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# User-testing an Interspecies Videogame

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**Abstract**

This paper explains and reflects upon the research process that was applied for the user testing of a tablet game designed for cats and humans. The user-testing process that we used includes the structural analysis of video observations following a Grounded Theory approach. We aim to initiate a more informed iterative design and research process in which the animal's experience with a playful artefact is analysed and reflected upon. The methodology described in this paper helped us gain new insights in the behaviour of the cat while interacting with the game.

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**Author Keywords**

User-testing; animal; game; method

**ACM Classification Keywords**

H5.m. Information interfaces and presentation.

### Existing Approaches

- Ethnography: studying the animal in particular social situations with a focus on manifest, observable actions [6].
- Indexical semiotics: understanding the relationships between humans and animals through meaningful exchanges mediated by technology. By trying to interpret the environment and make sense of the indexical signs of each other, the meaning of the interaction is created and the human and animal can 'co-evolve' [3].
- Digitally complemented zoomorphism: using external stimuli in the form of technological artefacts, interpreting animal behaviour in a common embodied praxis (such as play) through 'going-along', and digitally tracking metric and/or biometric data concerning the animal experience [7].

### Introduction

The design and development of technology is not only limited to human life, but also affects the life of animals. This is particularly evident in fields such as agricultural engineering, animal tracking, animal breeding, veterinary medicine, and the domestic animal industry. In the last few decades, a considerable amount of research as well as commercial products have appeared in the field of interaction design. The research field of Animal Computer Interaction (ACI) aims to work towards a systematic development taking a user-centred approach informed by the best available knowledge of animals' needs and preferences [2]. From this context we designed and user-tested an interspecies video game as part of a larger research project aimed at discovering how technical artefacts mediate the relationships between humans and animals [7]. This paper is a work-in-progress paper that explains and reflects upon the research process with the aim to give more insights in the testing procedures of this study.

### Related Design and Research Methodologies

Adopting a user-centred design approach, which aims to involve the needs, wants, and limitations of the end-users in the design process, appears complex when we design interactions that have animals as their intended users. How can we, as human beings that are subjectively bound to our human experience, ever fully understand the experiences and perceptions of animals and make design decisions accordingly?

Even though the research field of ACI is still exploratory, a few theoretical approaches to design and research have been articulated over the last few years. These include methodologies and guidelines in the

fields of 'ethnography', 'indexical semiotics', and 'digitally complemented zoomorphism' (see sidebar). These approaches formed the basis for the design and user-testing of a tablet game that allows humans and domestic cats to play together.

### ***Felino: A Game for Cats and Humans***

*Felino* is designed to specifically afford a gameplay structure that allows both cat and human to have a relevant role during the playful interaction. As human developers, we tried to design a digital toy that adheres to the sensory perceptions and playful behaviour of the cat (see sidebar on the next page). This means that we avoided including conventional mechanics such as time pressure, high scores, or game-over states, and we based our design decisions on our interpretation of available animal research regarding, for example, the eyesight, colour perception, and playful behaviour, of cats. We decided to avoid human interface elements that interfere with the cat's play since they are not understandable for the cat. These include introduction menus, textual explanations, or buttons that can unintentionally be operated by the cat. Additionally, the behavioural analysis of video observations that were recorded during user-testing with 19 different cats contributed to design iterations that were not only based on the experience of the human, but also included the animal in the design process.

### **User-testing Process**

For this research, a total of 19 domestic cats joined our user-tests. Most of these cats (15) were temporarily living in the Animal Shelter Breda, the Netherlands. The other 4 participants were tested in their home environment. The cats were a mix of gender (10 female) and age (average 5,4 years old). During the

### The Game *Felino*

The game takes place in an aquarium in which fish and other sea creatures can be caught by the cat. By using virtual controls placed at the bottom of the screen, the human player can alter game attributes, such as the size and speed of the fish, and regulate the movements of in-game objects in order to align the game to the interpreted preferences of the cat (see Figure 1). The interactions of the cat generate resources for the human to collect which creates a gameplay loop in which both the cat and the human can simultaneously participate.



Figure 1: *Felino* screenshot

testing, existing ethical guidelines were taken into account [5].

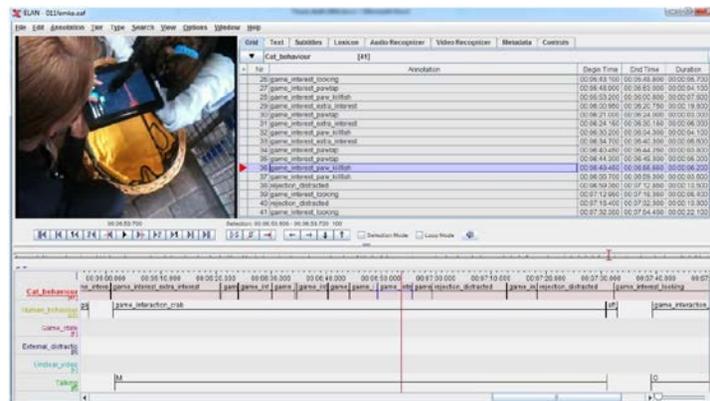
All user testing sessions were completely recorded using both audio and video. The length of each recording varied depending on the interest of the cat. On average the sessions lasted 5 minutes and 51 seconds. However, the shortest session was 57 seconds and the longest session lasted for 15 minutes and 54 seconds. The data was then analysed according to the principles of Grounded Theory (GT): the iterative analysis and gathering of data without the formulation of a predefined hypothesis or other preconceptions about the expectations of the study [1]. The method typically includes the collection of data through interviews or video observations, which are then coded and identified in order to make sense of the data [1].

Using the *Elan* software [4], the audio/video recordings were coded according to six different categories: Cat behaviour, Human behaviour, Game state, External distractions, Unclear video, and Talking (see Figure 2). After our initial data analysis, we decided to add two more categories of annotations including Cat Taps, and Extra Interest. This resulted in a total of 1666 annotations. This systematic analysis uncovered the interactions with the artefact as well as the interactions of the human and cat. We coded the behaviour of the cat to analyse movement patterns and playful signals. Human behaviour was coded to analyse their interaction with both the cat and the game. Additionally, we coded game content to analyse what happens in the game at certain points of interest. The other categories were used to mark distractions and external factors that might have influenced the behaviour of the cat and human.

### Initial Reflections

The behaviour of the cats was rather diverse: some cats decided to leave the interaction immediately after the prototype was presented, others solely looked at the screen with interest for different durations, and some cats tapped the screen and showed playful interactions. It became clear that during the coding of the video recordings new observations could be made about the cat's interaction with the game by looking at their behaviour repeatedly and in slow-motion. Furthermore, the annotation data of the participants led to new insights that we are currently evaluating with the goal to refine the game. The GT approach allows us to let the data guide the analysis in directions that are not planned from the start. In order to avoid the risk of anthropomorphic or false assumptions based on the cat's behaviour or underlying emotions, we restrict ourselves to analysing the visible interactions that were recorded (such as the instances in which the cat looked at specific game elements or tapped the screen).

The help of a local animal shelter was useful for finding sufficient participants in a short timeframe. However, the environment formed distractions for both the human and the cat (other visitors, multiple cats in a shared space, sounds, etc.). Even though we tried to code these instances and exclude them from our analysis, they might have influenced the interactions with the game. Next to this, we included only one human in the user-tests (a designer with expertise in cat behaviour) in order to avoid inconsistencies in the interactions with the game and the animal. Naturally, a follow-up study should include different human participants in order to include their experiences.



**Figure 2:** Example of participant 011 annotations in Elan v4.7.2 and pictures of the user-tests.

## Conclusion

This paper describes and reflects upon the process that we followed to user-test an interspecies videogame with the structural analysis of video observations following a Grounded Theory approach. We argue that this method initiates a more informed iterative design and research approach in which the animal's experience with a playful artefact is analysed and reflected upon. We believe that this initial outline of our research process could encourage other designers and researchers to include animals in their design approach.

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