Using Cat-Centred Research to Learn the Design Thinking Process

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doi: 10.21606/learnxdesign.2019.05114

Abstract: A new design centre at an American university was given the mission to incorporate design thinking and human-centred design across the university through multi-disciplinary collaborations. An opportunity arose with the university’s College of Veterinary Medicine to conduct research around cat house-soiling in preparation for a Hackathon to create new products and services to combat this type of behaviour. The design centre worked in collaboration with veterinarians to adapt the design thinking process to incorporate both cat owners and their cats while allowing students the chance to practice their design thinking skills in combination with an exploration of interspecies relationships. Through in-context field research conducted in cat owners’ homes, students used both human-centred and cat-centred design techniques to understand the cat-cat owner dynamic. By observing cats’ environments, behaviours, and human relationships, students were able to uncover three key opportunity areas for design around house-soiling for the Hackathon participants: leveraging data to modify cat behaviours, owner acceptance of existing undesirable behaviours, and a lack of understanding amongst owners for their cat’s motivations and intentions.

Keywords: other-than-human centred design; experimentation in design education

1 Introduction

At many universities across the United States, the philosophy of human-centred design has garnered great interest as an approach to identifying opportunities for innovation. Many of these universities are thus creating design centres to further promote and teach this process. This year a large design centre started its initiative at a well-known American university. This centre’s mission is to foster multidisciplinary collaborations across campus, using design thinking as an approach to promote human-centred design and mandated quick iterations. Being new to the campus, the centre was looking for opportunities to teach design thinking and human-centred design within a university setting. Early on, a Hackathon focused on specific cat behaviours, sponsored by the university’s College of Veterinary Medicine, emerged as an opportunity to experiment with the design thinking process through a non-human-centred lens. With the design centre team’s goal to collaborate broadly across the university, the question emerged why not cat-centred design? This Hackathon would allow more direct interaction with students and further the centre’s mission, all while promoting design thinking’s application to non-traditional subjects (e.g. cats). The opportunity would allow the centre
to showcase how design thinking is not a concrete process; one must always be adapting, evolving, prototyping, and experimenting within the process as needed in order to capture the necessary insights. Additionally, design research would allow Hackathon participants to better understand the challenge of the Hackathon while learning the design thinking process and applying it to their prototypes.

While the processes described throughout this paper may resemble speculative design, adversarial design, or other less solution-oriented forms of design, the clear impetus for the work was a product-oriented hackathon. The aim of producing a low-fidelity solution to the problem of cat house-soiling presented a clear bias towards action a well-documented fundamental tenant of today’s practice of design thinking (von Thienen et al., 2018). Broader conversations resulting from the research conducted do examine the very aim of the initial prompt and open up the phases of a cat’s experience for further questioning, but ultimately the purpose of the project was to inspire the creation of solutions to this problem space. Experimentation, as discussed in this paper, should be viewed as in the lens of Hans-Jörg Rheinberger’s experimental system (Rheinberger, 1994). Action was taken in the spirit of “let’s just try and see what happens”, not in the rigorous analytical methodology one may associate with traditional scientific experimentation.

2 A Hackathon to Address Cat House-Soiling

Traditionally, university Hackathons are multi-hour events in which computer science students compete to create a prototyped idea to solve a given problem and the best ideas are awarded a prize, often a cash reward. Some Hackathons attract students outside the realm of computer science, but computer science remains the most common field of participation. However, recently there has been a shift toward Hackathons encouraging those in all departments to participate.

Two alumni of the aforementioned university’s College of Veterinary Medicine had recently formed a new company focused on innovation in the field of veterinary medicine called VetMed2.0. Being young and looking to interact with their alma mater, VetMed2.0 came up with the idea of hosting a Hackathon surrounding a topic in veterinary medicine. They decided upon cat behaviours, specifically cats eliminating outside of their litter boxes, as the focus for this Hackathon.

The issue of feline house soiling is of great concern to many veterinarians and animal lovers alike as it results in many cats being relinquished to shelters, which unfortunately often leads to euthanization (stated by Dr. Aaron Smiley, DVM). The American Association of Feline Practitioners (AAFP) and the International Society of Feline Medicine (ISFM) have created a brochure for cat owners that details all the known reasons for why a cat may eliminate outside of its litter box [Appendix 1], along with a worksheet listing what owners can do in attempt to remedy the situation [Appendix 2]. Though these resources exist in addition to veterinarian and animal behaviour specialist recommendations, there are still cats and owners facing this problem. Understanding that despite these resources the issue of house-soiling remains, VetMed2.0 felt it would be appropriate to use as the problem of interest for their Hackathon.

3 Leveraging the New Design Centre’s Mission

Around the same time that this Hackathon was being planned, the design centre at the same university was structuring its first official year on campus. Following the like of giants such as the Stanford Hasso Plattner Institute of Design, these design centres aim to teach human-centred design through various courses and programming. While some American design centres are located within a specific college such as engineering or the applied arts, this centre is not affiliated with any college on the campus and aims to offer a space for multidisciplinary collaboration regardless of one’s focus or background.

Being in its first semester, the design centre had five main initiatives: building design thinking mindsets, leveraging students’ passions for social innovation, teaching basic design thinking skills, working with the humanities to build dialogue into design and action, and facilitating multidisciplinary projects. To fulfil these initiatives, the design centre began offering a variety of resources and planned several programs to engage the campus community and raise awareness of the centre’s presence. The centre’s first-semester offerings were courses on design thinking and partnerships with the humanities, large-scale collaborative events focused on raising awareness, campus-wide student-focused projects, and small-scale educational events. Pop-Up Workshops were created as one such small-scale event, creating opportunities for members of the university to experience the process of design thinking and human-centred design on a smaller scope than they would taking a semester-long course on the topic.
Early at the start of the semester, the design centre’s director crossed paths with the VetMed2.0 team, who had been looking for organizations to potentially collaborate with. The design centre thought this could be a unique opportunity to not only practice human-centred design, but also experiment with cat-centred design, given that both humans and cats living together needed to be observed and understood in order for one to understand opportunity areas for design. In discussions with the VetMed2.0 team, it was decided that the design centre would conduct field research on cats, interview and observe said cats’ owners regarding their experiences, and consult veterinarians with professional knowledge regarding the issue.

With one of the centre’s initiatives being to teach design thinking skills, a Pop-Up Workshop was constructed and students were invited to join the centre’s team during the research and synthesis process. Findings would then be presented to the Hackathon participants to provide empathy for both cats and cat owners facing this particular behavioural situation and aid user groups in the prototyping of possible solutions.

4 Conducting Field Research to Include Both Cat Owners and Cats

A typical human-centred design project would begin with recruiting research participants to shadow and interview in order to collect insights around emergent behaviours and unmet needs. For this research, both local house-soiling cats and their owners were contacted for observation and interviews. To source these local cats and cat owners, a survey was created and dispersed for cat owners to fill out detailing information about themselves and their cat(s) [Survey Questions for Cat Owners]. After the survey was closed, cat owners experiencing the target problem were contacted to participate in a one-hour interview in their home. Immersion in the cat’s world would allow Pop-Up participants to gain empathy for the cat’s unique situation(s) and develop an understanding of the cat-cat owner dynamic. Students who joined in the field research were given a booklet [Appendix 3] containing interview tips and techniques along with suggested interview questions to guide them through the process.

4.1 Survey Questions for Cat Owners

1. Tell us a little about yourself.
2. What is your first and last name?
3. What is your email address?
4. What is your gender?
5. What is your age?
6. What is your marital status?
7. How many children live in your home?
8. How many cats do you have?
9. Tell us a little about your cat(s).
10. What is/are your cat(s) name(s)?
11. What age is/are your cat(s)?
12. Tell us more about your litter box issues.
13. Let us know if there’s anything else you’d like to add about your cats!

Overall, seven different cat owners, with a total of nine cats, were interviewed. Interviews with cat owners and observation of individual cats (Figures 1 and 2) and scenarios of house-soiling (Figure 3) contextualized the existing ecological demands on cats. This research provided a deeper understanding for cats’ lives and behaviours -what may have instigated changes in behaviours, what might have frightened them, what their responses had been to a change in the family, how owners treated them and dealt with the situations, how the families may have not been able to reconcile the new behaviours and were now dealing with the house-soiling scenarios.

After each interview, the design centre team and student participants relocated to the team workspace to debrief and synthesize the information gathered (Figures 4 and 5). Student participants in the Pop Up were thus able to experience both the interview process as well as the synthesizing of insights to guide further design -two crucial steps in design thinking. Interviews and observations established an initial understanding of the existing ecological demands and surrounding environments for all the individual research participants -the cats and their respective owners.
Figure 1. Meeting cat Zoe in her home.

Figure 2. Observing one of the cat’s in-home eating environment.

Figure 3. Surveying the damage from the house-soiling of one of the cat research participants.
4.2 Overview of the Seven Interviews

4.2.1 Interview 1: Owner Peggy and Her Cats Nemo and Sunny

Peggy is a recently widowed woman in her sixties living alone with her two cats Nemo and Sunny. She is a long-time cat owner and volunteers at the local humane society. Both of her cats are from shelters and both were declawed prior to Peggy’s ownership. Nemo is an 8-year-old cat with diabetes. His diabetes causes him to urinate more often, usually on the pads Peggy has placed around the 6 litter boxes in her home. Nemo is more reserved than Sunny but has more house-soiling problems. Sunny is a very social 12-year-old cat. Though he is outgoing, he is very sensitive to sound and tends to urinate outside of his litter box when there are loud noises, such as when Peggy’s grandchildren visit or when Peggy uses her new vacuum cleaner. There is a screened-in porch in the house that he loves to relax in, and he gets sad when it is too cold to use. Peggy’s house is large and thus has litter boxes in almost every room. She said that no cats she has had have ever liked covered litter boxes, so all of hers are open. She uses tidy cats unscented litter and stated she doesn’t clean the litter boxes too often. She noticed that both cats prefer using a litter box close to where people are in the house so they can watch out for people. With her home being renovated at the time of our interview, she said when the carpet in her family room was first ripped up the cats could smell an animal that previously lived in the house and would urinate on the floor. The floor was then sealed which seemed to solve this
problem. Occasionally Peggy uses a hormonal spray to deter the cats from urinating on furniture. She also hangs plastic on the walls surrounding the litter boxes to protect them.

From this interview, two potential opportunities emerged: how might we protect the walls and floors in houses where cat soiling is imminent and how might we account for inevitable stressors such as noise?

4.2.2 Interview 2: Owner Amy and Her Cat Seraphina
Seraphina the cat lives with Amy, her husband, and her son. Amy's daughter used to live with them but has since moved out for college. Seraphina is the family's first cat and is 6-years-old. She was bought from a breeder in Indiana as a kitten. When she was first brought home she hid under a couch for a week, and it took 6 months to a year for her to adjust to her new home. She also had to be taught to use her litter box, not instinctively knowing how to use it. She is cared for by a sitter for one week twice a year but shows no difference in personality during those times. She only has one open litter box in the basement of the house. At one point, the basement flooded but that did not deter Seraphina from using her box. She used to have a problem with urinating on the couch and people's clothes, but a homemade repellent stopped this from happening. Amy's husband can now point toward the litter box and Seraphina will use it.

Based on this interview, it was discussed how cats learn cat-behaviours, how owners learn as part of this process, and what happens if there are challenges with either user group.

4.2.3 Interview 3: Owner Rachel and Her Cat Mika
Rachel, her husband Jeremy, and their twin daughters live with their cat Mika. Rachel and Jeremy work seasonally at a local apple orchard where there are several orchard cats that roam the premises freely. Mika was one of those cats, and they decided to adopt her when all the cats went up for adoption at the end of the season. However, one day she disappeared. Rachel and Jeremy posted for her to be brought back if someone took her, and she finally was. She seemed well cared for, so they assumed someone took her as their own for a period of time. Mika seemed fine after all this when they initially brought her home and wasn’t having any house-soiling problems. She would climb on their curtains and rip them up, so they decided to get her front claws declawed at the same time she was spayed. They noticed she became less playful after being declawed. When she was around 2-years-old they started noticing that she was urinating on the carpet as well as on clothes on the ground. Rachel stated that she would urinate on things after being messed with, though she never urinates on Rachel's clothes. Mika has two litter boxes that are covered and has never had an open litter box. Because of the house-soiling problem, Rachel and Jeremy began confining Mika to smaller portions of the house, until she was finally only allowed in one room. Mika prefers Rachel the most though Rachel doesn’t like her much. Mika also doesn’t like children, including the twins, or other cats, and is very territorial. She needs to be petted every night or she will urinate on things. She enjoys being outside, though one time she randomly attacked Rachel outside. Besides her house-soiling problems, she is a healthy cat. Her vet recommended a hormone spray to deter her from urinating places, but it was very costly.

Based on this interview, better preparation of humans for cat ownership, adaptation of spaces to accommodate for old behaviours a cat exhibits, identifying trauma in a cat, and identifying moments of non-routine in a cat presented themselves as opportunities for design.

4.2.4 Interview 4: Owners Marsha and Randy and Their Cat Zoe
Marsha and Randy live in a house built in the 1920s and are themselves in their 70s. They have two daughters that have moved out, and they were currently replacing their carpet when we interviewed them, due to extensive cat house-soiling problems. Zoe is their first cat, and they admitted they don’t have much experience with cats. Zoe was brought home as a kitten and is now 17-years-old. Four years earlier their basement flooded, which was where Zoe’s litter box was. She started having house-soiling problems after this incident and would act confused when she was put in her litter box. She was treated at one point for a bladder infection and was started on a new diet, though there was no follow-up with her vet. Marsha and Randy noted that she seems to prefer a dirty litter box and suggested she may have problems smelling it when it is clean. Her problem got better until Marsha and Randy went on vacation. She then started urinating in dark or corner areas. Marsha and Randy have resigned themselves to Zoe’s behaviours, saying she’s like a family member with a health problem. They’ve tried many different litter boxes and litters and moved the box to different locations in the house. They finally began keeping a tally of when she would go to the bathroom so they could know when to put her in her box.

This interview brought into question how we might adapt spaces to accommodate new cat behaviours and reminded researchers of analogous situations such as incontinence in the elderly. Marsha and Randy trying to understand Zoe’s
situation by using a tallying method to quantify the behaviours of their cat was indicative of opportunities to capture data to better track and change undesirable cat behaviours.

4.2.5 Interview 5: Kaity and Her Cat Cali
Cali is a 4-year-old cat living in a small apartment with her owner Kaity. One of her two litter boxes is in the kitchen area and Kaity stated she is very efficient cleaning them out. Kaity said Cali is very playful but vengeful, though she loves people. It was noticed that Cali seemed to occasionally get stressed around 10pm. Lately she has been urinating on anything made of paper or box-shaped, and one time urinated on a DVD case. Her house-soiling problem is not unique to her current apartment, as Kaity stated it started two apartments ago. Kaity also said she does not have room for a very large litter box but has two smaller open ones that Cali seems to use equally. She’s tried many different types of litter, but nothing has helped. She says Cali will urinate anywhere, even if her litter boxes are clean.

This interview made researchers question how we might create a space-saving litter box and if there is potential for some sort of stacked litter box.

4.2.6 Interview 6: Megan and Her Cats Hans, Casper and Sophie
This was our only three-cat household. Hans is one-years-old but was brought home at two months. He is a very large cat and does not have any house-soiling problems. He is friendly to other cats but tends to bully Sophie. Sophie is a very social 2-year-old cat that was brought home at 6 months. She was pregnant when she was 6-months-old and had two kittens, though they both passed away due to how small Sophie was at the time she had them. She doesn’t cover her excrement when she uses her litter box and has issues with getting her paws dirty. Megan tried toilet training at one point, but it didn’t stick. Casper is a 12-year-old, three-legged cat. His back leg was amputated due to infection, but he is able to get around fine. However, he does have issues using his litter box because he can’t squat down, leading to urine going outside of his box. Megan tried using a closed litter box, but urine still got out. He is a shy cat and has been with Megan for 10 years. When he gets anxious, he likes to go to Megan’s parents’ house, and will stay there if Megan is away. He occasionally is bullied by other cats at Megan’s parents’ house, with which he has to share a litter box. He does not like children much but will tolerate them. His litter box currently is just a pan and he has two litter mats surrounding it, though he still manages to track litter throughout the house.

After this interview, researchers questioned how we might make a litter box with high walls for disabled cats such as Casper, how we might make a litter box that cleans a cat’s paws or masks odours, and how we might design a litter box that makes cats such as Casper aware of its entrance.

4.2.7 Interview 7: Argentina and Her Cats Stevie and Evie
Stevie and Evie are about 2-years-old and live in a home with 2 adults and 2 children. Evie is an overweight cat and started urinating outside her litter box a few months after her family returned from vacation. She has urinated on clothes left on the floor, the sofa, the daughter’s bookbag, and all over one of the children’s room while the child was away for the summer. She has also lost a few pounds in the past few months because of a new diet. The other cat, Stevie, has not had any house-soiling problems. They had multiple litter boxes in their house, but they were all way too small and Evie could barely fit into them.

After this interview, further questions on why cats tend to urinate on human-scented things, and also if cats will act out due to the size of their litter boxes remained as opportunities for exploration.

5 Including Expertise from Veterinarians to Provide More Insights into Cat Behaviours
Through the storytelling and synthesis process for the field research, common insights around opportunity areas for design in the house-soiling scenarios were compiled. Patterns emerged around cat and cat owner behaviours that could be addressed with expertise from the veterinarians on the VetMed 2.0 team. A series of questions was created to fill in the gaps of knowledge and posed to these experts. The answers to these questions were to be explained during the Hackathon to help participants better understand cat owners and their cats.

5.1 Questions for Veterinarians and Corresponding Answers
1. What is the recommended size for a litter box?  
   The recommended size of a litter box is 1.5 times longer than the cat it’s for. However, cat owners tend to not want to buy a large litter box, which could be the cause of many house-soiling incidents.
2. Should a litter box be opened or closed?
   Litter boxes are recommended to be open – cats are generally afraid of being trapped.
3. Are there any alternatives to litter boxes?
   There are many alternatives to litter boxes; cats can be toilet trained or trained to go to the bathroom outside, but owners are wary to do anything besides litter boxes because it’s not generally how owners want to interact with their cats.
4. What is it about urinating on soft things on the ground?
   Cats will urinate on anything; they prefer clay litter but otherwise owners should use non-perfumed, non-clumping litter. Soft things hold smells better, and cats want to mark their environments with scents.
5. How else do cats mark their territory?
   Cats mark territory by rubbing with their paws, face rubbing, or urinating on things.
6. Are there artefacts or signifiers in the house that have meaning to a cat?
   Not necessarily, but owners can observe how a cat moves around its environment and take note of what its comfortable with. Cats move through a house differently than owners would, and a cat would divide up a room in a non-fixed structure.
7. Is it typical to not contact a vet about litter box issues?
   Rarely do owners contact vets regarding litter box issues – we hear about urinary tract infections, but maybe owners do not think vets can help with house-soiling? Additionally, behaviourists are expensive.
8. How does a vet usually follow-up about litter box or behavioural issues?
   It’s difficult for a vet to follow-up about such issues because owners tend to not schedule follow-ups—compliance is terrible.
9. Do cat owners usually resign themselves to these behaviours?
   Yes; owners will resign themselves to their cat’s behaviours because it’s easier.
10. How is trauma diagnosed and treated in cats?
    One thing that must be considered is that cats can be primed at young age to stress, even while in their mother’s womb. It is difficult for a vet to diagnose trauma in cats, and even more difficult to treat – cats are hard to pill.
11. How do cats recover from trauma?
    They find ways to change their environments – cats will try to take control of their situation, such as limiting stress, getting up high, getting secure food sources, etc.
12. Do cats get angry? Do they urinate out of spite?
    Spite is a high-level emotion, which is impossible for a cat to comprehend. There’s a new smell, so the cat is going to urinate on it to put their scent on it – this is my territory. Everyone needs to know this is my house.
13. Why are some cats more adaptable than others?
    Some cats just happen to be more adaptable than others, as is the case with humans.

It is worth noting that several of the insights gathered from the veterinarian interviews may come under scrutiny when examined with attention to the perspective of the cat. Some animal psychologists, such as Vinciane Despret, may argue that higher level emotions and considerations of abstract concepts like spite or freewill are well within the capacity of a cat. Despret has suggested that cat’s perform feline civil disobedience (Bussolini, 2013). Further consideration of cats’ capacity of higher level cognitive functioning were not accounted for in this research due to limited time and resources. However, further investigations into these issues may show that the ‘spiteful cat’ is a useful behavioural persona to pursue for design.

6 Final Hackathon Opportunity Areas for Cats and Cat Owners

From observations, interviews with cat owners, and interviews with veterinarians, three opportunity areas were identified that Hackathon participants could explore for new product ideas:

1. The Quantified Cat
   With technology available to capture data around a cat’s daily activities, what might an owner learn about her cat that could better help the owner adapt a situation to the cat’s existing behaviours? Quantification of the pet-human relationship is already being investigated by researchers interested in the field of human computer interaction (Lawson, Kirman, Linehan, Feltwell & Hopkins, 2015).
2. The New Normal
   When owners accept new behaviours from their cat, whatever these may be, how might the environment adapt to this “New Normal”?
3. Preventing Owner Error
Cat ownership is perceived to be easy – cats are thought to be convenient, inexpensive, and good for small spaces, and therefore a good choice for first-time pet owners. Additionally, many owners perceive house-soiling as a spiteful behaviour and yet experts know that spite is a high-level emotion cats are incapable of comprehending. How might we help educate new cat owners to the world and behaviours of their new cat?

7 Conclusion

Through this research, design thinking was carried out in a non-traditional manner, forgoing the typical anthropocentric biases of human-centred design for cat-centred research. While human owners and veterinarians were interviewed as part of the process, all insights were taken in the context of the cat’s experience. In the instance of the spiteful urination explanation amongst owners, it was found that anthropological bias with owners was contradicted by species experts (veterinarians). Additionally, exploration of the interspecies relationship between humans and cats identified three opportunities for design: the quantified cat, the new normal, and preventing owner error. These opportunities then guided the designs of the Hackathon. In addition, students learned the value of empathy and observation, key techniques of the design thinking process, whether with human or other-than-human research participants.

Acknowledgements: We would like to acknowledge the contributions of Lucas O’Brien, Jake Fava, and Ava Bilimoria from the Siebel Center for Design in the field research and synthesis from the research sessions, and to Aaron Smiley, Kristin Smiley, and Brooke Fowler from VetMed 2.0 for their collaboration with the Hackathon, which gave us the context for this research and experimentation with the design thinking process.

References


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Rachel Switzky is the director of the Siebel Center for Design. Prior to her current appointment, she has been a global design leader working with Fortune 100 companies over the past 20 years. As an Executive Director at IDEO, the company who pioneered the concept of design thinking, she helped teams imagine futures and then put them into action.

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Appendix 1: Feline House Soiling-Handout for Cat Owners

Feline House-Soiling
Useful Information for Cat Owners

FOUR BASIC CAUSES OF HOUSE-SOILING
Environmental and Social Factors
- Cats by nature are very clean and need adequate unsullied locations to eliminate, especially in a multi-cat household.
- Some cats may avoid using a litter box located in a high-traffic area or near cat doors or flaps.
- In a multi-cat household, the presence of a more dominant cat near the litter box area may cause a less confident cat to seek out other places for elimination.
- House-soiling may occur if a cat had a negative experience while it was in or near the litter box (e.g., someone administering medications, family members or children trapped a cat in the box for any reason, a dirty litter box, or even being startled by sudden noises from nearby human or other living animals).

Marking Behavior
- Urine spraying is a normal part of feline behavior in which a cat marks to leave its scent. Marking behaviors can include scratching, rubbing, urine spraying, and residing (depositing feces).
- Unneutered male cats and most unspayed females will mark as part of their sexual behavior. Spraying and marking dramatically worsen this behavior.
- Anxiety-related marking occurs in response to a change in the cat’s environment, especially the area where the cat eats, sleeps, and plays.
- Cats often target items with new or unrecognized scents such as bedpads and shoes.
- Marking behavior that starts at windows and doors usually suggests that the perceived threat is coming from outside the home. Marking in stairwells, hallways, doorways, or the center of rooms usually indicates stress or threats from inside the home, such as other pets or new people in the household, visitors, children, or remodeling.

Medical Causes and Problems
- Medical issues can cause a cat to exhibit behavior changes such as house-soiling. Your veterinarian will be able to diagnose or rule out any medical conditions that could be a factor in the house-soiling behavior.
- Every cat that starts house-soil requires a thorough physical examination and urinalysis to check for medical problems such as infections, cystitis, arthritis, kidney problems, diabetes, and other medical issues.
- If your veterinarian believes the house-soiling behavior is caused by a medical reason, he or she may perform additional tests such as a urine culture, abdominal radiographs, abdominal ultrasound, complete blood count, and biochemical profile. Digital rectal exams or fecal testing may be needed for cases of house-soiling with feces.

Feline Idiopathic Cystitis
- Feline idiopathic cystitis (FIC) is a frequent medical cause of house-soiling. Cats suffering from FIC have increased frequency of urination, difficulty and pain when urinating, and can have blood in their urine. This inflammatory condition can increase and decrease in severity over time and is aggravated by stress, changes in diet, and other issues.

TREATMENT AND MANAGEMENT OF HOUSE-SOILING
The design and management of the litter box is critical for encouraging acceptable toileting habits. When house-soiling occurs, always evaluate the litter box.

Designing the Optimal Litter Box
- Number - The general rule of thumb is to have one litter box for each cat, plus one extra box in multiple locations around the house. Socially affiliated cats, which are two or more cats that are familiar to each other, share a territory, and exhibit behaviors such as grooming, playing, or rubbing together, may be more willing to share litter boxes. Because more than one social group may occur in a home, providing adequate resources for each group is important to decrease the chance of adverse behaviors.
- Location - Take a look at the flow of your home and where your litter boxes are located:
  - Avoid placing food and water close to the litter box.
  - Cats usually prefer quiet, private places. Avoid busy areas of the home and locations where a cat could be cornered in, blocked off, or unable to flee. Cats can be cornered in the litter box so they are unable to flee (e.g., if the box is in a closet or small room where another cat can block the exit). If one cat prevents another cat’s access to the litter box (e.g., the box is down a hallway or in a room where another cat can block entry), it can be very stressful and cause the cat to house-soil because the victim is avoiding or cannot get to that location.
  - Keep the litter boxes apart in different locations because your cat considers boxes close to each other one large litter box.
- If a cat is toileting away from its box, try placing an additional litter box at the new site (temporarily or permanently) to get the cat using a box again.
- In a multi-level home, place a litter box on each level. If you have an older cat, place a litter box on the level where the cat spends the most time, as it may not be easy for the cat to go up and down stairs each time it needs to use the box.

Size - In general, bigger is better and many commercial litter boxes are too small. Litter boxes should be 1.5 times the length of the cat from the nose to the base of the tail. Suitable alternatives can include concrete mixing trays or storage containers. You can place the lid behind the box to protect the wall (Photo B). Older cats need a low entry so you can not shove the side but inspect for any sharp edges (Photo B).

Litter - If your cat is exhibiting house-soiling behaviors, you may need to try different types of litter until the cat indicates its preference. For preference evaluation, provide multiple boxes with different litters and variable-litter depths (Photo C). Many cats dislike scented or dusty litters, litter deodorizers, and box liners. Most cats prefer soft, unscented, clumping litters.

Managing the Litter Box - Remove waste at a minimum of once per day and add litter as needed. Wash the litter box every 1-4 days using soap and hot water only. Avoid strong chemicals, or any ammonia-based products.
Appendix 2: Handout for Cat Owners to Track House-Soiling Problems

HOUSE-SOILING: Take-Home Instructions for Cat Owners

Owner’s name: ____________________________ Date: ____________________________
Cat’s name: ____________________________ Date: ____________________________

Resolving house-soiling problems may require making changes to several aspects of a cat’s home environment and care. All the changes are interrelated. They will help to provide the optimal litter box/tray and decrease stress by meeting the cat’s other social and environmental needs. They may also include medical treatments and diet suggestions. Please make the following changes in your cat’s home environment, as indicated by the checked boxes.

**Environmental management**

1. Number, location and design of litter boxes:
   - Provide ______ additional litter boxes making a household total of ______. Offer some large (1½ times the cat’s length from nose to base of tail) deep, open boxes. Storage containers, sweater boxes and concrete mixing trays are examples. If necessary, cut a door in one end and cover edge with duct tape to avoid sharp edges. Your cat may prefer a hooded litter box if it is kept scrupulously clean.
   - If your cat often urinates over the edge of the litter box, put plastic covered by newspaper around the litter box to absorb the urine. A rigid sheet of plastic cut so that it can be positioned vertically inside the box can protect adjacent surfaces.
   - Put the litter boxes in separate locations around the house, ideally in quiet private places that are easy for a cat to access. Locate litter boxes where the cat needs them, such as in previously soiled sites, and in areas separate from other pets’ locations. Avoid high traffic or remote areas.
   - This is the recommended litter box plan for your home. See house floor plan in the Cat Owner Questionnaire for clarity if needed.

<table>
<thead>
<tr>
<th>Type of litter</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box 1:</td>
<td></td>
</tr>
<tr>
<td>Box 2:</td>
<td></td>
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<tr>
<td>Box 3:</td>
<td></td>
</tr>
<tr>
<td>Box 4:</td>
<td></td>
</tr>
</tbody>
</table>

2. Types of litter:
   - Offer a variety of litter types and allow your cat to choose its favorite. Cats most commonly prefer fine-textured unscented clumping litters. Brands:

   In addition, examples of alternative litters include play sand, potting soil or peat moss, or a piece of carpet or other soft material used as a temporary measure only and in select cases.

3. Scooping and changing litter:
   - Scoop the litter box daily and replenish litter. Wash the box every ________ weeks and replace the litter.
   - Some behaviorists feel that weekly washing and replacing the litter is optimal. Others find that every 2–4 weeks does not compromise the cat’s response. Rarely because of a particularly difficult to control urinary tract infection, daily washing of the litter box may be recommended.

   Use soap and hot water only; avoid strong chemicals or any ammonia-based products.

4. Litter attractants:
   - Herbal products for this use are available in the US (but may not be available in other countries).
   - An alternative is to sprinkle a small amount of the cat’s urine-soiled litter on top of the clean litter.

5. Synthetic pheromone sprays or plug-ins:
   - Use a spray or plug-in diffuser in areas we have marked on your house floor plan. Spray vertical surfaces...
Appendix 2 Cont.

TAKE-HOME INSTRUCTIONS / House-soiling

1–2 feet (up to 0.5 m) from the floor three times daily; use the diffuser 24 hours a day. Replace diffuser refill unit monthly, or sooner if the top of the brown wick becomes pale tan in color.

6 Ensure vertical spaces for resting or hiding places are available to cats.
   Use shelves, cat condos or trees to increase separation among cats. The more perceived space, the less stress cats undergo. Provide cardboard boxes and other cozy containers for resting places.

7 For cats needing increased opportunities for play and predatory behavior, increase window access by using cat trees and shelves.

8 If outdoor cats seem to be the stimulus for marking behavior, minimize exposure to them. Block the view through windows by applying something your cat cannot see through or prevent access to the window. Options include opaque glass decorating sprays, static film, or taping on paper or translucent window coverings. Put rough surface mats outside sliding doors to discourage other animals from resting there. If your cat lives indoors or does not leave the premises, use motion-activated water sprinklers at the perimeter of the yard to deter animals from entering the area.

9 Put clothing away rather than leaving it on the floor or accessible to your cat.

10 Place shoes, backpacks and luggage with unfamiliar odors off the floor and out of your cat’s reach.

11 Clean outside doors and walls where outdoor cats are spraying. Block drafts to prevent odors from penetrating indoors.

12 Deny access to affected areas if possible or place an item in the affected area that may discourage house-soiling. For example, food and water bowls placed in the soiled areas may discourage soiling; battery-operated motion-activated lights may illuminate dark private areas that a cat previously soiled.

13 Other recommended environmental changes:

Behavior management

Behavior modification efforts should focus on positive reinforcement of desired behaviors. Physically punishing a cat during or after house-soiling only creates stress and increases the motivation to continue the behavior. Punishment can lead to fear-related aggression and will almost always reduce the bond between a cat and owner. Punishment also tends to encourage house-soiling in less obvious areas.

1 If you catch your cat in the act of house-soiling, sneakily distract but do not scare it with noise that is not associated with humans, such as a whistle or by rattling coins in a can. Use your cat’s temperament as a guide to how loud this noise should be.

2 Praise your cat if you see it using the litter box. Keep a supply of treats near litter box stations for use as rewards.

3 Confine your cat in a single room according to the following timetable:
   At all times
   When you are unable to supervise the cat
   When the cat is separated from other pets
   Whenever your cat is confined, provide food, water and two litter boxes.

4 Make sure that adults, children, noisy appliances or assertive cats do not block traffic patterns or a cat’s access to litter boxes, especially in the case of timid or anxious cats.

5 Place a bell on the collar of the most assertive cat in the house.

6 Set up multiple (_______) food and water stations in the following locations (see floor plan for clarification if needed):
Cleaning soiled areas

Many products are available for cleaning areas affected by house-soiling. Urine will fluoresce in the dark under ultraviolet light. Use a black light from a poster store to find soiled areas. Clean affected areas with a good quality urine odor and stain remover according to the type of surface that the cat has soiled. **Test products on an inconspicuous area first.** Always ensure that you clean a sufficiently large area to remove the odor – this may be up to three times the diameter of a fresh wet patch or stain.

- **1 Carpets:** Chemical, bacterial-based and enzyme-based cleaners can all be effective when used as directed. Scrubbing the area with a 10% solution of biological washing powder (enzyme-based laundry detergent) to remove the protein content of urine, allowing area to dry and then spraying with isopropyl alcohol to remove the fat component is also effective. You may need to pull the carpet up for several days and treat the subflooring/underlay again using either a specifically designated cleaner or both the washing powder and isopropyl alcohol. If the padding under the carpet is soiled, cut out the affected area and replace with new padding. Use a concrete sealer if appropriate or a polyurethane or other sealant product if there is wood subflooring/underlay. Treat the back of the carpet with urine odor remover and back the carpet back down.

- **2 Concrete:** If allowed in your area, use a sodium hypochlorite bleach (1 tablespoon per gallon of water) to wash a concrete floor: Make sure the area is well ventilated, and eyes and hands are protected. Avoid all ammonia-containing cleaners.

- **3 Wooden baseboards/ Skirting boards:** Use a wood soap then seal the edge of the board to the wall with a silicone sealer.

- **4 Walls:** Use a product designed for urine and stain removal.

- **5 Bedding:** Launder in washing machine using your usual soap or detergent; add a peroxide-based bleaching agent, if available.

- **6 Upholstery:** Use products designed for these materials; for example, fabric or leather cleaners.

**Medical testing**

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal</th>
<th>Abnormal (blood, crystals, bacteria)</th>
<th>Very concentrated</th>
<th>Other</th>
</tr>
</thead>
</table>

- **Urine analysis:**
- **Urine culture:**
- **Blood panel:**
- **X-ray/ultrasound:**

**Medical treatment**

- **Treat for lower urinary tract disease:**
- **Treat for constipation:**
- **Treat for diarrhea:**
- **Treat for kidney disease:**
- **Treat for other medical condition:**
- **Dietary changes needed (see below)**
- **Antibiotic:**
- **Pain medication:**
Appendix 2 Cont.

TAKE-HOME INSTRUCTIONS / House-soiling

☐ Other:

☐ Treat with anti-anxiety medication:

NOTE: There are no anti-anxiety medications approved for use in cats. These drugs are prescribed for feline use as an extra-label application. Anti-anxiety drugs may cause side effects such as sedation, dilated pupils, weight gain, diabetes, increased appetite, liver and kidney disease, and cardiac arrhythmias. Do not change the medication dosing or frequency without consulting with your veterinarian. Laboratory tests are required before and during the use of many of these medications. Keep these medications out of the reach of children.

☐ Give:____________ times a day.

☐ Other side effects that can be seen with this medication include:

☐ Full effects may take up to 4–6 weeks to be seen.

☐ Clinical examination and blood tests must be performed before using this medication and every _____ months thereafter due to potential liver and kidney side effects.

☐ Other treatments:

Dietary changes

Gradually change to the diet recommended below. We can offer you suggestions on how to make the change if needed.

Change to: ☐ Prescription ☐ Canned ☐ Dry

☐ Non-prescription:

☐ Other:

☐ Sequentially offer the new foods we send home with you. Please purchase more of the prescription diet that your cat prefers and continue your cat on the prescription food until ___________ (date). Note: Do not stop feeding the prescription diet unless directed to do so. Most cats will have further health difficulties on regular dry foods. If your cat will not eat the prescribed diet please contact us!

☐ Dilution is the solution! Mix canned food with water to make a slurry consistency or ‘kitty soup’. Warming may improve palatability.

☐ Give _______ 12 cc (12 ml) syringes of water daily by mouth to dilute your cat’s urine if it will not eat canned food. Increase active feeding by placing food in toys or using puzzle toys to dispense food.

Follow-up

☐ Medical progress exam and repeat urinalysis and/or blood panel on: ___________ (date)

☐ Call with progress report on: ___________ (date)

☐ Other follow-up actions:

Appendix 3: Inside of Booklet for Students Attending Cat-Cat Owner Interviews

WHY DESIGN RESEARCH?

DESIGN RESEARCH AIMS TO UNDERSTAND WHY PEOPLE DO WHAT THEY CURRENTLY DO, WITH THE GOAL OF UNDERSTANDING WHAT THEY MIGHT DO IN THE FUTURE. By understanding motivations, values, and context, we can understand not only what is wrong, but also we can learn how we might use design and design thinking to fix existing problems & identify new opportunity areas.

INTERVIEW TIPS & TECHNIQUES

APPROACH WITH A OPEN MIND
Don’t judge or jump to conclusions. Be curious.

HAVE A CONVERSATION, NOT AN INTERVIEW
Avoid following a rigid script. Don’t make them feel like they’re being tested. We are here to learn from these people, not evaluate them.

EMPATHIZE AND IDENTIFY WITH THE PEOPLE YOU MEET
Try to see things from their point of view. Understand their perceptions. Don’t correct, refute, or challenge.

ASK OPEN ENDED QUESTIONS
Avoid leading questions. Instead of “Do you like this?” ask “What do you think of this?”

TELL ME ABOUT A TIME WHEN...
Ask participants to tell a story about an actual event in their past. This encourages people to move from the abstract to the real.

TRY NOT TO FILL ANY SILENCE
After asking a question, give them time to reflect and answer.

DO NOT ASSUME YOU KNOW WHAT THEY ARE GOING TO SAY
Don’t put words in their mouth. Always ask participants to explain their reasoning.

ALLOW FOR INTERPRETATION
Keep in mind that what they say might not match up with what they do. They may not be able to verbalize (or even know) what they need.

...AND TAKE LOTS OF PHOTOS!

SOME PEOPLE TO SPEAK WITH

CAT OWNERS
VETERINARIANS
PET STORE OWNERS/EMPLOYEES
PET SHELTER VOLUNTEERS

SOME QUESTIONS TO ASK...

IF YOU’RE SPEAKING TO A CAT OWNER
TELL ME ABOUT YOUR CATS.
What are they like?
How long have you had them?
Why did you choose to adopt?
Where did you get them from?

DOES YOUR CAT HAVE ANY SPECIAL HABITS? WHAT ARE THEY?

CAN YOU EXPLAIN YOUR CATS’ BATHROOM ROUTINE TO ME?
Where do they go? Do they receive any special training?

IF YOU’RE SPEAKING TO A VETERINARIAN...
WHAT TYPES OF BEHAVIOR DO CATS KNOW INNATELY? WHAT TYPES OF BEHAVIORS HAVE TO BE LEARNED?

DO OWNERS HAVE ISSUES WITH THEIR CATS GOING TO THE BATHROOM IN THE WRONG LOCATION?
What do you advise they do? Are there any common methods pet owners use to combat this behavior?

IF YOU’RE SPEAKING TO A PET STORE OWNER...
DO CAT OWNERS COMMONLY BUY ANY ITEMS TO HELP THEIR CATS GO TO THE BATHROOM?
Can you show me these items? How do they work? Why do cat owners purchase them?