CAT-FRIENDLY VETERINARIAN

Figure 1: A picture from Tim Wall [2]

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A project for: animal practice Slangenbeek
Client: Philip van Vulpen

Research Summary

The goal of this project is to find a solution that makes veterinary practices as stress-free as possible for cats with a solution that is as cost-friendly and feasible as possible. To do this we looked at existing solutions and research to create the best result. Our resulting product the ‘Feline Good’ has a small UI that runs on a mini-computer, an Arduino. This UI helps pet owners make decisions on how to give their cats a stress-free visit. To evaluate our product we questioned users, and we would have experimented with the UI and observed how pet-owners use our product but due to COVID-19, this stage did not happen. The crew of Feline Good believes the box combines and improves existing solutions making this one of the best solutions out there.

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Chapter 1: Introduction

1.1 Introduction

Going to a veterinarian is something all pet owners have to deal with.
And everyone wants to make it as enjoyable and stressless as they possibly can. Especially for cats since they are not only stuck in those small cat carriers but also have enthusiastic dogs around them who will bark and stick their noses against the carriers when they smell the cat.

This is also the problem our client Philips van Vulpen wants us to solve. Philip is one of the two veterinarians who work at the veterinarian practice Slangenbeek in Hengelo. The practice is for dogs, cats, rabbits and other pet animals. They have a big waiting room, two examination-rooms, one operation room (OR), one recovery and wetlab, one radiology room and an office which is also currently the breakroom. Since Slangenbeek treats both cats and dogs in the same practice, the cats and dogs naturally sit in the same waiting room which can lead to stress for cats, dogs as well as the humans involved.

To help make this experience better, there is a cat-friendly stamp to mark the state of the pet clinic. These stamps are divided into three categories (bronze, silver, and gold) which you can acquire by meeting the Cat-Friendly Clinic's guidelines [1]. Examples of standards you will have to meet for these accreditations are as follows. The bronze stamp you can get by meeting basic requirements like 'having trained staff', 'having emergency care' and 'keeping record'. For silver, which is the level the client wants to achieve at least, the practice will need additional requirements such as 'recording owners complaints', 'cat waiting area separated by barriers from dogs' and 'consulting room(s) that allow complete closure for privacy'. And lastly, the gold can be earned by 'reducing stress in the waiting room', 'one consulting room exclusively for felines' and 'consultation length must be 15 minutes or more' etcetera. Our client wants to make improvements to the clinic to achieve the silver or if possible gold stamp.

1.2 Problem goal

Our goal is to find a solution to make the practice cat-friendlier while also getting (at least) silver on the quality mark for cat-friendliness, with a solution that is as cost-friendly and feasible as possible.

There are many different ways to try and tackle such an issue, however, they all seem to be small solutions where only a few cats would profit or solutions that only work in certain situations [10]. Our product shall make the cat as comfortable as we can while also having as much space for cats as the veterinarian practice can and will offer. It will also be easy to clean as that is a necessary requirement in a veterinarian practice. Our product, suitably dubbed 'Feline Good' will also be easy to understand so nobody had to make the trip to the clinic extra long to figure out how to help their pet. And lastly, it will also come in multiple colors so if you would rather not want the steril clean look you could also go for a bright and happy color that better suits your clinic.

Like Charles Dickens said: “*What greater gift than the love of a cat.”*

Chapter 2: Analysis

2.1: Introduction

This chapter will focus on the main problem, the users, the required research and the product requirements to verify all the needed knowledge for the design will be there during the design process. First, the problem will be analyzed, then research will be done for a solution. After that, the focus will be on who uses the product and in which situations it will be used. Lastly, the focus will be on the design and implementation requirements. This process of examining every detail should provide the best solution.

2.2: Problem description

The main goal for the silver stamp is to make sure cats and dogs cannot make eye contact. This can be achieved through something as simple as a separation wall. This wall is preferably not from the floor to the ceiling but it has to be high enough so the biggest dog cannot look over it. Or it can be done with something more advanced. Currently, the waiting room is one big room with only a small cat tower to keep cats out of reach of dogs.

To achieve the silver stamp, we came up with a multipurpose wall for the cat. The 'Feline Good' box came to place with inspiration from the closet called the 'Kallax', a picture of this closet is in figure 6 of Appendix A. How it works is that you place your pet carrier inside one of the cubes. On the wall will be a panel where you can select the cube that your cat is in and choose which settings you like for your cat. You can vary the color, scent, warmth, and sound inside the cube. When activated, the cube is set on the normal settings for the owners who are not sure what the cat prefers. Some owners do know what their cat likes and can choose to change one of the variables.

For the variables in the cubes, we selected a few proven options to choose from. For the scent, we found multiple options that calm the cat: catnip, valerian, chamomile, hops, and bach's rescue remedy. [5][7][8]

For the hearing, there are multiple options. A special song has been made on the frequency of cats and they investigated the purrs of a cat and implemented that [4]. Another option is to use classical music [4], and explicitly Georg Friedrich Händel has been proven to have a calming effect. Finally, just the sound of a bird is not per se calming but it is very distracting.

With sight, it is more difficult to use this to help the cat calm down. There is a color palette that is calming for cats [3][14] so you do not want to use plain white [15], see figure 3. This will be implemented as light inside the cube.

Figure 2: The colors that have a calming effect on cats

We implemented the touch in a way of warmth. The preferred warmth depends on the cat, it depends on size, age, and breed but also their health. Cats with a thick fur will be less happy with a higher temperature than one with a thin coat. [9]

The wall is available for every pet clinic because the wall can come in every quantity and formation desired. Since the system works with cubes, it is rather easy to add a new cube and design it in the way it fits.

2.3: State of the art

As of now, when you enter the clinic, a maddening sound plays. After going to the registration desk, you then go to the waiting room. This is one big, white room with one special tower to place the cats in their pet carrier. On this tower, there is only space for two of these carriers. This way eye contact between the cat and dogs is still possible. In other clinics, there are also other solutions like a cupboard where items can be stored which also doubles as a room divider. With walls eye contact will be less likely, however, the cats will still be able to feel or hear the dogs because they cannot focus on much else.

2.4: Users, Use case

Pet owners want what is best for their pet, that is why they go to the veterinarian. But when your pet is so stressed when they go, that will only discourage the owner from going the next time. The ‘Feline Good’ box is a box that is in every way calming. This way a visit to the veterinarian will be more pleasant and hopefully will encourage the owner to go more frequently. Another reason why our box will help both owner and pet is that when the cat can associate the carrier or even the entire visit with a more positive feeling, the cat could come along more willingly and thus make the visit from start to finish less stressful.

2.5: Use scenario

When the owner arrives at the practice, they check-in at the desk. Afterward, they go to the waiting area and place their cat, who is already inside a pet travel box, into a ‘Feline Good’ cube of their choice. On the control panel, the owner can change the setting to whatever they want for their pet depending

on their size, age, breed, and health. The settings are set up with a simple system, the user can either choose everything according to their wishes or go for the predefined settings. If the user decides to choose everything themselves they will go through 4 menus: color, temperature, smell, and sound. In each of these menus, the user can still choose a preset option. This way if the owner only wants to choose a different sound for their cat outside of the predefined settings they can do so. With every successful choice the owner makes, a green light will go on on top of the box. This way the user knows the product successfully responded.

2.6: Design requirements

First of all the pet owners have to see that the 'Feline Good' wall is meant to put the pet carrier in. They should also be able to clearly see that there is an interface that is meant for them to use. After that, the owner has to know that they can set the preferred settings for the cat. As for looks, the physical design should come in different colors/materials so clinics who don't want metal can also use our product. These materials, however, should all be easy to clean since this is a very important demand for veterinary practices.

2.7: Requirements

One thing that is sure, is that the wall cannot fall over. This will not only stress out the cats, and the other animals, but it will also cause accidents. Another requirement is that adding another box to the series should be simple and should be doable for someone with no technical background. It should also be possible to add a large box to a series of medium/small boxes without needing to build a new wall for each size of boxes. As for inside the boxes themselves, the speakers should be placed facing towards the back and on a low volume so it does not bother other cats or owners. And lastly, it is also required that inside each box there is a ventilation system so the previous smell can be dissolved before a new user arrives. This ventilation system will also help to make sure the temperature inside the box will not affect the temperature inside the clinic too much.

Chapter 3: Design and implementations

3.1 Introduction

To make sure all requirements were taken into account, first, a 3D representation of the waiting room was made, as can be seen in figure 3. This is based on pictures that were taken during our visit. Hereby, we got a clear overview of whether or not our design would actually work in the client's waiting room, as he indicated he wanted to keep the waiting room an open space to give the feeling of a bigger room.

Figure 3: 3D representation of the waiting room

Using the 3D representation to figure out which size would or would not work we started designing the wall, which quickly turned into separate boxes when the realization struck that this was a better way to provide high seats for cats while still having a spacious room. The initial sketches for the boxes mostly focused on the small parts to see what looks better and what research had yet to be done. In Figure 7 of appendix A is an example of what one of the initial sketches looked like.

After the initial design sketches, a mood board was made to get a clear overview of necessities and wishes for our product, this way the final sketches could be made. On the mood board, necessary items and design decisions can be seen. This mood board is also in appendix A, Figure 8 to be exact.

And this process led us to our final design in figure 4. This 3D model is the finished design of our product**.**

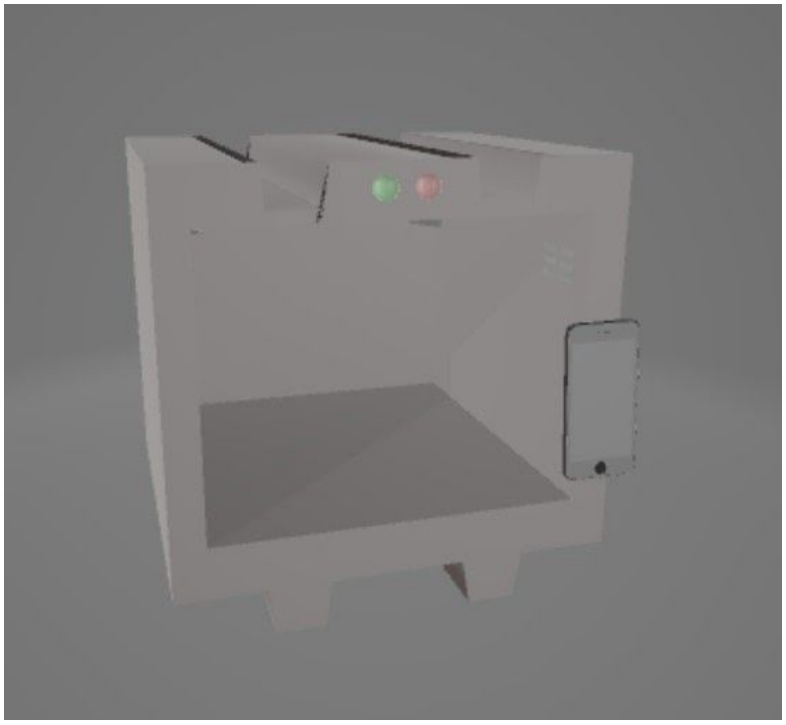

Figure 4: our final product design in 3D

3.2 Final Design

The basis of the product is a box with one side that is open. This is where the cat cages can be put in. Every box can operate separately, as every box also has its own power source in the form of a battery. The boxes are designed in such a way that they can operate separately from one another, but they can also be easily stacked on top of each other. There is a sturdy base, preventing the boxes from falling over, and the top and bottom are designed in such a way that boxes on top of other boxes will not start to shift.

3.3 Software Design

As far as software goes, there is a small UI running on the control panel which controls all of the elements through an Arduino. This UI is used to control the box but is also useful to draw attention to the boxes and to clarify what the boxes are for.

With the UI the user can indicate the color of the lights, the temperature, the scent, and what music or sound is played. There are a few presets, but the user can adjust the settings to fit their cat's preference.

3.4 Hardware Design

The structure of the 'Feline Good', as seen in figure 9 in appendix A, is quite simple. The box is controlled by a battery-powered Arduino. The control panel is connected to this display, together with the other

elements: A speaker [11], LED lights [12], A heating element [13], and the scent dispenser. The scent dispenser is made up of a bottle with a spray nozzle and a little motor that pushes down on the nozzle when activated. The scent dispenser is combined with a ventilator. This ventilator can be used to clear out the smell of the previous cat and the previous selection. Via the control panel, all these components can be individually adjusted. The control panel also has a button to neutralize the box if anything should go wrong. It puts the box on standby, turning off the heating, light, heating components and scent dispensers.

3.5 Product Design

The product design figure 5 represents our product quite well as it shows not only the design but also how it would work. It is only missing a few additional details that were added later on in the process. This is the final sketch we made before we made a 3D animation.

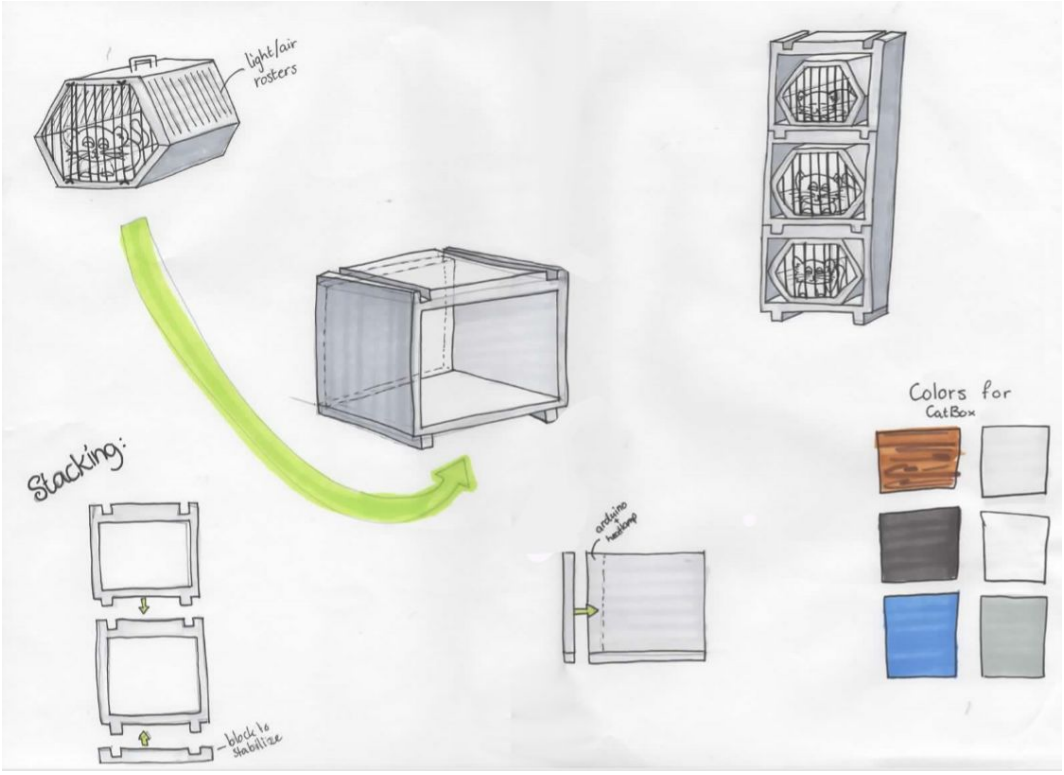

Figure 5: Our official sketch.

We made it so that our product is very easy to install. There is a sturdy base that prevents the boxes from falling over which can either be open so the user can store items in there or closed so it is easier to clean. The top and bottom are designed in such a way that boxes on top of other boxes will not start to shift. So all the user has to do is stack the boxes on top of each other and the rest our product will do automatically. When a customer buys multiple units, they can be connected to a power source through a relay network. This means that they will all be interconnected and for an entire wall of boxes only one power outlet is needed. This is possible due to the fact that these boxes are run by Arduinos which only requires about 5V each, so many units can be powered by a single outlet.

Chapter 4: evaluation

Chapter 4.1: Introduction

The challenge of the client is to find a way cats and dogs cannot see each other anymore in the waiting room, so they will be more relaxed when treated by the veterinarian. The client wants to obtain this, in order to get a certificate for cat friendliness. We are now going to evaluate if our product, the cat boxes, are a good solution for the product.

The focus of our product consists of three parts, we will evaluate the product on those points. First the effectiveness, in the end, our product should ensure that cats and dogs cannot see each other anymore in the waiting room. Besides that, the user should be able to make choices in the program for cats. When we look at efficiency, the user should be able to use the product's interface with not too many steps to get to the final result. Finally, the satisfaction, the user should feel like the cats are actually more relaxed, and that they themselves feel more relaxed too. Besides that, we want them to like the design; the interface with interaction, but also the clickable blocks.

For the evaluation, we will use various dependent variables. We also divided these dependent variables over the 3 parts of our focus. First of all, we will measure the effectiveness by the success rate. This means the rate of people that can successfully set the settings of our product. We will also measure how many errors and retraces there were. Besides that, the behavior of the cats will be measured. We will look if they are stressed by our products or more relaxed.

To measure the efficiency, we have other dependent variables, such as; how many steps did it take to get to the final goal, how many retraces did the user needs to reach the final goal, how much time did it take. Finally, we will measure satisfaction by taking interviews before and after the experiment. We will ask what they think of the behavior of their cats, the design and let them rate the product's aspects.

Chapter 4.2: Methods

There are several methods we will use to measure the variables we chose. We start the evaluations with questioning. There will be some questions before and after the test. This way we can compare them and evaluate the use of our product.

The questions that will be asked beforehand are:

- "How would you describe the environment for your cat in this clinic?"
- "What is the behavior of your cat when he goes to this clinic? Is he often stressed out?"
- "How do you feel when you walk into this clinic? Is there a relaxed atmosphere?"

We ask these questions so we can ask them after the experiment if anything has changed. We deliberately don't ask anything about dogs yet, because we want to observe indirect and direct. In the direct observing part, we will look at how they carry out the experiment related to our project. The focus is here on how the user uses the product and how he is carrying out the experiment.

We are also indirectly observing, in not telling them that we are actually trying to find a solution for distancing cats and dogs. This way we hope that they do not pay attention to that and are not influenced

by that fact. In the beginning, they are told that it is to get cats more comfortable, and at the end of the experiment, we will also tell them that it is for separation of cats and dogs.

The interview we will do after the experiments will ask the following questions:

- “Do you feel like your cat is more relaxed when using this device? How would you now describe the environment for your cat in this clinic?”
- “Do you feel more relaxed when you see your cat is not stressed out? Is the atmosphere in the clinic for you now better?”
- “Do you feel like the cat is more relaxed due to the fact that they can’t see the dogs anymore?”
- “How do you like the design of the clickable boxes? How did you experience the difficulty of the interface?”
- “Which design did you like best: the one with only presets, the one with only customized settings or the one with both”?
- “Do you have any additional suggestions?”

During the experiment, we will use a checklist to make sure we get all the measurements we need to evaluate the experiment. This will help us to not forget anything.

The dependent variables are described above. We will now explain the independent variables we use. First of all, we want to see how this technology is working for different people and different cats. We need young and old people testing our product, but also with young and old cats. Besides that, we want to divide them into a group with experienced and inexperienced cat owners. This means owners that have cats for years and understand signals of cats, and also owners who just got their cats.

We also want to see how they understand the system. To further test that, we will have 2 groups: one group will get an explanation before, and the other group will just go in without an explanation. Furthermore, we will test different versions of our design. There will be one design with just a preset function for the cat, one design where people have to manually set all the settings in the box and the last version will have both. All the external influences and settings, for example how our temperature sensors/actuators and aroma-diffuser work, need to stay the same. Also, the amount and types of dogs in the experiment need to stay the same, and the environment. Those are our confounding variables. We decided to do this because otherwise there were too many variables to test.

There is a difference in between-subject set-up and within-subject set-up. We will use the between-subject set-up for several things; comparing the group that had instructions before with the group that had not, comparing the group with experience with cats and without, and comparing younger and older people. We will use the within-subject set-up for comparing the different versions of designs.

Chapter 4.3: Hypothesis

There are a few expectations that we have regarding the experiment. First of all, we think that younger people will understand the interface more easily than older people. We will see this in fewer errors, fewer steps, and fewer retraces. It will also take them to get the desired result.

We expect that the group that had instructions beforehand will get the desired result in fewer steps, but we think this is not much less than the group that did not have instructions. We believe our interface is so simple and easy to understand that it does not influence this aspect.

Besides that, we expect that the cat owners will feel their cat being more relaxed, and therefore they will feel more relaxed too. Furthermore, we expect that people who have experience with cats before, better know what their cats like and like the product much better. We expect to see this in the interview that has been conducted at the beginning and at the end. The users will be happier with the way their cats are, and hopefully like the clickable design.

Furthermore, we expect that the version with presets as well as customized settings is higher valued than the rest of the versions. People like to have influence, but also want to have the choice to see what experts think is best for their cats. We can see this in the interviews and in the success of the product (if they get to the desired end result), the number of steps, retraces and time.

Chapter 4.4: Procedure and planning

The task that we ask from there is relatively simple. We will ask them the following:

- Set the cat in the box
- Set the settings that are preferable for your cat.
    - Set the best setting for scent
    - Set the best setting for light
    - Set the best setting for sound
    - Set the best setting for temperature

The experiment will be taken 3 times, each time another version. It is depending on the experiment how this will go. For example, when we use the version where there is only a preset, we will only ask them:" Set the box to the preset / turn the box on".

We will count it as successful when at the end of the experiment the box starts working. We have to make sure that the number of participants in all groups is the same. We will test in real situations (in clinics), so we will get the most reliable results. The materials we need during the experiment are the box itself (with all working electronics and interface), something it can stand on (later professional but now just to test) and paper and video for us to record the video.

There will be a planning and procedure beforehand how to carry out the experiment.
To begin the experiment, there will be a short introduction and explanation. After that, the interview and test will take place. At the end, another interview will be conducted.

We will have 8 different groups of people to test. They all have a slightly different set of aspects we want to measure. We will not have separate groups of young/old cats, because then we will get too many groups we need to take into account. Nevertheless, during the evaluation, we will look at this aspect and take measurements.

- Group 1: young experienced cat-owners who don't get explanation beforehand
- Group 2: young experienced cat-owners who get explanation beforehand
- Group 3: young inexperienced cat-owners who don't get explanation beforehand
- Group 4: young inexperienced cat-owners who get explanation beforehand
- Group 5: older experienced cat-owners who don't get explanation beforehand
- Group 6: older experienced cat-owners who get explanation beforehand
- Group 7: older inexperienced cat-owners who don't get explanation beforehand
- Group 8: older inexperienced cat-owners who get explanation beforehand

We will test all groups 3 times with the 3 different designs of the product. There will be a checklist that says what to prepare, measure, observe while the tasks are carried out. There will also be a timetable that shows approximately how long everything will take. We aim to have 5 people in every group. Time can be reduced by giving them all instructions at the same time.

Chapter 4.5: Results

Unfortunately, we can't show any results due to the COVID-19 virus and therefore lack of the physical product.

Chapter 5: conclusion

5.1: Discussion

Our goal was to find a solution to make the practice cat-friendlier while also getting (at least) silver on the quality mark for cat-friendliness, with a solution that is as cost-friendly and feasible as possible. The solution for this goal is a product called the 'Feline Good'. The 'Feline Good' is a box in which a cat carrier can be placed, and where the pet owner can then choose settings best fit to help their cat relax. These separate boxes can be stacked on top of one another to create a wall to separate cats and dogs.

So how does our work fit in with other existing solutions? The 'Feline Good' combines and improves existing approaches to maximize the comfort of cats. While the current solutions usually have either height or separation to avoid cats and dogs locking eyes, we combined both and added some additional features so the cats can focus on something else. With our product, the cat could, in theory, forget that the dog was even there with how relaxing the environment has become for them.

5.2: Conclusion

While our current solution is a great one, this was not our first answer to the problem. Our first answer was too much based on the idea of creating a wall and not enough based on the cat itself. However, realizing that we were not helping the cats themselves enough helped us transform our first official idea into the product we have now. Of course, due to the COVID-19 virus, the 'Feline Good' was never able to be tested in practice, so there might be things in the product that do not work the way we expect it to. However, we will just have to assume that a group of 6 CreaTe-students putting their brains together to think of the most optimal solution would have been able to solve any problems that could have come our way during testing.

One of the requirements was that it cannot fall over, this will severely stress the cats. This is solved with a heavy base for the wall, which is also intended as decoration. Adding another cube is as easy as putting it where you want and connecting it to the system. The same goes for adding a different size cube. All the cubes are in a ratio that fits and if there are empty spaces there are cubes for decoration that can fill them up. About the scents and sounds, we were unfortunately not able to calibrate them to be optimal.

For the owners, who have to know that it is meant for them, there will be all kinds of tools to help. For example, a poster and a manual. There is also always someone available at the desk to help if it really is necessary. And lastly, the clients' wish to be able to keep the open space is also possible with our product because the wall can be built as high or wide as the client wishes.

5.3: Recommendations

For the next person to work on this project we recommend to actually build our product and to find a way to improve our work or to show us what other great solutions are out there, this is also a great

opportunity to calibrate the correct temperature. We, unfortunately, could not do this because we could not build it. We also thought of an addition to the ‘Feline Good’. Some cats have chips with registration and might be a way to let the cube read the chip so the owner does not have to go to the check-in desk and get optimal time in the ‘Feline Good’. And most important: Remember that your goal is to help the cats, not directly the pet owners. We as designers are used to thinking human-centered when designing but in this case, you will have to recognize that for the cat to be as stress-free as it possibly can be, it will have to be cat centered. This is incredibly difficult to do because you keep thinking of ways that may help the cat indirectly while helping the owner directly, but as you can see here it is possible to turn that around.

Reference pages

[1] ISFM Cat Friendly Clinic Accreditation Criteria, PDF

[2] Tim Wall, Purina PetCare to acquire share of European vet group, article, 2019

[3] Vicki J. Pollard, AIA, CVT, and Ashley M. Shoults, AIA, 5 tips to quickly freshen up your practice with paint, article, 2019

[4] Richard Gray, Can classical music calm your cat? Playing the violin relaxes felines - but AC/DC could stress them out, study reveals, article, 2015

[5] PetMD Editorial, How to Calm Down a Cat: 5 Herbs for Cat Stress Relief, article, 2014

[6] Karen Overall, Manual of Clinical Behavioral Medicine for Dogs and Cats, e-book, 2013

[7] Neil B. Todd, Inheritance of the catnip response in domestic cats, PDF, 1962

[8] R. C. Hatch, Effect of Drugs on Catnip (Nepeta cataria) Induced Pleasure Behavior in Cats, PDF, 1972

[9] Lorena Avila, What's the best temperature at home for a cat, article, 2018

[10] Naedia Clarke, Designing a Stress Free Vet Visit: A Systematic Review, PDF, 2018

[11] Mini loudspeakers from this website

[12] LED Strip digital WS2812B from STORES

[13] Ceramic heater available on this website

[14] Lynn McKenzie, Color therapy for animals, article, 2010

[15] Rob, Colours that Stress and Calm Your Cat, article, 2015

Appendix A

Figure 6: The Kallax from IKEA - image source [IKEA]

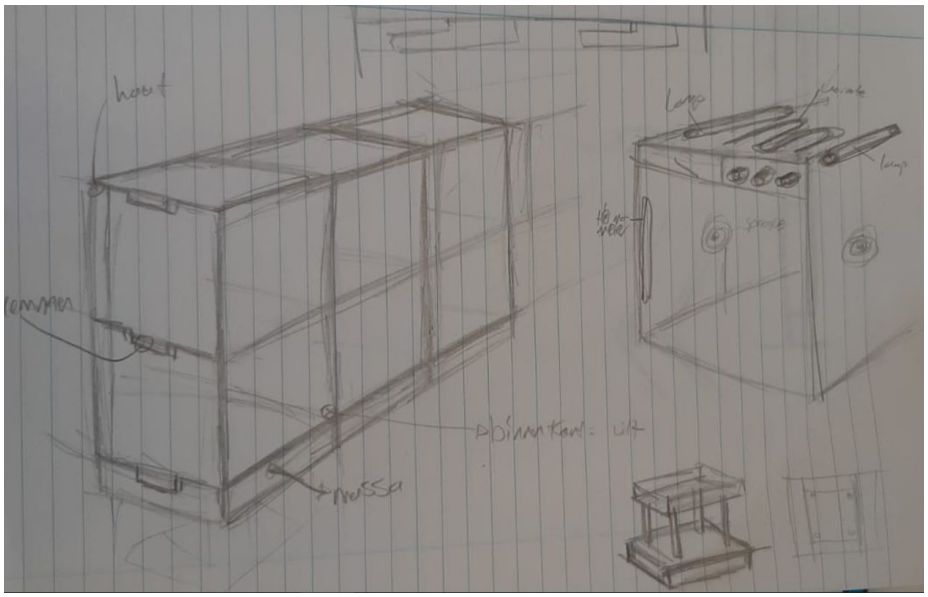

Figure 7: Initial sketches of our box

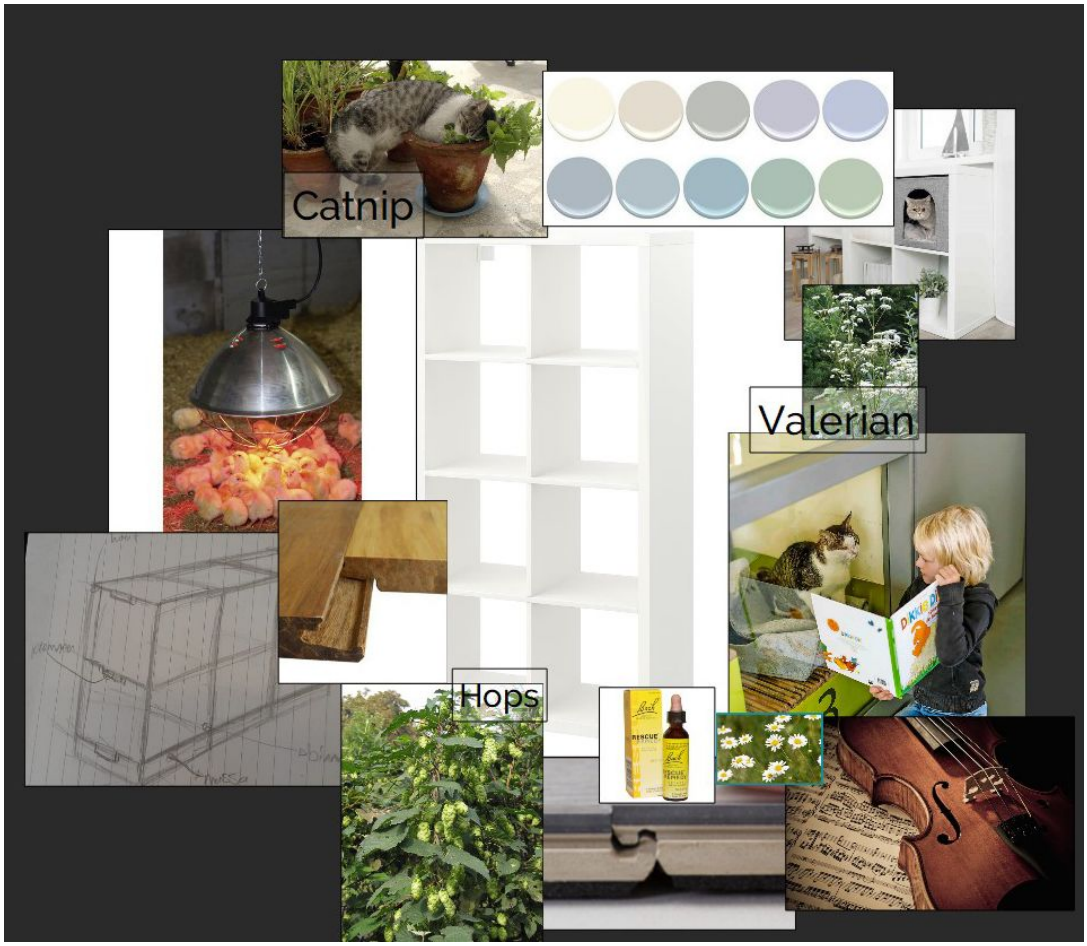

Figure 8: The mood board for our project and design

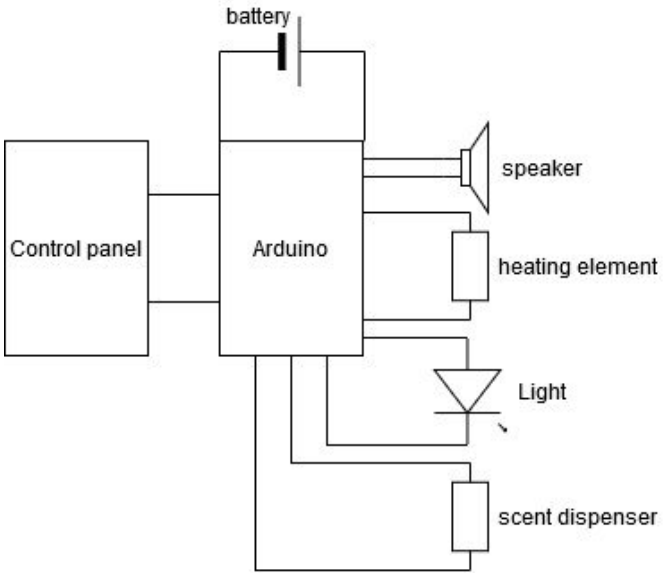

Figure 9: The hardware of the 'Feline Good'