

Multispecies methods, technologies for play

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This article discusses methodological considerations of user-centered design for non-human animals. These considerations are illustrated through a design research project that aims to apply digital technology to build games for orangutans' enrichment. The article argues that design for other species reveals limitations of designers' knowledge of prospected users. The article explores how to approach participants who cannot express themselves verbally and how to recognise play that may not look familiar to the designer. The article finally presents a participatory design method that allows for non-human contributions in design. This method applies play as an interspecies co-creative act and can be used as a starting point for addressing questions of difference in play and designing games that allow for ambiguous play.

Keywords: game design, non-human animal play, non-human animal creativity, design research, participation

1. Introduction

For several years now, the design research project Touch has focused on developing digital games for Bornean orangutans. The aim of the project is to apply digital technology to build games and toys for the enrichment of orangutans rescued from illegal trade (Wirman et al. 2011). However, designing games for orangutans is far from a straightforward task. This article will discuss challenges the design team encountered as well as how the Touch project sought to employ play as a way to engage orangutans as co-designers of digital enrichment.

The Touch project finds itself in the midst of what has sometimes recently been referred to as the 'Animal turn' in humanities and social sciences. This 'Animal turn' represents various inquiries into the ways in which the lives of humans and non-humans are entangled (Kohn 2013) and generally questions the nature-culture dichotomy that has long permeated philosophy, anthropology and not least art and design. Kirksey, Schuetze and Helmreich (2014) note how bringing art interventions together with

empirical ethnography can produce ruptures in the dominant thinking about nature and culture. The Touch project likewise aims to bring together not only research with design as a way to discuss, on a theoretical level, the divide between nature and culture, but also to intervene in it and provide orangutans with tools for playful, creative expression. Human life has been tangled up in digital technology for years. However, digital technology also affects the lives of non-human animals in many ways. In areas such as agriculture, digital technology has long been used to optimise production (Mancini 2011). Non-human animals are also greatly affected, e.g. when humans, in their need for fuel, replace the habitat of many animals, such as orangutans, with palm oil plantations. Such examples highlight the implications on technology, and that technology must be thought of as more than merely a tool. Fry (2012) argues that humans as tool using beings have not only given shape to technology, but that this technology also in a way exerts agency in the world and shapes the beings that occupy the world. This view portrays technology as a powerful tool for change but also as a critical site for the struggle of power. When digital technology is introduced to the orangutans that take part in the Touch project, it bears a potential for empowerment. This empowerment signifies a shift from object over user to designer: where the non-human animal is considered an object in a change of side effect, e.g. in deforestation, in the Touch project the non-human animal is treated as a user as well as a co-designer of digital technology.

By bringing digital technology to orangutans the Touch project explicitly raises questions about non-human animals and technology. What are the implications of merging digital technology with the more or less 'natural' habitats of the orangutans? How should the design of this technology be approached? Can technology empower orangutans? While the primary objective of the Touch project is to enrich the lives of orangutans in captivity, it also aims to challenge the nature-culture dichotomy and to shed light on the ways in which digital technology can provide remedy to some of the damage human innovation has caused on the environment. The starting point of this article is that orangutan creativity can be used in the design process of digital technology for orangutan use. However, the Touch project also points at issues of human centricity in the readily available methods for designing digital technology and applications. User-centred design methods are often applied in interaction design as a means to make design decisions based on an understanding of the needs of the user. However, applying this approach in a design project focused on non-human animal

gameplay is significantly more challenging due to the ‘Significant Otherness’ (Haraway 2008) of the user. This problem is not limited to design for non-human animals, but is a premise in all design. However, the commonplace solutions for dealing with difference are not directly applicable when it comes to design for non-human animals not least because of possibilities for verbal communication or, better, the lack of it. To approach it theoretically, Goode (2007) argues that experiences are essentially subjective products of the phenomenal world of the individual and in the case of humans this experience is furthermore shaped by language. Haraway (1988) imagines what the world may look like to her dog, but can never transgress her own point of view.

To address the difficulties that result, the aim of this article is to discuss the ways in which the gap between the designer and the user can be made visible, how to respect it and, generally, how to practically approach it and how this has all been done as part of the methodological explorations of the Touch project so far.

The article is structured as follows. The first two parts discuss the Touch project and similar Animal-Computer Interaction projects in relation to the prospects of bringing digital technology to non-human and the challenges that emerge from this objective. These challenges revolve particularly around the limitations of existing methods favoured in the field of interaction design. The latter part of the article opens up a discussion on play in non-human animals and on how interspecies play can be applied in research as a way of ‘becoming other’. The concept introduced by Haraway (2008) signifies a special relationship that emerges through play and in which players are bounded in significant otherness (2008). In play, there is thus a potential for shared experiences that can be applied in the design praxis (Wirman 2014). Play can furthermore be understood as a form of creative expression and this article therefore proposes a method for doing participatory design through interspecies play. By engaging in play and involving the non-human animal player as a co-designer, the designers can create games that allow for inclusive play that acknowledges and respects the differences between a human designer and a non-human animal player.

2. Game design for non-human animals

The orangutans involved in the Touch project are victims of animal trade that have been rescued to a wildlife rescue centre. The two orangutan participants of this project were removed from their natural habitat as infants and lack many of the basic skills needed for survival. Without sufficient skills it is very likely that the orangutans

will spend their whole lives at the wildlife rescue centre. The project relates to an emerging field within interaction design which Clara Mancini (2011) has named Animal-Computer Interaction. While the focus of Animal-Computer Interaction is on the general application of digital technologies for non-human animal users, a number of Animal-Computer Interaction projects have specifically addressed the design of games for a range of different species. While Touch was among the early pioneers of such game development projects, also pigs (Driessen et al. 2014), cats (Noz and An 2011; Westerlaken and Gualeni 2014) and elephants (French et al. 2014) have been addressed through game design. Common to these projects is the aim to enrich the lives and increase the wellbeing of non-human animal users through digital games that are specifically designed to meet the needs of their intended users. Clay et al. (2011) argue that with the use of digital technology it is possible to make cognitively complex toys and environments that promote behavioural diversity and increases the non-human animal's control. Technologically enhanced enrichment is already implemented in some Zoological parks, too. Clay et al. (2011) report on how digital technology, e.g. computers or computer-controlled systems, have been used in zoological parks as a means to provide stimulating or complex problem-solving activities to non-human animals.

The above examples have all brought human-made technology to non-human animal users, but this does not mean, however, that non-human animals are not using technologies without human intervention. Shumaker, Walkup and Beck (2011) found tool use among many non-human animals from octopuses to primates. They define tool use as an external employment of an unattached or manipulable attached environmental object to alter the user or other objects or organisms. Turner (2000) however, questions the distinction between the non-human animal and the external environment. In his studies of structures built by non-human animals such as earthworms, he argues that they function more as an external physiology of the organism than as an environment. The technology used in the Touch project is still human-made and when the orangutans are engaged in the design process it is not necessarily in the form of intentional or functional alteration or modification but in the form of playful exploration of the environment. The Touch project was initiated in 2006 and has undergone significant changes especially during the last four years. Currently, the project has moved from focusing mainly on digital games on touch screen computers to exploring the possibilities of designing tangible objects enhanced by digital technology. The touch

screen computer was initially chosen based on assumptions that orangutans can successfully learn to use this technology due to similarities in hand-structure, sensory function and memory (Wirman 2014). However, while field studies with two orangutans conducted as part of this project confirmed that the orangutans indeed had a basic interest in the computer, the studies also seriously challenged this assumption of the usability of the touch screen computer (Wirman 2014). The orangutans who take part in the Touch project seemingly prefer to interact with the touch screen computer using their tongues (Figure 1). However, the touch screen computer designed for and by humans only supports interaction with fingers and requires a certain amount of pressure and precision. Based on existing results and on the decision to explore play with more tangible objects, the current agenda of the Touch project is to learn more about orangutan play as it already occurs in the everyday environment of the captive orangutans participating in the project, as well as to explore how they interact with various simple objects. This knowledge will be used to identify patterns of interactions and preferred properties of objects that can be used as raw material for a later design. Instead of introducing new physical objects and gestures, existing play activities and objects can be digitally enhanced to support more versatile play.

3. The limitations of user-centred design

User-centred design, including numerous participatory practices, has been accepted as a significant movement towards understanding and better taking into account the ‘Other’ in the field of design. The term user-centred design covers a variety of design methodologies that strive to centralise the user and her needs. It therefore signals a departure from what Akrich called ‘i-methodology’ (1995) and what is commonly known as the designer’s perhaps quite natural tendency to consider the expected user similar to herself (Wirman 2014).

Out of user-centred design sprung movements such as emphatic design and user experience that take into account the more intrinsic experiences and emotions of interacting with an object (Koskinen et al. 2011). In game design that focuses on user experiences seems like a natural fit since play is traditionally considered an intrinsically motivated (mental) activity (Burghardt 2005; Huizinga 1938; Caillois 1961). Also in the Touch project, considerations around user experience are central since games are created to serve as enjoyable enrichment and players are not, for instance, rewarded with food for their play.

User experience research in the field of game design often approaches it from the point of view of measuring players' biometric signals during play (e.g. Nacke et al. 2009). Such research focuses on mapping the various emotional states of the user, such as stress, thrill and calmness, as experienced during gameplay and linking them to specific events in a game. While this type of user experience research is capable of describing experiences, it cannot explain how such experiences appear to the player without relying on the researchers' own subjective experiences. The problem has been thoroughly discussed on an academic level by Leino (2009) but is nonetheless greatly ignored in practical game design. Instead, designers seek to overcome this knowledge gap by interviewing players about their gameplay experiences and by ultimately drawing on their own perceptions of what constitutes good gameplay. In design for non-human animals there are, however, serious constraints to applying such methods. There thus seems to exist fundamental limitations to how much the designer can know about the user.

User-centred design has also been met with criticism from the field of science-and-technology studies and from posthumanism. Posthumanist tradition criticises the general idea of technology as a tool that can be controlled by an autonomous human user and rather thinks of the user as constituted by technology (e.g. Hayles 1999). While this is a general critique, utilising digital technology magnifies the problems of thinking about the user as a rational, autonomous authority.

Another critique of user-centred design relates to the idea that the design researcher, through observation, could be able to represent the user. User-centred design methods fundamentally rely either on a shared language between the designer and the user, or on that the designer can reasonably transfer her own experiences with a designed object to those of her user's. However, this kind of objectivity has been questioned, especially by feminist theorists. According to Haraway, knowledge is always situated and local (Haraway 1988) and the designer will therefore never be able to account for the user's experiences. Though it is important to recognise that significant differences exist between humans' cognitive and physical abilities, this gap between designer and user is even further widened and becomes a serious obstacle when the user does not belong to the same species as the designer. While the human designer designing for human players can interview her users, there are no commonly adopted practices for communication between human designers and their non-human animal users. No matter how much effort the human designer puts into studying the physical,

cognitive and sensory characteristics of the user, she is still left with the problem of how to meaningfully interpret this feedback.

The movement of participatory design can be seen as an attempt to overcome the outlined limitations by involving the user directly in the design process rather than relying on the designer's knowledge of the user. Through participatory design, end-users are invited into the design process as co-designers. A research project on games for senior citizens (Vanden Abeele and Van Rompaey 2006), among others, serves as a good example of how participatory design can be applied in game development. In the project, participants were observed and interviewed and they were asked to write down and rank enjoyable activities. The participants were furthermore invited to a design session where researchers and senior citizens together completed brainstorming and developed the best ideas into game concepts (Vanden Abeele and Van Rompaey 2006).

In a similar project Ermi and Mäyrä (2005) argue for the use of a participatory design approach in the design of novel and innovative games where no existing data from similar projects can be used as a starting point. An example of this is games designed for emerging platforms such as mobile technology that target completely new user-groups such as senior citizens (Ermi and Mäyrä 2005). The fundamental argument for the usefulness of participatory design approach in their game design project is that no existing games using this new technology addressed this particular group of users. It was therefore not possible to find any existing games that could inform the design process. Only with the participation of actual players would it be possible to develop games that this group of potential players would desire (Ermi and Mäyrä 2005).

The challenges identified in the Touch project are not unlike those in the project of Ermi and Mäyrä. The aim of designing novel digital games that target a very new audience is challenged by the lack of knowledge on the preferences of orangutan players. It therefore seems beneficial to involve the orangutan players directly in the game design process.

However, traditional methods that emerge from both user experience and participatory design are not readily available in design projects for non-human animal users. Due to the fact that conventional human means of communication must be excluded, a participatory design method involving non-human animals must rely on other means. For that very reason, Mancini (2011) calls for development of new methods for Animal-Computer Interaction. It is the aim of the latter parts of this article to propose one such method that invites orangutan players into the design process of

their own enrichment that builds on shared play experiences between humans and non-human animals. This method is to inform not only research on animal play but also design of games and toys for animal players.

4. Play in non-human animals

Play has long been recognised as a significant activity in both humans and non-human animals, and Huizinga (1938) even considered play the predecessor of culture.

Nevertheless, play in humans and in non-human animals is often discussed separately.

Play in non-human animals has been widely studied and discussed in a variety of disciplines. The often addressed questions relate to why non-human animals play and what function does it serve. Burghardt (2005), for instance, defines play as a not fully functional activity that is voluntary and autotelic and takes place when the non-human animal is fully fed, healthy and not under stress. Play resembles many functional activities such as fighting or preying, but is not fully functional as it is incomplete, exaggerated or somehow modified (Burghardt 2005). Instead of bearing instrumental value, play is intrinsically motivated and performed for the pleasure or satisfaction of the activity in itself (Burghardt 2005). For these reasons play is also only performed when the animal does not have to focus on issues such as danger, mating, or hunger (Burghardt 2005). Fagen identifies three basic types of play behaviour in non-human animals: locomotor play, which consists of large body movements such as running, climbing and sliding, object play, which is a form of playful interaction and exploration of objects, and social play, such as play fighting, tumbling, and chasing (Burghardt 2005).

While it is possible to categorise types of play, one of the most fundamental challenges in the observations conducted for the present study has been to distinguish play from the diverse spectrum of functional behaviour observed in orangutans. While it may seem like a trivial task for a human designer to identify human play, identifying non-human animal play has proven to be a much more complex task. The seemingly ‘non-playful’ praxis of ‘owning’ objects (seizing them and making sure other orangutans do not acquire them), for instance, serves to demonstrate this challenge. The praxis of ‘owning’ objects is so entangled with general object play that it is impossible to identify when one activity stops and the other one begins. Object play has therefore been considered part of play in the Touch project.

Burghardt also points out that some behavioural patterns may look like, but must not be mistaken for play. This includes stereotypes and general exploration that can be an aspect of play but is not play as such (Burghardt 2005). Play differs from such activities because it contains various signals that signify that this is exactly play and not a functional activity (Burghardt 2005). Bateson (1972) understands these kinds of play signals as a form of meta-communication between the players. Bateson argues that in a play activity such as play fighting, the playful nip denotes the bite from an actual fight, but does not denote the aggression that this bite would stand for. The playful nip thus signals to other players that this is only play.

The beginning of play itself can be signalled in many different ways that often vary from species to species, such as excreting distinctive odours or play pheromones (Burghardt 2005). To add to the load of the human play researcher, many such signals are nearly impossible to identify. Nevertheless, play signals that are identifiable for the human researcher can be crucial for determining if an activity is play.

Meanwhile, a game of tug-of-war played between a researcher and an orangutan during a field study under the Touch project provides an example of how play is signified during play. In this session, an orangutan player located inside an enclosure holds one end of a rope while a researcher located outside of the enclosure holds the other end. The orangutan who may be up to seven times stronger than a human, interestingly, pulled with only just enough strength to provide resistance to the human player. While the orangutan could easily pull the rope away from the human, the orangutan's suppressed strength signified to the other player that this is in fact play and thus ensured that the activity could continue. Bekoff and Pierce (2009) mentions how play 'tolerates asymmetries' and often provides a way to create equal settings through self-handicapping.

Play signals such as those that indicate self-handicapping are not easily available from outside of play (Burghardt 2005), and this article argues that only when the researcher assumes the role of co-player, can the signals be recognised. In the given example, the human researcher experienced first-hand how the orangutan player held back and thus signalled that this is only play. It thus seems that the researcher may benefit from engaging in play as a method for doing research and study play from within the praxis itself rather than from a distance. This engagement with the study subject may be highly questionable for a researcher who is concerned about play as it appears in nature, and in such cases traditional observations from afar may be more

appropriate. However, the Touch project is essentially concerned with bringing digital technology to captive orangutans who are already in close contact with humans, and as such, this is a completely different and far more intrusive project than that of the ethologist's study of play in nature. In the following, the idea of play as a form of research along with the potential for the players to 'become with' (Haraway 2008) each other as a way to achieve a shared experience of play will be further discussed.

5. Becoming with in research through play

The 'animal turn' (Kohn 2013) can inform not only the study of animal play but also the development of new radical ways of doing user-centred, participatory design that deal with the challenges that the different 'Other' non-human animal player comes to impose on the human designer.

The idea of play as research can be considered as an application of the participant observation paradigm used in ethnographic research. Goode's study of canine play (2007) is an example of such research and serves as a point of reference for what play as research may look like and is based on notes and video recordings taken during play sessions with his dog. In his notes, Goode documents play as it is 'naturally available' to the players, i.e. as concrete, situated and observable events detached from any theoretical knowledge on play that he as the researcher may possess (Goode 2007).

A similar approach has been adopted in the Touch project. Here, play has been studied from within as instances of human-orangutan play. Figure 2 shows researcher and orangutan engaged in interspecies play with the touch screen computer. Using both fingers and a poking stick the two players together explore various ways to playfully interact with elements on the screen as well as with the computer itself. Interactions with other orangutans, humans and/or their environment have been observed and described as they were naturally available to the researcher. In these descriptions, the researcher has strived to carefully document the context of the interactions and to avoid making any assumptions about the inner states of the orangutan player or interpret them into the researcher's own understanding of play.

The orangutan also merges play with other objects and individuals with the play on touch screen. In another paper, Wirman (2014) discussed this emerging 'continuum of play' as characteristic of orangutan play. Instead of merely the events on the screen, the touch screen as an object along with all other nearby individuals, objects and sensory stimuli became part of play. When documenting this kind of play the researcher

must be aware of and take into account existing prejudices and strive to avoid judgements about whether orangutans have used the touch screen computer 'right' or 'wrong'. Instead, the researcher must acknowledge all kinds of interactions as proper in its own way even if a specific interaction involves seemingly damaging actions, such as pouring liquids all over the expensive equipment (Wirman 2014). As a natural consequence of this, far more extensive affordances (Norman 2013) of the technology used in the project must be considered. The touch screen computer thus not only affords touching but also kicking, banging and peeing on as well as being pressed against the muzzle area or simply being carried around to make sure other individuals do not seize it. All this becomes part of a playful interaction

While Goode's praxis of play as participatory research allows him to account for the cross-species interaction of play, Haraway's notion of 'becoming with' suggests that in play there exists a potential for a radical insight in the cross-species relationships evolving through such interaction. According to Haraway (2008), play facilitates a 'becoming with' what was first considered 'Other'. This means that in play there is more than the sheer interaction between agents. Play creates a space for establishing shared experiences of togetherness between players that goes beyond a relationship of action. 'Becoming with' thus signifies more than just doing things together, it signifies experiencing being together.

Haraway recounts the intriguing story of the anthropologist Barbara Smuts who during a study of a family of baboons learned how to 'become with' these non-human animals by attuning herself to the behaviour of the baboons and responding to them in ways she picked up from them (Haraway 2008). 'Becoming with' does thus not entail pretending to be an orangutan but rather, as Kohn (2013) describes it, recognising the other as an intending subject and assuming the point of view of the other.

Kohn further points towards various signification strategies that both humans and non-humans can adopt in order to assume this point of view. This idea draws on the field of zoosemiotics that recognises non-human animals as agents of semiosis. As agents of semiosis, the subject makes sense of her environment as well as constructs sense and passes it on to the environment (Martinelli 2010). When a dog looks at the object that a human hand is pointing towards and not the hand itself, it takes part in human semiosis and thus recognises the human point of view (Kohn 2013). Likewise, the human can take part in non-human animal semiosis by applying or responding to the signification strategies used by this particular subject. It is important to point out that

this kind of becoming is not a human becoming non-human animal or vice versa. The human does not become a dog but instead human-dog (Kohn 2013) and a human does thus not become an orangutan either, but human-orangutan. It is therefore not the other subject but their mutual interaction that is entailed by this act of becoming, and the human designer does not withdraw from her own point of view but assumes a point of view that is simultaneously both her own and that of the orangutan. Such a process may therefore involve both the human researcher and the orangutan player familiarising themselves with the play signals of the other. As previously argued, this cannot be done from a distance but takes place through the physical, shared encounter. The game of tug-a-war played between an orangutan and a human researcher mentioned earlier in this article serves as an example of this idea of ‘becoming with’. In order for this game to go on, both orangutan and researcher must carefully pay attention to each other’s strength and movements and attune their own movements accordingly so they function as one. The agents in the game, orangutan, human and rope, thus momentarily go into symbiosis and are transformed into one being.

Play as research allows the researcher to identify play and to describe it as it appears as a shared experience. In play a shared experience between human and non-human animal emerge that is more than just the sheer interaction of play. In this ‘becoming with’ the orangutan becomes more than an informant observed by a human researcher. Instead, she is taken as a creative, intentional agent who can be part of shaping the design. Through the peculiar practice of play which serves as a breeding ground for mutual communication and design research, the designer designs ‘with’ non-humans instead of ‘for’ non-humans. While Deleuze and Guattari (1987) argue for the possibility to become numerous different kinds of life forms such as viruses and bacteria, the method proposed in this paper takes a pragmatic approach. The method is thus constrained by the participants’ actual ability to recognise each other as a co-player and in particular by the researcher’s ability to assume the point of view of the non-human other.

So far this article has mainly been concerned with the role of play in research. However, as the Touch project identifies itself as a design research project the objective is twofold and entails both research and design praxis. The following chapter will move to a discussion of this latter part. Play will be discussed in relation to animal creativity and a non-verbal method for conducting participatory design that builds on the shared experience will finally be proposed.

6. Design through play

The idea of bringing orangutans into the design process builds on an understanding of non-human animals as capable creative agents. In comparative psychology non-human animal creativity is often related to the non-human animal's ability to solve various tasks in new and innovative ways (Kaufman and Kaufman 2015). This kind of creativity has been reported in wild orangutans as an ability to spontaneously find solutions to different challenges they meet when they traverse treetops. When traveling the upper strata of the forest orangutans will often meet wide gaps between trees that they need to overcome. In such cases, it has been reported that orangutans have spontaneously and with no prior learning found ways to manipulate branches so that they become tools to bridge the gaps in the treetops (Russon, Kuncoro and Ferisa 2015). While such accounts of non-human animal creativity may seem closely linked to highly functional behaviour, Burghardt (2015) stresses the non-functional nature of creativity and links it to that of play. To Burghardt, it is not the outcome of an activity but the process in itself that is creative. Understanding play as a form of creative expression also has implications on which non-human animals can be considered creative. While orangutans are in fact tool-users, other non-human animals who do not build structures or manufacture tools, can still be considered creative with this idea of play as creativity.

Both play and creativity are activities that may lead to novel or unusual results, but this does not mean that these activities in themselves are useful. Whether a novel behaviour can be used in a non-play context does not determine if it counts as creative (Burghardt 2015). Nevertheless, Bateson and Martin (2013) argue that play can often be a catalyst of creativity through which the player can discover different features of the environment. Mitchell (2015) discusses one additional source of creativity related to social play. In social play arises a sort of instrumental creativity between players who exchange novel ideas and interactions under the shared constraints of the game. This kind of intimacy relies on players being at the same time opponents trying to resist the other's project and allies trying to uphold play as long as possible (Mitchell 2015). This means that play is not only a precursor for creativity but is a creative praxis in itself. As Burghardt (2005) notes, this way of practicing play may at first sight seem similar to exploration. However, compared to exploration, play is non-functional and it is precisely due to this lack of immediate function that it ignites creativity. On the one hand, as exploration is performed with the aim of gaining knowledge about the environment it is often not repeated unless this environment changes substantially. On

the other hand, play is performed for its own sake, and as such it can be repeated many times which further allows for exploration of the environment. Such play can result in behaviours that are immediately non-functional but have the potential to later become creative solutions to various tasks at hand (Bateson and Martin 2013).

Considering play as a creative praxis makes it possible to think of the non-human players as not only active but also creative agents in the design process. Agents in play, whether they are orangutans, humans or the technological agent, are simultaneously opponents and allies who try to both resist and uphold play as long as possible. In the Touch project, this means that through play the players together explore play environments and conceive of new satisfactory ways of interacting with it and with each other. The presence of both players makes this a reciprocal process where the players' agencies are in constant interplay. Human designers are then able to consider the available forms of interaction with technologies as well as the new affordances that emerge through this interaction from an assumed point of view of the shared interaction.

7. Towards a method for interspecies participatory design

The above considerations represent the foundation for a proposal of a design research method that applies the idea of participatory design through play while striving to avoid human centrality. This method adopts play between the human designer and non-human animal as an interspecies co-creative act that becomes part of the actual design process. As participatory design, this entails that the orangutan player is considered an active agent throughout the design process and not simply included when human-originated ideas have already been implemented in a prototype. Taking the idea of the non-human animal seriously also means that the human researcher must try not to impose her own preconceptions on the non-human player. Instead, the human researcher must be ready to inquire into whatever possibilities for play that may occur. The non-human animal then becomes a subject that is allowed to shape the design process by exploring preferred properties of objects and ways to interact with them in a meaningful way.

Drawing on participatory design instead of other co-design methods emphasises the political perspective which has been central to the historical development of the participatory design movement. The idea of participatory design is not only about enabling designers to meet the needs of the users, but also to empower users and let them openly engage with the technologies that are increasingly influencing their work

and everyday lives (Koskinen et al. 2011). Likewise the Touch project is not only about bringing games to orangutans, but about empowering them and acknowledging them as creative agents that can and should have influence on their environment. This is particularly important in the case of the orangutans that are involved in the Touch project. Due to illegal animal trade, some of the current and future orangutan co-designers will never be able to acquire the skills they need to return to their natural habitat but must spend the rest of their lives in captivity. This life can never be as unrestricted as life in the forest, but the hope is, that inviting the orangutans into the design of toys and games not only provides enrichment in their daily lives but also gives them agency over their surroundings.

In the last four years of the Touch project, reflections such as these have been manifest in various acts of co-play between human researcher and orangutan. This play often involves digital technology: sitting with the orangutan and playing games or enjoying a short movie clip on the computer (Figure 3). This process however, is highly uncontrolled and the play sessions also often quickly transform into something completely different that does not necessarily revolve around the digital objects. A rope, a piece of plastic or maybe simply the bodies of the players suddenly attracts the attention of the orangutan players. Changes are welcome, as the play sessions should evolve freely and unrestricted in ways that are most meaningful for all players. As such these play sessions are not unlike the 101 Things to do with a Box test often used in studies of non-human animal creativity (Kaufmann and Kaufmann 2004). However, while the focus of this test is to explore the scope of creativity in non-human animals (Kaufmann and Kaufmann 2004), the premise of the Touch project is different: that orangutans are creative is taken as the very starting point for both design and research. Attention is instead directed towards the interactions and shared experiences that are revealed through play. The orangutans are invited into the process as co-designers who take part in deciding the properties of the designed objects as well as the possible interactions between objects and players. The properties and affordances of the objects change as designers learn to see them from the shared position of play.

This participatory method will probably be rather different from typical game design processes that often revolve around the design of structured and challenging experiences. The games that will be designed together with the orangutan participants will most likely be much more ambiguous and unregulated since they do not rely on a

shared idea of what constitutes pleasurable and satisfactory experiences but merely relies on a mutual acknowledgment of the differences that emerge through play.

However, it is important to note, that this approach of using play as a method for conducting participatory design is still anthropocentric in the way that it relies on technology that remains largely unattainable to non-human animals when it comes to the praxis of making the actual devices for play. While non-human animals can be drawn into the process of designing interactions and deciding on properties, it remains that the human designer programs the software. This aspect thus still possesses a challenge to the aim of designing with instead of for the non-human animal.

In the Touch project, co-play between researcher and orangutan has informed studies of how the orangutans interact with touch screen computers. The approach has allowed researchers to identify play in interactions that would otherwise most likely have been rejected as wrong use, e.g. pouring liquid or dirt all over the touch screen computer. Playing with the orangutans has also made researchers aware of the many stimuli and agents in the environment that becomes part of this play. This has furthermore resulted in the design of a game prototype that allows the orangutan player to explore sounds by manipulating various poking sticks. The prototype has yet to be tested with the orangutans.

8. Conclusion

This article has discussed some of the possibilities and challenges of bringing digital technology to non-human animals and of designing games for non-human animal use. The starting point of this discussion is the challenges that have been met in the research design project Touch. The aims of this project are twofold. First, it aims to study play in orangutans with a special focus on play that is digitally facilitated and second, the project aims to design digital games for orangutans. As design research, this calls for methods that account for the ‘significant otherness’ of the non-human animal (Haraway 2008). While user-centred design has served as a starting point for this research, there are also critical limitations to this method. Designing for non-human animal use brings into question the notions of user, autonomy and power.

Non-human animal use differs from the normative understanding of the rational user implied in user-centred design. User-centred design also assumes that the designer can gain knowledge about the user’s needs and desires. However, such assumptions can

be criticised for not taking into account how knowledge is situated, which is particularly important in the case of design for non-human animals.

To deal with such points of critique, this article presents a pragmatic participatory design approach based on play. Play is an intrinsically motivated behaviour that is found among both humans and non-humans (Burghardt 2005). Since play contains potential for becoming with what was once considered other (Haraway 2008), play can be used in design research as a way for the human researcher to situate herself inside the experience of play and gain insight in the interactions between human, non-human animal and technological artefact. This approach becomes particularly beneficial in relation to behaviours such as play that would otherwise have been difficult for the human researcher to perceive through observation. Through play the researcher is more likely to be able to recognise key play signals such as inhibition (Burghardt 2005) and play can thus function as a form of interspecies communication (Bateson 1972). Play furthermore functions as a catalyst for creativity (Burghardt 2015; Mitchell 2015; Bateson and Martin 2013) where players together can come up with novel ways of interaction. In the Touch project, this prospect is particularly interesting since it is not possible to base the design on existing knowledge about orangutan's preferences in relation to the design of digital games. However, through interspecies play the human researcher and orangutan player can engage in a shared creative inquiry into the ways in which objects enhanced by digital technology can be played with. Based on these findings the human designer can then develop prototypes for further testing.

As mentioned in the introduction of this article, these challenges are not limited to design for non-human animals, but are a premise in all design. However, designing for non-human animals may function as a catalyst for the many misconceptions about the homogeneity of human behaviour and properties. The potential of 'becoming with' in play is thus not limited in design for non-human animals but can be applied on a much more general level.

While there is still uncertainty and a gap between human researchers and orangutan participants, this paper suggest using play as a design research method as a step towards understanding which interactions afford satisfying cross-species play. The researcher may never be able to understand the play preferences of orangutans, but through shared play the researcher may achieve a tentative sense of which kinds of interactions are pleasurable for the orangutans. Involving the orangutan in the design

process as co-designer does not eliminate the need for other methods such as observation and prototype-testing. In the Touch project, both observation and prototype testing have been carried out along with instances of co-play. The different methods have thus continuously informed each other. However, the act of play puts the human researcher in a fundamentally different position than in the act of distant observation. In the Touch project through co-play it has been possible to study first-hand the characteristics of play that emerge in the interaction between orangutan and researcher, e.g. how a simple interaction with a rope is transformed into a game of tug-of-war, something that would not have been possible without the mutual trust between players and the careful attention to each other's movements, location and strength.

Applying play in the design shows the potential of empowering the orangutan user. The toys and games that eventually come out of this design process are not only designed for orangutans but rather with them. While the Touch project is concerned with orangutans, play can be used as a research method for other playing non-human animals as well. Allowing non-human animals to exert creative power in the design of technological artefacts challenges the dichotomy of nature-culture and finally the human monopoly of technology. This has implications for dedicated design fields such as Animal-Computer Interaction, where the prospects of play are considerable when it comes to engaging the non-human animal in design processes. This potential is not limited to design projects that relate to the design of toys and games, but also to the design of digital application for other non-playful means.

Furthermore, seeing play as a form of creative expression also implies a more broad and inclusive understanding of creativity and innovation among non-human animals (Burghardt 2015) and conducting design through play can thus expand the understanding of creativity in animals.

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List of figures

Figure 1. Orangutan playing with the touch screen computer at Tasikoki Rescue Center. While the orangutans were definitely interested in the technology, the computer did not accommodate the preferred ways of play of the orangutan.

Figure 2. Cross-species play between human and orangutan at Tasikoki Rescue Center, North Sulawesi, Indonesia. The two players are exploring various ways of playing with the touch screen computer.

Figure 3. Orangutan in front of the touch screen computer. There is potential of play to be found not only on the screen, but also in the physical hardware of the computers and in the curious researchers standing outside the enclosures with notebooks and cameras.