

FETCH: Fostering and Enhancing Teamwork, Communication, and Healthy Community Among Animal Shelter Volunteers through Mobile Technology

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Figure 1: Volunteers helping with vaccine clinic operation

ABSTRACT

Although prior literature has explored technologies for generally supporting volunteer work, no studies have accounted for the specific and contextually-situated technology needs of animal shelters and the volunteers who keep them running. In this paper, we present a case study in which we: 1) conduct formative work (need-finding surveys, interviews) with a local animal shelter; 2) use an iterative human-centered design process to build a mobile app called FETCH catered to this community's priorities; and 3) conduct user testing sessions to assess FETCH. We found that during shifts at the shelter, volunteers face challenges with communication and information management. We designed FETCH to help dog walkers with information management between shifts and community development. Users found FETCH practical, effective and accessible; Moreover, the results of this case study can help inform future projects that aim to develop technology for animal shelters and rescues which perform vital services for society and animal wellbeing.

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CCS CONCEPTS

• Human-centered computing → Collaborative and social computing design and evaluation methods.

KEYWORDS

Volunteering, volunteers, animal shelter, animal rescue, mobile application, human-centered-design

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1 INTRODUCTION

In the United States, animal shelters are important organizations that help animals and people [16]. Approximately 6.3 million companion animals enter U.S. animal shelters nationwide every year [3]. While the explicit mission for animal shelters is usually to care for animals, they also frequently run community outreach programs, host community events, and provide support for people in need [16]. Most non-profit shelters rely on donation/fundraising events as well as state funding. Aside from caring for animals accepted into

the facility, they also provide supplies and veterinary care for community members. Many shelters operate on a limited budget that only allows salaries for essential staff such as medical care staff, animal care staff, and admin personnel. Therefore, most rely on significant volunteer programs to maintain daily operations, from basic cleaning and care to guiding shelter patrons and assisting with admin work [15]. Without help from volunteers, most shelters would need to operate at a much lower capacity.

Kresnye and Shih found three areas for animal shelter improvement including: (1) fundraising and facilitating adoption, (2) volunteer and shelter management, and (3) awareness and communication of shelter needs [9]. Additionally, effective governance is critical for volunteer commitment and organizational identity [18]. All of these issues are of general relevance in the HCI literature and industry. Although prior research has looked at technology in a variety of volunteering contexts, no prior work in HCI has explored the specific needs of animal shelters or rescues. However, the development of new technologies for animal shelters could significantly alleviate the concerns identified in prior work outside of HCI. Therefore, the goal of this paper is to establish a preliminary case study that explores how a human-centered design process can support the technology needs of animal shelter stakeholders.

Through an initial interview with the shelter program manager and surveys distributed to volunteers, we found that less than half of the volunteers felt like a community. Limited communication between volunteers, especially during shifts, hampered task completion and social connection. In this paper, we present our human-centered design process and our prototype, FETCH, following some design implications derived from qualitative and quantitative data. We worked with a local open-admission animal shelter located in the Denver metro area in order to create a new technology solution that could help address these problems in a real-world context. The insights gleaned through this process are reflective of the specific community we partnered with, however, they may also be relevant in other volunteer communities that share certain characteristics (e.g., resource-constrained, goal-driven, frequent turn-over, etc.). Consequently, our work contributes preliminary insights to help guide technology design for volunteer communities.

Prior Work on Technology for Volunteering. Most existing research on technology for volunteering relates to the recruitment or training of volunteers. Bødker et al. present a case study of technology used by volunteers in a Danish food community [2]. They started with a community wiki, then moved to a website to better suit their needs, where the technology was further improved through everyday appropriation and was proven to be effective. Similarly, Howard and Digennaro Reed found that training outcomes are improved when the training is assisted with technology and behavioral feedback [7]. Huck et al. focus on the use of knowledge management systems for a volunteer-based bicycle workshop. The bicycle workshop demonstrated the characteristics of a community of practice, which uses social structure, social participation, and relationships to engage knowledge building [8]; they propose a technology system including a wiki, private blog, and knowledge network using existing social networks and other channels, but the influence of the technologies concerning the social dynamics of that group was not presented. While research has explored how

technology can serve volunteer-based organizations by assisting with various tasks, it is clear that a gap exists: *How can existing research and insights extend into the context of animal shelters? How well do they align with the priorities and needs of the volunteer community in animal shelters? And what role can technology play in supporting them?*

2 SHELTER OVERVIEW

Our animal shelter partner has around 300 active volunteers, one volunteer program manager and one volunteer program coordinator. From our interview data, most volunteers who terminate their roles do so because of relocating or health issues, and overall retention is good. At this shelter, on-boarding for new volunteers happens roughly every 4 months where 40-60 new volunteers are on-boarded. There has been limited technology adoption at the shelter to date, including only 12 radios, a desktop computer for volunteers to use during shifts, and a whiteboard used to share announcements (see Fig. 2). The primary method of communication is email or in-person conversation. Additionally, this shelter is almost always at full capacity because they actively take in animals in need from other organizations in the area due to an excellent adoption rate.

3 FORMATIVE WORK

Our study was exempted from IRB review by the Human Subjects Review Board at our institution. Regarding positionality, the first author has been an active volunteer at the shelter for two years; she is passionate about improving animal welfare and therefore relied upon her existing relationships and knowledge of the program to situate this study. We first conducted a semi-structured interview with the program's volunteer program manager to identify problem areas. Because this is the shelter's only program manager dedicated to volunteer programs, this was an ideal participant to help us narrow the scope of the design space. We then designed a survey based on the issues brought up during the interview, which was distributed to the volunteer mailing list. We received 18 responses, which we analyzed using grounded theory method and memos generated during the interview. The results revealed common themes, including a lack of community between volunteers, tension with staff and staff turnover, and communication during shifts. Here we present insights and results from the interview and surveys.

3.1 Interview with Program Manager

Our interview with the program manager uncovered issues faced by the shelter including: over-reliance on the program manager; lack of communication during shifts; excessive time spent writing emails; and dealing with volunteer cancellations. Communication between people in the shelter was mostly done through radio or in-person conversations, but due to the limited number available, most radios were given to staff and dog-walkers. Volunteers were also mostly unable to communicate problems to the next shift. One department had physical whiteboards (Fig. 2a) for notes, but this is not implemented across all departments due to physical space limitations (i.e., rooms with kennels do not have enough wall space for whiteboards without patrons seeing them). The manager spent a few hours each day writing emails, but she was not sure how the



(a) Volunteer announcements on a whiteboard

(b) Volunteer sign-in desk with desktop computer

(c) Behavior and health notes located on animal cages

Figure 2: Photos showing existing physical tools to facilitate communication.

volunteers perceived them: *“I probably get 50-70 emails everyday, close to 50 on a normal day...I don’t really use a template, I should right? I still mostly write them from scratch.”* Questions were often emailed to the program manager or asked in person even if she was not an expert in that area—for example, how to handle a specific animal or where treats were located. She wanted to maintain a close connection with volunteers but wondered if there was a better method for them to get answers: *“I have gotten questions of all kinds, which I love, but for example, you probably know way more about SMAM [small animal and mammals] than I do! ... I then would have to grab someone who actually know this stuff.”* (‘You’ refers to the interviewer, an active volunteer.)

Identifying and accommodating canceled volunteer shifts was another significant issue due to the short notice often given. The volunteer program manager also mentioned that the idea of unmoderated social media associated with the shelter made her uncomfortable (the shelter already has a Facebook group which the manager said she spends hours moderating), albeit some volunteers have expressed interest in having an unmoderated space to talk to each other.

3.2 Survey of Volunteers

Based on the preliminary interview, we designed a survey to inform possible solutions and to gather a baseline for proficiency with technology. A survey was appropriate because it deals with user characteristics, user experience feedback, and awareness [14]. The survey included informed consent and demographics such as volunteer role(s) and age. We asked about their perception and engagement with the shelter’s volunteer community (free response), how they deal with issues during their shift (multiple choice), comfort using different technologies (rating between 1 and 5), familiarity with existing platforms such as guidelines/handbooks, and feedback on the emails and other communication (rating and free response). Our survey was approved by the volunteer program manager and then distributed during their weekly email. We then utilized grounded theory method on interview/survey data and memos we generated during interview to code and categorize insights [12, 13].

We received 18 survey responses and collected data from a variety of volunteer roles including dog walkers, fosters, photographers, data entry, and cleaners. All survey participants were over 18; 3 respondents were in the age group of 30 – 49, 10 were 50 – 69, and 7 were 70+. The majority (15 out of 18) had been volunteers for over 3 years. No information on gender was collected because gender information was not relevant to our main research goals. Our goal was to understand how volunteers gauge the sense of community at the animal shelter and how volunteers get and share information with each other. The results reflected the manager’s prediction that most volunteers would ask or email her their questions (15/18). Other popular solutions included asking staff members (12/18) and figuring it out on their own (7/18). All respondents were very comfortable asking the program manager or other volunteers for help (4 or 5 out of 5). There were 2 people that were very uncomfortable with the staff, giving them a 1 out of 5 rating. We asked which technologies the volunteers were most comfortable with, an app on their personal phone, a shared community device, or some other personal device (see Fig. 3).

4 ANALYSIS AND DESIGN IMPLICATIONS

We used affinity mapping to reveal common themes from the free response results [10, 11]. Some issues that emerged included a lack of community between volunteers, tension with staff and staff turnover, and communication during their shifts (especially for the dog walkers). Feedback on email communication was generally positive (although this may be biased due to recruitment occurring through email). One participant mentioned that it was difficult to organize the dog walkers because of the lack of a central point of communication. Another said *“I’ve always wished (the shelter) could utilize some ‘higher tech’ solutions for things like dog walking - having all that be electronic where walkers could make immediate notes that were shared with all other walkers and staff.”* There were also mentions of improving the Facebook group or other methods to encourage a sense of community with other volunteers. By analyzing interview and survey data, we identified the principal

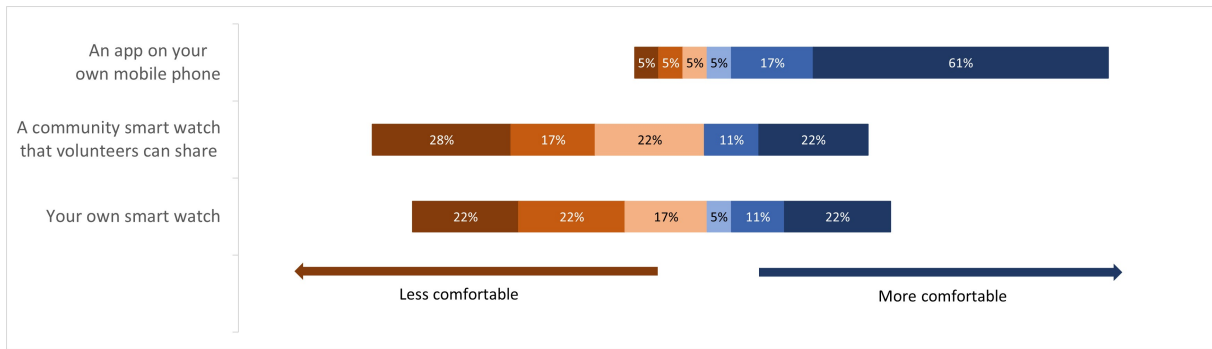


Figure 3: Preferred Form factor: Volunteers felt more comfortable with mobile devices

improvement we want to provide with our solution: **better on-shift communication**. From these results, we derived four design implications for animal shelter operations and missions:

- (1) Electronic solutions should utilize personal phones. (See Figure 3)
- (2) Solutions should help volunteers get to know the staff and other volunteers better by promoting communication and mutual help. Proper maintenance of the volunteer identity is important for the larger mission of shelters [5].
- (3) Solutions should facilitate communication both during and between shifts, which was previously difficult due to the lack of platforms beyond face-to-face communication. Effective training and communication in animal shelters are challenging and require careful planning [6].
- (4) Solutions should reduce work for the volunteer coordinator and manager given the sheer amount of scheduling and requests for help they get. This can help minimize fatigue and increase retention [4].

5 DESIGNING A MINIMUM VIABLE PROTOTYPE (MVP)

Our initial IDEO session resulted in 29 possible solutions that included a messaging board, volunteer wiki, robot animal companions, announcement systems, and more. We based our ideas on typical scenarios in a shelter setting and considered challenges that we identified from our interview and survey. Our ideas focused on facilitating information access and communication, volunteer guidance, and notification systems.

The two ideas that stood out were utilizing an existing platform to allow volunteers to interact and socialize, and a dog walker app. We chose to develop a mobile app named FETCH that includes a question/answer portion and a "kennel" section where volunteers can leave notes on specific animals. We focused on the dog walkers because a new technology could readily replace the physical systems currently in place that take up a large amount of time from the volunteer manager without adequately solving the communication problems. This solution targets our design implications by: being usable on personal phones, providing social interactions between volunteers while answering each other's questions, improving communication of complications between shifts via the kennel section, and redirecting questions away from the volunteer

manager—especially those that other volunteers are more suited to answer. We chose not to pursue the first option because shelter management needed to act as moderator for all social media/online interaction between the volunteers, and creating a platform solely for the purpose of allowing volunteers to interact with each other in an informal way would add more work for our stakeholders.

6 FETCH IMPLEMENTATION

We created a minimum viable prototype (MVP) of FETCH to allow volunteers to ask and answer questions among themselves and leave notes on specific animals in the corresponding kennel. We developed three FETCH prototypes of increasing fidelity (see Fig. 4). We drew an initial sketch to establish primary functionality and design. Next, we created a low-fi wireframe in Figma to map out the main interactions and screens. The final prototype was a mobile application emulated through a website with views optimized for mobile. We pre-populated it with questions, answers, and kennel notes for users to browse. Users could post their own questions, answers, and notes which are displayed on their own device. Data persistence was emulated through the local use of session storage; no user data was collected or stored. Comprehensive screenshots of the MVP can be found in the Appendix in Figures 6, 7, and 8.

We wanted our MVP to have an intuitive interface and a clear user journey, therefore each functionality was organized into its own module. The question and answer section allowed volunteers to ask their own questions and view a list of other people's questions that could be answered. The kennel section was organized by kennel number and displayed the name of the animal currently in residence. Volunteers could open a kennel to view previous volunteer notes or add their own. A login function stored the username locally to emulate the traditional identification of the author of a question, answer, or kennel note.

7 USER TESTING

Our in-person user testing was attended by all researchers and three participants. We initially intended to conduct our user testing session over the course of an actual volunteer shift. However, after realizing the constant loud noise, and out of consideration for practicality and safety, we conducted user testing on-site in a separate meeting room. One participant was the volunteer program manager; the other two were dog-walking volunteers recruited via

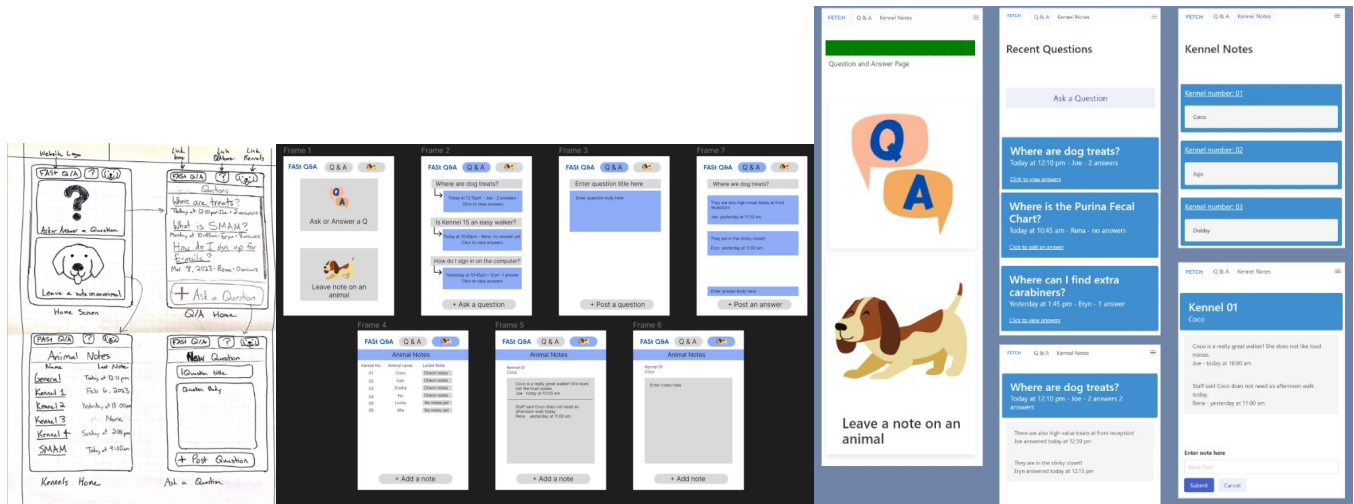


Figure 4: Evolution of the prototype. Left: A hand drawn sketch of a user interface. Center: Figma wireframe. Right: Screenshots of the final FETCH website, viewed on mobile.

emails with the help of the manager. Our testing included initial exploration of the FETCH interface. We presented use cases to test the functionalities and collect design feedback. We recorded and later analyzed audio of the session similarly using grounded theory analysis. Volunteer participants gave positive feedback about the question and answer section and said they would use this type of system to help other volunteers. They added that they believed this would be most useful for new volunteers and improve the sense of community between new and veteran volunteers. When presented with a certain scenario (i.e., during actual shifts) participants indicated they would still be able to use this between tasks, even though they might not be able to reach for their phone when handling animals.

Users suggested adding functionality to search questions and answers and to organize the questions by topic. Systems for targeting or alerting the volunteer coordinator for important questions were also requested. Participants conveyed that they would want the option for notifications, but it was unclear whether they would turn them on. The kennel section in FETCH was also well received, with most feedback being additional information on the kennels. Volunteers wanted more statistics on the animal (picture, age, weight, and ID), which would help volunteers identify a dog or remember which kennel the dog was in. Kennels for other animal types were also requested; color-coding the kennel based on pre-existing categories was suggested to improve identification, for example, this shelter commonly uses red, green, yellow to indicate whether a dog is reactive and shy, easy to walk, or somewhere in between, and volunteers are all familiar with these color codes. Figure 5 shows prospective future interfaces of FETCH based on feedback gathered during user testing.

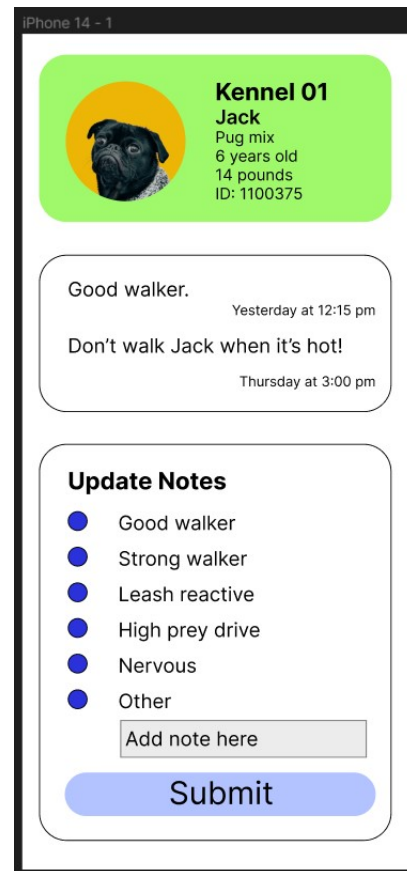


Figure 5: Prospective UI/UX rendition incorporating participant feedback. Future versions should include color-coding, Shelter Buddy ID, and pre-populated behavior notes.

The program manager believed individual volunteer kennel notes regarding specific animals could be fraught with emotion and lead to harmful interactions. Specifically, conversations around individual experiences with animals, or even sometimes small comments that are meant to remind and help others, can appear like comments on other volunteers' behaviors. Therefore, proposed solutions for future iterations included anonymous notes, moderation tools, and preset options for shift notes. The manager was favorable about this section because it could automate behavior notes which is currently done through email and physical whiteboards.

Overall, participants found Fetch easy to use and navigate, but worried about older volunteers (both participants were in their 30s). They believed the app would not be helpful for communication **during** a shift, due to animals requiring their full attention, but would still be useful **between tasks or shifts**. Other suggestions included a social section to increase volunteer's sense of community, and options to display different information based on the volunteer's role.

8 LESSONS LEARNED

During evaluation of FETCH, we learned about the priority and need for technology in this community. We used a user-centered approach which generated insight into working closely with the shelter community during the development of technology. Here we synthesize insights and discuss how they can inform future design practices.

In-situ usage: While we envisioned this application could facilitate communication between volunteers and staff during their shifts, based on the feedback we received during user testing, volunteers preferred to use this tool **between** tasks or shifts. This illustrates how in-situ interactions can differ from interactions on the drawing board in this context. Designers must be mindful of this difference and allow flexibility in their process and artifact.

Modular Functionality: Animal shelters typically have a variety of volunteer roles, as briefly mentioned during the interview and illustrated by survey results. In this project, we focused on dog-walking volunteers. The resulting MVP worked well for participants during the user testing and they commented on how practical the functionalities were for their shift. However, volunteer responsibilities and needs differ substantially, and the same set of functions may not work for everyone. Instead, it might be more practical to keep the functionalities modular, providing separate, adaptable features for different roles. For example, while our design centers around dog walkers, modifying current design and keeping animal behavior notes separate from kennel information can ensure technology can effectively serve kennel cleaners who don't need detailed behavior data.

User friendliness: The volunteer community we worked with is diverse in age. While many are older adults, volunteers can be teenagers, working adults, senior citizens and everywhere in between. While user-friendliness is a common goal, it is particularly important for various age groups in this community. Moreover, onboarding happens often when new volunteers join. Therefore, to best serve all members and considerate of frequent turn-over, technology has to be easy to navigate; user-friendliness must be prioritized over complex functionality.

9 CONCLUSION, LIMITATIONS, AND FUTURE WORK

In this work, we contribute a preliminary case study that can guide future HCI research in the context of animal shelter and rescue communities. We wanted to streamline communication, reduce workload for the volunteer manager and to enable volunteers to collaborate with each other. We conducted semi-structured interviews and surveys to learn about concrete user needs and people's perceptions and preferences of different technologies. We emulated a mobile app to allow volunteers to help and communicate with each other. We conducted a user testing session with volunteers and a program manager; all of them found the prototype easy to navigate, and the functionalities useful and practical. With the feedback we gathered from user testing, in the future we could integrate color-coding, Shelter Buddy ID, as well as pre-populated anonymous animal behavior notes into the mobile app to further integrate the communication process and address some concerns expressed over possible tension amongst volunteers arising from leaving free-form animal behavior notes. These prospective future updates can be seen in Figure 5.

One limitation of our work is that participants for our user-testing session were from a younger age group, however many of the volunteers at the shelter are senior citizens. Many older adults perceive themselves as digitally illiterate, even though that's not necessarily true [17]. Nonetheless, most older users will adopt communicative technology after an adaptation period [1]. Therefore, future work needs to also engage with older stakeholders to understand their experiences and concerns. Along the same lines, we would also like to conduct more in-depth participant observation sessions in the future to learn more about real time interactions with our system.

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Appendix: MVP functionalities and screenshots

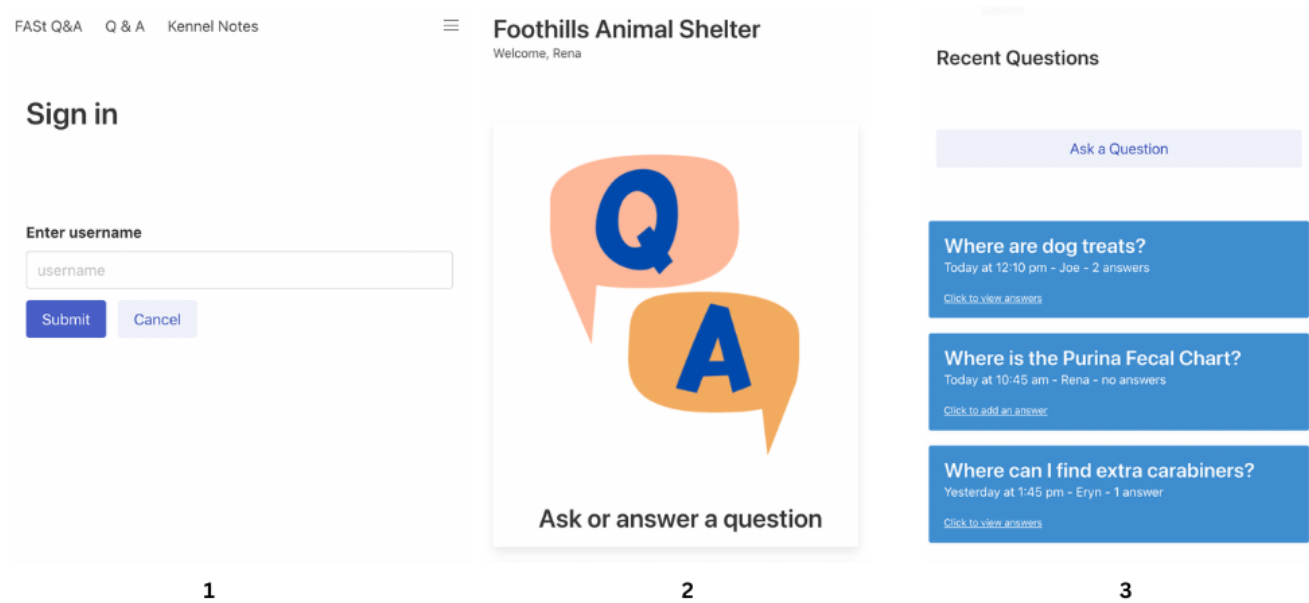


Figure 6: 1-5 shows one of the core functionalities, logging in and asking a question. 1 shows sign-in, 2 shows the option to "ask or answer a question", 3 shows some already answered questions, on the top there's additional option to ask a new question

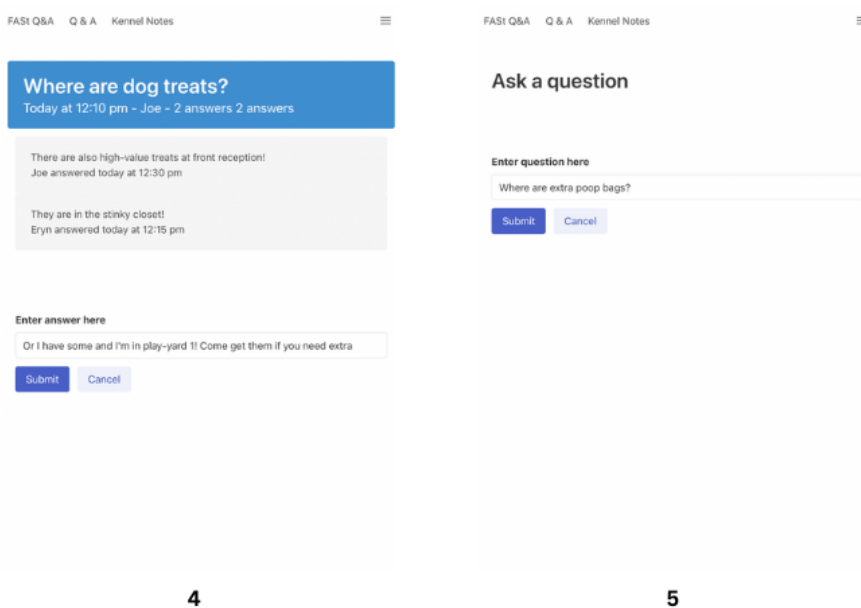
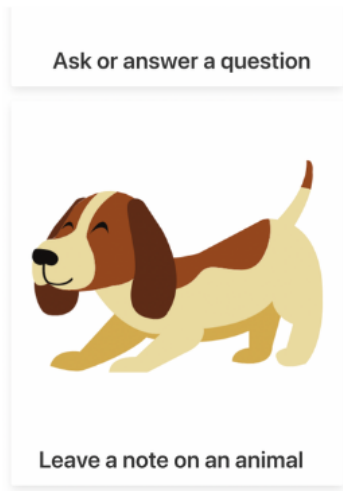
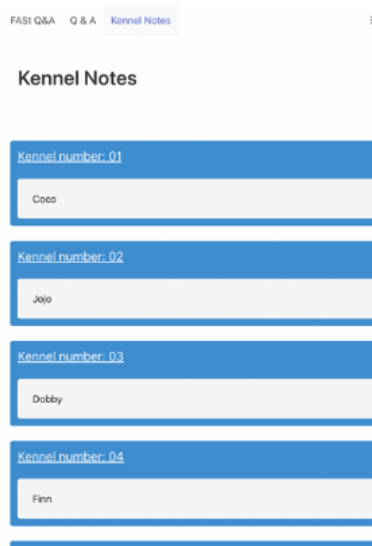


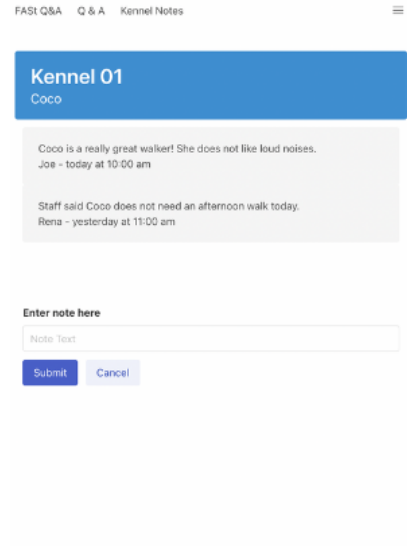
Figure 7: Cont. of Fig. 6, 4 shows an existing question with several answers contributed by other users, and 5 shows how a user might ask a new question.



1



2



3

Figure 8: 1-3 shows another one of the core functionalities, leaving a note on an animal. 1 shows the option to "leave a note", 2 shows options for the user to select which represent kennels, 3 shows the sample screen of leaving a note if the user selects Kennel 01, which also shows existing notes left by other users.