
SeaPatch: The Urban Farming Mobile App

TEAM JPEGASUS

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Abstract

This report summarizes the design of SeaPatch, a mobile application for urban farmers devised following a user-centered design process. The first step in this process was to conduct user research. Results were triangulated via the completion of three different research methods: an online survey, semi-structured interviews, and a competitive product analysis. Upon analyzing the resulting data, two main themes—knowledge and networking—were revealed. While many resources that service these needs already exist, the research also highlighted the need for a singular, comprehensive tool to bring everything together in one easily accessible place. These findings informed the subsequent ideation phase, where sketching and brainstorming sessions led to the development of a mobile application solution. The creation of a prototype and a subsequent 5-participant user evaluation followed. The evaluation results suggest that SeaPatch has the potential to be a useful tool for the urban farming community. A review of what the team learned about the user-centered design process, as well as a summary of possibilities for future work on the application, conclude this report.

Introduction

On April 29th, 2010, less than a year ago, the Seattle Department of Planning and Development declared 2010 the “Year of Urban Agriculture.” It was the intent

of the DPD to modify many of the city's codes in order to remove what they identified as barriers to urban agriculture. The legislation took effect on September 23, 2010, and included language to add or clarify the definitions of various agriculture-related terms, allow community gardens in all zones, allow rooftop gardens, and increased to number of chickens allowed on residential property from three to eight [1]. All of these changes were intended to support and encourage urban agriculture in Seattle. It was the goal of our team to identify the needs of this burgeoning population, and, through user research and analysis, design a system that meets these needs.

Once we defined the population that our product was to serve, the team embarked on the first phase of the project, user research. The three techniques we chose—survey, interviews, and competitive product analysis—are detailed in the following section. Once our user research was complete, we analyzed the data obtained, which led us to define stakeholders, functional requirements of the system, and personas of our target users. We identified two overarching goals for our product: to support the communicative or social aspects of urban agriculture in Seattle, and to support the informational needs of the community. User research revealed smartphones as a popular and, more importantly, growing trend among our target population, which led us to the design of a mobile application. Another contributing factor to that decision was the fact that the team saw value in the users' potential ability to answer questions immediately within the context of his or her garden, which would not be possible with a desktop application. In a brainstorming session, the team produced numerous sketches, which explored the overall UI scheme of the product as well

as various tools that the prototype could include. We then focused our efforts on producing a prototype of the mobile application, and finally performed informal user testing on the prototype.

User Research

The research phase consisted of three different studies, which were then used in the development of three primary user personas. The studies each employed different methods, which were chosen to complement each other and provide triangulated research results. These methods were: 1) an online survey, 2) semi-structured interviews, and 3) a competitive product analysis.

Online Survey

The online survey provided a high-level, general understanding of the problem space. It was distributed to the city-wide P-Patch list serv, posted on Urban Farm Hub, and emailed to individuals that the design team, through online research, identified as particularly active in the Seattle urban agriculture movement. Distributing the survey through these channels ensured that responses were derived directly from target users. The survey consisted of 22 questions, which were divided into five themes: 1) urban agriculture in general, 2) urban agriculture as a social activity, 3) communication practices among urban farmers, 4) technology use among urban farmers, and 5) the demographics of urban farmers. 145 completed surveys were returned.

Semi-Structured Interviews

At the end of the online survey, participants were given the opportunity to volunteer for in-person interviews and to give tours of their gardens or farming spaces. The resulting interviews provided a more in-depth and

personal set of data than the initial survey responses. Interviews were scheduled with four participants of various backgrounds and engagement in the urban farming community, ensuring a more diverse sampling and thus a more representative set of data. As recommended by Preece, we used a “basic script for guidance” during each interview [2]. Questions focused on participants’ backgrounds in urban farming, their interaction and relationship with other urban farmers, their use of technology in the context of urban farming, and any opportunities they saw for technology to better aid the urban farming community. Participants were as follows:

- *Participant 1:* Founder of and volunteer at the Seattle Farm Co-op, which supplies urban farmers in the Seattle area. P1 is also a P-Patch member, but claims to have difficulty “keeping up with it.” Instead, P1 focuses on livestock, raising rabbits, chickens, and sheep.
- *Participant 2:* An active P-Patch member and owner of a 16-year-old organic fertilizer business. P2 focuses on gardening rather than livestock. While a self-described loner, P2 still likes to know what’s going on and “what people are talking about” in the urban farming community. P2 frequently trades and shares produce with others.
- *Participant 3:* A solo, backyard urban farmer. P3 is a hardcore urban farmer who grows almost all of the food her family eats. She both grows produce and raises livestock (chickens, ducks, and off-site goats). She engages with the rest of the urban farming community

through her blog, and at the time of the interview, was in the middle of writing a book on urban farming.

- *Participant 4:* Co-owner of the Seattle Urban Farm Company, a business that designs, builds, and maintains food gardens, chicken coops, and goat pens. SUFC works with homeowners, restaurants, businesses, and property managers. P4’s work lends him a unique perspective on the development and current state of the urban farming movement in Seattle.

Competitive Product Analysis

In both the survey and the interviews, participants were asked questions about the tools they use to communicate with other farmers and the technological resources they use to learn more about urban farming. By completing a more in-depth review of these existing tools, the design team was able to identify which features were successful or unsuccessful, helpful or unhelpful, and where there were missed opportunities or gaps that could be filled. This method was an excellent complement to the more user-centric survey and interview studies, and it helped in the development of a more thorough and holistic understanding of the urban farming landscape.

Results

Analysis of the research results led to the identification of two main themes—knowledge and networking—which then guided the remainder of the design process. Examples of some basic research results that led to the recognition of these themes include:

- Urban farming is a very social activity. 82% of survey respondents said they share tips and knowledge with other urban farmers, while a third claimed to engage in trade and sharing. Only 4% said they don't talk to other farmers.
- The internet is a valuable knowledge resource. 81% of respondents said they use online resources to learn more about urban farming.
- Urban farmers are tech-savvy. 93% of survey respondents rated themselves as being average or higher in their computer skills. A fifth rated themselves as experts.
- Smartphones are a growing trend among urban farmers. 41% of the survey respondents identified themselves as owning smartphones, while 7% said they plan on buying one within the coming year.
- There is a wide variety of resources (online and otherwise) available to the urban farming community, but these resources are spread out and difficult to sort through.
- People like the idea of "neighbors helping neighbors" and enjoy the sense of camaraderie in the urban farming community.

Personas

The research conducted during the investigation phase helped the group create three different personas. These three personas each represent a group of potential users that share a common goal, and that typify a third of the urban farming population as determined by data

gathered from the online survey and the in-person interviews. We were also able to use our research data to help create personas that were "typical and believable, but not stereotypical" [3].

For example, Peter P. Patcher, a 65 year old man who recently retired from his job as a computer manager, represents users whose goals are networking and trading produce with other urban farmers, and learning more about urban farming. Peter would love to have an online resource where he can ask for help with his garden when he's gone travelling, or search for other urban farmers who are interested in trading their products. He would also like a tool where he can search for information related to plant diseases and pests, particularly ones that are common to the plants he grows and the region he lives in. For instance, last summer insects spoiled nearly all of his strawberries. Even though Peter has strong technological background, he felt overwhelmed by all the information he found on the web when searching for help. He would prefer having one tool where he can post questions and have other gardening aficionados provide answers, allowing for more focused information better tailored to his specific needs.

The second persona is Barbara Backyard, a 35-year-old married woman with two boys. One of Barbara's goals is trading overstock produce. For instance, every summer she has an overstock of apples and, because she's an independent farmer who grows in her own yard, she has difficulty finding other urban farmers with whom to trade or share. Also, Barbara is very concerned about eating healthy and growing her food organically. She writes about the benefits of eating right in her blog, but would like to have an even easier

way of spreading her knowledge and connecting with other people. One of Barbara's life goals is to see just how self-sufficient she can be in growing her own food.

Last, Ophelia Organization is 45-year-old artist who loves to paint landscapes and make wooden soles for Irish tap dancers. She's an urban farmer like the other personas, but is more interested in livestock than produce. As a founder of the Seattle Farm Co-op, she also plays a more prominent role in the overall urban farming community. Ophelia needs a place where she can connect with the Seattle community and promote urban farming practices and values, and she thinks Seattle could use an online resource where all the information related to urban farming is clearly organized. One of Ophelia's goals in life is to open her own food stand in front of her house to sell eggs from her chickens.

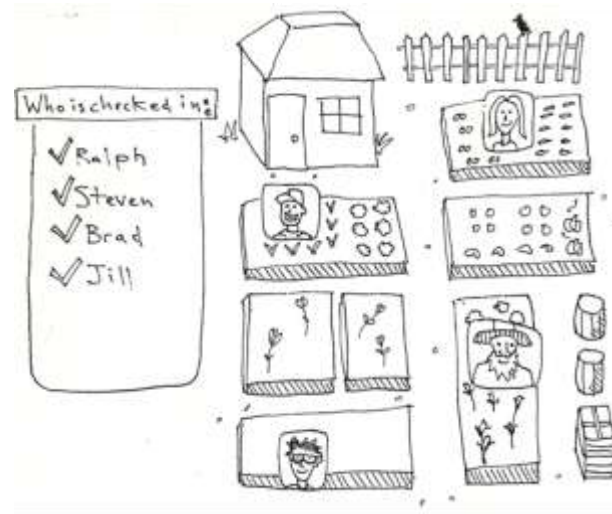


Figure 1. Sketch of the Farmer Finder concept

Ideation

Having garnered such an enthusiastic reaction from the urban farming community in response to the online survey and the in-person interviews, it was easy for our team to come back together and begin the brainstorming process. As mentioned previously, our research revealed two themes: knowledge and networking. These themes led to the development of three main ideas for the design of our application:

Farmer Finder

This is a tool similar to the mobile app Foursquare, but tailored to P-Patch members. It shows a virtual map of the user's P-Patch, and displays which P-Patch members are currently there working (fig. 1). Farmer Finder also allows you to send messages to the people you see checked in at the P-Patch. Thus, if you wanted to talk to a fellow gardener about something specific, or co-ordinate a gardening session to spend time with someone you liked, this tool can help facilitate that interaction.

Product Content and Features are Customizable: Drag and Drop Tiles of Interest

This sketch (fig. 2) captures the basic concept of how our application would work: by choosing items from a library of options, you populate your active screen with a selection of tools customized to your particular needs. During our research we realized there was an incredible amount of knowledge and tools users could potentially choose from, and a wide variety of needs from user to user. Thus, we wanted to provide users the ability to self govern in deciding which tools they wanted to see, allowing for a more personalized and focused experience. The greatest strength of this approach was that it was an already learned model of interaction: we

chose to mimic the iPhone App store model, thus maintaining a paradigm users would be familiar and comfortable with.

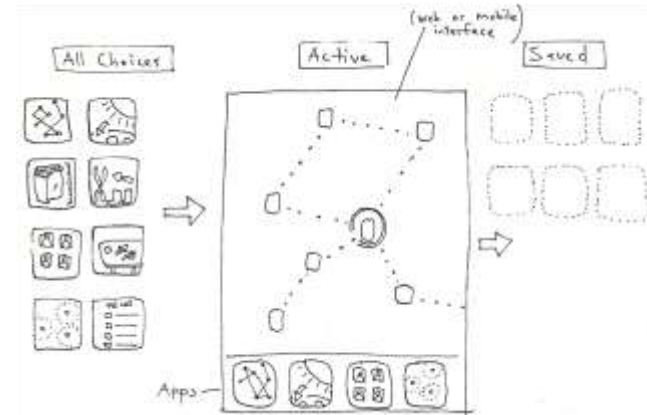


Figure 2. Sketch of the customization concept



Figure 3. Sketch of the user-generated knowledge concept

Communal, user-generated knowledge base

Taking a high level view of our application, the goal was to combine the knowledge and networking themes that our user research uncovered by providing a central resource that could then be accessed by individual users. As is the case for virtually any other topic, there is an overwhelming amount of online resources available on urban farming. Multiple opinions, perspectives, philosophies, and techniques exist for almost every aspect of gardening and raising livestock. Our sharing model encourages communication within the urban agriculture community, allowing people to develop, share, debate, and hopefully even evolve their ideas and practices. By having the entire community connected to the knowledge sharing, you have a wiki-like experience where best practices are shaped through conversation and contribution. Another strength of this concept is in the localization of the knowledge, given the focus that our product will have on agriculture in the Seattle area. Growing tips and techniques gain an additional element of usefulness when the knowledge behind them is specific to the local climate and/or soil zone. Similar to the location-based networking feature detailed in sketch #1, the success of this idea is limited by user participation. To mitigate this, we might lightly pre-populate the knowledge library in order to encourage user buy-in. Letting the users own the knowledge was very important to us. Knowing from our interviews and research that users were passionate about gardening and urban agriculture, we felt the information would be given a lot of attention and the database a healthy amount of maintenance.

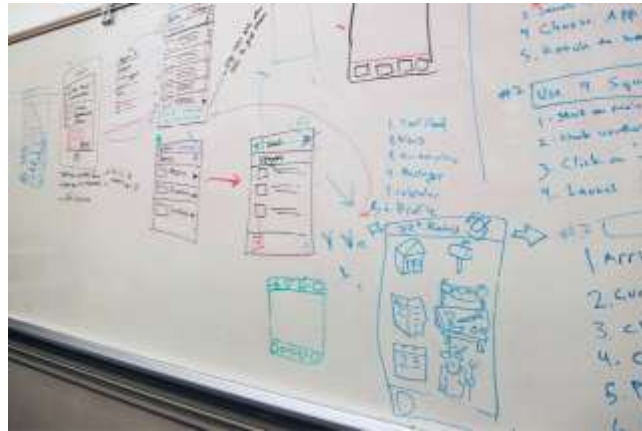


Figure 4. Sketching a user flow

Prototype

User Flow Phase

Once the team identified the main design ideas, a user flow was outlined to help guide the creation of a high-fidelity prototype. We began this phase of the project by sketching examples of the application on a whiteboard (fig. 4). This setting gave each team member the opportunity to voice “suggestions, criticisms, and changes” [5]. In this manner, the sketching process was an excellent method for tackling this stage as a team.

Colors and Title

The background on most of the pages was inspired by grass, while the sea-green title bar and button styles were selected to represent Seattle. We wanted a “Seattle” feel to the application to match its name, and because the application would, at least in its initial iteration, be specific to the Puget Sound region.

Development / Design Programs

The program Adobe Flash was nominated because it produced very fluid transitions between interfaces, and we also wanted a prototype that would “respond in a manner that represent(ed) the behavior of the eventual product” [6]. It also helped that one of our team members was skilled with Flash. For design, Photoshop was accessible to every member, and the interface was divided equally between the whole team. Once this was completed, we regrouped to make all the styles look and feel consistent, which was a “key activity within the design of (the) interactive system” [7].

Splash Page

Our initial process for the splash page was to place any interpretation, realistic or silly, of urban farming. For our ideas, we drew goats, plants and even a farmer sleeping. However, presenting too much information “necessarily means that it will take the reader longer to find any desired subset of that information” [8]. The team concluded that the main emphasis was to express urban farmer’s passion and care for farming, leading the splash page to become a minimal image of hands holding a sapling (fig. 5).

Tool page

The toolshed metaphor was used for this page (fig. 6) because from our research, a lot of the tools and information that farmers required were held in an actual toolshed. Our team elected to use individual tiles (tools) to hold knowledge about specific topics that catered to our users’ point of interests. Urban farmers wanted a tremendous amount of information regarding farming, which varied from “tulip bulbs from the east



Figure 5. The splash page



Figure 6. The Tool Shed



Figure 7. The homepage



Figure 8. Farmer Finder

coast” to “organic rich compost” to “region specific apple seeds”. Having the tile format allows users to select their favorite tools.

Home Page

The home page (fig. 7) consists of 6 focal buttons that a majority of our target audience asked for from our research. The main topics are: news, messages, marketplace, toolshed, and profile. A weather bar was also provided for a quick access to information regarding whether a day was sunny or cloudy.

Farmer Finder + Message Page

The concept of the farmer finder page (fig. 8) was inspired by a combination of Foursquare and a binder located at the Ballard P-patch. The binder displayed information on every registered member, and show where their patch was located in square formats. For our application we also added a messaging feature, thus allowing users to message people they

see checked in to the p-patch. The message board page was inspired by a whiteboard that could be found in the toolshed from the actual P-patch. The whiteboard’s purpose was to help members communicate with each other, and we followed that metaphor when creating this page.

Evaluation

In the final stage of the project, the SeaPatch prototype underwent informal usability testing. The scenario and tasks were written to explore the quality of interaction and overall usability of the product, explained as “the effectiveness, efficiency, and satisfaction with which specified users can achieve goals in particular environments” [9].

The team defined the overall scenario of use as follows: “You just downloaded a new app to your iPhone called SeaPatch. It’s designed to be a knowledge and

networking tool for urban farmers in Seattle.” The tasks explored all of the registration, profile, and setup screens we designed as well as the use of the Farmer Finder tool and associated pages. A few considerations that we employed in designing our scenario and tasks were to avoid the use of leading questions and language and to designate when the task was considered to be completed. We also used think aloud protocol to understand users’ expectations and experience of using the product.

The first task of the usability test required users to “open SeaPatch and set up an account.” This was mostly straightforward, except that 5/5 users were confused by the transition from the splash screen, which required them to click through in order to get to the first registration screen. It is typical of mobile applications that the transition happens automatically, with no action required of the user, and this departure from typical mobile app behavior is what contributed to the users’ confusion. This issue is an artifact of unfaithfulness in the prototype as compared to how the actual developed product would behave on the correct platform.

The second task required the user to create a profile, populated with information provided by the task. The feedback we received on this task reinforced design considerations that the team discussed, but was ultimately not included in the prototype due to time restraints. One of the users expressed that there should be a way to differentiate between areas of interest and areas of expertise, and also that those areas should be chosen from a list rather than requiring the user to populate a blank field. In addition, several users were confused by the presence of both a “neighborhood” and

“P-Patch” field, although our user research indicated that urban agriculturalists often maintain p-patches outside of their neighborhoods due to long wait lists for popular p-patch locations. Again, allowing the user to choose from a list of options for each field may mitigate the confusion experienced, as some P-Patches have names that are not derived from their neighborhood locations.

The third task required that the user find and add specific tools to his tool shed. Again, there were no severe issues with this task, but one user did suggest that moving the save button to the bottom of the screen, where the chosen tools appear, would make it more discoverable.

Task four required the user to use the weather widget on the home screen to check the forecast. We received very positive feedback on this aspect of the prototype; all users were successful and many expressed that they found the interface “cool,” “nice,” or “good.” The final task required the user to use the farmer finder tool to check who had checked in at his patch, see if anyone there could serve as a resource for information on organic gardening, and send a message to that person. The only major issue with this task was the absence of a “message sent” notification. After the user hit send message, the dialog box disappeared, and the user received no feedback on his action. This problem was easily remedied in an update to the prototype with the addition of a notification that “Your message has been sent.”

The biggest lesson learned in the user testing phase was to consider the potential interaction differences between the prototype and the final product, if the

platforms are different. While our informal testing did not uncover any severe problems, there were some small issues discovered, the elimination of which would increase the overall usability and quality of interaction with SeaPatch.

Conclusion and Future Work

The future for release of an app that serves the urban farming community is quite promising: surprisingly, we could not find a current product on the market that accomplishes what we have envisioned. Additionally, we have a substantial base of users who are eager to share their passion for farming with others. Finally, to tie it all off, we have a team that works very well together, with complementary strengths and areas of interest. Some of us enjoy research, some design, some development, some analyzing data. It worked out very well.

If we were to move forward there are, of course, a few areas which we could improve upon. These include in-the-field device testing, developing a marketing plan, and understanding adoption rates and long-term usage. Is this the type of application that people would come to a few times and then lose interest in, or is it something they would return to over and over? How could we encourage sustained, active usage? How easy would it be to access info from a mobile phone in a P-Patch? Would removing gloves to activate the touch screen be an issue? Would the phone need a special protective cover to repel soil and moisture? How would the application generate revenue? Would it be offered for free and supported by advertising, or would it be a paid download? These are all issues we would want to consider before shipping the application. This

would probably be best achieved by analyzing the history of previous, similar applications. Once we went to market, we would want to be sure to continue capturing data to improve on its adoption and see what other features could be added.

There is some potential for SeaPatch actually making it to market, either through private funding or via a grant or contest. The founder of a 20,000 member international online farming community is actually interested in the application, and with the huge amount of support and interest we experienced among the urban farming community, it seems like SeaPatch does have the potential to grow beyond just a classroom exercise and into a viable, real-world application.

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