have built three iPad apps for parks:

On the Highline: Exploring America's Most Original Urban Parks, *Wild Flight of the Imagination: The Story of the Golden Gate Bridge* and *Russian California: Hidden Stories from Fort Ross and Beyond*.

Potential goals

19 park managers, interpretive specialists, conservancy directors and other interested parties we interviewed raised a variety of possible goals for park tablet apps. We also drew possible goals from existing park strategic planning documents. These goals, roughly ordered by popularity, included:

- Enhancing the visitor experience
- Making park media generate enough revenue to fund their own maintenance
- Reaching out to growing ethnic minorities, who do not traditionally visit parks
- Showing Californians why parks are important
- Enhancing the experiences of school groups along the trail
- Encouraging volunteering, donating to park conservancies or legislative advocacy
- Enhancing visitor safety
- Telling untold stories
- Showing park museum collections

Suggested goal for a tablet app

As we concluded our interviews, we explored existing research on the best ways to meet these goals and discussed them with 36 Views and CSPF. We concluded that the app's primary purpose should be to *enhance the experience of park visitors who currently use tablets or smartphones*.

Although the other goals mentioned in our initial interviews with park staffs may well be met by the app, we suggested to focus on this goal because:

- This is the single goal that all the parks, conservancies and other partners involved in this project share.
- Previous California state and national park projects have already identified ways in which mobile devices can enhance the visitor experience, but its role in safety, reaching out to non-visitors or even supporting school group's experience along the trail is murky.

Suggested audience for a tablet app

We suggest a tablet app for parks focus on *people who already visit parks with access to tablets or smartphones* because:

- Research suggests that investments in school programs, outreach to community groups, and non-electronic media are the most effective ways to reach people who do not already visit parks (Roberts 2012).
- This project assumes that its audience already has access to tablets or smartphones. Having to purchase tablets or smartphones for members of the target audience to use the app would severely curtail the number of people the app could reach.

- Members of this group are likely to be able to purchase apps for their tablet. Charging for the app may be a way to finance its ongoing maintenance.

Previous Research on Enhancing the Visitor Experience

California State Park Foundation's *Vision for Excellence* project's survey, telephone poll and listening sessions found which amenities would enhance current visitors' experience:

"Current park users were more likely to report updated and marked trails, as well as maps and park guides as important amenities to achieve excellence. Current visitors also noted the need for more self-guided tour/trail materials and information" (CSPF 2011, p. 14).

In other words, existing park visitors feel good information, in the form of maps, guides and self-guided trails, is essential to a good park experience.

Research Questions

CSPF's *Vision for Excellence* research gives few clues about what kind of information visitors want or whether they would be open to using tablets to receive it. It also does not explore whether visitors might want to share and create information over the course of their park visit.

As a result, our research answered these questions:

- 1 At what points over the course of their visit does our target audience have access to internet-enabled computers, tablets, smartphones or mobile devices? At what points do they want to use them?
- 2 What information do our audiences want and need before, during and after their visits to parks? What do they want to share? What do they want to create?

Methods

Subject Recruitment

Participants in our study had to:

- Be 18 years or older
- Have visited a state/national park in California in the last year, or are planning to visit one in the next year
- Own a smartphone or tablet

We created a Google Doc Form screener survey that asked these questions, as well as several open-ended questions to try to assess how frequently they visited parks and how they already used smartphones or tablets used in parks (e.g. “My favorite thing to do in parks is...” and “If you have a smartphone or tablet, what is your favorite app?”). See appendix A for a copy of the screener survey.

We got potential participants to fill out the screener survey in several ways. We posted an invitation to forums, email lists, Facebook pages and Meetup.com groups of northern and southern California hiking groups. We also posted flyers around the Berkeley area in places like REI and graduate student housing for UC Berkeley students. Finally, we encouraged enrolled participants to pass along the online screener survey link to their friends that were interested in outdoor activities. See appendix B for a full list of our recruiting sources.

In total, 85 people completed the survey, of which 70 fit our criteria and were asked to participate. Enrolled individuals included a fairly even mix of males and females, as well as a geographically diverse group, hailing from Sacramento to San Diego. A more detailed list of the numbers of participants that completed each of the research task is included below:

Method	Number of Participants
Focus Group	13 (4 Northern, 9 Southern)
Diary Study	11 (2 Northern, 9 Southern) (7 Text Message, 4 Notebook)
Follow-up Survey	8 (2 Northern, 6 Southern) (6 Text Message, 2 Notebook)
Observation	4 (4 Southern, 0 Northern)

Theoretical Approach

We used qualitative methods to generate insights about the kinds of information visitors needed and the types of attitudes they had toward tablets or smartphone use in parks. Quantitative methods were less appropriate for this project because our goal was not to estimate how many visitors had each need or attitude, but instead survey what needs or attitudes existed.

We chose our methods to try to study different stages of a park visit with varying levels of specificity (e.g. a focus group participant might be interested in learning about the different types of birds in a park, while a diary study participant might question, “What bird is that?”).

Focus Groups

We conducted focus groups to gain a more holistic understanding of information needs and attitudes towards tablets and mobile devices before, during and after park visits. Session leaders from our team worked to encourage a group dialogue instead of one on one conversations. Our questions focused on what information participants needed during our park visit. Several

questions also explored participant access of and attitudes towards smartphones and tablets before, during and after a park visit. Finally, we also discussed how tablets, smartphones or computers influenced participants' park experiences, from initial inspiration to go to a park to sharing photos when returning home. See appendix C for the entire list of focus group questions and script.



Image 1: Our focus group in Culver City, CA

One focus group took place at Baldwin Hills Scenic Overlook in Culver City, CA and one at South Hall on the UC Berkeley campus. Each focus group lasted for approximately 90 minutes and was audio recorded. Participants signed consent forms indicating their agreement to participate and be recorded.

Focus group participants received snacks and drinks and a \$10 Starbucks card.

Diary Study

We conducted a diary study to identify what information visitors need during their visit to parks. We asked diary study participants to record the following experiences as they occurred during their visit:

- Like learning about something

- Want to know more about something
- Don't like something

We conducted a pilot diary study at Angel Island State Park. A member of our team asked pilot study participants to choose one of three different methods of recording their thoughts:

- Writing on blank sheets of paper contained in a binder
- Annotating where each experience occurred on a map and then elaborating on the experience on the back of the map contained in a binder
- Speak into a portable voice recorder

Participants enjoyed having a choice but found these choices unappealing. The binder was too large to carry and using a voice recorder was awkward and too intrusive to the natural park experience. Feedback from the participants informed what methods were offered for the final diary study:

- Sending text messages from their own cell phone to our Google voice number
- Writing in a small notepad we supply



Images 2 and 3: Text message and notepad diary studies

After participants agreed to participate in either form of the diary study, we emailed them instructions about how to participate (see Appendix D and E).

We mailed notepad users their notepad and a self-addressed stamped envelope to return it in. They received a 2.5" x 3" waterproof notepad with sections labeled: what they liked learning, didn't like and wanted to know more about.

Follow-up Survey

We required participants who completed the diary study to participate in a follow-up online survey to gain knowledge about what devices they brought with them on their park visit and what, if anything, they looked up or shared concerning their park visit after they returned home. The survey was conducted using Google Doc Forms (See Appendix F).

Participants who completed the diary study and survey recieved a \$40 Amazon.com gift card.

Observations

We conducted observations of several park visits to gain a more nuanced understanding of information needs visitors have during a park visit. Participants spoke their thoughts out loud and were asked clarifying questions.

We conducted two observations. The first participant was a young professional who enjoys going to parks to “clear his mind”. The second observation consisted of a family (mother, father, teenage daughter) who described themselves as a “park family”. All the people we observed were friends of friends.

Observation participants refused to accept any incentives offered.

Analysis Process



Image 4: Our analysis process in progress

From the diary study, focus group interviews, surveys and observations we transcribed the participants' feedback onto sticky notes. We then conducted a two day, iterative process of categorizing and organizing the data in different ways to make sense of the data.

Finally, we realized that different groups of sticky notes represented different activities visitors completed over the course of their visit to parks. Visitors had different information needs during each activity. We labeled each activity and drew connections between them. (This categorization scheme later became the basis for our information needs diagram below).

As we developed this categorization scheme, we realized that some of the visitors we encountered spent more time completing some activities than others. From this realization, we developed a typology of visitors (also depicted in the Visitor Information Needs diagram Figure 1).

We then searched for other quotes and observations about when visitors had access to tablets, smartphones and computers. We noticed that visitors often mentioned particular sources of

information they were using (some from tablets or smartphones and some from elsewhere).

These became the basis for the information sources and device use in Figure 2.

Results

Visitor Information Needs

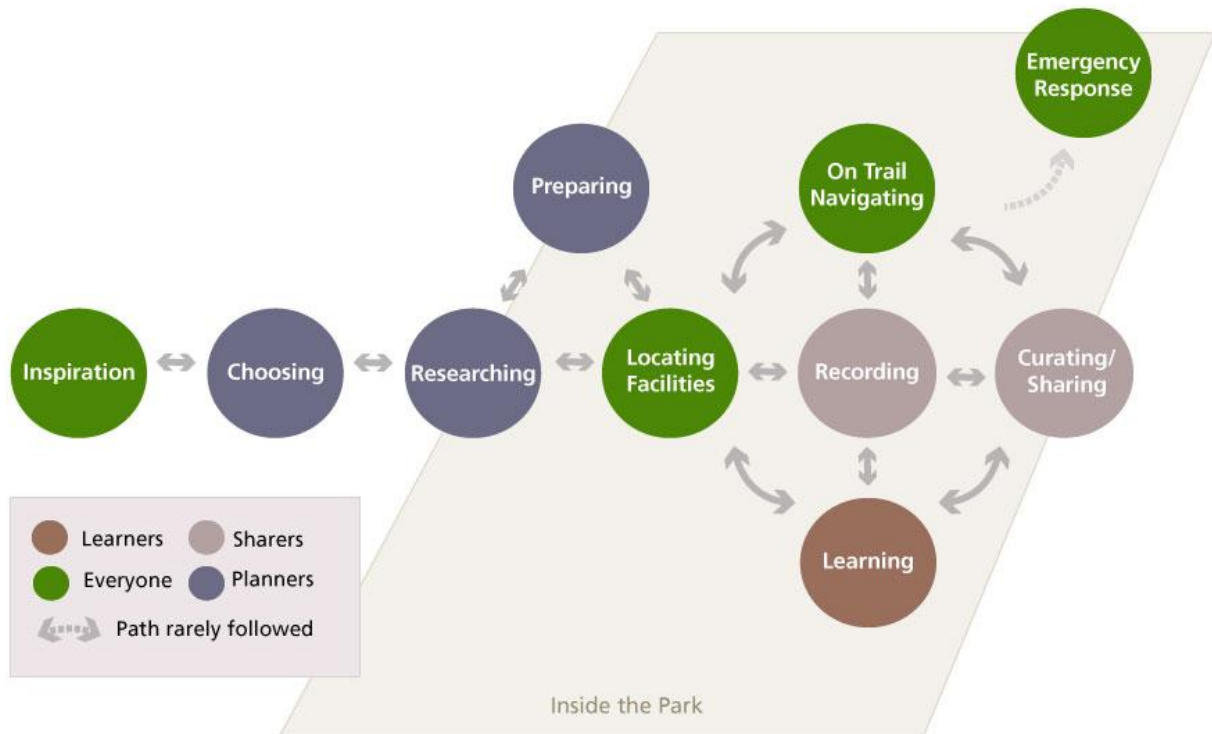


Figure 1: Park visitor activities

Figure 1 shows park visitors engage in up to 10 information-related activities before, during and after their visit to parks:

- **Inspiration** or becoming motivated to visit a park.
- **Choosing** or deciding which park(s) to visit. At this stage, visitors look for parks that seem unusual, are nearby and/or offer a mix of activities that appeals to them.

- **Researching** or looking for specific information about the activities available at a park. Visitors want to build a mental image of what doing those activities would be like. If hiking, visitors look for trail length, difficulty, crowding, wildlife sightings. If camping, visitors look for where the campgrounds are, what the campsites look like, whether they are available, what to do if it rains, how much they will pay. If biking, visitors wonder where they are allowed to bike and how long the paved portion of the bike path is. If kayaking, visitors wonder what the rules for use are, whether they have to pay a fee and where the launch location is.
- **Preparing** or packing their bags and figuring out how to pay their park fees. Visitors want to know what kinds of clothing to wear. Visitors want to know where to park and how to pay the fee. They want to know, in advance, whether a park takes credit cards and whether they can pay in advance.
- **Locating Facilities** or figuring out where trailheads, bathrooms, visitor centers, campgrounds and other key facilities are after arrival at the park.
- **On Trail Navigating** or deciding what turns to take while on a trail. Some typical questions include “Where am I?”, “Should I take a left or right at this fork?” and “Do we have time to take this trail instead?”
- **Learning** or acquiring knowledge about the park. Some visitors wonder what landmarks or large geographical features they can see from viewpoints. Some wonder what kinds of flora or fauna inhabit the area. Sometimes, they ask what a specific plant or animal is. Some ask about the human history of an area. A few visitors wonder about the current management of the park, asking questions like “How do parks in this area work together” or “Why is this a state park, not a regional park?”
- **Recording** or taking pictures, writing notes or getting park-specific stamps in special booklets.
- **Curating and Sharing** or culling what was recorded and sharing it with friends, family or strangers off-line or on-line.
- **Emergency Response** or acting in response to an emergency that is already underway. When an emergency is in progress, visitors want to know what phone numbers to call. They are also interested in survival skills, like knowing what plants are safe to eat when lost. Some wonder what dangerous animals or plants to look out for.

Visitors do not progress linearly through these activities. As indicated by the bi-directional arrows in Figure 1, they switch between certain activities frequently and repeatedly. For example, visitors often tentatively choose a park, research it and then decide to choose another. They conduct research while preparing for their visit and preparing helps them locate facilities. On the trail, they constantly shift between locating facilities, navigating on the trail and learning.

Some activities happen both inside and outside the park. Visitors often research particular trails when they arrive at the park, as well as when they're planning their visit. Visitors curate and share what they've recorded both during their visit and after they leave.

Visitor Types

Some visitors spend more time on some of these activities than others. “Planners” spend more time choosing, researching and preparing for park visits. “Sharers” spend more time recording, curating and sharing. “Learners” spend more time acquiring knowledge about the park during their visit. One person can be any combination of these types. For example, many “planners” are also “learners.”

Visitors who visit parks to recreate can also be learners, planners, sharers or none of the above. There is substantial variation in how visitors recreate at parks. Some spend time planning and choosing where they will bike, hike, camp or swim. Others simply go along with friends. Some spend time recording their recreational experience, others do not.

Park visits often do not have clear ends. Visitors return to researching new trails or activities when they get home. Often that post-visit researching leads to a return park visit.

One visitor’s sharing is often another’s inspiration. Visitors often post their photos to inspire their friends and family to visit parks. One of the primary sources of visitor inspiration are photos and stories from family and friends.

Visitor Access to Devices and Existing Information Sources

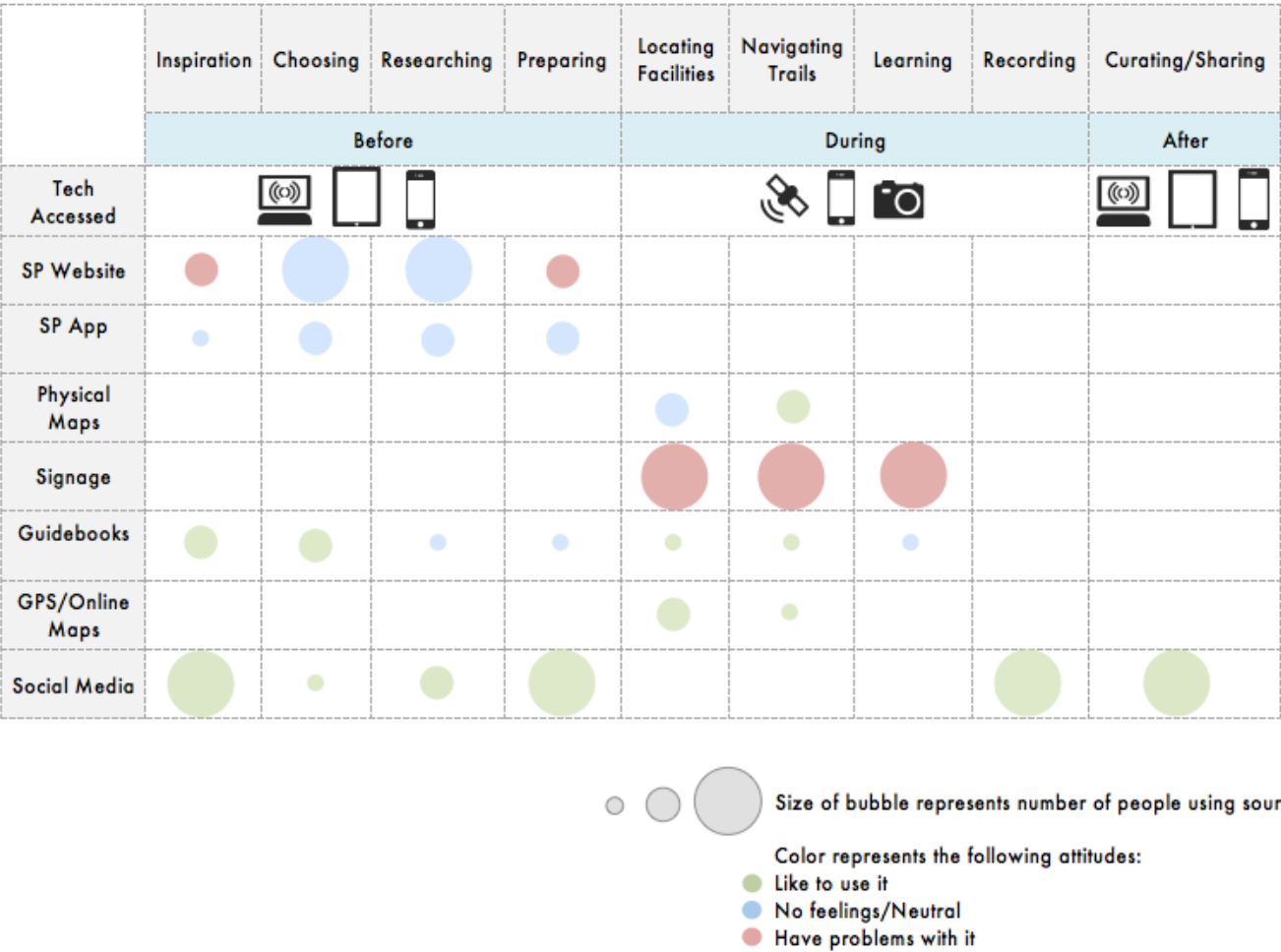


Figure 2: Information sources and needs for park visitors

Figure 2 summarizes the key findings of our research about visitor access to tablets, computers and mobile devices, as well as the existing information sources they use to meet their information needs. The columns show the different activities visitors engage in during their park visit (as depicted in Figure 1). The first row shows the different kinds of devices visitors accessed

during various stages of their park visit. The following rows correspond to different sources visitors use to obtain information. The size of the bubbles is proportional to the number of visitors we found use a source to fulfill their information needs in the corresponding stage. For example, the large red bubble in the signage row and locating facilities column indicates that a lot of visitors use signage to locate facilities. The color of the bubbles represents the visitors' attitudes toward using the source (for that stage). As the legend states, the color green represents a majority of park visitors liking the information source, the color blue represents visitors having no particular feelings, while the color red represents visitors disliking using the source. In the previous example, the red bubble indicates that lots of visitors use signage to locate facilities, but do not like it much.

Access to Tablets, Computers and Other Mobile Devices

We found that though park visitors often owned tablets, they were not carrying them into parks. Visitors used digital cameras, smartphones and handheld GPS devices during their visit to the parks. We also realized that even though most visitors carried smartphones to parks, not all visitors were open to the idea of using tablets or smartphones during their park visits. Some visitors went to parks to “get away from technology,” some liked using it to aid them on their visit and some absolutely loved using devices and apps throughout their visit. Essentially, visitors have a variety of attitudes towards using mobile devices in parks, ranging from not using them to embracing them.

Official State Parks Website (parks.ca.gov)

We found that visitors used the state parks website heavily before their visit for researching park information and then choose the park that they will go to. Most visitors were neutral about using the state parks website and did not express any strong feelings of liking or disliking about using it as resource to fulfill their information needs. Though many visitors were using the state park

website frequently, they did not enjoy the experience and had to look at other sources for inspiration and for information on preparing for the park visit. For both these information needs, visitors turned to social media and guidebooks to fulfill their information needs

California State Park Foundation App

The California State Parks phone application. Some visitors mentioned using the state parks app before their visit. Again, those visitors expressed no strong like or dislike of the app or were fairly neutral to using this source to fulfill their information needs.

Physical Maps and Maps on Phones

Visitors used both these sources for help them in navigating trails and locating different facilities at the park, during their park visit. More visitors mentioned using physical maps for navigating through trails because they could not rely on online maps for navigating some remote trails where connectivity would be an issue.

Signage

A large proportion of the visitors relied on signage throughout the time they were at the park for locating facilities, navigating through trails and learning, but disliked their experience. Several visitors commented that the signage was “old,” “rundown,” “weather” or “needed to be replaced.” Warning signs are often generic and visitors feel they are uninformative. Visitors commented that signs about wildlife were “the same everywhere” and “don’t add value to the park.”

Guidebooks

Some of the visitors we interviewed in the focus group mentioned using guidebooks like *Dayhikes Around Los Angeles*. These visitors were satisfied with using these books before their visit for choosing, researching, inspiration and preparation, as well as during their visit for learning and navigating around the park.

Social Media

The term social media is used here to describe Internet-based applications that allow the creation and exchange of user-generated content. We found that a majority of visitors used different kinds of social media almost throughout their park experience. Visitors mentioned using Yelp to find information about trails, current park conditions, images and reviews that other visitors shared. Some mentioned using an app called MapMyHike to plan, track, study and share their hikes. Visitors also used social media like Facebook, Twitter, Flickr to share the information they had recorded, sometimes with the intention of inspiring others or to maintain journals of their park visits. Most visitors were happy with using these apps as they provided reliable, current, crowd-sourced information about recent events and park conditions.

Overall, visitors need better signage for learning, locating facilities and navigating trails. Most visitors were entirely dependent on signage for learning and navigating inside the park, but thought there was a lot of room for improvement in this area. Furthermore, crowd-sourced information from social media could be harnessed to give visitors real time information about current park conditions. Social media was also heavily used for inspiration, with almost no competition from other sources.

Conclusion

Our findings show that park visitors were able to satisfy some of their information needs. They discover upcoming events and current park conditions using social media and happily choose and researching with guidebooks and online review sites, like Yelp. However, visitors have trouble choosing, researching, preparing, learning, navigating and locating with the current websites, signage and CalParks app. Apps that support these could further enhance the current

visitor experience. The following recommendations describe ways we could address these information needs successfully.

Our findings show tablets are mainly used before and after a park visit, while smartphones are used during all phases of the park visit. Therefore, depending on the needs addressed by a feature, some features are appropriate for both tablets and smartphones and others just for smartphones.

Recommendations

Recommendations are organized based on their relevance to a tablet or smartphone. The features described in the recommendations should work in offline mode when possible due to the absence of a wireless data connection in many of the parks.

We suggest an app for either smartphones or tablets provide:

- **A list of state parks, searchable by which is nearest the visitors and the kind of activities (e.g. hiking, biking, camping) they offer.** This feature would help visitors choose and research the parks to visit. These needs are poorly met by the current information sources. Such a feature would be relevant to both a smartphone and tablet app.
- **A list of activities** available at each park filtered based on time of year. The listing for each activity could include:
 - the places you can do an activity
 - information about what it is like to do the activity at those places (For example, the hiking activity would be composed of the various trails and information about the trail such as elevation change and distance.)

- a to-do list for what that activity involves (e.g. getting a permit, checking in at a visitor center, etc.).

Like the previous feature, this feature could help visitors choose and plan their visit.

- **A map** which identifies hiking trails (and their trailheads), restrooms, shops, visitor center and other key locations in the park. This feature could help meet visitors' needs for locating facilities, on-trail navigating and preparing.
- **A park conditions feed and subscription service.** This feature would allow visitors to learn what the current conditions of the park are as well as receive notifications when park condition updates are made. This includes issues relating to park maintenance (e.g. trail closures), events (e.g. reenactments), temporary natural phenomenon (e.g. waterfalls are full, certain wildlife is in season) and weather. This frequently-requested feature would help visitors choose, research and prepare for trips to parks, as well as make decisions about how much farther to go when they are there.
- **Text, photos and illustrations that help visitors acquire knowledge about an area.** In particular, this content could help visitors learn:
 - what landmarks or large geographical features they can see from key viewpoints
 - what kinds of flora or fauna inhabit the area
 - what a specific plant or animal is (based on its characteristics). Some ask about the human history of an area
 - a description of how the park is currently managed

This feature could help meet visitors' needs for learning about parks, as well as researching what they can do in certain parks.

In addition, we suggest a smartphone app for parks have the following features:

- **Steps for emergency prevention and response.** A section dedicated to describing the potential dangers in the park and what to do if the danger is encountered. For example, a list of the poisonous snakes, their descriptions and actions to take if bitten. Also, a list of emergency contact numbers appropriate for the type of emergency. This content would meet visitors' needs to respond to emergencies, as well as prepare for park visits. Such a feature would be most relevant to a smartphone app which visitors would use while in the park.
- **Buttons that allow visitors to share pictures of parks or information about park events on their social media profiles.** These buttons could help visitors who wish to share more about park visits. A photo sharing service dedicated to park content and hosted by the app would be welcomed by those that find social media sites too cluttered to effectively share their park photos. This feature seems most relevant to a smartphone app as visitors often engage in the sharing while they're in parks (and rarely bring tablets with them to parks).
- **Badges to record each park visit.** These virtual badges would be associated with a profile so a visitor's park history can be accessible from different devices. The virtual badges could be linked to physical badges that can be purchased or shared on social media. This feature will help meet the needs of visitors who enjoy recording and sharing their visit.

Reflection

Interpreting the results took longer than we expected due to the large size of our team. The more people in the team, the more chances for different interpretations to collide and impede the path towards a consensus. However, we did discover a key benefit to a large team. The varied interpretations present allow for a very thorough analysis of the data. We feel this is the key point we learned about user research: the process of user research is enriched when people from different backgrounds work together. We discovered an effective method for handling large groups: by splitting into smaller teams and peer reviewing our work, we saved time by covering more ground while still taking advantage of the large group dynamic.

We also learned a lot about the specific methods used in our project and they are explained below :

Focus Group

Our focus groups provided us with a great overview of how different visitors go about planning their park visit. The interaction among different participants was key to gaining insights that individuals may not have thought of on their own.

We did run into a few issues during our first group session. The one with the greatest impact to our project was that one individual tended to dominate the conversation. This individual had a lot of experience with smartphones and tablets and was an avid park visitor. He had a lot of useful information to share, but at times his expertise seemed to make the other participants self-conscious of their responses. It was tricky trying to balance the conversation and keep a good dialogue among these individuals. However, it was important to do this because we found that while the other members of the group were not as knowledgeable about park apps and other information-dense websites, their unique perspective was still very helpful. Several of

these quieter member used social media apps like Yelp to plan their park visits. This is something we would not have discovered had we not probed them further.

We were fortunate to have two focus groups. This allowed us to try to improve some of our strategies and refine our questions for our second group. During this session we did a better job of balancing the conversation, asking each individual if they had anything to share when there was a lull in the flow of discussion. We also asked more specific questions about what types of apps and websites visitors used. Finally, we tried to get a better understanding of what devices visitors used over the course of their park journey. Several participants had volunteered some of this information in our first session, but we realized it was not a full picture of the different types of mobile devices they used. Finding this information helped us validate our initial hypotheses regarding the devices that were used. This was very helpful in the development of our information needs conceptual model.

Observation

We found it very helpful to be able to ask visitors specific questions at the very moment we thought they were experiencing something interesting, either from their face reaction (a frown, a smile, etc) or body language (arms crossing, posture, etc). During these moments we were able to gather the participants' actual thoughts with clarity. Being present allowed us to understand the specific context where observations were made. For instance, when discovering a participant was curious about the history of the region, we had the opportunity to ask for elaboration whereupon we found out that when the participant mentioned history he actually referred to what the area of the park looked like before humans arrived.

But we also found that, no matter what instructions you give participants, their personality will dictate the dynamic of the observation. For example, one of our participants was very outgoing.

He spent most the observation hike asking how we liked the park, instead of telling us about his park experience. This happened despite our repeated questions about what he was thinking.

Participant behavior was noticeably affected by their awareness of being part of a study. Both participants were concerned they were not offering the information we desired or thought we were looking for something in particular. Care should be taken to have the participant duplicate their natural behavior as much as possible leading before the observation begins (e.g. while planning their visit to the park) to ensure the most natural experience possible. We found one factor that can lead to more unnatural behavior are personal connections between the participant and observer, no matter how small. The observation had a better chance of staying on task if none of the observers had any connection to the participant.

We also found recording with audio to be advantageous as taking notes while walking and observing is cumbersome and may lead to missing participant behavior.

Diary Study

We learned that diary studies were a great method for quickly reaching a large number of participants, but not necessarily gathering rich data about their experiences. We initially thought diary studies would capture honest experiences of park visitors in great detail because visitors recorded their experiences without the disruption of an observer. However, we found many people wanted to perform the task with the least amount of work possible. We assumed that since our recruits included those interested in park improvement they would put effort into the task. Adjusting the instructions to require participants make at least 10 entries greatly improved the amount of data recorded. We also learned that the clarity of the instructions and the way the media was designed to facilitate following those instructions is crucial to the quality of data returned. Iterations of pretesting should be performed to help ensure participants

record the desired type of data. Pre-testing was also very useful in determining which methods for recording participants would be more willing to use.

Survey

The reason we decided to do a follow up survey with our diary study participants is because we wanted to understand the information needs that visitors had at the park, that were not fulfilled and they had to search for, after they had visited the park. We felt that we could miss out on this important aspect of a visit if we didn't do a post diary study survey. Participants who returned from the diary study would have their information needs still fresh in their mind, and we could capture them in the survey, as opposed to the focus group where they would have to recollect from memory. The survey also helped us get more context about their visit like what devices they carried to the park, what devices they actually used, what they recorded and shared with others. We realized that asking these questions during the diary study could have been too intrusive and surveys helped us gather details that the diary study missed out on.

We realized that survey was a very quick way to specific information about people's park visit. The scope of our survey was limited and hence we kept it short and simple. We could have asked more follow up questions about why people didn't use a certain technology at parks, or looked at all the posts/pictures they had shared, but we wanted to use the survey to just get validate our hypothesis about technology use in parks and if people created and shared information after their visit to the park. We wanted to look at the posts/pictures that people shared on social networks, but it wasn't exactly under the scope of our research goals.

References

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(<http://www.calparks.org/whoweare/>).

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Appendices

Appendix A: Screener Survey

California State Park Survey

Hello! We are students from UC Berkeley who are working with the California State Park Foundation to conduct a study about people's experiences in California State Parks. We are also interested in technology use.

Would you like to help us by participating in our Focus Group interviews or by providing information about your upcoming park visit?

The group interviews should take about an hour and a half. One will be held in the Los Angeles region on the morning of Saturday April 20th, and one will be held on the UC Berkeley Campus on the evening of Wednesday April 24th. We will provide snacks. You'll also get a \$10 gift certificate to Starbucks.

The Park Visitor Survey will involve texting or writing down questions and comments during a state park visit to be made by April 22. You'll also get a \$40 gift card to Amazon.

If you are interested, please fill out the short survey:

*** Required**

I confirm that I am 18 years or older. *

- ☐ Yes
☐ No

I am: *

- ☐ Female
☐ Male

How long do you usually spend planning for park visits? *

- ☐ less than 10 minutes
- ☐ 10-30 minutes
- ☐ 30-60 minutes
- ☐ 1-2 hours
- ☐ 2-5 hours
- ☐ Other:

I usually visit parks with: *

- ☐ Myself
- ☐ My partner
- ☐ My family
- ☐ Friends
- ☐ A hiking group
- ☐ Other:

My favorite thing to do at parks is:

(This question is optional)

When was the last time you visited a California State or National Park? *

- ☐ Within the last week
- ☐ Within the last month
- ☐ Within the last 6 months
- ☐ Within the last year
- ☐ I've never gone to a California State or National Park, or it's been more than a year.

Which park did you go to? *

(If you can't remember what it's called, describe where it is.)

Are you planning on going to a California State or National Park soon? *

- ☐ Yes, in the next week.
- ☐ Yes, in the next month.
- ☐ Yes, in the next 6 months.
- ☐ Yes, in the next year.
- ☐ No, I have no plans to go to a park, or I might go, but in more than one year.

Which park are you planning on going to? *

(If you can't remember what it's called, describe where it is.)

How long do you usually spend planning for park visits? *

- ☐ less than 10 minutes
- ☐ 10-30 minutes
- ☐ 30-60 minutes
- ☐ 1-2 hours
- ☐ 2-5 hours
- ☐ Other:

I usually visit parks with: *

- ☐ Myself
- ☐ My partner
- ☐ My family
- ☐ Friends
- ☐ A hiking group
- ☐ Other:

My favorite thing to do at parks is:

(This question is optional)

I own: *

(check all that apply)

- ☐ A desktop computer
- ☐ A laptop
- ☐ A smartphone
- ☐ A tablet

If you have a smartphone or tablet, what is your favorite app? *

My email is: *

My name is: *

I'm interested in participating in: *

- ☐ Focus group interview
- ☐ Park Visitor survey
- ☐ Either one!

If you're interested in the visitor survey, would you like to record your questions in a notebook or via text message?

- ☐ Notebook (to be provided)
- ☐ Text message
- ☐ Either one!

Submit

Appendix B: Recruiting Sources

Northern California

- Bay Area Anything Active Facebook Page (<https://www.facebook.com/AnythingActive>)
- Bay Area Hiking Yahoo Group (<http://groups.yahoo.com/group/BayAreaHiking/>)
- CalAdventures Facebook Page (<https://www.facebook.com/CalAdventures>)
- California State Park Foundation Facebook Page
(<https://www.facebook.com/CalAdventures>)
- East Bay Casual Hiking Club (<http://hiking.bondon.com/>)
- Meetup.com Groups:
 - Bay Area Everything Outdoors Club for 20,30,40 year olds
 - San Francisco Bay Chapter of the Sierra Club
 - Bay Area Hikers (20s & 30s only)
 - SFBayCafe
 - Golden Gate Hikers
 - East Bay Hiking and Yoga Club
 - East Bay Hikers
 - Berkeley Adventuring
- North Bay Christian Hikers (<http://www.northbaychristianhikers.com/>)
- Posted physical flyers at:

- Whole Foods
- Berkeley Bowl
- REI
- University Village Albany

Southern California

- Community Hiking Club (communityhikingclub.org/index.php/chc-contact-form)
- Do You Wanna Hike Facebook Page (<https://www.facebook.com/dooyuwannahike>)
- Los Angeles Sierra Club (http://angeles2.sierraclub.org/about_us/contact_us)
- [Meetup.com](http://meetup.com) Groups:
 - Best Hikes of SoCal
 - LA Hiking Society
 - LA Backpackers Club
 - SoCal Hikers and Peakbaggers Group
- OC Hiking www.OC-Hiking.com
- reddit.com Social Hiking board
(http://www.reddit.com/r/socalhiking/comments/1bywoe/enhancing_the_use_of_tech_nology_in_california/)
- Sandie Go Hiking Club (<http://sandiegohikingclub.org/contactform>)
- SoCal Hikers (<http://groups.yahoo.com/group/socalhikers/?m=0>)

- Tripadvisor.com Forums (http://www.tripadvisor.com/ShowTopic-g32655-i61-k5122330-Baldwin_Hills_area_lodging-Los_Angeles_California.html)

Appendix C: Focus Group Questions and Script

Script: (5 minutes)

Welcome, intro. Consent.

Hi everyone and welcome. Thanks again for participating in our focus group. We really appreciate you taking the time to be here today. Feedback from people like you is a really important part of our project, so feel free to speak freely. There is no right or wrong answer.

So why are we here? Our project is looking to understand people's park experience, and also to understand how people use technology in parks. Our trip here is being funded by the California State Park foundation, and the information we gather may be used in the future development of an iPad app for the California State Park Foundation. Sound good?

Experience Questions: (15 minutes)

- What are some of the reasons you visit California State Parks?
- What is your favorite moment when visiting a park?
- What is your least favorite moment?

Planning/Info: (35 minutes)

- What makes you decide you want to visit a state park?
- What kind of tools do you use?
- Is there any point during park visits when you wish you had more information?
- Can you provide an example? (parking, questions on the trail, map or how to get somewhere)
- After you leave the park, do you ever find that you want to search for more information about the park?
- If so, what types of information do you generally look for? How?

Technology: (30 minutes)

- Do you bring any kind of mobile devices with you to parks?
- If so what kind?
- Do you use them in the park? How?
- Do you own mobile devices such as smartphones or tablets that you choose not to bring to parks?
- Are there any situations where you wish you had them or thought they might be useful?
- If you were to use an App when visiting a state park, are there features that you would like to have?

Wrap-up (5 minutes)

- Is there anything else you'd like to share related to using technology in state parks?

Thank you!

Appendix D: Notebook Diary Study Instructions

Hi Dianne,

Thank you very much for contributing to research to benefit California State Parks!

We have you interested in writing down questions and comments during a State Park visit. The following are instructions for how to perform the study and receive your gift:

1. Visit a California State Park before April 22
2. Before visiting, a notepad, instructions, and a return envelope will be mailed to you. If you need to make your visit within 24 hours after we receive your address, you are welcome to use your own notebook and we will send you a return envelope.
3. Take the notepad with you to the park and follow the instructions on how to document your visit. The instructions are:

Please note when you have one of the following experiences (interpret as you see fit):

- Like learning about something
- Want to know or know more about something
- Don't like something

Then write a brief description explaining each experience in the notepad. Spend enough time in the park to make at least 10 observations.

4. Mail back the notepad using the prepaid self-addressed return envelope.
5. Upon receipt we will email you a short survey that should take no longer than 10 minutes.
6. Upon completion of the survey, a \$40 Amazon gift card will be credited to the account associated with your email address. Please let us know if you would like to use another email for the gift card.

If you can commit to this study, please reply with your address and a date you need the notepad by.

Thanks again for your consideration!

If you know of anyone who might also be interested, please forward them to:
<http://tinyurl.com/berkeleyparks>

Appendix E: Text Message Diary Study Instructions

Hi Glen,

Thank you very much for your interest in research benefiting California State Parks!

We understand you're interested in texting questions and comments during a State Park visit. The following are instructions for how to perform the study and receive your gift:

1. Visit a California State Park before April 22
2. Before you visit the park, text your name, email address, and the park you're visiting to (657) 205-9608
3. Along the way, send us a text message when you:
 - Like learning about something
 - Want to know more about something
 - Don't like something

Spend enough time in the park to make at least 10 observations.

4. When you're done, send us a text message saying "Done."
5. We will email you a short survey that should take no longer than 10 minutes.
6. Upon completion of the survey, a \$40 Amazon gift card will be credited to the account associated with your email address. Please let us know if you would like to use another email for the gift card.

If you plan to complete this activity, please respond to this email as soon as possible.

Thanks again for your consideration!

If you know of anyone who might also be interested, please forward them to:

<http://tinyurl.com/berkeleyparks>

Appendix F: Post-Diary Study Survey

California State Parks Post Diary Study Survey

This survey concerns your creating and sharing activities after you completed the diary study.

All responses will remain confidential and will be used strictly for the purpose of research.

If you have any questions about the survey, please don't hesitate to contact us at ucberkeley.parksteam@berkeley.edu.

* Required

My name is: *

My email is: *

I own a: *

(check all that apply)

- ☐ Computer/laptop
- ☐ Tablet
- ☐ Smartphone

Which of the following devices did you carry on your visit to the park? *

(check all that apply)

- ☐ Laptop
- ☐ Tablet
- ☐ Smartphone
- ☐ None

Which of the following devices did you use on your visit to the park? *

(check all that apply)

- ☐ Laptop
- ☐ Tablet
- ☐ Smartphone
- ☐ None

After your park visit, did you look up any information related to your park experience? *

- ☐ Yes
- ☐ No

If you did, what information did you look for and where did you find it?

(if you looked on Google for example, also let us know where you ultimately found it)

Did you take any pictures or video during your visit to the park? If so, what device did you use to capture them? *

- ☐ Camera
- ☐ Tablet
- ☐ Phone
- ☐ I didn't take any pictures or video

Which of following did you share with other people? *

(check all that apply)

- ☐ Pictures
- ☐ Videos
- ☐ Status updates on social networks like Facebook, Twitter etc.
- ☐ Reviews/posts on forums
- ☐ Blog posts (public)
- ☐ Postcards
- ☐ I didn't share anything
- ☐ Other:

For all the options checked above, would you be willing to share those with us? *

(you will be contacted later via email to share the information)

- ☐ Yes
- ☐ No
- ☐ Not Applicable

Did you create any of the following without the intention of sharing it with others? *

(check all that apply)

- ☐ Scrapbook
- ☐ Personal Diary
- ☐ Personal Lists
- ☐ Personal Blog
- ☐ I didn't create anything
- ☐ Other:

Please enter the email address connected to your amazon account so it can be credited.