

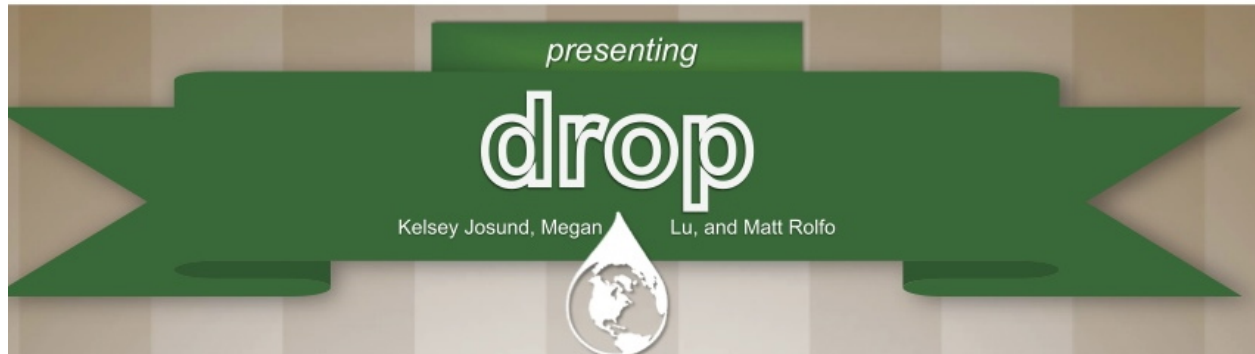
Drop: High-Fidelity Prototype

Mathieu Rolfo - development

Megan Lu - design, user testing

Kelsey Josund - manager, documentation

A gamified water use and reduction app that aims to help people understand and become motivated to reduce their water usage.



Problem and Solution Overview

••••• AT&T LTE 1:56 PM 45%



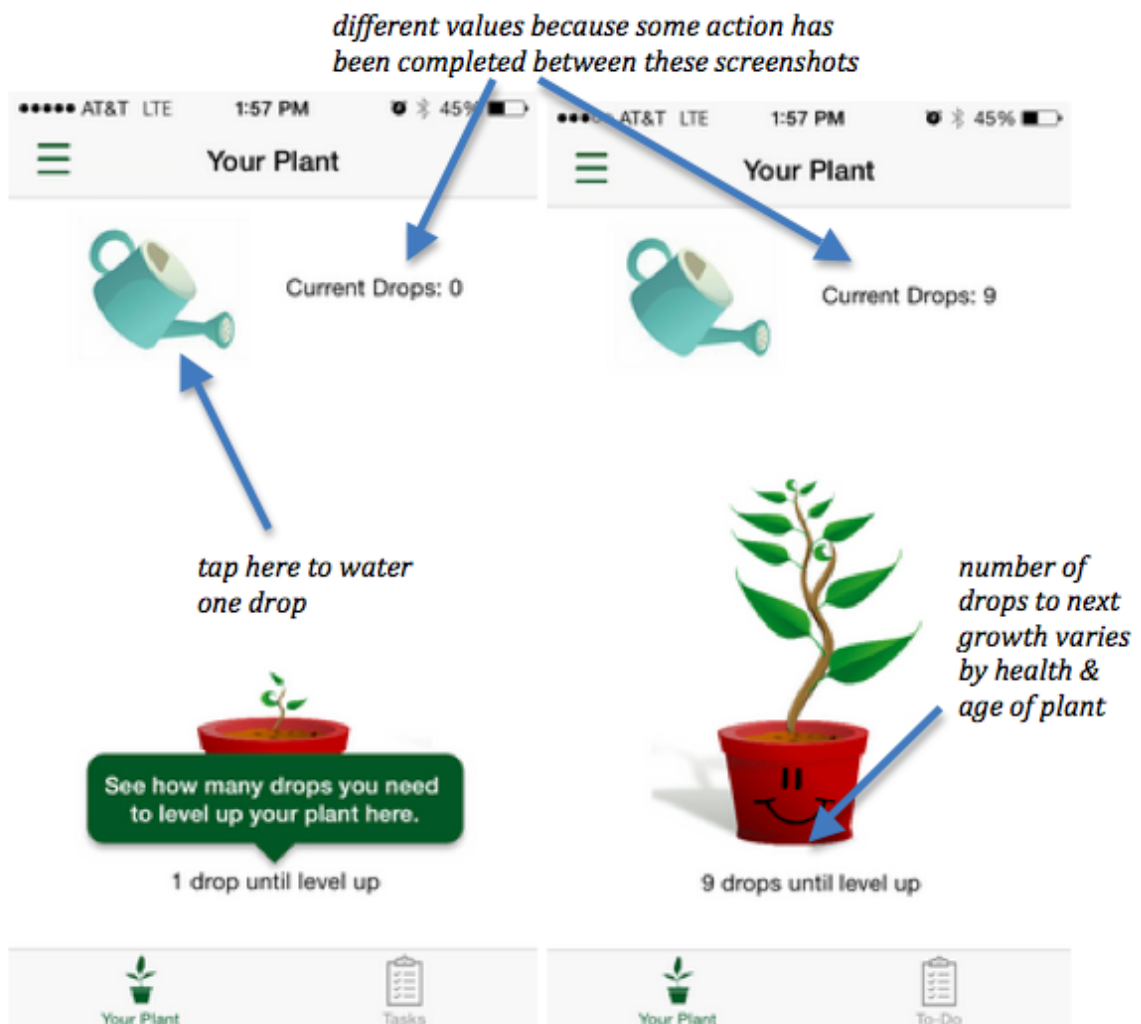
Much has been said about the benefits of living "greener," but few people take significant action to achieve that. If we can make reducing water use fun, people will be more likely to actually make changes to help conserve this precious resource. Our app is intended to help people who are interested in using less water but not particularly motivated to do so, increase awareness about water saving practices and motivate them. We've created a gamified water-use and water-saving tracking app, where users can complete suggested water-saving actions to accumulate "drops" that they can use to water a plant or purchase new plants and grow their garden. This couples water use reduction with positive reinforcement: users are given "drops" that correspond to real gallons saved, rather than being told about the dire effects of *not* saving water. Ultimately, users will be able to learn about water-saving tactics, log their actions, tend their expanding garden, and view the tasks and gardens of their friends. Our app helps people visualize their water conservation actions by letting them check these

actions off a list and then rewarding them with the ability to maintain a virtual garden. This gamified solution is more fun than just lists and charts and graphs and helps people develop habits that lead to benefits for the environment.

Tasks & Final Interface Scenarios

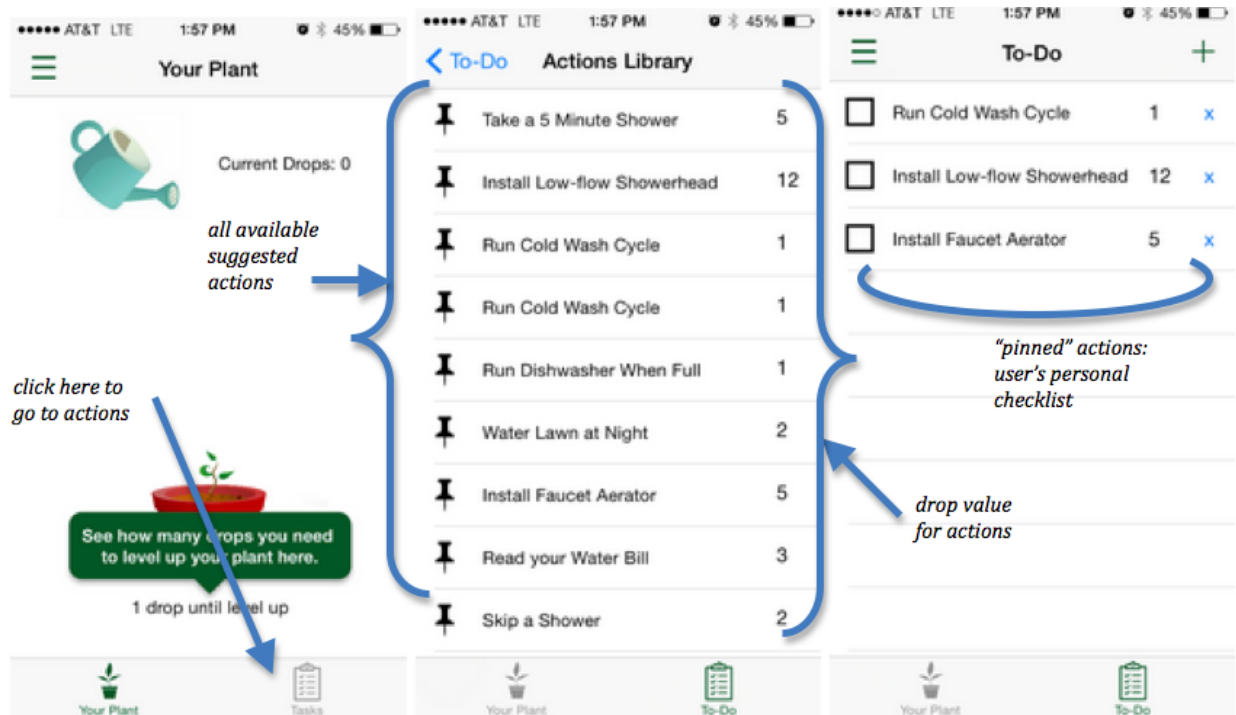
Task 1: Tend to Garden (simple)

Users can view their current garden at the home screen or navigate back to it from other parts of the app. When they click the watering can, drops are removed from their daily tally and their plant's health improves. When it has received enough water, it grows.



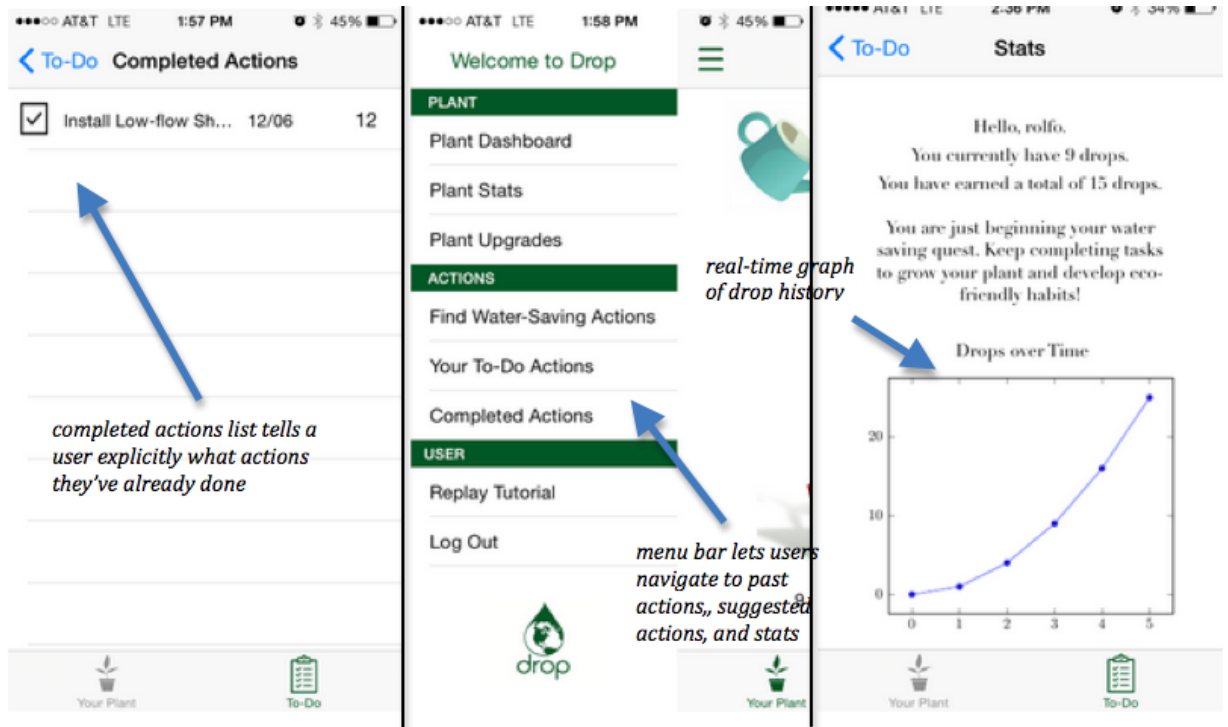
Task 2: Pin, Complete, and Track Actions (medium)

Users can navigate to the actions section of the app, which consists of three separate but related lists. These are 1) a list of suggested actions, 2) actions the user has pinned to their own personal to-do list, and 3) actions the user has already completed. They can pin actions from the first list to the second, check off actions from the second list to move them to the third, and review their actions from the third list.



Task 3: Understand Patterns and Progress (complex)

The app maintains a tally of historical drops overtime (in addition to "daily drops" that have been earned but not yet spent), which can be used to track progress through the app. Users can view the amount of drops their plant needs to grow to further levels to understand their progress through the game, and see which actions they have planned or already completed to understand their progress towards conserving water.

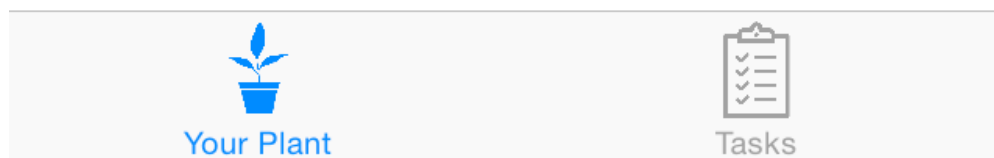


Major Usability Problems Addressed

*** note: our Proto.io account was disabled and we lost access to the prototype on which heuristic evaluation was performed, so we have no comparison screenshots*

2-3: User Control and Freedom

The navigation hamburger menu did not appear on all screens.

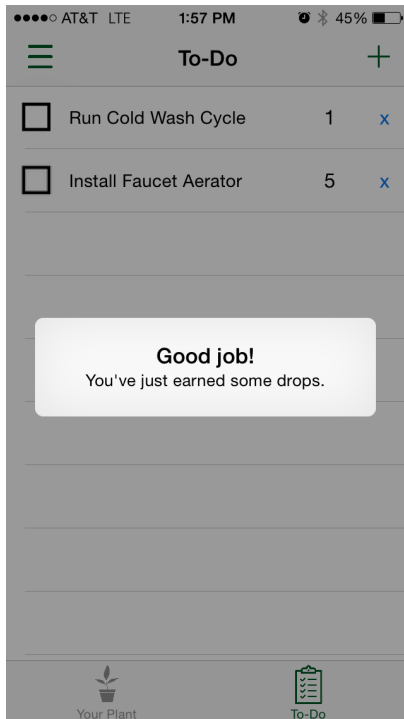
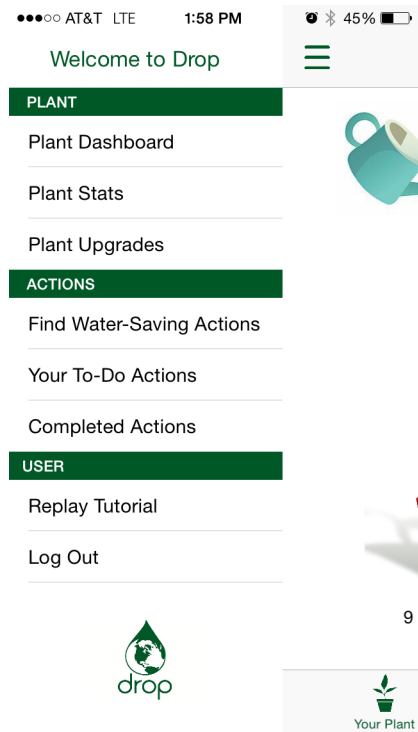


We addressed this usability violation by making an effort to enforce consistency in navigation throughout screens of the app. In the high-fidelity prototype, we don't actually use a hamburger menu at all since we decided logical places to put it conflicted with other necessary elements of the screen: upper left corner did not work because we need a back button on some screens, and upper right corner did not work because users look to upper corners for scores and we need to display daily and historical drop tallies. Instead, we added a navigation bar across the bottom of the screen which allows users to toggle between the garden view and the checklist view.

2-7: Flexibility and Efficiency of Use

Navigation of the app was buggy; buttons did not work as expected.

This was rated as a level four usability violation but was really just a problem inherent in the functionality of a prototype created with proto.io. We were not able to create link granularity as finely as we would have liked based on the linking constraints of the prototyping tool. Because these constraints were removed when we started coding the high-fidelity prototype, since in code you can specify link destinations more reliably and accurately, this violation was easy to fix without significant change in design. Static images do not really illustrate the solution since it was about interactivity.



2-1: Visibility of System Status

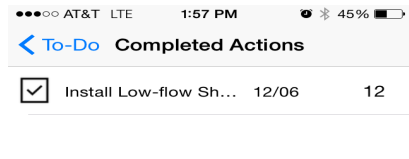
The checkbox icon and check-off action on various screens had different meaning; not clear that buttons have been clicked

On different parts of the actions checklists (suggested, pinned, and completed), the “checkbox” icon indicated different actions. On the completed list, it indicated undoing an action and moving it back to the pinned list; on the suggested list it indicated moving it to the pinned list; and on the pinned list it indicated completing it and moving it to the completed list. This was understandably confusing. We remedied this usability violation by changing the icons to more accurately reflect their action. Now we have a plus (“+”) to indicate adding a suggested action to the pinned list and an X to indicate deleting an action from the completed or pinned list (but not completing it). We retained the checkbox for the pinned list to indicate completion of an action, since checking something off a list is a frequent motif in user interface design and makes sense to people generally.

2-2: Match between system and real world

When users “uncomplete” a checklist item, what happens?

After much debate we decided that there is no simple way to include intuitive functionality for unchecking checklist items, because that would require modifying daily and historical drop counts. Is someone checked off a task a week ago, does it make sense to modify today’s drop count? What if a user ended up with negative drops? Because any solution was very complex and not very easy to understand, we decided to make it not possible to uncomplete an action once it has been moved to the completed list. This would allow users to gain points for actions they never did, but of course since the tracking of actions is on the honor system anyway we decided this was a risk worth taking. We can’t enforce people actually taking actions either way.



Design Evolution



Our app went through very drastic changes as the design process progressed. At all stages we worked to encourage and motivate resource-use-reduction, but the focus on water and gamified technique were only introduced in the second medium-fidelity prototype.

The initial idea, pictured to the left, was to create a sort of resource hub that would allow users to track and learn about their resource usage in many areas. This would involve entering their location or using location settings on their phone, and then adding more information about their energy/water/etc bills. The app would compare these data points to information about the nature of the resource in that particular area and estimate how “green” the user’s lifestyle is, presenting graphs of the user compared to other users, people in general, and themselves over time.

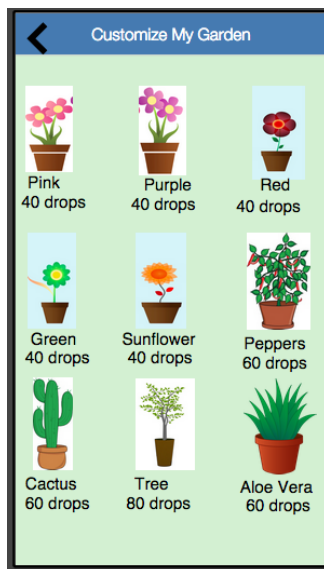
Feedback indicated that the app seemed too utilitarian and not sufficiently engaging to motivate people who didn't already care a great deal about reducing resource usage.

In an attempt to make the app more "fun", we added social networking aspects and information about actions to take based on the information gathered about the user. The app would connect them to societal/political actions to take, information about their "resource story", and updates from their friends and neighbors. At this point we began focusing primarily on water, although we still expected to build out to other resources at some later point.

After feedback we received indicated that the app seemed overly complex and not terribly interesting, with a slow turnaround for data entry and response, we completely revamped the plan and moved toward gamification.

We created a second medium-fidelity prototype to represent the new gamified concept, with actions to complete and the basic idea of a garden to care for using points earned for completing green actions.

We focused definitively on water use



reduction at this

point, since it only made sense to save water and water plants -- saving electricity or using less natural gas did not intuitively lead to caring for a garden.

The high-fidelity prototype is very similar to the second medium-fidelity prototype, but problems with the UI based on the abilities of the prototyping tool we used in the earlier prototype were fixed.

Prototype Implementation

We created the high-fidelity prototype using Objective-C in xCode, because a team member had iPhone programming experience and all three of us use iPhones. Creating an iPhone app was a good choice because we are familiar with Apple products, layout, and design patterns, but the major downside was that only the team member with Objective-C experience could really contribute to the coding of the prototype.

We hardcoded a fairly limited list of suggested actions users can take to reduce water consumption. In a final version of the app there would hopefully be far more suggested actions to keep the app useful and fun and allow users to get more creative with water conservation and continue saving water over time. Also limited in functionality is the water conservation history screen; rather than actually graphing the drops earned by a user over time in this implementation, we store a single static graph to represent what would be customized and responsive in a final version of the application.

In this version of the prototype, the “upgrade” option is not fully fleshed out. In this part of the final app, users who have earned enough cumulative drops can trade up to more and fancier plants. As of this prototype, users there is just a list of potential upgrades; users cannot actually “purchase” them. Of course, since this prototype is intended for use case testing and evaluation, it is unlikely test users would earn enough cumulative drops to upgrade their garden anyway.

Also in a final version of the app we would perhaps add sign-in options via a third party (like Facebook or GMail), depending on user response in further user testing. If we decide to use third party social signin, we would like to add some sort of social functionality to the app in the future. This would allow users to compare their gardens, pinned list, and completed list to their friends on other social networks who also use Drop. Functionality like this would probably further motivate users to take positive actions to reduce their water usage by adding a direct competitive aspect to the app. It does work without such functionality, and adding it would involve adding several screens and storing more information about more users to create a working prototype. The complexity of adding this, and our limited time to create the medium- and high-fidelity prototypes given our near-complete pivot, kept us from adding this functionality to this prototype.