

Project Zoo: co-designing behavioural enrichment products and activities for orang-utans

Dr. Daria Loi

Design and Social Context Portfolio – RMIT University
GPO Box 2476V – Melbourne 3001 VIC Australia
daria.loi@rmit.edu.au

ABSTRACT

This exploratory paper examines the experiences of Project Zoo, a collaborative endeavour between the Industrial Design department at RMIT University and Melbourne Zoo.

The project, adopting constructivist pedagogy and a participatory design approach, focussed on the development of behavioural enrichment products and scenarios for orang-utans in captivity.

Through lengthy observations, by collecting data in multiple manners and undertaking a number of activities, students learned in action about the everydayness of the zoo, the needs and routines of its inhabitants and a number of related limitations and considerations for their designs, to then develop a series of concepts and scenarios for their unusual clients, with the iterative help of keepers at the primate department and, at times, volunteers and general staff.

The project proved to be a successful experience for a number of reasons, particularly for (1) the participatory research students have engaged in and learned from over the course of a semester, (2) the success among zoo staff of the designed prototypes, some which are currently being developed and formally manufactured with the zoo and for its primate department, and (3) a partnership, originally developed as a pilot project, that is currently being re-negotiated as a long-term relationship thanks to newly developed shared values and the acknowledgement of reciprocal interests and benefits.

Keywords

Participatory Design, industrial design, case study, zoo, behavioral enrichment, education.

BACKGROUND

At the beginning of 2005, Melbourne Zoo approached the Industrial Design department at RMIT University to discuss the possibility to run a collaborative project to develop new behavioural enrichment activities and products for their orang-utans. Project Zoo starts as a pilot partnership between university staff, undergraduate students and zoo keepers in charge of the Primate department.

Based on constructivist principles [1,2,3,4,5] Project Zoo employed a pedagogical approach where learners learned through experience and by reflecting on experiences [6] and a participatory approach where zoo staff (and at times the orang-utans themselves) actively contributed to the design process and its related outcomes by engaging with university staff and students through feedback and testing loops.

During a 13-weeks semester a dozen of students immersed themselves in the community of the zoo, with an emphasis on the primate department, to develop a number of concepts and scenarios for the behavioural enrichment of the orang-utans.



Figure 1. Students loading an experimental jigsaw

Enriching activities and props are needed to rescue orang-utans from boredom and maintain their wild activity levels through endeavours where their instinct is used to experience novel situations and consequently have positive benefits for their long-term mental health.

These enriching activities and props are central to the notion of *behavioural enrichment*, "...a process for improving or enhancing animal environments and care within the context of their inhabitants' behavioural biology and natural history. It is a dynamic process in which changes to structures and husbandry practices are made with the goal of increasing behavioural choices available to animals and drawing out their species-appropriate behaviours and abilities, thus enhancing animal welfare" [7].

Orang-utans are mainly herbivorous and in the wild lead a solitary life within large territories. Generally, their only long-term relationship is with their mother (for up to six or seven years) and most of their time is spent up in the tree tops, swinging between branches with their long strong arms. Orang-utans can also walk (but rarely do in the wild) and can grasp objects with both hands and feet.

In captivity, orang-utans lead however a different life and a "correct social environment, whether a large social group, a monogamous pairing, or a solitary lifestyle, is the best way to assure well-being for captive primates" as they get "the best stimulation and are less stressed when their social needs are taken into consideration" [8].

Moreover, in the wild primates spend their days mainly foraging for food, while in captivity that source of activity "is frequently removed by providing food once, twice, or three times a day, in large amounts" [8]. Variety (of foods, textures, and tastes) and presentation have a key role in the behavioural enrichment of nonhuman primates if they are maintained "as close to the natural state as possible" [8].

One of the objectives of behavioural enrichment programs is to "ensure that natural levels and times of activities approach the wild situation" and it is critical to "observe the levels and timing of activities, and to evaluate the success of any behavioural enrichment program by comparison to wild levels, if known" [8]. There are four main types of behavioural enrichment to consider: complex environment; indestructible toys; destructible toys; and *work for food* rewards.

DESIGNING FOR ORANG-UTANS

How can we enrich orang-utans everyday experiences through new devices and scenarios? How can undergraduate students and university staff collaborate with zoo keepers and develop new ideas for primates? How can the needs of orang-utans and the strict requirements of the zoo be met while creating new toys that can be manufactured and adopted by strong, highly intelligent yet very unusual users?

Over a few months the Project Zoo team has addressed these questions while being amazed and inspired by orang-utans.

Students were asked to design new behavioural enrichment objects and activities to challenge primates' capabilities as well as being versatile. The task proved complex, as each device has to withstand orang-utans' strength, challenge their intellect, adopt appropriate materials, be reusable, cost-effective and easy to access/load.

Keepers and volunteers are resourceful and knowledgeable and, by having full access to the zoo, students had the opportunity to learn from their strategies while gaining insights from daily activities and involved users.

During the first part of the semester students spent a large amount of their time at the site, collecting and documenting data in a number of ways – observations, video-recordings, photographs, interviews, notes and drawings, Cultural Probes [9] and Reflective Probes [10].



Figure 2. Student preparing a fast-design and Orang-utan trying to get food-treats (source: Luca Abate)

Students, inducted by zoo staff, had the opportunity to unfold through practice the notion of behavioural enrichment and its related impacts on what materials and manufacturing processes can be employed. They also had exposure to strategies for designing zoo's enclosures through local architects and landscape designers and to the concept of zoos as communities from zoo staff, besides online and more traditional resources.

Through their everyday encounters with context and animals, students eventually created a number of playful portraits of their clients. For instance, Gabby, a 15 years old orang-utans, is a *bundle of trouble*; Kiani's, 27 years old, *prefers purple items*; Santa, 28 years old, is a *well known thief*; Maimunah, 19 years old, *likes blankets*; and Malu, 2 years old, is the *young and cute of the bunch*.

Far from being traditional data, these portraits demonstrate however the level of empathy students generated through their participatory and active engagement with the site and its inhabitants. Students wanted to design their very best for zoo staff and orang-utans – they felt close and ethically responsible for them. This empathy and its consequences had an invaluable significance in their learning process.

During the semester students also conducted two community activities at the zoo: one day with keepers, helping them feeding the animals and loading existing

behavioural enrichment toys; and one day with local volunteers, producing and testing fast-designs for one-off behavioural enrichment activities which are required on a daily basis.

Through these experiences, students had the chance to identify two *work for food reward* categories of objects which can be used for behavioural enrichment: quick and easy and reusable.

The first category is low costs, ready available and needs to be re-loaded/made each time – they keep orang-utans busy at low costs but objects need to be re-made each time, as to access treats orang-utans destroy containers. Examples include "cardboard rolls, inserts, and boxes (from local stores), old telephone books (with popcorn inserted into pages and taped in), magazines (sachets removed, perfume sample pages left in), pine cones stuffed with popcorn, paper sacks rolled up and tied, and burlap sacks" [8].

The second category is re-usable, has higher costs, and is often flexible to be used with a variety of animals. The purpose is to stimulate animals to squeeze the food out or to use tools to extract it. These objects should be non-toxic, cheap, without lethal parts; maintain their novelty; and be rotated regularly. Examples include heavy duty plastic chairs, bin lids, crates, boomer balls, puzzle boxes and dip tubes [8].

In both cases it is important to have designs which can be adapted to enable different and challenging ways of getting food. In line with this, keepers always ensure that enrichment objects are put in the dens following irregular schedules so that orang-utans cannot anticipate what they will get and be consequently challenged. Weekly activities can for instance include [8]: ice blocks in three layers of different flavoured cordials; treat boxes; or giant bamboo with sunflower seeds, dried apricots or figs and a mixture of flour, water, and sunflower seeds or maize kernels.

Following observations, experiments and profiling, students were asked to design a series of concepts and scenarios for the primate department in general and the behavioural enrichment of the orang-utans in particular.

A number of ideas were identified, in small teams or individually, and developed into mock-ups or prototypes.

Several students decided to design behavioural enrichment toys where animals have to engage with jigsaw-like devices to get some of their favourite food-treats. A student concentrated on a more traditional industrial design project: a multi-task tool for keepers. A couple of students decided to attempt more experimental approaches, looking at the effects of music and textures on animals' behaviour. Finally, one group developed a concept for a future-zoo, where new technologies act as conduits between animals (left in the wilderness, in conservation reserves) and people

interested in learning about them (in city-re-constructions of the original site, where they can navigate experiences through projections and sound).

While all ideas have been discussed and/or tested iteratively with zoo keepers, only some have been tested by the animals, mainly due to time constraints or to lack of materials or manufacturing impossibility to further all concepts from mock-ups to animal-proof prototypes.



Figure 3. Testing a design (source: James O'Halloran)

At the end of this process, student presented and received a final feedback and recommendation about their works from both academic and zoo staff and then displayed their projects in a community exhibition designed and set-up by them in the zoo's resource centre.

Following the above activities the zoo, after expressing the level of new knowledge developed thanks to this shared endeavour, asked for four concepts to be further developed and then formally manufactured for their animals. This opportunity is being currently negotiated and explored by each involved student.

CONCLUSIONS

The case study discussed in this paper explored a teaching and learning exercise where a dozen undergraduate students engaged over the course of a semester in a participatory design process with a local zoo to develop with its staff a number of scenarios and devices for the behavioural enrichment of orang-utans.

Through a partnership created between the zoo and the industrial design department, students had the opportunity to:

- fully access the zoo, learn in action, and construct their own learning in a number of ways – gathering data in traditional and alternative manners;
- observe and document the everydayness of context, people, and animals;
- reflect on and address their needs, dreams and preferences;

- undertake a number of community activities and initiatives;
- develop and iteratively critique their works with clients;
- test ideas in practice;
- present formally their work to a panel composed by academic and zoo staff; and
- design a final exhibition where to share with surrounding communities their co-designs.

Students had the opportunity to learn in action *with, through and for* their clients and Project Zoo proved to be a stimulating experience for all involved parties.

However, working with a zoo is a very complex endeavour.

In the case reported by this paper a major difficulty has been the coordination of keepers' schedules with the aims and scope of a university assignment.

Keepers expressed in various instances the benefits of *seeing things from new perspectives* thanks to their collaboration with students and, more generally, university's ways of thinking and operating. They could clearly recognise the link between such benefits and the welfare of the orang-utans they are responsible for and did their best to assist students, providing key feedback and iterating their ideas over the semester.

However, this commitment often interfered with their everyday dense schedules, challenging in some occasions this delicate industry-university partnership. As a rather large organisation, the zoo is also characterised by a number of internal communication dynamics and tacit ways of operating that differ from those typical of a university environment. Differences emerged at various stages of the collaboration, when communication *hiccups* challenged involved parties to be more resourceful and open to *sideways* of operating, communicating and cooperating.

It should be finally stressed how a number of health and safety limitations (from the perspective of students' interaction with the environment and animals' testing of final designs) and the role keepers played throughout the experience opened up a number of fundamental questions: Who participated to the design process together with the students-designers? Who was the final user of their designs? Animals? Keepers? How much can an orang-utan participate when s/he speaks such a different language? Who should mediate significant language-barriers, ensuring designs can be iterated with users such as orang-utans? Designers? Keepers?

More generally, where is the participatory engagement located in these cases? Who uses? Who participates? Who mediates?



Figure 4. Playing with some designs (source: Thalia Karen)

Although many questions remain unanswered, involved parties have discussed at the end of the experience some of the above challenges, to negotiate effective ways to continue the partnership on a longer-term basis. Thanks to the success of the pilot project discussed in this paper, Project Zoo is therefore now in its new phase – this will be reported in future publications, where some of the above questions will be further investigated.

ACKNOWLEDGMENTS

I wish to thank the following people for sharing this wonderful journey with me: Industrial Design students participating to this project (Alex, Huey, James, Katie, Luca, Nick, Paul, Shae, Thalia and Victor); Melbourne Zoo keepers (in particular Fleur); Melbourne Zoo and Zoos Victoria Foundation staff (Cate Rejman, Jan Steele and Marylou Verbene); and RMIT colleague Deanne Koelmeyer.

REFERENCES

1. Ausubel, D.P. *Educational psychology, a cognitive view*. Holt Rinehart and Winston, New York, 1968.
2. Bruner, J.S. and National Academy of Sciences. *The process of education*. Harvard University Press, Cambridge, Mass., 1960.
3. Bruner, J.S. *Toward a theory of instruction*. Belknap Press of Harvard University, Cambridge, Mass., 1966.
4. Papert, S. *Mindstorms: children, computers, and powerful ideas*. Harvester Press, Brighton Sussex, 1980.
5. Vygotsky, L. S. *Thought and language*. M.I.T. Press, Cambridge Mass., 1965.
6. Schön, D. *The reflective practitioner: How Professionals Think in Action*. Basic Books, 1983.
7. AZA/BAG. Behavioural Enrichment. <http://www.animalenrichment.org>, 11/03/05, 1999.
8. Cocks, L., Baker, C., Harris, G., and Butcher, F. Behavioral Enrichment for Nonhuman Primates. <http://www.orangutan.org.au>, 11/10/05, 1998.
9. Gaver, B., Dunne, A. and Pacenti, E. Cultural Probes. *Interactions* 6, 1 (1999), 21-29.
10. Loi, D. Document/Reflect/Create – Cultural Probes in Teaching and Learning environments. In Bond, A., Clement, A., de Cindio, F., Schuler, D. and van der Besselar, P. (Eds.) *PDC Proceedings 2* (2004), 123-126.