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Designing for a Multispecies House-hold

Development of Pet's Habitats

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This article makes a brief presentation of the development process of two prototypes that foster the environmental enrichment of two species of companion animals: guinea pigs and cats. The prototypes Domus Petra and Locus Turi were the results of a research project carried out within the scope of a master's thesis in product design. The main goal of the project is to research how product design can promote animal welfare, health and, also, human wellbeing. There were identified cats and guinea pigs' main characteristics and needs, as well as the problems of the spaces they inhabit when integrated into multispecies households. The animal's artificial habitats were re-evaluated and redesigned to encourage the practice of normal species behaviours. The focus lays on the relationship dynamics between humans and companion animals: their practices of care; feeding; maintenance of animals and their products; ways of living together; and human-animal-objects interactions. The Domus Petra and Locus Turi prototypes seem to be usable by animals and humans, however, future improvements and developments should be considered. There is a need to explore other approaches to non-anthropocentric design practices, and other paths to include animal perspectives in product development.

Keywords *Multispecies Design, Cats, Guinea Pigs, Non-Anthropocentric Design, Habitats.*

Introduction

Human and non-human animals have been living side by side and co-constructing their lives together. Non-human species are present in urban and rural areas, inside and outside “human” houses, and far from sight in the wilderness. These “other” species are everywhere. They are part of our lives, society, and culture. We buy them, sell them, kill them, eat them, and test on them (Urbanik, 2012). We also care for them, protect them, feed them, raise them, and mourn them when they die (Nast, 2006). Our human lives are profoundly entangled with those of other species. We are in a constant process of “becoming with” all of these creatures we encounter (Haraway, 2008). The process of co-constructing who we are as humans happens not only with the species we interact with in the outside world but also with those who live inside with us. “To be one is always to become with many” (Haraway, 2008, p.4).

The homes in which humans live are also places of coexistence with other animals. Pets occupy a liminal space in family households. They are individual beings, “human” enough to be cared for and adopted as family, and, at the same time, still animals easily disposable when is no longer convenient to attend to their needs (Irvine & Cilia, 2016). Today, companion animals exist in large numbers within households around the world. The way they are viewed and valued has changed considerably over the past fifty years. Despite the ambivalence in which they are seen, they are active family members who participate in family “making” (Irvine & Cilia, 2016). They reshape family routines and practices. As was mentioned by Leslie Irvine and Laurent Cilia “families are, and always have been, constituted as more-than-human” (Irvine & Cilia, 2016, p.8).

Although pets are members of multispecies households, their natural behaviours and needs diverge from those of humans. When living in spaces designed for humans, pets may have difficulty in practicing normal behaviours. They inhabit spaces that aren’t designed to fully fulfil their needs. The lack of environmental enrichment brings consequences to pets’ health, wellbeing, and may cause abnormal behaviours (Young, 2003). Humans may give up on their relationship with their companion animals due to behavioural problems, leaving them in shelters (Nast, 2006, p.313; American Association of Feline Practitioners, 2004). For humans, it might be difficult to identify the origin of behavioural problems since there are usually feelings involved (Young, 2003, p.77). However, pets need more than food and affection. They need the freedom to live healthier lives and to express themselves fully by actions like running, scratching, or climbing.

Urbanik, J. (2012) *Placing animals, an introduction to the geography of human-animal relations*. Rowman & Littlefield Pub- lisher

Nast, H. J. (2006) *Loving... whatever: Alienation, neoliberalism and pet-love in the twenty-first century*. https://www.researchgate.net/publication/228771911_Loving_Whatever_Alienation_neoliberalism_and_pet-love_in_the_twenty-first_century

Haraway, D. J. (2008) *When species meet*. University of Minnesota Press. http://xenopraxis.net/readings/haraway_species.pdf

Irvine, L., & Cilia, L. (2017). *More-than-human families: Pets, people, and practices in multispecies households*. *Sociology Compass*, 11(2), e12455. <https://doi.org/10.1111/soc4.12455>

Young, Robert John (2003) *Environmental Enrichment for Captive Animals*. Blackwell Publishing

Wolch, J., & Owens, M., (2017). *Animals in Contemporary Architecture and Design*. *Humanimalia*, 8(2), 1-18. http://www.expandedenvironment.org/wp-content/uploads/2017/08/Wolch-Owens-Animals-in-Contemporary-Architecture-and-Design_.pdf

Wainwright, Tom, (2018) *Pet-ecture Design for pets*. Phaidon

Uexküll, J. v. (s.d.) *Dos animais e dos homens: digressões pelos seus próprios mundos / Doutrina do significado*. Livros do Brasil.

Jönsson, L., (2014). *Design Events - On explorations of a non-anthropocentric framework in design* (PhD Dissertation, The Royal Danish Academy of Fine Arts, School of Design) https://www.researchgate.net/publication/317092661_Design_Events_On_explorations_of_a_nonanthropocentric_framework_in_design

DiSalvo, C., & Lukens, J. (2011). *Nonanthropocentrism and the nonhuman in design: possibilities for designing new forms of engagement with and through technology. From social butterfly to engaged citizen: urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement*, 421.

Despite the struggle to satisfy their needs, pets receive different objects and products that coexist in spaces shared with humans. Designs for various pet species exist in abundance, mainly for dogs and cats (Wolch, & Owens, 2017; Wainwright, 2018). Nevertheless, not everything that is designed for animals is truly focused on them. Their needs are frequently ignored and the products don’t contribute to a substantial improvement in their quality of life. These, sometimes, add nothing other than appealing aesthetics to pre-existing product typologies. Pet products aren’t always able to satisfy the animal’s needs especially when they are designed to appeal to humans and their markets (Young, 2003; Wolch & Owens, 2017).

Although environmental enrichment is already widely developed in the context of zoo animals, it isn’t fully developed in the case of pets. Generally, their environment is only enriched by interactions with human beings, or with toys (Young, 2003, p.77). While humans should not be removed from thought when designing for animals, the latter’s needs, and ways of perceiving and interacting with the world should be the starting point of project development. Designers must dive deep into animal’s worlds like Jakob von Uexküll who “traveled” through the “worlds” of other species (Uexküll, s.d.). Designing for non-human animals from a non-anthropocentric approach implies considering these animals, considering human beings, and also considering their coexistence and shared worlds. Taking a non-anthropocentric approach to design practices is not about abolishing human perspectives, but rather adding animal ones (Jönsson, 2014; DiSalvo & Lukens 2011). Designing for companion animals, members of multispecies households, is not a straightforward process: there is a need to understand their “animality”, but since they aren’t wild there is also a need to understand their human companions and environments.

Strategies for Project Development

The developing process of both prototypes was inspired by practices of environmental enrichment for wild animals in zoos (Young, 2003). To this end, the characteristics of guinea pigs and cats were researched, such as: their behaviours, needs, kinds of foods, diseases, hygiene and several aspects of these species lives. The pet’s artificial habitats were looked for; along with objects, products, and materials with which animals usually interact. These objects could facilitate feeding, scratching, hiding, playing or confining them to a given area. There were established differences in ways of living among humans. In our society pets, such as dogs or cats, may have access to all or some rooms of the house. Other animal species, such as guinea pigs and other rodents,

reptiles, fish, and birds, live inside cages, terrariums, or aquariums and are limited to those spaces (Young, 2003). Differences in the way species live within households also represent differences in the way humans interact and care for them. Designing the habitat and environmental enrichment of pets in each of these contexts is, in most cases, different. While in the case of those who roam freely, most approaches aim to enrich an existing enclosure shared with humans, in the case of animals that live inside cages, there is a need to consider the entire animal habitat: enclosure and furniture. “Furniture” is the word used by Robert J. Young when referring to existing objects inside an animal's enclosure with the aim of enriching it. This “furniture” is what makes the environment interesting for the animals (Young, 2003).

Guinea Pigs

Guinea Pigs and Their Artificial Habitat

In order to develop the guinea pigs' artificial habitat, the animal's main characteristics and needs were first identified. They are social animals that live in groups; they eat three different types of foods like vegetables, hay, and pellets; they get scared easily and need to have a hiding place; they need to drink clean water. Their enclosure must be covered with a material to allow the absorption of animal waste (Judah & Nuttall, 2008). Secondly, the problems and disadvantages of most common artificial enclosures were pinpointed. Pet guinea pigs are usually housed in small cages that lack enrichment and furniture items. Considering the size of the cages, even the larger ones are still small to accommodate two animals and their objects. Cages and enclosures delimited by mesh or bars are also unaesthetic leading humans to place them far from sight. In order to solve these problems and create a rich environment for guinea pigs, the furniture to be developed needs to stimulate the animals to search for food, as they would do in natural environments, be large enough, easy to maintain, and aesthetically pleasing for humans. Because guinea pigs are social animals they should not live alone, so the artificial habitat has to be prepared to accommodate at least two animals.

Domus Petra: Prototype Development

The furniture items were the first to be developed, creating the guidelines to the animal's enclosure. For the animals, the furniture that is inside the enclosure with which they interact is significant. Therefore, was important to devise strategies to enrich the environment and, working from the inside to the outside, give greater relevance to the animal's interaction with the furniture. Only later would we move towards developing an enclosure capable of housing the animals, and incorporating all

Young, R. J. *op. cit.*

Judah, V. & Nuttall, K. (2008) *Exotic Animal Care & Management*. Thomson Delmar Learning.



Figure 1

these items. The furniture development was inspired by organic and natural shapes as opposed to regular ones of artificial environments. The aim was not to recreate the natural habitat, but rather develop an artificial one inspired by its irregularities. The different items were designed to foster normal behavioural practices using various foods as a way of stimulating animal action. A container for vegetables was created, one for pellets, another for hay, one vase for fresh herbs, a cover to replace the vase when it is not being used, a drinking fountain, a hiding place, and a box for animal waste.

To build the furniture items natural stones and wood logs, with proper size and shape, were collected to serve as a reference for the construction of plaster moulds, and finally the stoneware furniture through a slip casting process. This material was chosen for its malleability that allows to reproduce organic shapes, and textures. The stoneware, provides washable surfaces resistant to animal's use, and the selected geometry of furniture items combined with the material's mass prevents the animals from overthrowing these objects. Among the ceramic materials, stoneware was selected for its resistance even when not glazed. The exterior surfaces of furniture items were not glazed for aesthetic reasons, and to keep the natural expression of the stones and logs that gave shape to these items. Three different pigments were chosen to be added to the stoneware slip for colour testing. Two of these pigments were in grey shades, and the other one was brown. These colours were selected because they are earthly, and darker tones, usually found in natural environments. Different pigment percentages were sampled and

tested, namely a sample was made for each pigment using 4g, 8g, and 12g of pigment powder per 100g of stoneware powder. The brown pigment with a percentage of 8g to 100g of stoneware powder was chosen because of its proximity with the wood logs natural colour. The vegetable and the pellet container, as well as the box for animal waste, were glazed in its interior to keep these surfaces clean. A high temperature glossy transparent glaze was selected and glaze dilution tests were conducted to ensure a uniform surface coverage.

The vegetable container has five different spots to contain food, at various elevation levels, making the animals search for it and exercise. Pellet container holds this food in its interior, and guinea pigs also need to make effort to reach for it. This container was designed to be difficult to overturn. The hay container allows animals to retrieve it in two different spots, above or near the ground. The vase for herbs makes possible for guinea pigs to experience eating directly from live plants as they would do in natural environments. This furniture item is placed on the floor level and can occasionally be removed from the enclosure for herbs regeneration. For this reason, a cover was developed to be installed in its place. The hiding place has three different openings allowing guinea pigs to enter and exit through two of them, and observe the exterior by the smaller one. The drinking fountain consists of a reservoir, a pump, and a cover with a drinking spot. This drinking system offers animals the possibility of being in direct contact with moving water instead of using the conventional water bottle with a metal sphere dispenser. However, this contact occurs in a limited area in order to avoid water contamination. The box for animal waste is to be placed in the corner of the enclosure where the animals regularly defecate, and may eventually facilitate its cleaning. The efficiency of this box depends on the individual habits of each animal.

The enclosure was developed taking into consideration the size needed to accommodate two guinea pigs, their ceramic furniture, and the space for them to run. Vicki Judah and Kathy Nuttall in *Exotic Animal Care & Management* argue that a guinea pig enclosure should not have less than 914mm long (Judah & Nuttall, 2008, p.51). Bearing this in mind it was decided to give each guinea pig a space between 920 mm to 1000 mm in length and an area of 0,84 m² to 1 m². The enclosure development was inspired by a table typology: a simple top, with detachable legs, and six glass guards that delimitate the animals' space, but allow them to be seen. The glass guards are easily attached and removed without the use of screws or other hardware. This solution has been tested and adjusted to have suitable mechanical strength. The structure was built in pinewood, plywood, and

Judah, V. & Nuttall, K., *op. cit.*

Edwards, A. (1999) *The Ultimate Encyclopedia of Cats – Cat Breeds & Cat Care*. Lorenz Books

American Association of Feline Practitioners (2004) *Feline behavior guidelines*. <https://catvets.com/public/PDFs/PracticeGuidelines/FelineBehaviorGLS.pdf>

Hart, B. (2008) *Why do dogs and cats eat grass?* https://www.researchgate.net/publication/288656215_Why_do_dogs_and_cats_eat_grass

Young, R. J. *op. cit.*

later was varnished and painted in order to protect the surface from the animal's waste. To facilitate its maintenance a garbage bag can be fixed under the enclosure, and the waste swept into it. The fixation system is composed of a plywood hoop, a hinge, and a magnet, making the cleaning process simple to carry on. The overall measurements of the enclosure structure are 1055mm of width per 2055mm of length and 1073mm of height. The Domus Petra prototype, which includes the set of furniture items and the enclosure, can be seen in use in Fig. 1.

Cats

Cats and Their Artificial Habitat

While developing the cat's habitat prototype, the animal's main needs and characteristics were also taken into consideration. Cats are intelligent and independent animals, who can live alone or in groups (Edwards, 1999; American Association of Feline Practitioners, 2004, p.9). They are carnivores and natural hunters with sharp vision, hearing, and smell. Cats need to scratch, climb trees, and these needs remain even when they live indoors. They may occasionally consume grasses that are a natural emetic (Edwards, 1999). This is a normal behaviour inherited from their wild ancestors who would probably do so as a way to eliminate intestinal parasites (Hart, 2008). Cats have needs that go beyond nutrition and hydration, which include safety, physical activity, and sensorial stimulation. When living indoors cats may have some trouble in practicing normal behaviours like climbing, scratching, running, and eating grasses. When they occur, these behaviours are sometimes repressed and even punished by humans, leading to the development of behavioural problems. As it was mentioned by the American Association of Feline Practitioners "behavior problems are still the most common cause of euthanasia in pet cats" (American Association of Feline Practitioners, 2004, p.7). After identifying the cat's main characteristics and needs, it was concluded that they also need a space to scratch, play, eat grasses, rest, and sleep when living indoors. This should be a space for them to release energies without being punished. Vertical structures within a cat's enclosures are proper options to increase the animal's overall space of use (American Association of Feline Practitioners, 2004; Young, 2003).

Locus Turi: Prototype Development

The developed prototype consists in a modular structure for cats that uses vertical space and can assume different sizes and configurations, in the floor or hang on the wall. This structure has a hexagonal pattern that provides cats with platforms at

different heights allowing them to roam around and explore. The modularity is useful because it provides the possibility of adaptation to a diversity of spaces and several cats. The structure has three different modules: the basic, with a round opening for cats to pass through, and with a scratcher. Measuring 200 mm by 400 mm, the modules were made of 10 mm plywood and rough fabric for the scratcher. They were assembled by PLA 3D printed connectors with 30% filling. Four different connectors were produced: double and triple connectors, with and without wall fixation option. When the first ones were printed and tested there were found small differences between them. Some connectors worked better than others, because there were slight dimensional variations both in the plywood modules and in the connectors themselves. Some of these small variations resulted from the printing process. As more modules were assembled, the mating parts were subjected to greater pressure, making them difficult to handle. To correct this problem, a batch of connectors within 1 mm tolerance of the plywood thickness was tested. The connectors printed with the measurement of 10,5mm presented better results when assembled and disassembled. The ones with 10mm were too tight making it difficult to disassemble the structure, while the ones with 11mm were too wide making them fall out of place. The structure is complemented by accessories like vases for grasses, pillows, and toys. The pillow is made with raw cloth fabric, polyester fiber filling, and a cover that would be in direct contact with cats. This cover can be removed and washed. A sponge filling pillow with a straighter shape was also made, but the polyester fiber filling was the one chosen because it seems to be more comfortable for the animals. The pillow cover has a zippered flap to fix it to the structure, avoiding it to fall out with the cat's movement. Four different toys were created using the same rough fabric material as the scratcher. Three of these toys have rubber bands and contain rattles, in order to get the cats' attention through movement and sound. Each toy is attached to a round plywood circle, which allows it to be fixed to the module with a round opening. The faience vase for cat's grass can also be attached to this module. The Locus Turi prototype, which includes the structure and the accessories, can be seen in Figure 2.

Conclusion

The two developed prototypes seem to work, and after some tests, it was noticeable that the animals were able to use them. However, they were not subjected to prolonged use, which is important for the perception of problems. They are always susceptible to future changes, improvements, and developments.

American Association of Feline Practitioners (2004) Feline behavior guidelines. <https://catvets.com/public/PDFs/PracticeGuidelines/FelineBehaviorGLS.pdf>



Figure 2

New furniture items could be developed to be integrated into guinea pigs' enclosure, such as elevations to be climbed, and furniture built with non-ceramic materials, to be chewed and provide optimal tooth length. Likewise, other toys, and accessories, could also be developed to integrate and enrich the Locus Turi prototype. One year after the ending of the project, it was possible to conclude that the scratcher of the Locus Turi needed improvement. Although the material is attractive to the animals, its size and angle discourage its use. The recognition of this design flaw brought important insights into the reason why cats choose to don't use some scratchers. This information brings the possibility of future product developments that better understand the needs and perspectives of cats. These product developments may also include animal perspectives by letting them show us, voluntarily, their preferences. If we give them prototypes, and furniture items with shapes, textures, colours, and materials variations, they could communicate their preferences by choosing to use some objects instead of others. This research opens the door for explorations of non-anthropocentric approaches to design practices. Future research on this topic could work on the intersection of the fields of Design and Human-Animal Studies (HAS), and also use co-design methodologies for these endeavours. Co-design may be the path to include animal perspectives into project development and probe ways of designing with other species instead of just designing for them. Co-designing methods could also facilitate collaborations between scholars of different fields and help generate new insights.