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GAMES FOR/WITH STRANGERS— CAPTIVE ORANGUTAN (PONGO PIGMAEUS) TOUCHSCREEN PLAY

This essay introduces an ongoing project that aims to enrich the lives of captive orangutans and raise awareness around issues related to their wellbeing and endangerment. Building on experimental and exploratory game design research with orangutans, it addresses a number of examples that highlight the areas of discomfort and uncertainty in human-animal communication and ACI (Animal-Computer Interaction). Cases of unusual play practices and uses of touch screen technology are explored alongside the ethical stance of the research. The essay goes on discussing how play can be used as means to facilitate interaction between individuals of different kind. In play, there is a potential for 'becoming with' whom we may first consider a stranger (Haraway 2008). Digital play, in particular, allows a form of mediated communication that eliminates some of the immediate and bodily obstacles and opens up new ways for togetherness in play.

Author: Hannah Wirman

During the past three years, I have been most fortunate to get to know some of human's closest relatives in the kingdom Animalia: Bornean Orangutans also known as *Pongo Pygmaeus*. I have studied their physical and mental capabilities, nesting habits, endangerment, preferred foods, body structure, tool-use, and play behavior. I have also learned not to even blink my eye when someone (usually an orangutan) spits on my face and I have mastered the persistent patience needed to swallow a message from a technician which states that our expensive gaming platform is currently out of use because 'rats had eaten the wires'. Reflecting on the specific context of this research in a remote rescue center in a differently developed country, it is telling that my first thought in this latter incident concerned not only rats' wellbeing and the apes' gaming possibilities but also human health. Rats are a local delicacy in the Indonesian province of Northern Sulawesi where my project's field-work takes place. This essay discusses captive orangutans' explorations with (wo)manmade technologies.

These technologies have contributed to massive challenges and overwhelming moments of discovery and beauty in my recent study of orangutan play. The project, now called TOUCH, is an ongoing investigation towards the similarities and differences between human and nonhuman animal (primate) play. By the means of introducing computer technologies, namely touch screens, and digital games to captive Bornean Orangutans in a wildlife rescue centre, my attempt has been threefold. The project aims 1) to provide enrichment for captive orangutans who cannot be reintroduced to their natural environment, 2) to raise awareness around the environmental and ethical issues related to the wellbeing of orangutans as endangered species, and 3) to research the basis of animal play in nonhumans and humans through species-specific and cross-species game design. This project will add to our understanding of cross-species interaction and species specific behavior. To position the study among others that discuss orangutans, it has to be stated that I know very little



Figure 1: Is operates Panasonic Toughbook H1 computer using index fingers.
18 March 2013

we call nature or 'natural habitat.' A state of captivity currently is where an increasing number of orangutans are kept primarily because of the fast-growing palm oil industry that leads to deforestation of their habitat. While rehabilitation is preferred, it has become increasingly difficult to reintroduce even healthy individuals back to the wild due to the lack of safe environments. Another reason why apes and other species end up in rescue centers in Indonesia is the illegal wildlife trade. An orangutan named 'Is', is one of the protagonists of this story—it was taken to Tasikoki Wildlife Rescue Centre roughly ten years ago after being confiscated from illegal animal traders as they were about to be smuggled to Philippines.

Furthermore, I do not know about captive orangutans in general, either. My research is based on the study of two orangutans, the aforementioned

'Is' and his cage-mate 'Bento'. Regardless of these limitations, I believe that the observations discussed hereafter will contribute to the knowledge on how to use digital technologies in captive animals' life-enrichment but they will contribute to understand how, as designers and scholars with a critical perspective on design and animals, we can address and negotiate relations with these 'Others' as research participants, users and players. This essay will discuss cases questioning the often implicit assumptions made on the role of the user of computer technologies based on the fact that our target subject, in the vast majority of cases, is very close to us designers: a human being.

Baseline for Animal/Computer interaction

Although relatively little consideration has been given to non-humans as users of digital technologies, Clara Mancini outlined aims for Animal Computer Interaction (ACI) in 2011, only some months after I had began working on this project. ACI is supposed to “improve animals’ life expectancy and quality by facilitating the fulfillment of their physiological and psychological needs” (2011, 70) – values central to my research too.

Providing computer technologies for captive orangutans has recently been proposed as a successful enrichment method (Perdue et al. 2011). On a broader scale, we may draw on previous research according to which happy orangutans live longer in captivity (Weiss, Adams & King 2011). From here I postulate the need for establishing and describing the kinds of hardware, software and interfaces that are likely to provide pleasant and engaging encounters for orangutans.

To support practices of enrichment in general, primatologist and pioneer in the study of animal intelligence, Robert Yerkes’ straightforward proposition from nearly hundred years speaks clear and loud: “The greatest possibility for captive primates lies in the invention and installation of apparatus which can be used for play or work” (Yerkes 1925). Of the two possibilities provided by Yerkes, play was chosen in this research. Play constitutes a meaningful activities amongst most animals given that the evolutionary foundations of play are ancient. (Burghardt 2005) In the humanities and social sciences alike, Johan Huizinga and Brian Sutton-Smith have proposed that play existed before culture and that it is something humans share with other animals. “Animals have not waited for man to teach them their playing” (Huizinga 1938, 1). Instead, it is “a form of communication far preceding language in evolution because it is also found in animals” (Sutton-Smith 1997, 6-7).

For this research, play is therefore understood as something that acts as an equalizing, common ground between humans and some nonhumans. It is a sphere of activities and practices that can facilitate cross-species interaction and thus help us better understand each other. Where technological enhancement and expansion of playful practices is characteristic to human species, it is some of the most advanced technologies that my aim is to bring to orangutans. I believe that where modern digital technologies may signify human

advancement and cultivation of our techno-cultural civilization, it is exactly innovations in this realm that can provide a link and a platform for mutual understanding and ‘becoming with’, possibly better than any non-digital forms of play. As such, my project draws on pioneering research started by Dr. Willie Smits and Leo Hulsker at Apenheul Zoo in the Netherlands around 2006, when they made orangutan play with simple computer games using a touch-screen. Similarly, in this project, and in collaboration with Smits and Hulsker, I have utilized the very same technology to further research orangutan’s play preferences and encounters with the physical materiality of the screen.

Approaching the Difference

Alongside foundational goals for ACI, Mancini proposes ethical considerations for ACI’s design and research. Two of them are what this paper will touch upon. Namely, facilitating ACI should (1) “acknowledge and respect the characteristics of all species participating in the research without discriminating against any of them” as well as (2) “treat both human and nonhuman participants as individuals equally deserving of consideration, respect, and care according to their needs” (Mancini 2011, 72).

As many design research projects do, I, too, began from studying my users. Knowing the skills, abilities and preferences of those who you design draws on well-established design principles of user-centered (systems) design. “The needs of the users should dominate the design of the interface, and the needs of the interface should dominate the design of the rest of the system”, Don Norman prominently wrote in 1986. This approach stems with Mancini’s call for ethics in ACI, largely because of ACI’s basis in HCI (human-computer interaction); that we should consider the characteristics and needs of those we study.

With respect to these valuable aims, I will discuss how meeting them in the practice of design and technological implementation constitutes a challenge that may still lie beyond our human capabilities. This may be because of the newness of the practice (orangutan computer game play). Knowing orangutans’ needs in computer game-play and how game-play fits into their everyday lives constitutes a great challenge. Hence, drawing on methods used in user-centered systems design (e.g. Gulliksen et al. 2003), knowledge related to five

specific areas that I will introduce hereafter, proved insufficient. First, no such systems existed among the studied apes prior to the study. While there are earlier cases of touch-screen introduction and use among orangutans, their focus has been elsewhere and very little documentation on the aspects relevant to this study are available (Clay et al. 2011; Perdue et al. 2011; Swartz & Himmanen 2006; Vonk 2002, 2003). Second, user's abilities and skills, as related to touch-screens and game interfaces specifically, did not exist yet. Third, gameplay preferences of the users cannot be unknown. We can map out their playful behavior, but conjoining those with digital technology is not straightforward. Fourth, use-setting is not established. As part of this, it is hard to clearly initiate and define sessions of play and non-play in captivity and for another species. And last, users' goals, tasks and needs in relation to games and using them for play (instead of work) were not understood.

The remaining part of the essay will explore the first steps in getting to know 'Bento' and 'Is' as computer game players.

Playing 'wrong'

A handful of projects have already suggested successful use of touch-screen computers in orangutan and primate experience-enrichment. Due to great similarities in hand-structure, vision, memory, and hearing among others, game-design assumptions suggested that orangutans in captivity can and will learn how to play games on a touch-interface using gestures not unlike those of humans.

Four illustrative cases follow to prove the limitations of this assumption. First, I will focus on the apes' input method. Second, the ways in which the apes view the screen. Third, their general attitude towards a touch-screen. Lastly, the continuum of play within which the apes' computer game-play situates itself.

Input mechanisms

In initial play-testing of the games for apes, 'Is' and 'Bento' used the touch-screen with significant force. The screen is custom-made with this particular aspect in mind. It is especially resistant, and survives very rough use from individuals that are up to seven times stronger than an average man. However, the input mechanism associated with the games, while accepting lots of force, does not recognize large

areas as in full palms or fists. For instance, when 'Is' hit the screen with his hand after a beautiful pirouette nothing equally beautiful happens in the game. To put it simple, the games was not designed to afford or appreciate this kind of use.

Apes operate the screen using various body parts. The screens I introduced have been licked and bitten, as well as stroked with legs, feet and shoulders. Most recently, the sexually maturing apes rubbed their private parts against the screen too. They pour liquids on the screen as well as poke it with sticks. When they have food in hands, they wipe the screen with it, which results in a smelly and sticky screen after an hour of gameplay. Of all these innovative and new use-methods, none are sufficiently recognized let alone distinguished by the current game-system and by a screen designed for human use. Hence, given the resources, screens that allow touch of different force, multi-touch as well as touch using objects (sticks, fruit, even water) would provide new insightful explorations in the future.

Viewing angle

When viewing the screen, the apes are either too close, too far, upside down or approaching the screen from yet another unusual angle. It goes without saying that a screen designed for upright human beings that are used to sit tight and approximately half a meter away, the screen does not fulfill an orangutan point of view particularly well. Apes often look elsewhere when touching the screen, or pick their noses touching the glass surface that protects the screen afterwards.

Regardless of ape keepers' attempts to simulate successful viewing and posture, the apes also move around their play-room and return to the screen, sometimes frequently, sometimes less so. Their attention span when playing with the computer appears rather short and to-and-fro movement in front of the screen is typical. For the games designed for them, time lapse is of no hindrance. However, the games so far haven't recognized when an ape leaves and when they return to the screen in order to better customize a gameplay experience that encourages return and allows roaming in the playroom.

So far the games they have played form a set of very simple interactions in which 'Is' and 'Bento' can move objects on the screen, make items disappear by touching them, and select video



Figure 2:
Bento observes orangutan-proof touch screen 'too close' with orangutan keeper Yan Menda.
21 July 2011

clips to be played. We have tested various drawing software and watched YouTube together. From these observations, so far it seems that photographs and life footage appeals to them more than 2D graphics. Alongside 3D graphics, I wish to explore different colour combinations, graphics styles and varying degrees of photorealistic representation in the future. While rotated a image has already been implemented to allow different viewing angles, 'Is' and 'Bento' seem to increasingly conform to an upright sitting position similar to those of us humans using the screens.

Software/hardware

In the image showing Bento sitting on the touch screen, it can be seen that orangutans, as I know them, do not seem to have a particular draw to moving images or computer screens. As humans who are used to focus our attention to a TV nearby once it's turned on, it is hard to understand that what

looks like an attractive screen for us especially when accompanied by loud audio tracks, does not interest everyone. 'Is' and 'Bento' seem to treat the screens like other objects. Screen or not, it can be licked, poked, destroyed, viewed, and possibly snatched.

The mere presence of a computer and software with certain kind of interface and familiar input devices signals us Western humans that we are supposed to or at least be able to participate in gameplay. This clearly does not apply to my research participants. I have also observed how any and all technologies are an object of immediate deconstruction. Perhaps because the apes are used to finding treats from inside objects given to them (hiding food inside leaves bottles and wood is a usual method for more traditional enrichment), their first approach to technologies is to break them apart. Their interest in unknown to us but exploration is not unlike a child's interest in looking beyond and inside a screen of moving images.

To be fair and to explain my interest to



Figure 3: Bento 'owns' the screen.
23 July 2011

continue pursuing the apes' use of touch screens, however, I should mention various encouraging uses of the screen, too. Sitting down with them and observing their play behind a glass hours after hours, I have surely witnessed genuine interest in exploring items on the screen, watching videos of humans and orangutans, and exploring how different interfaces work. At this stage, the apes seem to have understood a difference between moving live footage and graphic elements. These may be assumedly learned from my and other humans' use of the same screens. The apes have learned not to touch moving image, whereas graphical elements and thumbnail photos gain their interactive inspection.

Continuum of play practices

In the apes' lives, digital play competes with a range of other play activities. Some of them are directly linked to the software and hardware I provide them

with, some of them are less so. Playing with water, poking humans and screens alike, pulling cables, breaking cameras, moving the cage door, and other various activities on and with the actual touch screen are examples of play behavior that moves between digital and analog, manual and screen-based. In such practice, it is impossible to pinpoint when computer gameplay starts and other forms of play end. There is no border between playing the game or playing with the game or between the software and the hardware. There is, possibly, no distinctively 'digital' for them, but digital is overruled by the physical features of the screen. Other people and I whom have introduced technologies to them become parts in their play, objects, and co-players in the movement between physical and digital. For example, quite often, the apes' interest, rapidly moves from on-screen events to the human companion showing, holding, or merely observing the screen and the non-human player. It has also been regularly proven how 'Is' and 'Bento' recognize



Figure 4: Is and Bento watch videos of themselves from previous play sessions.
4 January 2014

particular value in objects important to humans and seek to obtain items such as pliers or notebooks.

As some animals initiate and invite play with species-specific play-enabling signals, it would help to be able to recognize and express such signals while proposing play. But “the gestural communication of orangutans along with their socio-cognitive abilities has not been well investigated” (Liebal, Pika & Tomasello 2006, 2). While some research associates specific gestures and behavior with play – Liebal, Pika and Tomasello (2006) for instance conclude that 33% of the signals they covered were used in the context of play – there is little or no research in which orangutan gestures are specifically and most prominently used in signaling or initiating play. I have observed, however, similarly to Katja Liebal, Simone Pika and Miachel Tomasello

that most play-related gestures are tactile instead of visual or facial. For systematic use of such signaling, however, more research is needed to map out the specific signals among captive orangutans and among ‘Is’ and ‘Bento’.

Given the lack of recognizing or establishing beginning or end for play, initiation or departure from playful behavior, I have merely observed playful practices around touch-screen use. For ‘Is’ and ‘Bento’s’ play seems to be all over the place. This echoes the difference between wild and captive play where more natural play appears as a luxury among various responsibilities and survival practices in wild environments (cf. Bekoff & Pierce 2009) whereas life in captivity is characterized by excess of time that is best used for play (cf. earlier quote from Yerkes). From game design and research perspective, to

build on Huizinga's concept (1938), their lives are in a persistent and all-encompassing 'magic circle'. Furthermore, through the introduction of one kind of screen-based play, we have allowed the emergence of a range of playful activities that are based on the new physical and material structures, technologies, assisting objects, and events of the playroom and its personnel. In this room, digital gaming competes with a range of other play activities and seamlessly merges with them. Observing such continuum of play has focused my attention on the experimentation and exploration types of play instead of predetermined goal-based play on a screen. Significantly though, it remains unexplored to which extent the apes' worldview covers events on a digital screen with its representations, simulations and interactive elements.

Approaching the topic through the means of linear visual art, Rachel Mayeri has experimented with the idea of showing great apes videos and films in a zoo environment (Mayeri 2011). Betsy Herrelko's PhD research, meanwhile, allows chimpanzees themselves to record films (Walker 2010). Such projects have the potential to unravel apes' abilities to understand and manipulate digital imagery as well as to draw connections between representations and their physical counterparts. I have personally come to see how 'Is' and 'Bento' clearly recognize people on videos – including me speaking to them through a Skype connection—and have preferences towards some videos over others. Their most respected and valued human friends, for instance, gain more attention than unknown persons on videos. How and to which extent apes perceive a digital screen different or separate from their environments that afford direct physical manipulation demands closer research.

The introduced four peculiarities of orangutan play can be perceived as differences between human and orangutan play. However, I would state that it is more a question of communicating the assumed and preferred kind of use to test users rather than difference in any 'natural' approaches to such technologies. In my play-testing sessions with 'Is' and 'Bento' it has become apparent that the means of teaching them what to do remain limited. The apes persist not to take my instructions. Nor do I speak their language in order to fully communicate with them. Play initiation is one of these insufficient forms of communication.

Humans are malleable and usually follow what the designers wish them to do. And we are already culturised, even habituated, to use computers and screens in certain, sometimes non-ergonomic, uninteresting, even nonsensical ways. Meanwhile my experience with orangutans continues to be as if they resisted to be taught. They seek thrill, surprise and challenge us. Sometimes, I assume, I have been trying to teach them to be what they cannot be. This has occasionally led to feelings of great incompetency, which I am little by little learning to let go and allow control from my side to theirs.

Even if to anticipate and lead specific use and behavior is commonly considered a designer's role, I have followed a path similar to what Barbara Smuts describes as a move from commands to conversation. In her close observation and reciprocal exchange with dogs, Smuts proposes that accepting dogs as serious individuals paves way for more equal relationships and 'wonderful surprises' (2006). Achieving the third goal of the project, facilitation of cross-species interaction, may thus serve as a solution for the first two. Philosopher Luce Irigaray, when discussing relationships between humans and nonhuman animals, suggests that in such encounters we should "welcome the other in their difference, to be reborn thus in a fidelity to ourselves and to this other [...] we play with each other and become significant others to each other" (2004, 201). In other words, it may be play that allows new, shared, becomings to emerge. Very similarly Donna Haraway states that "[p]lay is the practice that makes us new, that makes us into something that is neither one nor two, that brings us into the open where purposes and functions are given a rest" (2008, 237). In play, there is a potential for 'becoming with' what we may first consider a stranger.

Finally, looking into more science-oriented research, Marc Bekoff and Jessica Pierce postulate how "it may turn out that play is a unique category of behavior that tolerates asymmetries more than other categories of social behavior" (2009, 461). Play allows beings of different kinds to come together regardless of seemingly unbalanced skill-sets or competencies. As such, play serves as "one of nature's most effective social lubricants" (Balcombe 2011, 28). In my own research, it is the uncountable moments of suddenly appearing cross-species play such as 'tug of war' using Ethernet cables or imitation of each other's behavior that enables

mutual understanding, agreed-upon goal-setting and direct interaction.

If I had taken the route to really teach (read: condition) the apes to 'correctly' use and play the games I made, this would have been a step away from my very understanding of play itself. In game studies paradigm, play is established as voluntary and non-utilitarian (e.g. Huizinga 1938; Suits 1978). A common theoretical stance is also to understand games as 'autotelic' – as activities performed for their own sake (e.g. Ducasse 1929). This is because it is the games themselves that give meaning and importance to specific objects, actions and outcomes. It is not a game if there exists a direct external prize or rewards. Teaching the apes to play 'right' through the means of providing food treats, for instance, would then approach the second aspect of technological enrichment suggested by Yerkes: work, which was not my intention. While the application of binary opposition work and play can be negatively anthropomorphizing, this distinction marks, I believe, a useful difference between those activities that are instrumental for achieving fulfillment to (other) basic needs and those that seem purposeless immediately to their expression and performing. In such distinction, even autotelic play can, however, have wider evolutionary or developmental value. Literature around animal play commonly refers to play as a practice that teaches around survival skills, physical development and social behavior, for instance.

Future Play

At the beginning of this text I grounded my study in the aims of ACI as outlined by Mancini. I mentioned a general aim according to which technologies should be provided to improve animals' life expectancy and add to their quality of lives. Yet another aim for ACI is of particular interest in the future development of this research. ACI should "foster the relationship between humans and animals by enabling communication and promoting understanding between them; technology that allows companion animals to play entertaining games with their guardians or enables guardians to understand and respond to the emotions of their companion animals might be consistent with this aim" (Mancini 2011, 69). In the further orientations of this research lays an overarching goal to bring humans and orangutans to play together across geographic distances and between long distances.

While pressures for sustainable travel and economic status of majority of people around the world do not allow travel to the homelands of orangutans or even to the zoos that host them, gameplay facilitated online would offer new encounters and possibilities for greater understanding between species.

While touch technologies and the very focused, gentle-touching gameplay that my games afforded may be limiting in regard to the specific uses discussed, I continue to see tremendous potential in digital technologies and play when it comes to enrichment and facilitation of cross-species interaction. We can design play that allows moving back and forth, expression of orangutans' strength, or even pouring water, for instance. An immediate future goal of the project is to move beyond the screen and involve tangible and non-screen-based enrichment methods, which nevertheless include digital technology. This, I believe, will allow more orangutan-friendly gameplay. I have started experimenting with orangutan-proof RFID tags, for instance, that can be moved around the enclosure and trigger sounds in different locations. We will next install such tags in the hanging ropes. In this way, digital enhancement of the apes' existing play such as hanging would take place.

Moreover, not knowing the personalities of orangutan players does not mean I cannot facilitate play. For instance, play does not have to be structural; rules can be loose and open to negotiation. Computer technologies in particular can create new kinds of possibilities and help diminishing asymmetries in players of different species, as mentioned. Digital play allows a form of mediated communication that eliminates some of the immediate and bodily obstacles and opens up new ways for 'becoming with' in play. My work is very much in progress and real progress comes slowly. If this is the first generation of orangutan computer game players, the utmost goal for the project during the next couple of years is to help raising awareness so that it won't be the last one.

In order to design better play and technology for non-human primates, I have wanted to get to know my users and understand who they are. So far I have learned a lot, but there nevertheless remains a feeling that not all of it can ever be compassed. Throughout my study so far the need to know my users has been in contradiction with a simultaneous urge to accept orangutans as strangers in their difference. In front of another species, one is forced

to accept 'Otherness' that is here to stay.

Another lesson I wish to draw from this early study centers on who we are as designers. For I would like to state that as important as it is to know your users it is to know where one comes as a designer. What Madeleine Akrich asserted as a problematic and unwanted 'I-methodology' (1995), the tendency to assume user as someone like yourself, is a mere impossibility in design for orangutans. Designing for another species forces us to note and take into considerations species and culturally specific design practices and conventions. How far away we tend to stay from a screen and how much force or which body parts we use touching computer technologies are examples of these. Further considerations of smell and taste input and output are aspects brought up by design for orangutans. We are forced to think who is the stranger and even how can we provide platforms for such forms of play that we cannot fully foresee or anticipate.

For the explorative study I have described here, principles of active user participation and iterative design – often emphasized characteristics of user-centered system design (e.g. Gulliksen et al. 2003) – have been of utmost importance. There was no orangutan computer game play practice let alone 'game culture' at the Tasikoki Wildlife Centre prior to this study. For the reasons specified earlier, these practices were established and continuously developed throughout this project. Observation, iteration and open-minded strangeness-accepting experimentation, I strongly believe, are the only means to do this.

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