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Pawsitive

Encouraging safe and positive social interactions for dogs

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Problem and Solution Overview

A common problem that dog owners face is handling social scenarios with their dogs in their community. Since there is a wide range of what socialization can entail, our design focuses on tackling interactions between dogs during walks and finding suitable dog companions for them. For the former, our problem concerns unpleasant and/or awkward interactions between other unfamiliar owners and dogs and the nervousness that it creates. While owners already take steps to help reduce uncomfortable interactions by actively avoiding other owners on walks, some express the desire to slowly and safely expose their dogs to others, as they believe socialization to be critical for their dog's happiness. Moreover, while short-term compatibility is included in the first part of this problem, long-term companionship between dogs is also desired by some owners. Thus, we aim to ease this area of the socialization process as well.

Our proposed solution includes an attachable button and a collar that aim to identify the compatibility of two dogs as they interact on walks. The design works by utilizing owner input of their dog's basic information, socialization preferences if known, and results from prior interactions. When passing by another owner with the collar, the device in the collar will calculate if the dogs' preference information matches, and will consequently light up the collar. Different colors indicate the approachability of the dog in social scenarios, so dog owners can act appropriately and correct the light output if needed. Information about each interaction is stored and visually summarized through a phone application. The design works as a way to notify others rather than impede the personal connection between owner and dog.

Initial Paper Prototype

Overview Images

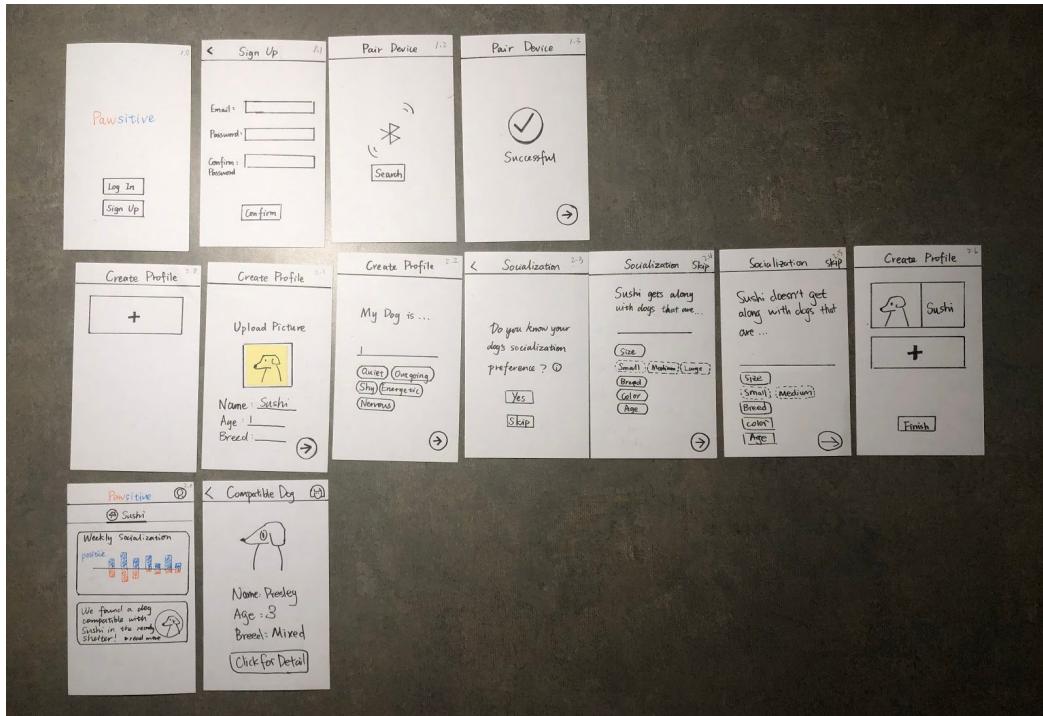


Figure 1.1. Entire Prototype - Mobile Application



Figure 1.2. Entire Prototype - Wearable Technology

Task 1: Identifying dog friends and decreasing negative owner interactions

This task heavily relies on the participant information from the dog profile and owner interactions with the leash handle. To start, a participant owner pairs the wearable devices with the mobile application, so information about each social interaction can be recorded and stored.

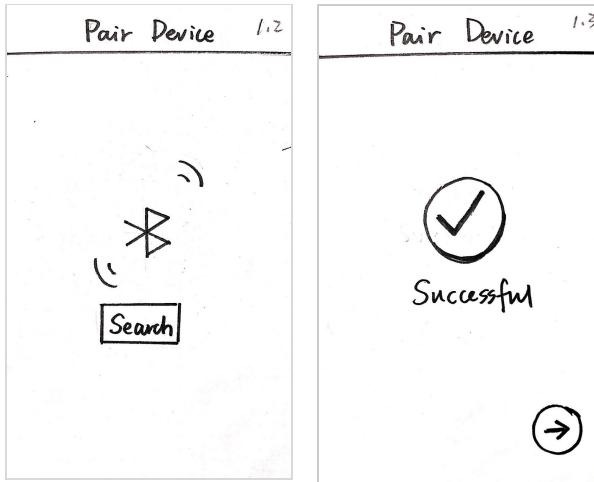


Figure 1.3. Pair the device

Figure 1.4. Successfully paired

Then, the participant creates a profile (Figure 1.5) in the mobile application and inputs information about the dog such as name, age, and breed (Figure 1.6). The participant is then taken to a screen that asks for the dog's personality (Figure 1.7). If the participant is knowledgeable, they also input information about their dog's social preferences (Figure 1.8-1.10); however, this part is skippable which means the device would rely solely on participant input from social interactions. Once the profile is complete, the participant can create another dog profile or "finish" which takes them to the data visualization page (Figure 1.11 and 1.12). This information will be used to inform the device during upcoming interactions.

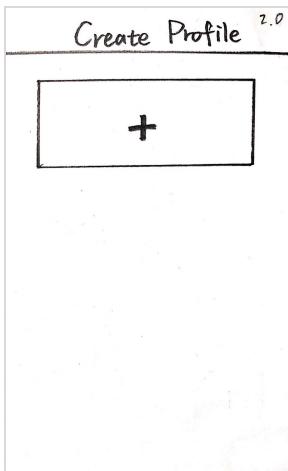


Figure 1.5. Create a dog profile

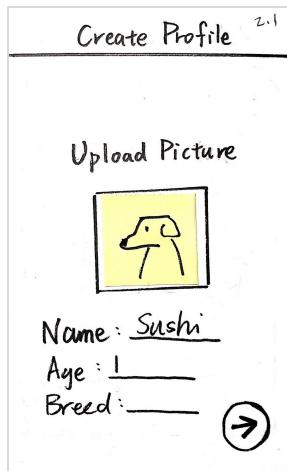


Figure 1.6. Edit basic dog information



Figure 1.7. Edit dog personality information

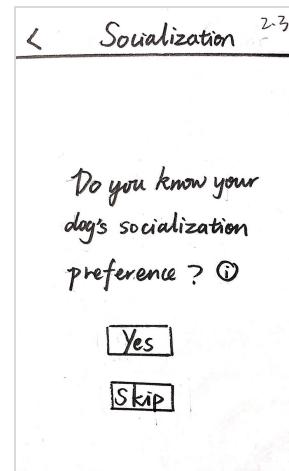


Figure 1.8. Ask for socialization preferences

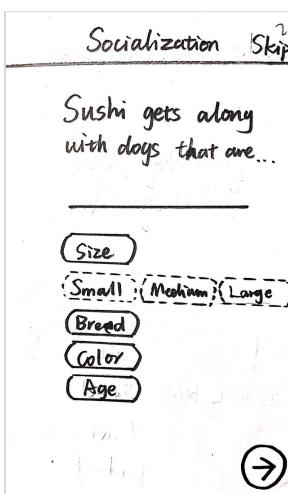


Figure 1.9. Specify socialization preferences (likes)

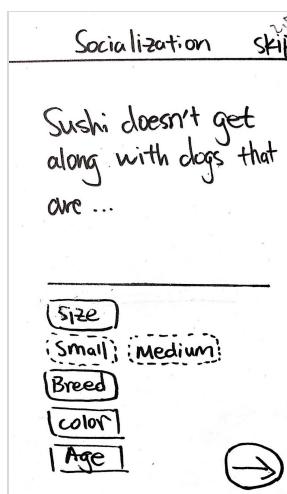


Figure 1.10. Specify socialization preferences (dislikes)

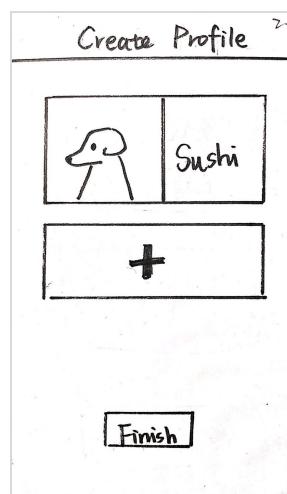


Figure 1.11. Finish creating a profile or add another

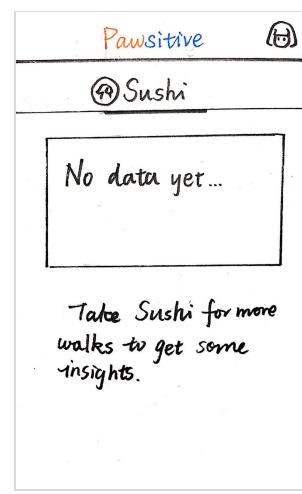


Figure 1.12. Landing page for dog profile

Next, the participant takes their dog, Sushi, on a walk. When they come across another dog, based on the profile information, Pawsitive decides that Sushi is likely to enjoy the interaction. To signify this, the leash lights up blue (Figure 1.13).

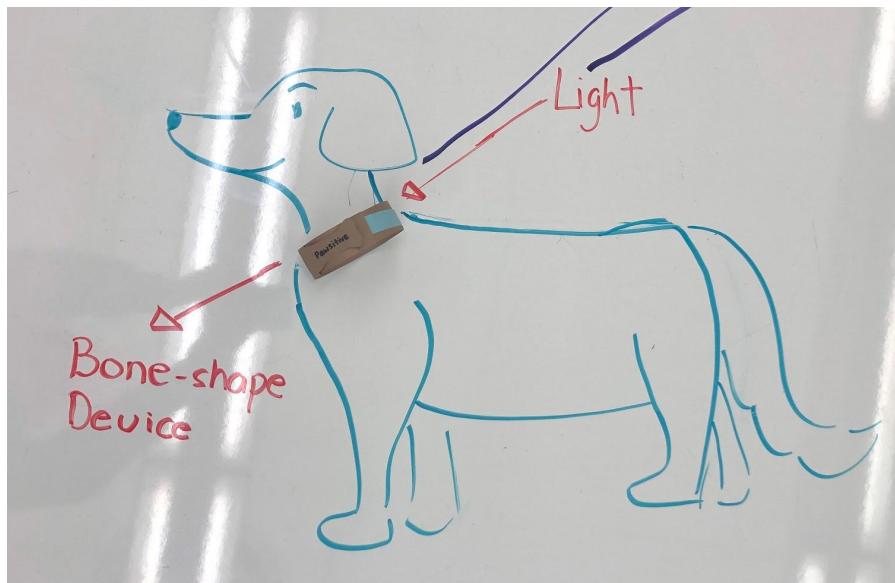


Figure 1.13. Collar wearable lights blue

However, the owner senses that Sushi is growing anxious in the presence of the other dog, so the owner manually slides their button towards themselves (Figure 1.14). The light on the collar then turns yellow, and the application begins to learn that Sushi is anxious around dogs like this one (Figure 1.15).



Figure 1.14. Owner slides button

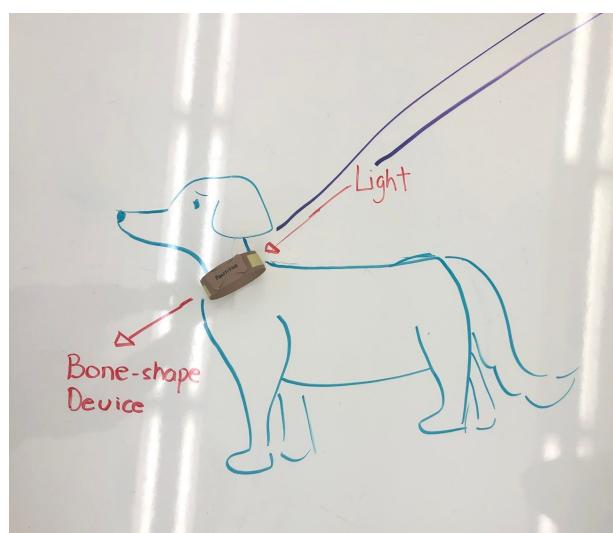


Figure 1.15. Collar wearable lights yellow

Task 2: Identify compatible dogs as a permanent companion for current dog

After a few months of using Pawsitive, this owner decides that their dog, Sushi, would benefit from a permanent companion. They utilize Pawsitive's information on Sushi's social preferences to find a good match for Sushi. Pawsitive suggests Presley, a dog at a local shelter which has matching physical and personality types as most of Sushi's friends. The owner can press "Click for Detail" to be sent to the shelter website to gather more information about adopting Presley.

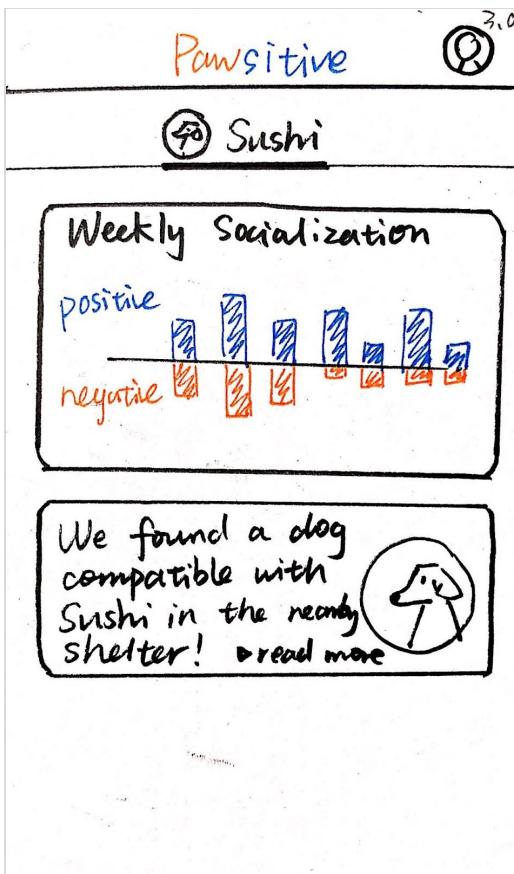


Figure 1.16. The main page of the app shows a weekly report and suggests potential adoptable dog

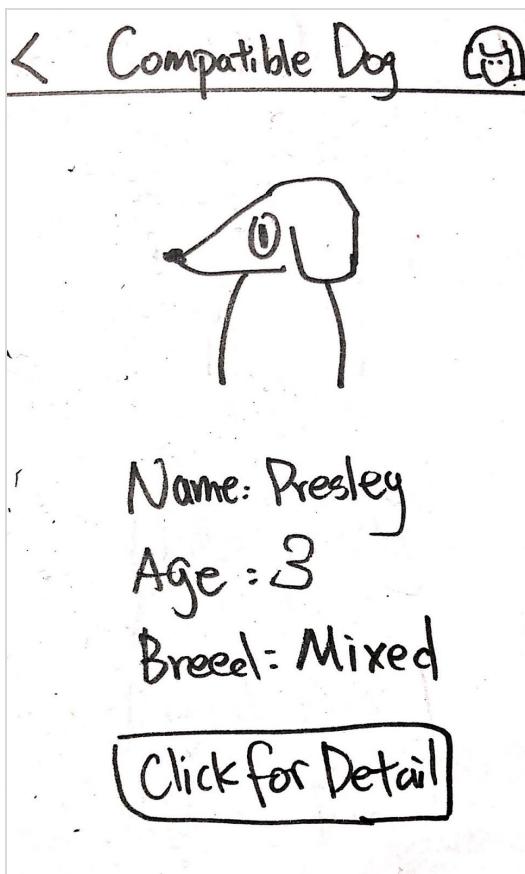


Figure 1.17. Basic information and a link to the shelter website for more details are provided

Testing Process

Our testing process includes 2 heuristic evaluations with other groups from class, 2 design critiques with the course staff, and 4 usability tests of paper prototypes with our participants, who are dog owners with various backgrounds.

Heuristic Evaluations

Evaluation 1: Evaluated by Yuma Tou from Team MoodWatch, conducted by ZK and Grace

Evaluation 2: Evaluated by Team Air Quality, conducted by Aeron, Megan, and Grace

In our first evaluation, we started by laying the paper prototypes on the table and asking our evaluator if she had questions about any interfaces or physical prototypes. Then we went over each heuristic rule to discuss further questions. We found this process repetitive, and the evaluator was unsure where to start when seeing all the prototypes at once. Therefore, in the second evaluation, we had one dedicated communicator to lead the evaluator through the paper prototypes one by one and two dedicated notetakers. Afterwards, we went through each problem in the notes to discuss solutions.

Design Critiques

After the first usability test, we received design critiques from our two TAs, Jeremy and Manaswi. Instead of letting the participant go through the whole interface flow then propose problems, we discussed with the TAs as they went through the flow. That was helpful because we were able to propose solutions and receive feedback right away. In the second critique, we simplified some steps such as filling in email and password, to focus more on the parts that we had questions with.

Usability Testings

Test 1: CSE undergraduate student with a 6-year old miniature Australian Shepherd

Test 2: Microsoft engineer with previous dog-owning experience, currently dog-sitting Border Collie

Test 3: UW informatics undergraduate student with a 3-year-old Labradoodle

Test 4: UW CSE undergraduate student with a 5-month-old Maltipoo

All of our usability tests went smoothly and we received meaningful insights. Testing consisted of three stages. The initial portion was a casual demographic interview where we asked general questions about the dog and the experience as a dog owner. The second stage was the usability testing split into two tasks. The final stage was a debrief about the participant's experience during testing. This structure was helpful for us to build rapport with participants. Initially, we were unsure what roles each of us should take. As we repeated the testing process, we gained familiarity with our chosen roles and became more efficient. If we were to do the usability tests again, we would practice on our own before we test our participants. Another potential change is to document the changes in prototypes more systematically, since we had difficulties finding some of the photos of the interfaces because they look similar and are taken by multiple members.

Testing Results

Heuristic Evaluations

The heuristic evaluations were very helpful for us to fix readability and legibility issues in our design before bringing our prototype on board for the usability test. Since we were too familiar with our product, we did not design an app in a first time user's perspective. Through the evaluations, we gained a better understanding of which features required more clarifications and identified multiple violations of the design principles:

- **Help and Documentation:** The evaluators was unclear how to use the physical devices. The evaluators were unclear how all 3 components of our design work together without any instruction on the app. To address the issue, we provided more instruction on how to connect the collar through Bluetooth and added a brief tutorial after the sign-up process.
- **User Control:** During the signup process, the evaluators noticed that our design didn't allow participants to go back to the last screen. Thus, we added back buttons on the signup interfaces, which allow users to edit/undo their input.
- **Help users recognize, diagnose, and recover from errors:** At the Bluetooth connection page, we did not address the situation when the device has not been paired successfully. We added a screen showing errors and providing help.
- **Flexibility and Efficiency of Use:** Our participants found thinking of words to describe their dogs personality to be a vague task and noted it would be hard for us to analyze the data. To address the problem, we selected predefined main personality types that a user can rate.
- **Consistency and Standards:** The data report visualization page only showed the data of the current weeks, with no method to access past data. We modified the screen and allowed the user to swipe left or right to view data from the previous weeks.

Usability Testing

Usability Test 1

Provide more concise and non-repetitive content

When the participant entered her dog's personality, she noted that some of the options that we provided were opposite with each other. For example, "confident" is the opposite of "shy", so she was inputting the same data twice. To address the problem, we did more research on the dog's personalities and selected more unrelated personality traits.

Refine content structures

In the data visualization page, the participant wondered if the weekly social graph was related to the suggested companion and if the suggested dogs were available for adoption at shelters near her. Since adoption is not a frequent task and may be more of a "browsing" activity, the participant also may not want to see suggestions on the home page. Instead of presenting the compatible dogs, we decided to show personality traits of dogs that were enjoyable underneath the weekly

social graph and place the adoption suggestions on a separate screen, accessible through a button on the home page. The current location of the owner is also editable to find nearby shelters.

Provide affordances on the physical devices and adding instructions in app

The participant was also confused about which device (button or collar) she needed to connect to the app since there was more than 1 physical device. She also needed guidance on how to connect the devices (the only button is on the clicker and the participant was not sure whether the button also controls the collar). To address this problem, we provided tutorials on which devices they will connect to and how to connect it, and we also add a button on the collar to turn it on/off.

Usability Test 2

Introduce scenarios to get better data

This participant did not feel confident in ranking general aspects of their dog's personality, but had plenty of experience in observing their dog in various situations. Thus, we phrased our questions through a scenario to prompt the participant to consider specific aspects that produce anxious feelings in the dogs and increase clarity for the participant.

Usability Test 3

Request feedback after a walk

We added a feature that allowed participants to input information about a memorable interaction on their walk that day. Prior to this addition, our device only relied on the initial profile data and user input through the button. This should encourage more awareness of the dog owner about their dog's socialization that day and to allow more specific information to be logged in over time, especially in the instance that the other dog does not have the Pawsitive collar. This was encouraged during a TA evaluation and also reinforced during our usability testing.

Usability Test 4

Allowing multiple selections in social preferences

We received the feedback that this participant would like to input multiple breeds since his dog gets along with multiple breeds. So, Pawsitive now allows multiple choices to be inputted when the users fill out the compatible/incompatible dogs' characteristics form. This revision is also helpful to our data analysis by obtaining more information about the dog's preferences, which will make the device's prediction more accurate. It also matched realistic inputs for the other participants as well.

Design Critique (TAs)

We received lots of useful feedback from our TAs, especially for the design of the physical devices. We had the on/off button on the collar facing outward originally, but our TA noted that other dogs might accidentally trigger the button during the interaction. We decided to put the button inside and change the way to trigger the button by long pressing. They also helped generate useful ideas such as feedback after walks and describing personalities with scenarios.

Final Paper Prototype

Overview Images

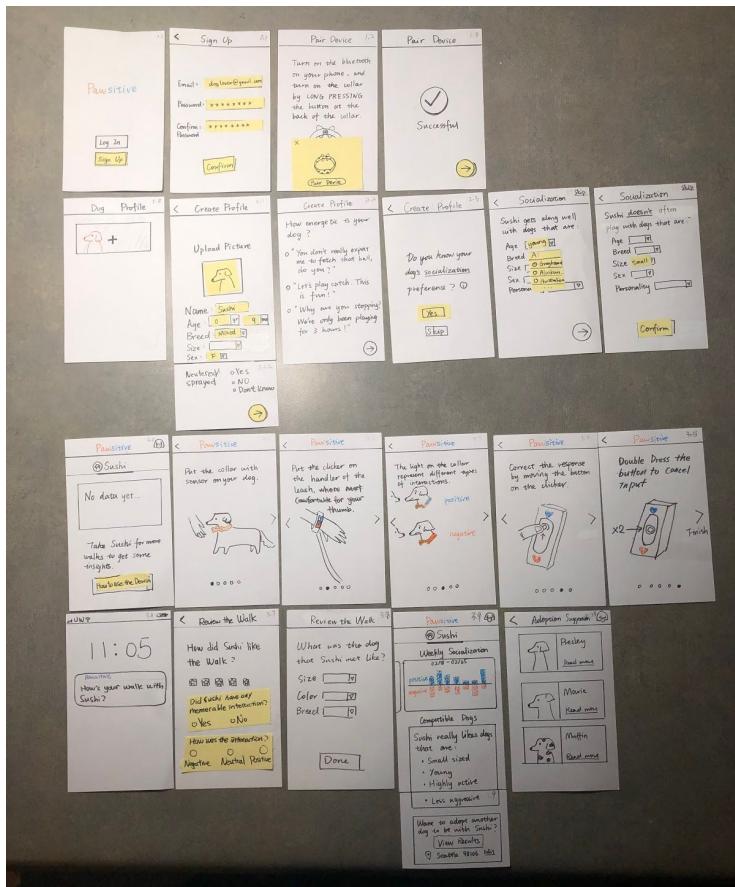


Figure 2.0. Image of the final paper prototypes

Task 1: Identifying dog friends and decreasing negative owner interactions

The participant gets the app and device and needs to set up their dog's profile. First, they connect devices to the app (Figures 2.1-2.3). Then the participant/owner creates a profile for their dogs (Figures 2.4-2.9) and attaches the physical components to get ready for a walk after viewing a tutorial (Figures 2.11-2.16). Then we talk through a scenario in which the collar lights up blue; however, the owner senses their dog's nervousness and wants to override the compatibility decision (Figure 2.17). The owner then corrects the compiled false results through the use of the button (Figure 2.18) and the collar lights up yellow (Figure 2.19). After the walk, the owner decides whether to provide feedback on the walk (Figure 2.20). If yes, they will rate their walk and input their pet's memorable interaction (Figure 2.21 - 2.22).

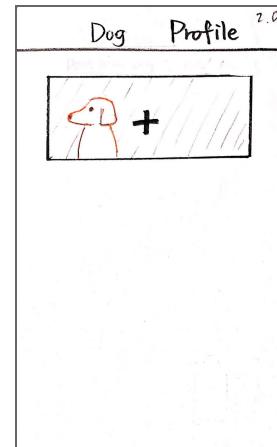
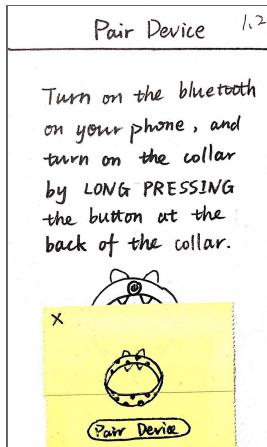


Figure 2.1. Tap search to find the Pawsitive device

Figure 2.2. Hold the power button on the collar to connect

Figure 2.3. Press the arrow to move on once pairing is successful

Figure 2.4. Participant presses "+" to add a dog profile

< Create Profile 2.1

Upload Picture



Name: Sushi

Age: 0 yr 9 mo

Breed: Mixed

Size:

Sex: F

Neutered: Yes

Sprayed: NO Don't know

Yes No Don't know

→

< Create Profile 2.2

How energetic is your dog?

- "You don't really expect me to fetch that ball, do you?"
- "Let's play catch. This is fun!"
- "Why are you stopping? We've only been playing for 3 hours!"

→

< Create Profile 2.3

Do you know your dog's socialization preference?

Yes
Skip

< Socialization 3.1

Sushi gets along well with dogs that are:

Age: Young

Breed: AI

Size: Greyhound Alaskan...

Sex: Australian Person...

→

Figure 2.5. The participant inputs basic information about their dog

Figure 2.6. The participant indicates their dog's personality by answering a list of questions

Figure 2.7. The participant presses "Yes" to indicate their dog's socialization preference

Figure 2.8. Participant taps and selects traits that their dog does get along with. Understands rest of fields are optional

< Socialization 3.5

Sushi doesn't get along well with dogs that are:

Age: old

Breed:

Size: 10

Sex:

Personality:

[Confirm]

Pawsitive 3.0

(1) Sushi

No data yet...

Take Sushi for more walks to get some insights.

[View Tutorial]

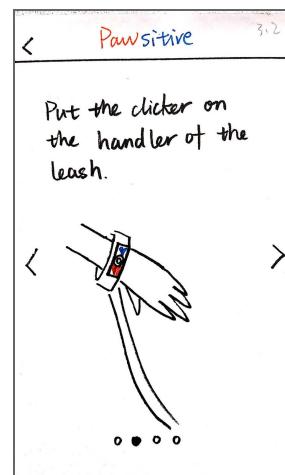
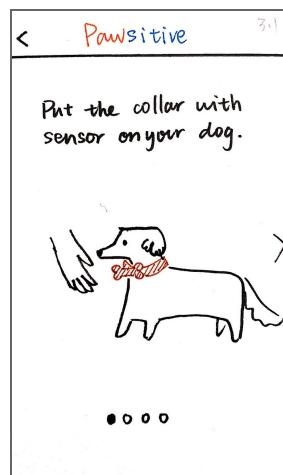


Figure 2.9. Participant does the similar thing to Figure 8 but with incompatible dogs

Figure 2.10. Participant clicks on "View Tutorial"

Figure 2.11. Participant swipes right to view next step

Figure 2.12. Participant swipes right

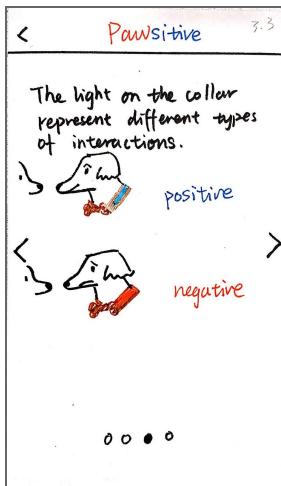


Figure 2.13. Participant swipes right

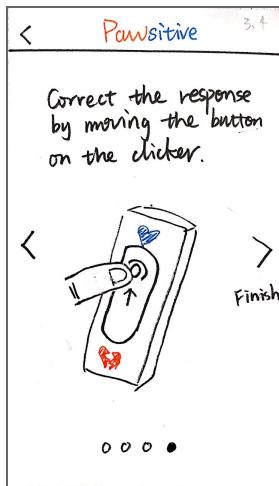


Figure 2.14. Participant swipes right to finish tutorial

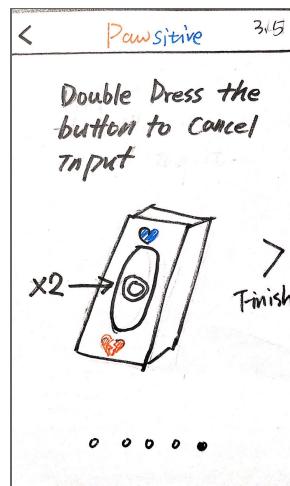


Figure 2.15. Participant swipes right to finish tutorial



Figure 2.16. Participant attaches button to leash



Figure 2.17. While on a walk, the collar turns blue



Figure 2.18. The owner senses the dog's nervousness and pushes the button towards themselves to override the device



Figure 2.19. The collar light switches to yellow

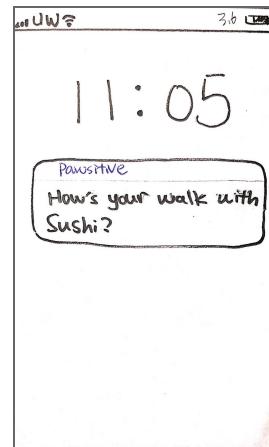


Figure 2.20. After the walk, app pings participant and participant clicks on the notification

< Review the Walk 3.7

How did Sushi like the walk?

Did Sushi have any memorable interaction?

Yes No

How was the interaction?

Negative Neutral Positive

< Review the Walk 3.8

What was the dog that Sushi met like?

Size

Color

Breed

Done

Figure 2.21. Participant rates their walk, then answers pop up questions

Figure 2.22. If they choose to input a memorable interaction from the previous screen, they fill out information about the other dog and press did

Task 2: Explore compatible dogs for adoption

After a few months of using Pawsitive, the owner decides that their dog, Sushi, would benefit from a permanent companion. On the Pawsitive home page, a panel appears asking “Want to adopt another dog to be with Sushi?” (Figure 2.23). These dogs are found based off of the compatible dog types listed above and the owner location, which can be edited, if incorrect. When the owner taps “View Results”, various dogs from nearby shelters are presented (Figure 2.24). The owner clicks on “Read More” to be directed to the dog’s adoption page on the shelter’s website.

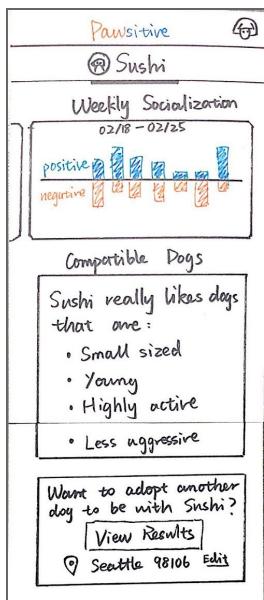


Figure 2.23. Participant views their dog's weekly socialization and scrolls down to see what dogs are available for adoption

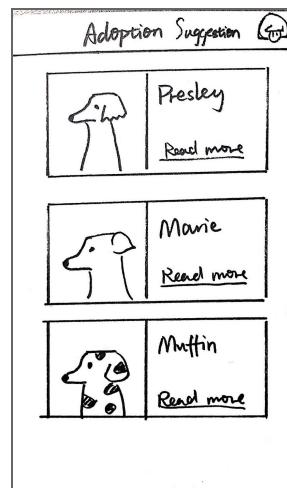


Figure 2.24. Participant clicks on dog profile and is taken to the shelter's website for more information

Digital Mockup

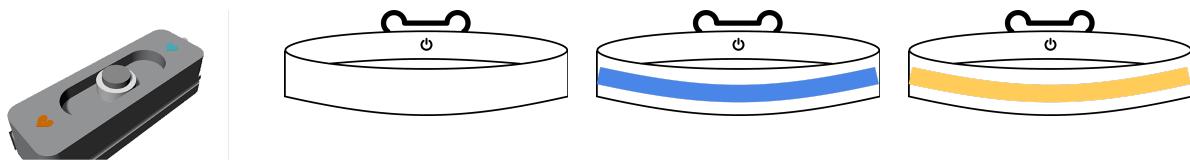
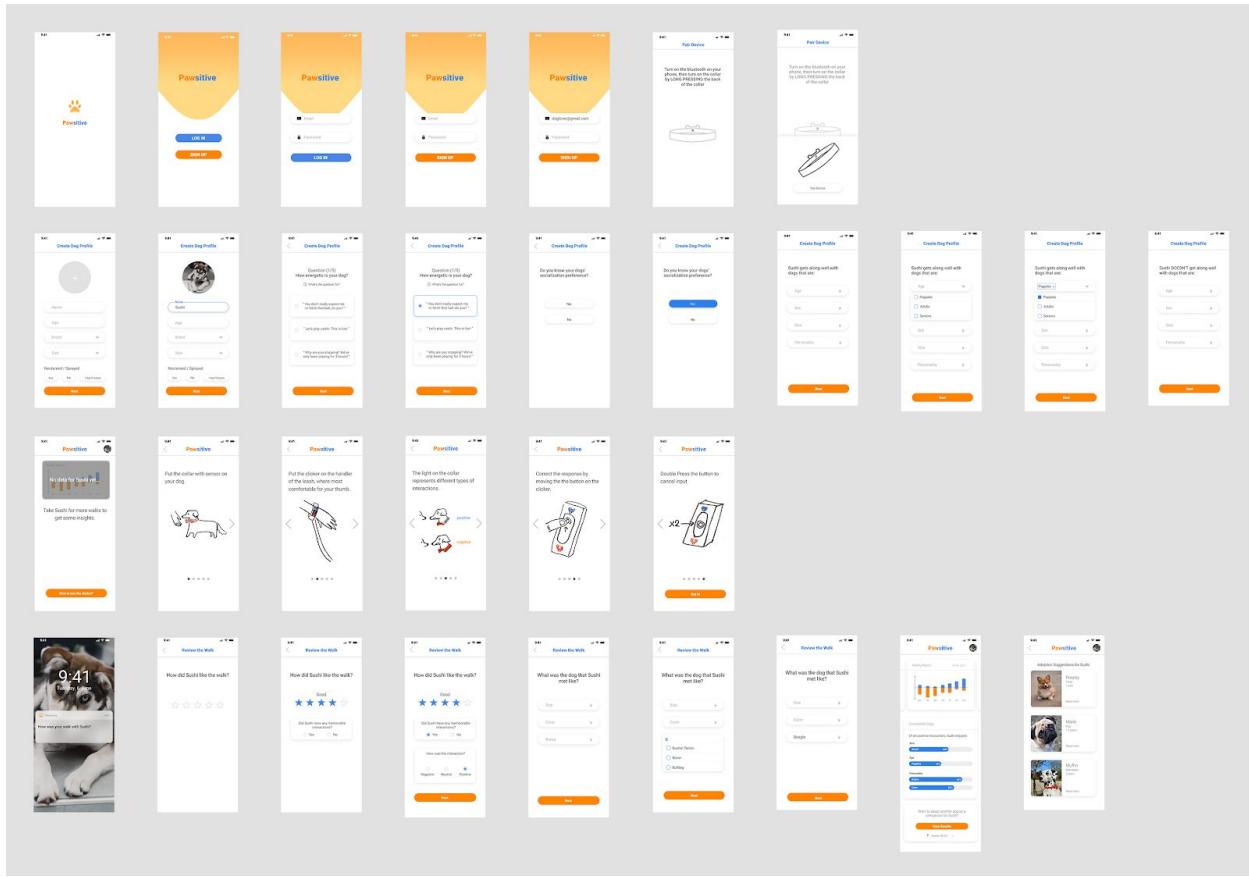


Figure 3.1. Digital Mockup Overview

We made two significant changes in the process of switching from paper to digital tools. The first appears on the data visualization page, in the portion that asks what types of dogs Sushi enjoys. In the paper prototype, we only presented a list of the dog's compatible traits, but in our digit mockup, we changed this to a percentage bar to better show how the device suggests compatible traits by contextualizing the results as being derived from "all encounters". This representation is also more visually appealing.

The second large change occurs in the "does/doesn't get along with" pages. We changed the design to include a deletable drop down to make it more obvious to participants that they can select multiple traits for each category.

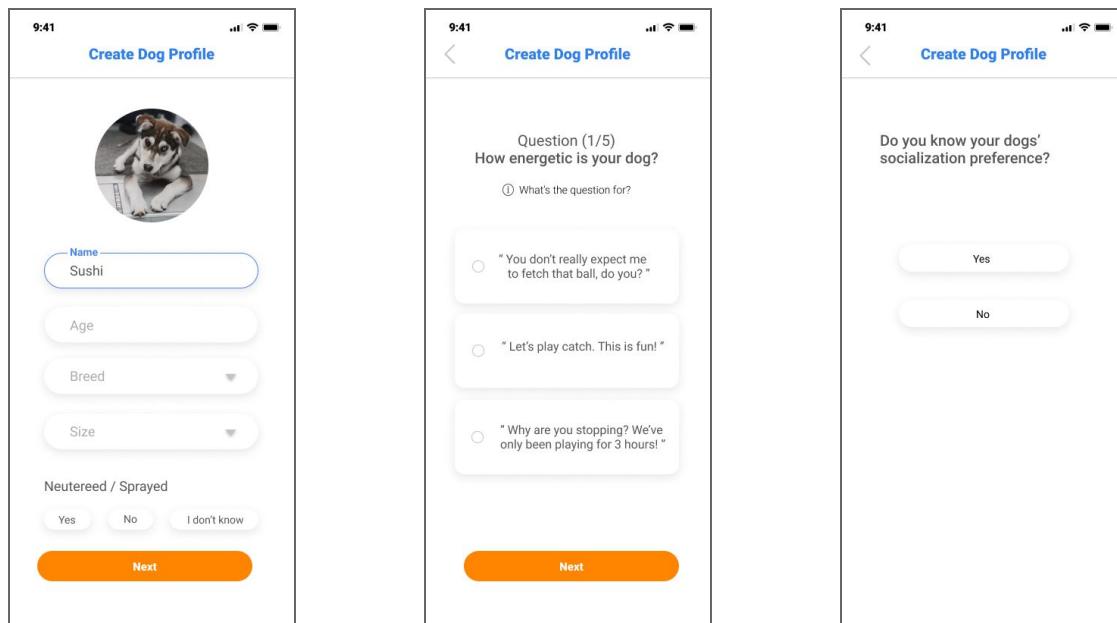
Our two primary tasks are: 1) Identifying dog friends and decreasing negative owner interactions and 2) Exploring compatible dogs for adoption. Descriptions of each of these tasks are provided below, alongside the important digital mockup components.

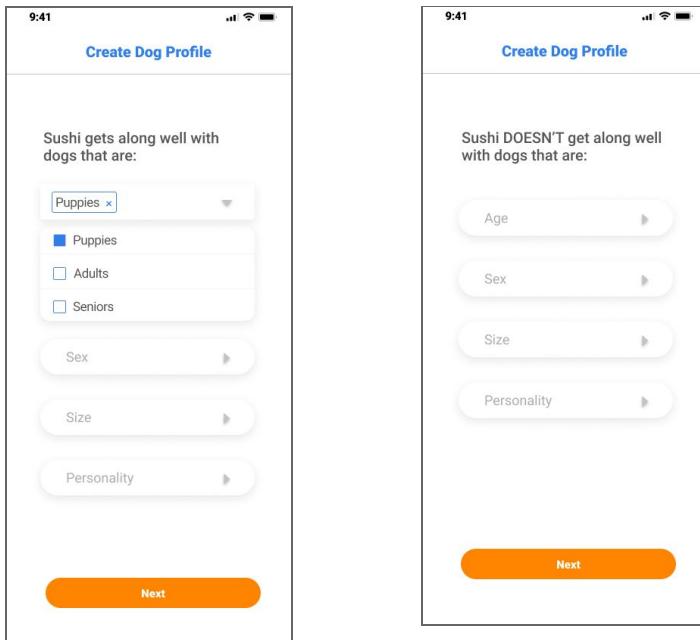
Task 1: Identifying dog friends and decreasing negative owner interactions

Our design supports the first task of identifying dog friends and decreasing negative owner interactions in a few ways. First, we go through the process of creating a profile. The profile creation is important as it acts as the basis for identifying matches between dog information and preferences while out on walks. Once on a walk, the collar will indicate possible compatibility between dogs that can be corrected by the owner -- which the device learns from for future accuracy -- and the owner can either avoid or engage in the upcoming interaction. Finally, our design allows feedback after a walk to encourage the owner to actively think about their dog's socialization and who their dog may be compatible with. A walkthrough is shown below:

Create a Dog Profile

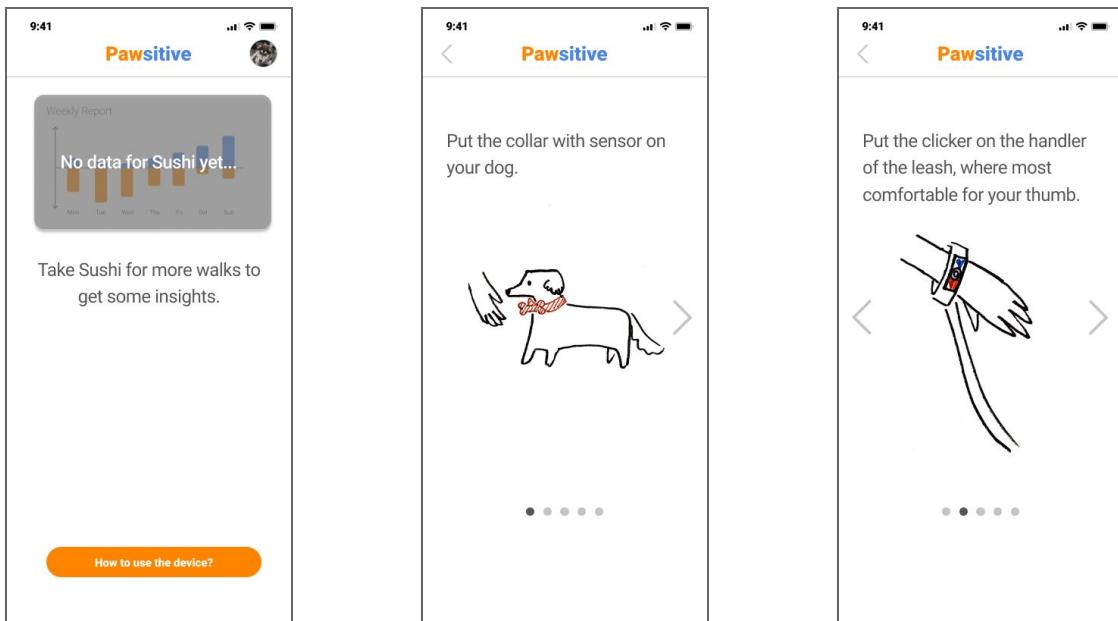
The participant then creates a dog profile by entering information about their dog. They are then asked a series of questions regarding their dogs' personality. Next, if they already have knowledge of their dogs' socialization preferences, they input information about types of dogs their pet does or does not get along with.

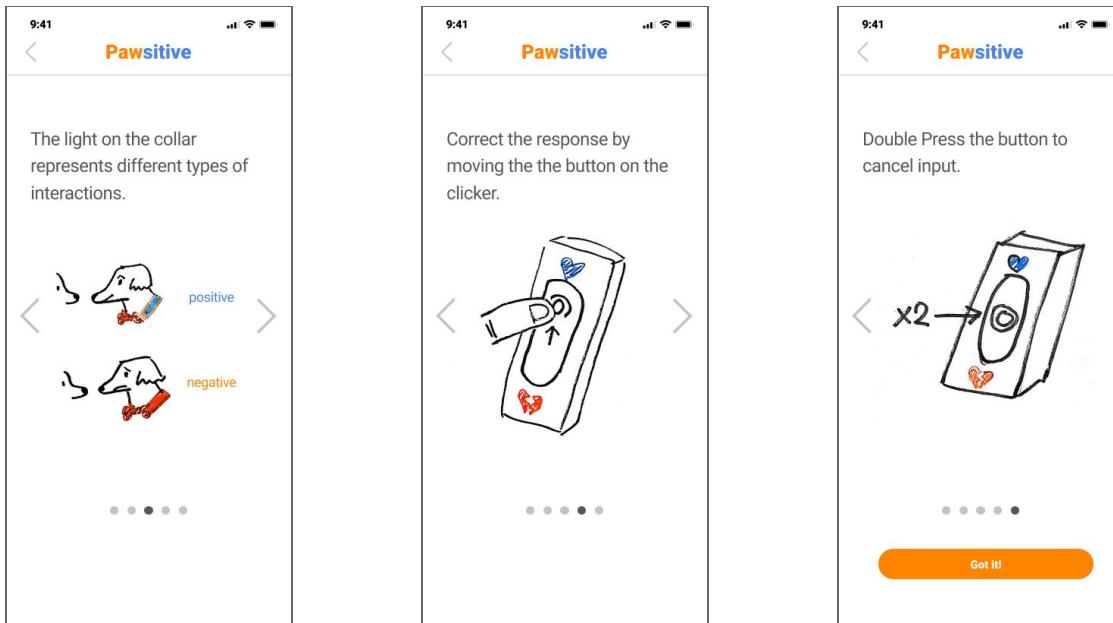




Tutorial

When first logged in, there are no data available for the participant to view. The participant has the option to go through a tutorial on how to use the physical device during a walk.





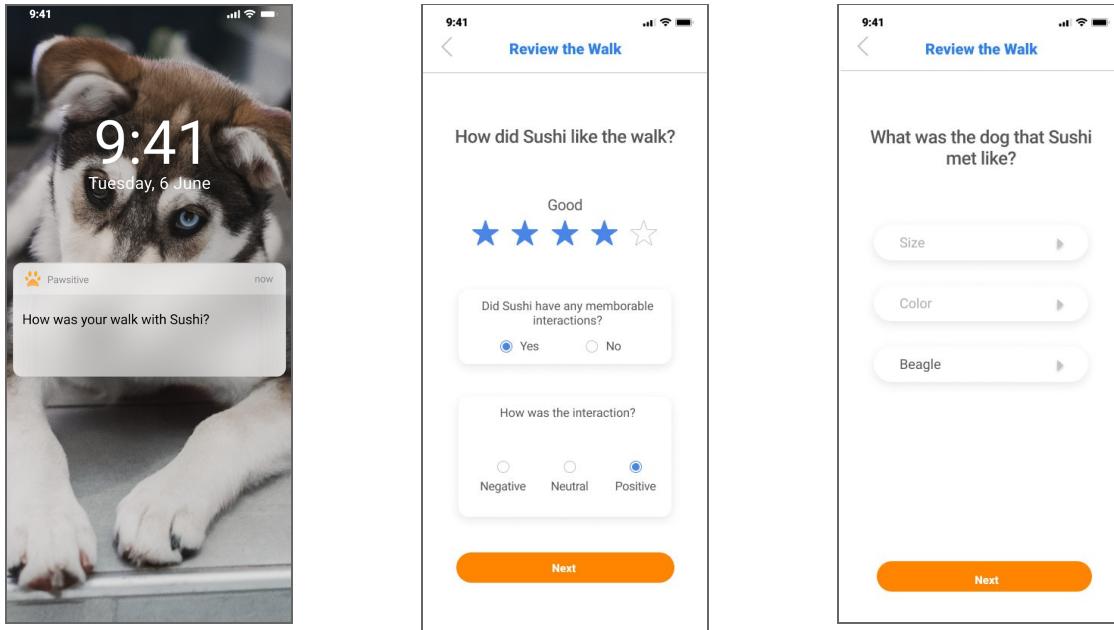
Use the Physical Device on a Walk

For example, when the participant takes their dog for a walk and encounters another dog, the collar flashes blue, indicating the interaction is positive. However, the participant notices his/her dog isn't quite comfortable and uses the physical button to override the false response. The collar then flashes yellow.



Ping for Walk Information

The participant receives a notification asking about the recent walk. They rank the walk and choose a memorable interaction to input more information about.

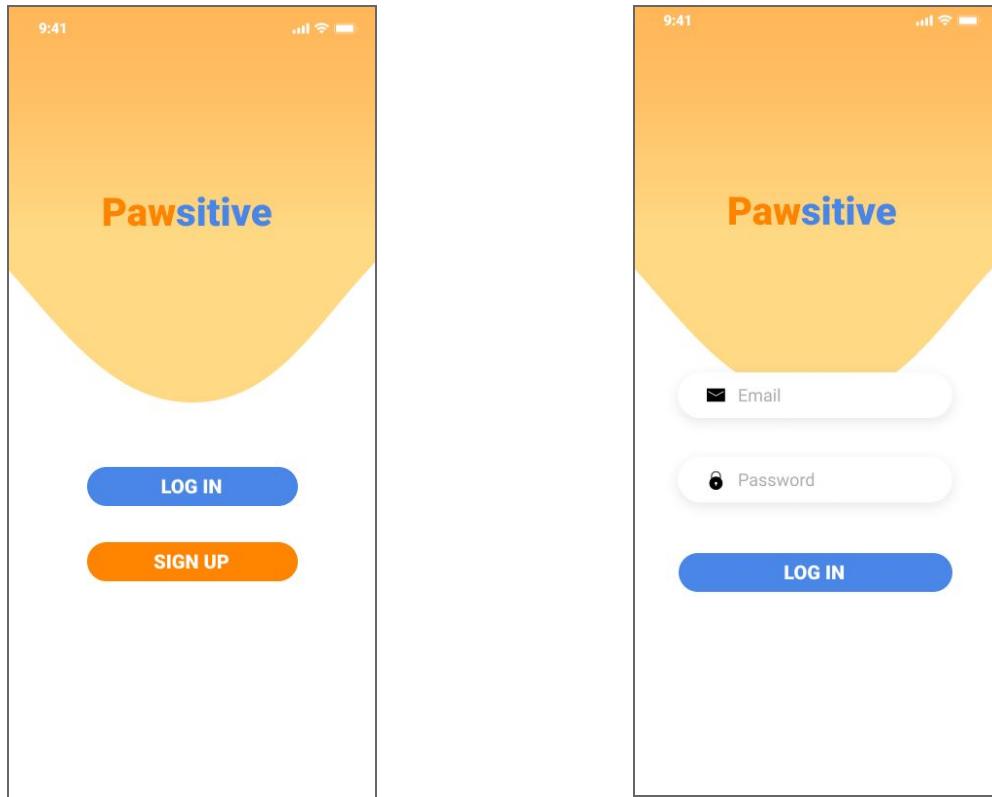


Task 2: Explore compatible dogs for adoption

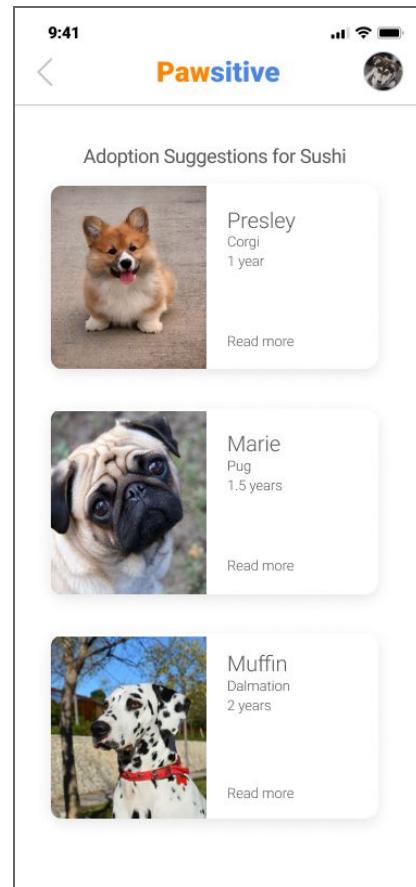
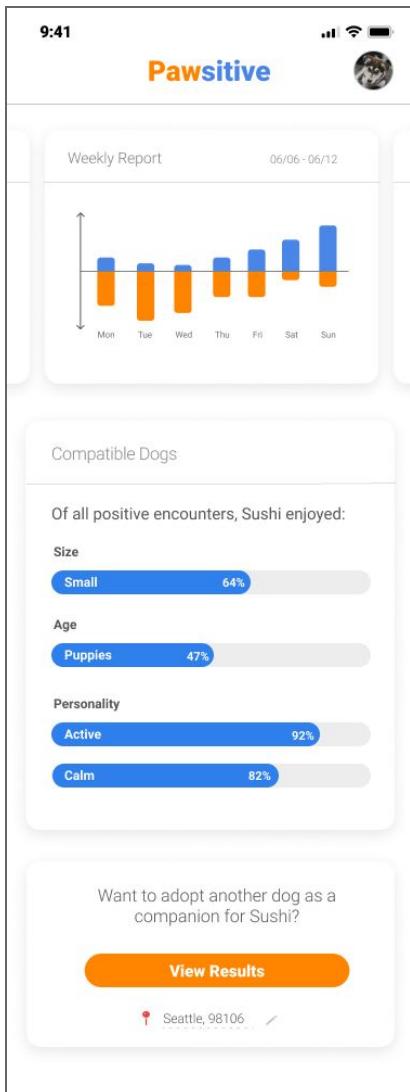
Our second task centers around long-term companionship and is supported by our adoption browsing features and compatible trait identification. The visual report and trait summary card helps give transparency as to what dogs are suggested for adoption and encourages owners to actively think about their dog's social interactions more. Thus, the aim of the design is to help owner's make informed decisions when exploring compatible long-term companions for their current dog.

Adoption

The participant is first taken to the login screen where they type in their email and password and press log in.



Once the participant is logged in, they are taken to the landing page which displays their dog's socialization information, which includes a weekly socialization report and a report on compatible traits so far. The participant scrolls down to and clicks on "View Results" to browse adoption suggestions for Sushi based on the results compiled. They are then taken to a page that lists adoptable dogs nearby. Once they click on a dog profile, they are taken to the shelter's page.



Discussion

Through the iterative design process, we refined the appropriate level of detail that is necessary to effectively test and build a prototype. We initially overlooked several crucial components to our design, namely user control and freedom standards in navigating the application and owning multiple dogs. The initial heuristic evaluations helped to catch these mistakes.

The iterative design process helped us understand how participants interact with data collection and interpretation. We also found that participants were curious as to how the device functioned in collecting information and providing suggestions. This lead us away from a device that detected the dogs mood through biological sensors and towards a design that functioned using participant input. For instance, our application now utilizes the data presented in the profile creation process to begin the process of learning a dogs socialization preferences. We also discovered that this input should be continuous so the data can improve through time. We implemented this aspect through monitoring corrections through the button and prompting for feedback after walks. We also took this into account in asking situational questions, rather than asking a participant to objectively rank their dogs prominent qualities.

Our first task was originally oriented toward finding dog friends and decreasing negative interactions between owners as a result of incompatible dogs. As our prototype developed, we focused on the interaction with the application and wearable devices so that the tasks were more involved than just watching the lights change color. Thus, our task became more geared towards creating a profile and correctly overriding the lights using the button when it is incorrect. This goal helped us focus on the quality of data collection in the device.

Our second task was originally aimed at identifying compatible dogs as current companions for the current dog. After the usability tests, we found that this was not a common priority for most dog owners. As a result, this became more oriented towards exploring compatible dogs for adoption, so the task is possible if the owner is interested.

We found that after the first two usability tests, we had uncovered the most severe problems in our design. However, after our final usability test, we had made a few minor modifications, such as the situational questions in the profile. These changes were based on the information gathered through the testing process, but it would have been nice to test these additions to ensure participants are still successful. Thus, we think we could have benefitted from a few more iterations of our design.

Appendix

[Appendix I Usability Test Script](#)

[Appendix II Heuristic Evaluation Issues and Revision](#)

[Appendix III Usability Test Issues and Revision](#)

Appendix I. Usability Test Script

Introduction

"Hi, my name is _____. Thanks for coming today. We're doing usability testing for a product we designed for our HCI class. We're designing a wearable piece of technology that helps dog owner to track their dogs' interactions with other dogs and unfamiliar owners during walks.

We will begin by asking you a couple of questions to understand your experience as a dog owner, followed by a few simple tasks to navigate through our current prototype. Do you have any questions before we begin?

Warm-up / Demographic Questions

About the dog

- How many dog(s) do you have?
- What are their names?
- How old is/are your dog(s)?
- What kind of dog(s) are they?

About the owner

- How long have you been a dog owner?
- How long have you had your (current) dog(s)?
- Have you used any tools to track the socialization about your dog(s)? (probe for what they are and why they use it)

Testing:

Key Features to test:

- App:
 - Registration / Setup
 - Connect Devices
 - Create Profile for your dog/s
 - Find Compatible Dogs with Sushi
- Physical Device Usage: Take walk with the devices
 - Turn on/off the device
 - Understanding the indication of the light
 - Correct the false compiled results / Input interaction status

Introduction

We are now going to ask you to perform some simple tasks using our prototype. We want to let you know that we are here to test this product, not you, so anything that goes wrong is our fault, not yours. I won't be able to answer your questions during the test, because the goal is to see where people have difficulty, so we can make it easier. It will be great if you can think out loud so that we will be able to understand your thoughts better. Do you have any questions before we start?

Content

<During the testing process, make sure to ask the participants the reason why they took certain actions.>

Supposed that you have a mixed dog called Sushi, and you have purchased our product online. It just delivered to your place and you have downloaded our app at your mobile device.

Tasks

1. Setup an account in the mobile app
 - a. Connect Devices
 - b. Create a Profile for Sushi
 - i. Alternative: Skip the socialization preferences

You've placed the collar on Sushi and are now going to turn on the devices and get ready to walk with Sushi

2. Take walk with the devices
 - a. Turn on/off the device

Imagine you are going on a walk with him. You see another dog approaching Sushi and the collar flashes blue; however, you know that Sushi is starting to feel nervous, What would you do?

- b. Correct the false compiled results / Input interaction status

Alternative: Now after your walk, your phone pings you with a notification.

- c. Check phone, click on mobile notification
 - d. Hopefully fills out particular interaction from walk that day

Now suppose that you would like to adopt another dog that will be compatible with Sushi through our app, what would you do?

3. Find Compatible Dogs for Sushi

Post-Testing Questions

- What do you think of the devices and the app overall?
- Could you introduce this app for me by imaging I am a new user who has no experience of this app before?
- What do you like about it and what do you think we need to improve?
- From a star rating of 1-5, 5 being best, how easy would you rate this experience? Why?
- From a star rating of 1-5, 5 being most, how likely would you use the devices and why?
- Anything you would like to add?

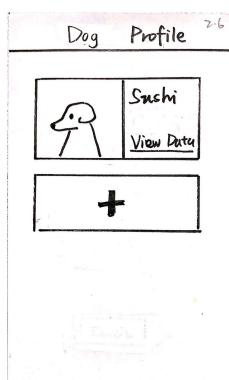
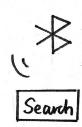
Thank you for participating in our interview!

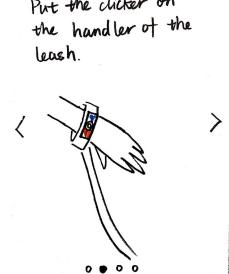
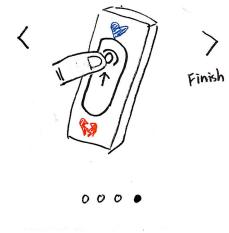
Appendix II. Heuristic Evaluation Results

Original Image	Issue Identification	Severity	Revision	Revision Image								
<p><u>Create Profile</u></p> <p>Dog Sushi</p> <p>+</p> <p>Finish</p>	<p>It's unclear how the clickers work when the owners have more than 2 dogs.</p> <p>Heuristic: Help and Documentation</p>	4	<p>Add a help/hint button that provides instruction for multiple devices/dogs owners</p>	<p>Dog Profile</p> <p>Sushi</p> <p>View Data</p> <p>+</p> <p>Have more than one dog? ☺</p>								
<p><u>PawSitive</u></p> <p>Sushi</p> <p>Weekly Socialization</p> <table border="1"> <tr><td>positive</td><td>blue bars</td></tr> <tr><td>negative</td><td>red bars</td></tr> </table> <p>We found a dog compatible with Sushi in the ready shelter! > read more</p>	positive	blue bars	negative	red bars	<p>The Data Report visualization should allow users to view the past data.</p> <p>Heuristic: Consistency and Standards</p>	2	<p>Add forward and backward buttons and allow the user to swipe left or right to view previous weeks</p>	<p>PawSitive</p> <p>Sushi</p> <p>Week 02/18</p> <table border="1"> <tr><td>positive</td><td>blue bars</td></tr> <tr><td>negative</td><td>red bars</td></tr> </table> <p>Compatible dogs</p> <p>Presley 3 year old</p>	positive	blue bars	negative	red bars
positive	blue bars											
negative	red bars											
positive	blue bars											
negative	red bars											
<p><u>Create Profile</u></p> <p>My Dog is ...</p> <p>Quiet Outgoing</p> <p>Shy Energetic</p> <p>Nervous</p> <p>→</p>	<p>There should be back buttons in the creating profile process that allow users to go back to the last step.</p> <p>Heuristic: User Control</p>	4	<p>Add back buttons that allow users to backtrack.</p>	<p>< Create Profile</p> <p>Upload Picture</p> <p>Name: Sushi</p> <p>Age: 0 yr 9 mo</p> <p>Breed: Mixed</p> <p>Size: Small</p> <p>Sex: F</p>								

<p>Socialization <input checked="" type="checkbox"/> skip</p> <p>Sushi doesn't get along with dogs that are ...</p> <hr/> <p>(Size) <input type="checkbox"/> Small <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Large <input type="checkbox"/> Breed <input type="checkbox"/> Color <input type="checkbox"/> Age</p>  <p>Socialization <input checked="" type="checkbox"/> skip</p> <p>Sushi gets along with dogs that are ...</p> <hr/> <p>(Size) <input type="checkbox"/> Small <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Large <input type="checkbox"/> Breed <input type="checkbox"/> Color <input type="checkbox"/> Age</p> 			<p>< Create Profile 2-2</p> <p>My dog's personality</p> <table border="1"> <tr><td>Confident</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Shy / Timid</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Independent</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Laidback</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>Adaptable</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr> </table> <p>← Create Profile 2-3</p> <p>Do you know your dog's <u>socialization</u> preference? <input type="checkbox"/></p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> Skip</p> <p>< Socialization 2-4 skip</p> <p>Sushi gets along well with dogs that are:</p> <p>Age <input checked="" type="checkbox"/> young <input type="checkbox"/> old Breed <input type="checkbox"/> <input checked="" type="checkbox"/> Size <input checked="" type="checkbox"/> small <input type="checkbox"/> large Sex <input type="checkbox"/> male <input checked="" type="checkbox"/> female Personality <input type="checkbox"/> confident <input checked="" type="checkbox"/> shy/timid</p> 	Confident	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shy / Timid	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Independent	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Laidback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Adaptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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<p>Pair Device 1-2</p>  <p><input type="checkbox"/> Search</p>	<p>It's unclear how to pair devices for the first time users</p> <p>Heuristic: Help and Documentation</p>	<p>3</p>	<p>Add a step-by-step drawing with a caption of the pairing process</p> <p>< Pair Device 1-2</p> <p>Hold your sensor device close to your phone.</p>  <p><input type="checkbox"/> Search</p>																														

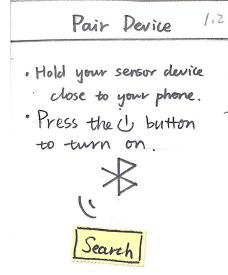
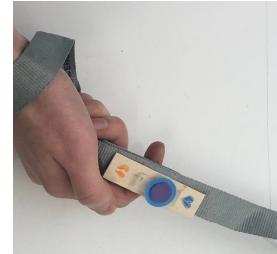
				<p><u>Pair Device</u> 1.3</p> <p>Searching for device...</p> <p>(Cancel)</p> <p>device not showing up? Help</p>
				<p><u>Pair Device</u> 1.4</p> <p>(Successful)</p> <p>(Next)</p>
<p>Create Profile 2.6</p> <p>Sushi</p> <p>+</p> <p>Finish</p>	<p>Make the distinction between "Create Profile" and "Home Profile" screens</p> <p>Heuristic: Visibility of System Status</p>	3	<p>Create another home profile screen that allows users to edit their dogs' profiles</p>	<p><u>Dog Profile</u> 2.0</p> <p>Don't have any? Create one.</p> <p>+</p> <p>< Create Profile 2.1</p> <p>Upload Picture</p> <p>Name: Sushi</p> <p>Age: 0 yr 9 mo</p> <p>Breed: Mixed</p> <p>Size: Small</p> <p>Sex: F</p> <p>(Next)</p>

				
<u>Pair Device</u> 1.2 	Add more error screens, specifically with bluetooth connection page. Heuristic: Help users recognize, diagnose, and recover from errors	2	When the device has not been paired successfully, add a screen showing error	<u>Pair Device</u> 1.3  Searching for device... Device not showing up? Help
(No Image)	Add an option to view a tutorial at the beginning of the collar and button. Heuristic: Help and Documentation	1	Provide Instruction on how to use the physical devices	<u>Pawsitive</u> 3.1 Put the collar with sensor on your dog.  • • •

			<p style="text-align: right;">Pawsitive 3.2</p>  <p>Put the clicker on the handler of the leash.</p>																								
			<p style="text-align: right;">Pawsitive 3.4</p>  <p>Correct the response by moving the button on the clicker.</p>																								
	<p>Create Profile 2.2</p> <p>My Dog is ...</p> <p>_____</p> <p>(Quiet) (Outgoing) (Shy) (Energetic) (Nervous)</p> <p>→</p>	<p>Allow the user to type words into personality text input and choose from a select pool of words if the pre-selected list is not helpful.</p> <p>Heuristic: Flexibility and Efficiency of Use</p>	<p>3</p> <p>Change the selection process to a screen with predefined main personality types that a user can rate from "Disagree" to "Agree"</p>																								
	<p>Pawsitive ②</p> <p>④ Sushi</p> <p>Weekly Socialization</p> <table border="1"> <tr> <td>positive</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> </tr> <tr> <td>negative</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> </tr> </table> <p>We found a dog compatible with Sushi in the nearby shelter! > read more</p>	positive	blue bar	blue bar	blue bar	blue bar	blue bar	negative	red bar	<p>1</p> <p>Have a separate screen to browse multiple dogs for adoption.</p> <p>Heuristic: Aesthetic and Minimalist design</p>	<p>Pawsitive 3.5 (4)</p> <p>④ Sushi</p> <p>Week 02/18</p> <table border="1"> <tr> <td>positive</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> <td>blue bar</td> </tr> <tr> <td>negative</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> <td>red bar</td> </tr> </table> <p>Compatible Dogs Presley 3 year old</p>	positive	blue bar	negative	red bar												
positive	blue bar	blue bar	blue bar	blue bar	blue bar																						
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negative	red bar	red bar	red bar	red bar	red bar																						

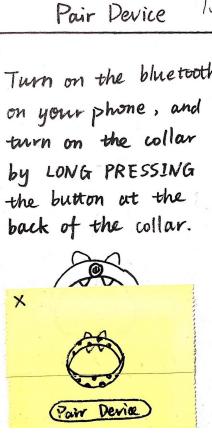
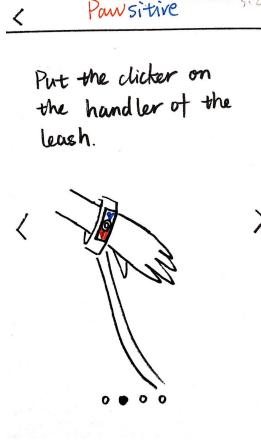
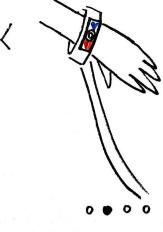
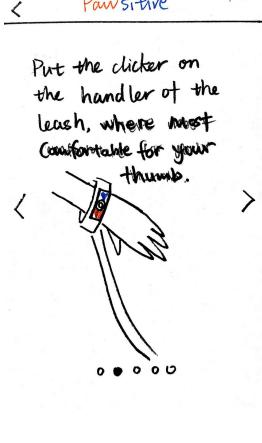
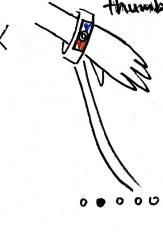
Appendix III Usability Test Result

Usability Test #1

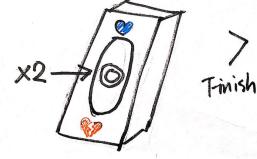
Original Image	Description of the Incident	Severity	Revision	Revision Image
 <p>Pair Device /1,2</p> <p>Hold your sensor device close to your phone.</p> <p>Search</p>	<p>Connect the physical devices to the app</p> <p>The participant was confused about which device (button or collar) she needed to connect since there is more than 1 physical device. She also needed guidance on how to connect the devices (The only button is on the clicker and the participant was not sure whether the button also controls the collar).</p>	4	<p>Provide tutorials for the first-time users on which devices they will connect to and how to connect it.</p> <p>Add a button on the collar to turn it on/off.</p>	 <p>Pair Device /1,2</p> <ul style="list-style-type: none"> Hold your sensor device close to your phone. Press the  button to turn on. <p>Search</p> 
	<p>Attach the button to the leash</p> <p>The participant was unsure of how to attach the button to the leash.</p>	4	<p>Make the attachable button more obviously “attachable” by adding a clasp (gluing the button to a binder clip so it can be attached to the leash).</p>	

	<h2>Create Profile Personality</h2> <p>The participant noted that confident is the opposite of shy, so she was inputting the same data twice.</p>	2	<p>Select more unrelated personality traits.</p>
	<h2>Interact with compatible dogs section</h2> <p>The participant wondered if the weekly social graph was related to the suggested companion. It was also unclear that the suggested dogs were available for adoption.</p>	4	<p>Show personality traits of dogs that were enjoyable underneath the weekly social graph.</p> <p>Have a separate compatible dogs screen.</p>

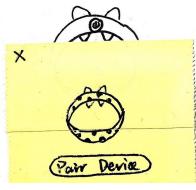
Usability Test #2

Original Image	Description of the Incident	Severity	Revision	Revision Image
<p>Pair Device 1.2</p>  <ul style="list-style-type: none"> Hold your sensor device close to your phone. Press the ⌂ button to turn on. 	<p>Connect the physical devices to the app</p> <p>The participant was confused about which device (button or collar) she needed to connect since there was more than 1 physical device and both of them had buttons. She also needed guidance on how to connect the devices.</p>	4	<p>Provide a clearer introduction for which device they need to connect.</p> <p>Long hold to turn on collar (button still on collar, now inside)</p>	<p>Pair Device 1.2</p> 
<p>Pawsitive 3.2</p>  <p>Put the clicker on the handle of the leash.</p> 	<p>Put the Clicker on the handle of the leash</p> <p>The participant put the clicker on the handle of the leash in an uncomfortable position for her to use the button.</p>	1	<p>Add instruction to the page to indicate specifically to place clicker where most comfortable for thumb</p>	<p>Pawsitive 3.2</p>  <p>Put the clicker on the handle of the leash, where most comfortable for your thumb.</p> 

<p>< Create Profile 2.2</p> <p>My dog is...</p>	<p>Create Profile Personality</p> <p>The participant noted that it was hard for her to scale her dog's personality. She would like to answer questions with scenario related to her dog's personality instead.</p>	3	<p>Ask personality test questions instead of requiring dog owners to rate their dog's personality</p>
No image	<p>Need a way to input information about walk</p> <p>Doesn't have a way to add additional information about the type of dog on an encounter.</p>	3	<p>Added three screens that will ping the user with a notification about the recent walk, ask brief questions about the walk and allow the user to log the information of the dog encountered.</p> <p>11:05</p> <p>Pawitive How's your walk with Sushi?</p> <p>< Review the Walk 3.7</p> <p>How did Sushi like the Walk?</p> <p>Did Sushi have any memorable interaction? ○ Yes ○ No</p> <p>How was the interaction? ○ Negative ○ Neutral ○ Positive</p>

				<u>Review the Walk</u> 3.8
				<p>What was the dog that Sushi met like?</p> <p>Size <input checked="" type="checkbox"/> <input type="checkbox"/></p> <p>Color <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Breed <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p><input type="button" value="Done"/></p>
No image	<p>Walk through the Tutorial</p> <p>Unsure about how to cancel an input.</p>	4	<p>Added a screen in the tutorial to inform the user.</p>	<p>< Pawsitive 3.5</p> <p>Double Press the button to cancel input</p>  <p>.....</p>
<p>< Create Profile 2.1</p> <p>Upload Picture</p>  <p>Name: Sushi</p> <p>Age: 0 yr 9 mo</p> <p>Breed: Mixed <input checked="" type="checkbox"/></p> <p>Size: Small <input checked="" type="checkbox"/></p> <p>Sex: F <input checked="" type="checkbox"/></p>	<p>Add neutered/spayed information about dog</p> <p>Can't find a place to input whether the dog is neutered/spayed, which is important to the user.</p>	2	<p>Added a question to ask whether dog is neutered/spayed on profile page</p>	<p>< Create Profile 2.1</p> <p>Upload Picture</p>  <p>Name: Sushi</p> <p>Age: 0 yr 9 mo</p> <p>Breed: Mixed <input checked="" type="checkbox"/></p> <p>Size: <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Sex: F <input checked="" type="checkbox"/></p> <p>Neutered/ sprayed: <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't Know</p> 

Usability Test #3

Original Image	Description of the Incident	Severity	Revision	Revision Image
<p><u>Review the Walk 3.8</u></p> <p>What was the dog that Sushi met like?</p> <p>Age [] <input checked="" type="checkbox"/></p> <p>Color [] <input checked="" type="checkbox"/></p> <p>Breed [] <input checked="" type="checkbox"/></p> <p>Size [] <input checked="" type="checkbox"/></p> <p>Sex [] <input checked="" type="checkbox"/></p> <p>DONE</p>	<p>Unsure of sex and age of dog</p> <p>The participant noted that on a walk, she probably would not be able to take note of the sex and age of the dog and that those two fields were a unrealistic to fill out.</p>	2	<p>Delete the dropdowns associated with sex and age.</p>	<p><u>Review the Walk 3.8</u></p> <p>What was the dog that Sushi met like?</p> <p>Size <input checked="" type="checkbox"/></p> <p>Color <input checked="" type="checkbox"/></p> <p>Breed <input checked="" type="checkbox"/></p> <p>Done</p>
<p><u>Pair Device 1.2</u></p> <ul style="list-style-type: none"> Hold your sensor device close to your phone. Press the  button to turn on.  <p>your Device Not yours</p>	<p>Order of Pairing Devices</p> <p>Participant was unsure if she should hold the button on the collar while pairing and was confused about the process order in general</p>	2	<p>Change the screen to have more clear instructions and “pop up” with the device to pair</p>	<p><u>Pair Device 1.2</u></p> <p>Turn on the bluetooth on your phone, and turn on the collar by LONG PRESSING the button at the back of the collar.</p> 

Usability Test #4

Original Image	Description of the Incident	Severity	Revision	Revision Image
<p>Socialization <input type="button" value="Skip"/></p> <p>Sushi gets along well with dogs that are:</p> <p>Age <input checked="" type="checkbox"/> young <input type="checkbox"/> old</p> <p>Breed <input type="checkbox"/> A1 <input type="checkbox"/> B2</p> <p>Size <input type="checkbox"/> small <input checked="" type="checkbox"/> medium <input type="checkbox"/> large</p> <p>Sex <input type="checkbox"/> male <input checked="" type="checkbox"/> female</p> <p>Personality <input type="checkbox"/> friendly <input checked="" type="checkbox"/> unfriendly</p> <p><input type="button" value="Confirm"/></p>	<p>Input their dog's socialization status</p> <p>Unsure about how to select more than one breeds.</p>	3	<p>Added a drop down menu where the user can type, search and select multiple answers to the breed question.</p>	<p>Socialization <input type="button" value="Skip"/></p> <p>Sushi gets along well with dogs that are:</p> <p>Age <input checked="" type="checkbox"/> young <input type="checkbox"/> old</p> <p>Breed <input checked="" type="checkbox"/> A1 <input type="checkbox"/> B2</p> <p>Size <input type="checkbox"/> small <input checked="" type="checkbox"/> medium <input type="checkbox"/> large</p> <p>Sex <input type="checkbox"/> male <input checked="" type="checkbox"/> female</p> <p>Personality <input type="checkbox"/> friendly <input checked="" type="checkbox"/> unfriendly</p> <p><input type="button" value="Confirm"/></p>
<p>Socialization <input type="button" value="Skip"/></p> <p>Sushi <u>doesn't</u> get along well with dogs that are:</p> <p>Age <input checked="" type="checkbox"/> old <input type="checkbox"/> young</p> <p>Breed <input type="checkbox"/> A1 <input type="checkbox"/> B2</p> <p>Size <input type="checkbox"/> small <input checked="" type="checkbox"/> medium <input type="checkbox"/> large</p> <p>Sex <input type="checkbox"/> male <input checked="" type="checkbox"/> female</p> <p>Personality <input type="checkbox"/> friendly <input checked="" type="checkbox"/> unfriendly</p> <p><input type="button" value="Confirm"/></p>	<p>Input their dog's socialization status</p> <p>Participant was not sure if "doesn't get along with" is the right term to use. Since his dog gets along with all kinds of dogs, but it depends on whether the other dog would like to interact with his dog.</p>	1	<p>Change the term "doesn't get along with"</p>	<p>Socialization <input type="button" value="Skip"/></p> <p>Sushi <u>doesn't</u> often play with dogs that are:</p> <p>Age <input type="checkbox"/> old <input checked="" type="checkbox"/> young</p> <p>Breed <input type="checkbox"/> A1 <input type="checkbox"/> B2</p> <p>Size <input checked="" type="checkbox"/> small <input type="checkbox"/> medium <input type="checkbox"/> large</p> <p>Sex <input type="checkbox"/> male <input checked="" type="checkbox"/> female</p> <p>Personality <input type="checkbox"/> friendly <input checked="" type="checkbox"/> unfriendly</p> <p><input type="button" value="Confirm"/></p>