UC San Diego Mobile App:
The Next Generation

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The Problem

The UC San Diego Mobile App was launched in 2009. It allowed students, staff, faculty, and visitors to search and browse static content. Although several updates added functionality and improved the user interface somewhat, the app was essentially a web-browser wrapper rather than a native mobile application. It did not leverage recently developed capabilities of mobile devices or provide an optimal mobile experience.

Modern mobile apps use the device's location and temporal information to push relevant contextual content to users. Information retrieval in the app required a level of effort that users, especially ages 18–24, did not expect or were not familiar with. The app increasingly failed to meet user experience/user interface (UX/UI) requirements and lacked functional capabilities of modern native applications.

Users who were accustomed to getting timely, contextual content from their mobile phones were either frustrated or unaware of university events and possibilities around them.

The Solution

The development team looked at current mobile solutions and borrowed features relevant to a university environment. Most notably, we changed the original app's grid of icons (which linked to static information) to a card-based, modular interface. This created a concise and clear presentation of dynamic content.

We established an ongoing collaboration among the development team and users by developing within an open-source environment where ideas and code could be easily shared and reviewed.

The UC San Diego Mobile App has already had a positive effect on campus life. Users can now expect current, contextual information based on their location, presented in an intuitive interface on both iOS and Android platforms. The app anticipates user questions and needs through the GPS capabilities of smartphones to present location-relevant information (such as the closest shuttle stop or dining options).

Collaboration
Scott Kirkland and John Knoll, developers at UC Davis, were valuable collaborators and early validators of our transparent and decentralized approach to development.

We used GitHub, a collaboration platform, in this project. It allowed developers throughout the UC system to participate without the need to ask permission or interfere with others' work. This transparency made developers accountable for their work because contributions were openly reviewed. Bugs, upcoming features, milestones, and activity were easily monitored.

Contributions to the project even came from outside the UC system. They included a spelling correction from a GitHub user in Hong Kong and code documentation from a former UC San Diego student. These contributions were not solicited, but were offered as *pull requests* into the project.

We actively worked a group of Computer Science and UI/UX students to add their expertise and ideas to the project. This collaboration came from students hearing about the project and reaching out to the group.

Vivian Pham, a Computer Science major wrote:
> "I had heard of this project through Warren College Student Council and saw a great opportunity to give back to UC San Diego, as well as to enhance student involvement and experience. This is a project that students, like myself, can and will actually use so they can enjoy their time here, get more involved within the community (e.g., student orgs and events), succeed in their studies, and help them with whatever they need. It will be a project for students by students. In addition, with it being open sourced, this is a fantastic learning opportunity for me and other interested students to learn more about mobile development and work with new technologies."

Another student wrote:
> "Earlier in this academic year, I submitted a complaint detailing some of the many issues I had regarding the official UCSD app. It was embarrassingly difficult to use and I was often frustrated because of this. The latest improvements to this app have been extraordinary. Thank you for responding to the concerns of the students."

We also worked closely with UC San Diego Housing Dining and Hospitality (HDH) to provide campus dining locations, menus, and nutrition information. By actively engaging with students,

staff, and departments, we optimized the app and increased the visibility of and interest in the project.

Next Steps
We invite user feedback via an in-app form and use these user experiences and opinions when designing new features or re-designing older ones.

Thanks to student requests, we are testing integration of the university's Single Sign On system to allow students to access their academic records. Students will be able to access personal class data on their mobile devices using existing APIs created by campus departments.

Timeline
- Late 2014 - Initial concept of card-based interface
- Oct 2015 - iOS development began
- Jan 2016 - Alpha iOS prototypes
- Jun 2016 - Android development began, iOS version released to Apple app store, began collaboration with UC Davis developers
- Aug 2016 - Android version released to Google Play store
- Mar 2017 - Mobile App framework became the official UC San Diego Mobile App

Technology
Although the end products are iOS and Android applications, the development process was more akin to web development than an Objective-C or Java approach for each operating system. As a result, a web-oriented developer could begin development more quickly. The process is similar to developing a web application, coding in JavaScript, and debugging with the Chrome browser's console tool.

We use an open-source framework by Facebook that allows us to distribute native solutions to both iOS and Android platforms while maintaining a common codebase for both. Working in conjunction with university departments, we use Amazon Web Services (AWS) to normalize and serve APIs to our app. By using Node.js to work with AWS, we leverage JavaScript to increase flexibility and productivity.

This layered approach—with JSON as the data format and APIs as integration points—allows us to upgrade and change the backend services without disruption to the mobile clients, and more efficiently bring dynamic university data to the app.

Links
- [UC San Diego Mobile for iOS](#)
- [UC San Diego Mobile for Android](#)
- [Open-Source Mobile Framework: Campus Mobile on GitHub](#)

Screenshots
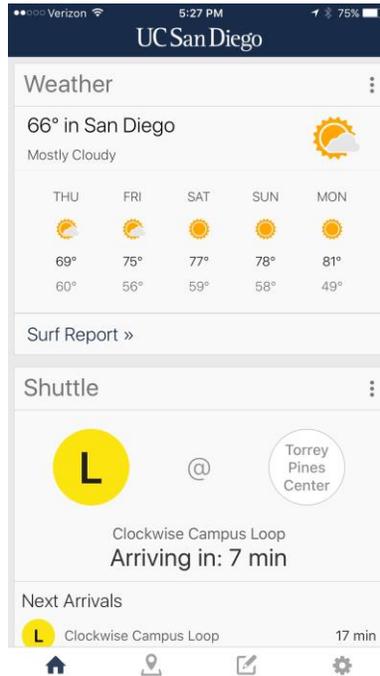
Modularity allows users to customize their opening screen. Above, this user is most interested in the weather and the current location of shuttles in relation to most-used stops.

Working closely with UC San Diego Housing Dining and Hospitality (HDH), we provide current, detailed dining information via the Dining module.
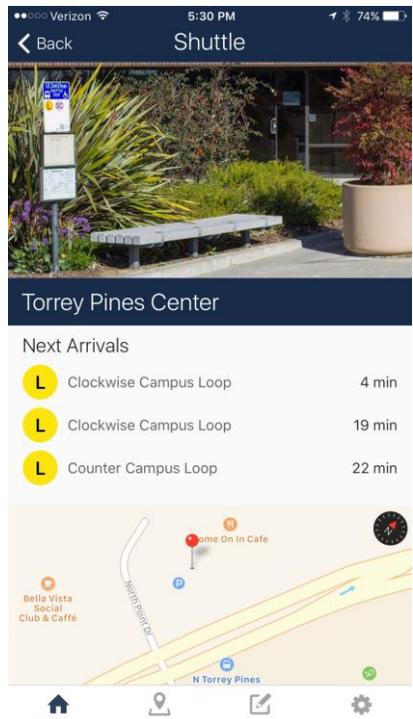
The Shuttle module provides visual, current contextual information that users can customize for often-used shuttle stops.

The Map module shows buildings and departments relevant to the location of the user.