DESIGNING THE “NEXT” SMART OBJECTS TOGETHER WITH CHILDREN

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Abstract: Today we are facing with the notion of smart objects that are increasingly showing their presence in our daily environments. This phenomenon opens up discussions on how our lives will be in future under the influence of emerging technologies and how designers can speculate on that. Designer - the creator of the “next” that doesn’t exist at the moment, but will come true in the future - should go beyond the limits of technology and today’s circumstances to introduce what would wait for us. “Design fiction” has emerged in design field answering these questions, envisioning possible futures for our society by using different narration techniques. This paper questions how designers can find inspiration for imagining the impossible to reach the so-called “fiction” and represents an experiment, in which imagination of children was the source of creation of future smart object scenarios.

Keywords: Co-design; design fiction; smart objects; children; storytelling

1. Introduction

Through being embedded with digital technologies, objects have become smart entities, introducing a new type of human-object interaction, in which they can dialogue with their users, create emotional bonds, or even influence how their users behave. This phenomenon opens up discussions on how our relationship with those artefacts could be in near future and how designers should show us those alternative futures. With our rapidly evolving technological world, what today is fiction could become reality in few years. Hence, designers need to think ahead of their time and try to depict how we would live with these future technologies. In this new realm, “design fiction” has emerged to envision possible futures for our society by using narrative techniques. By turning prototypes as ‘performative artefacts’ (Suchman et al., 2002), it simulates different scenarios – utopic or dystopic- about how our daily life will be in the future with the influence of new technologies. Designer - the creator of the “next” – goes beyond the limits of technology and today’s circumstances to introduce fictional scenarios. Imagining the “next” that doesn’t exist at the moment, but will come true in the future is neither an easy task, nor happens by chance. Hence, design fiction introduces new techniques for designers on fictioning about our future.

This paper presents a design experiment that explores how designers can find inspiration for imagining our relation with smart objects and reaching the so-called “fiction”, which is driven by the
imagination of children. TANA (TAngible NArrators) research project embraces a series of co-design workshops, in which storytelling techniques were used to stimulate children to freely express their ideas about future smart objects and to create stories, where smart objects were the main characters of a fictional world. As an outcome of the experiment, we focalised on “Smart Plate” theme and created mock-ups from children’s ideas with 3D printing technique to trigger discussion and reflection on smart objects and their role in the future. The paper discusses how creative process in design of new technologies has been changing and it introduces our model that allowed us to collaborate with children to design future scenarios. While this paper addresses notions on design fiction dealing with design and technology, it represents the methodology used during TANA project as an example for designing the “next” smart objects.

2. Design Fiction

Rose (2014) draws our attention on designer’s role that is to act as a fiction creator rather than a scientist or engineer influenced by knowing the possibilities of technology. In this respect, “design fiction” has emerged as a new field, bridging between the fact and the fiction, introducing a new role for designers - the narrators of future product stories. The design fiction term was firstly coined by Sterling (2005) as a way to speculate on new ideas through prototyping and storytelling. It has been mostly used for addressing possible implications of technology in hypothetical social-cultural contexts. According to Dunne and Raby (2001), it can stimulate discussions and debate about aesthetics of technologies, challenge the stereotypical limits of today and make people think about our alternative futures. It speculates about futuristic scenarios, in which possibilities can emerge for new types and new uses of technology. Voros (2001) defines four classes of alternative futures based on Henchey (1978)’s work: possible futures that “might happen”, plausible futures that “could happen”, probably futures that “likely to happen” and preferable futures that we “want them to” happen. If a designer presents “implausible concepts or alien technological habitats, the audience will not relate to the proposal” (Auger, 2013, p. 2), thus, this could cause disconnection with reality. To increase the credibility of fictional scenarios, designers should reflect on plausible futures, in which they can construct their preferable scenarios. For that reason, storytelling has an important role in design fiction projects to make audiences/users believe in what they see and experience. Storytelling can be done not only with words, videos or storyboards, but also with physical prototypes that can increase the plausibility of these fictional scenarios. Dunne and Raby (2013) also underlines the importance of “physical props” to create an immediate material connection with the fictional world that is constructed by designers.

Since digital technology has more and more integrated in our everyday lives, it has had a great influence on how we create our utopias or dystopias, thus, one of the roles of design fiction is proposing new scenarios for this ever-changing world shaped by technologies. In this new realm, there are many design projects which deal with technology’s implications in our near future. “Philips Design Probes” (Philips Design, 2015) presents insights about 5-15 years out lifestyle scenarios through narratives and prototypes, imagining our clothes, homes or cities of future. Another example is “Hertzian Tales” that shows a similar approach proposing fictional products that might exist in our future (Dunne, 2006). Besides, the “Prototyping the future” project envisions Stockholm in 2050 where energy use have been decreased by 60% and addresses how design fiction can be used to “alter expectations regarding sustainable lifestyles” (Ilstedt and Wangel, 2014). Chambers (2010) explored what if everyday objects equipped with technology could have survival instincts like animals, such as a radio sneezing to protect itself from dust, or floppy disc drive standing up when
nearby liquid. The common ground of these examples is the “fiction”, in which reality is reflected on plausible and preferable futures.

3. Children, Fiction and Co-design

How can designers find inspiration for imagining the future? How can they go out of box and reach the so called “fiction”? Design is always related to a forward action, creating something new, which is supposed to exist in the near future. Creativity as a “mysterious” action is an intrinsic behavior that bends the rules and constrains to bring out something new (Boden, 1990). In a play setting we can imagine things without rules, and therefore we can think about the “impossible” through asking “what if?” questions. According to Vygotsky (2004, p. 11), “child’s play is not simply a reproduction of what he has experienced, but a creative reworking of the impressions he has acquired”. In a play setting the child combines his/her knowledge to construct a new reality, a fictional world that things can work in a radical way. During a game, a simple branch can be perceived as a magic sword, or a pillow can be the door of an imaginary castle. According to Druin (1999) involving children in design process of technologies can bring new insights and solutions. She defines a new type of role for children, shifting from being users to being “design partners” that create ideas with designers from brainstorming stage to prototyping and testing.

In the last decades, we see that participatory design methods have been commonly used to create desirable futures, rather than plausible ones by engaging users, citizens, children in the design process. Sanders (2000, p.1) addresses the issue of “today’s world made of the dreams of the CEO, technologists and business strategists” and draws our attention as an alternative to co-design approach to give people the chance to construct their own future through “generative tools”. Besides, in Future WS technique the citizens are imagining their future, through a three-step model: critique, fantasy and implementation phase (Jungk and Mullert, 1987). Role-playing and drama have also been used as methods to make users imagine new solutions for ubiquitous computing (Strömberg, Pirttilä & Ikonen, 2004).

In our project, we involve children in design process to create scenarios for future smart objects in co-design workshops. We believe that storytelling can be used as a tool to help children to create future scenarios in an iterative design process. Giving them the possibility to create ideas in a story setting can ease their integration into the design process to construct their scenarios of “the new”.

In this project, co-design workshops with children were the primary activities, where future scenarios were born and elaborated. These workshops aimed at turning children’s fictional designs into new possibilities for smart objects. Our hypothesis is that while working with children would give us the chance to explore plausible futures of smart objects, the public presentations of the results of these fictional objects would direct us to the preferable futures among those plausible ones.

4. Design Process

The design process was carried out in four steps (Fig.1):

1. Storytelling Sessions: three co-design workshops in which children were integrated as storytellers-designers of smart objects.

2. Idea Generation: a co-design workshop (with the same group of children), in which the focus was on designing future’s “Smart Plate”.
3. Mock-up creation: physical prototyping of selected ideas that manifest the results in embodied and provocative ways to get reflections.

4. Reflections: Presentations of results to a wider public to create debates on future smart objects.

4.1 Storytelling Sessions

According to Druin (1999), 7–10-year-olds children are more suitable to be design partners in creating new technologies since they have enough verbal skills to discuss their ideas. Therefore, co-design workshops were conducted with 24 children (age 7-8 years) in a primary school. To create an environment where the children would feel more like playing, the school’s theatre room was selected as an ideal location to conduct the workshops. The workshops were led and observed by an anthropologist and a designer, and assisted by the classroom teacher. During the execution of the activities, while the designers’ role was translating the children’s ideas into scenarios and mock-ups, the anthropologist’s role was observing and analyzing the object-human relationship and reflecting on educational outcomes of the workshops and in learning process.

In each session, a different storytelling technique and tools were used to stimulate children to think-loud and freely express their ideas on smart objects. One of the tools we prepared to help children create stories about future smart objects was a card game (Fig.2). The card game includes a deck of cards with object illustrations and an A3 paperboard with keywords (What, Where, with Whom?). The cards include 42 objects that have three different levels of interaction with user: intimate interaction (wearable), medium interaction (handheld) and distant interaction (environmental). The children worked in groups of four. After selecting a card from the deck each group started telling stories by following these questions: “What would this smart object do? Where would it be? With whom would it be?” Besides using the paperboard to create bubble diagrams with text, they also used A4 sheets to draw their stories.
In the second workshop, physical objects were used as medium to support storytelling (Fig. 3). Children were asked to select a quotidian object, imagine it as smart and describe what the object could do by telling its story. Through this method they could have the possibility to interact with the objects, and this helped them to notice different physical characteristics and discover embodied interaction modalities. In this workshop, they worked individually and drew/wrote the stories of objects onto papers.

In the third workshop, we focused solely on the chair as an object to animate with technology and ‘smartness’. A shadow game setting was prepared to make children animate classroom chairs and make them talk/act behind a curtain (Fig. 4). The aim was to give children the possibility to be creative through acting with their whole body, and to trigger new ideas through the ambiguity of shadows. This method helped children to put themselves in the shoes of an object, therefore enriched their imagination and gave them the possibility express their ideas not only with words but also through their body language.
4.2 Idea Generation

During the first storytelling session, a group of children imagined a story about a plate, which was giving advises to its user about what to eat. Starting from this idea, we asked children to imagine how future’s smart plates would be. We selected the “smart plate” theme as a focus for the idea generation session. Figure 5 shows some drawings of smart plate ideas done by the participants.
4.3 Mock-ups

Starting from children’s sketches of smart plate ideas, we created five 3D models and subsequently printed them with 3D printing technique. The prototypes were photographed, and a video animation was created to explain how they function.

4.4 Reflections

This session embraced involvement of the public in re-thinking and dialoguing on our smart object scenarios by becoming “active imaginers” (Dunne and Raby, 2013) that would interpret them. Through this session we aimed at opening up new questions about human-smart object relation, rather than offering solutions.

5. Results

5.1 Smart Object Stories

The stories and the unexpected interaction with objects led to new insights for smart objects. Although in our workshops more than 30 scenarios were created, in this paper we present some of them, divided into categories based on their similarities.

During the storytelling sessions, some children focused on emotional aspect of smart objects, considering that they could have emotions. For instance, they created stories in which objects were asking for more attention, or complaining about their misuse. They assigned personalities to smart objects, for instance a chair was stubborn, or a watch was always pessimistic.

Another subject was morality. They imagined smart objects that could have moral capacities. For instance, they created stories in which smart objects were warning their user about their user’s behaviors such as their energy consumption, eating habits or their actions in interpersonal relationships.

Another focus point set by the children revolved around connectivity. The children created stories of smart objects that were connected to someone else or some other object. They designed a bottle that could collect voices and send it to a friend by shaking it as a private communication channel. They imagined a smart fridge that could connect with other fridges in the world and transfer food from one place to other.

Another important subject raised from stories was empathy. They imagined smart objects as medium to exchange emotions and experiences between people and to put themselves in somebody else’s shoes. A child wrote a story in which a smart necklace travelled from one wearer to another to show how the previous wearer was feeling. Or smart eyeglasses could work as an experience exchanger, showing the world from its previous user’s point of view.

The other category was objects that could move and direct their users to a destination with their own freewill. They envisioned a smart spool that could move around and take its user to a new place through leaving a trace with a yarn. The smart wardrobe could turn into a luggage and advice where to go. The smart bag could fly next to its user directing him/her to new places.

The last category was frame-like objects, such as smart door or window imagined as transition tool from one state to another. The children envisioned smart doors, windows that could open to new, or alternative worlds existing today, in the past, or in the future.
5.2 Smart Plates

Based on the results of storytelling sessions, a final co-design workshop was conducted to design and conceive smart plate ideas together with the same group of children. The sketches were collected and merged into five different smart plate ideas, that were 3D printed as mock-ups (Fig.6):

Capiat: The plate can use visual, tactile and auditory signals to inform its user about the ingredients of the food that he/she is consuming. When a healthy food is served on the plate, the plate’s surface becomes smooth. In case of a contrary situation, it starts having wrinkles that would cause an unpleasant sound when fork or spoon touches. The wrinkles become red to warn the user about the severity of the situation.

Verdufrutti: The plate can recognise the fingerprint of the user and turns the food into a desired form and taste. It transforms a pill shaped seed into different shapes of food, by keeping the ingredients as it is, but giving a form and taste that would fit to the user’s taste. Through simulating the desired reality, people can always eat good quality of food that goes with their appetite.

Fegato: The plate is a part of a system like intestines that can digest the rest of the food. The plate absorbs the food without user cleaning it. The organic structure of the plate functions as a self-cleaning mechanism that finds solution to water consumption and waste management.

Piatto del Giudizio: This plate helps people to regulate their eating routines. The actual state of the plate looks like a normal plate with a concave structure that contains the food, and when the person exceeds the necessary amount of food, the plate becomes convex that doesn't permit food to stay on the plate.

Ingrandiscibutta: The plate embraces a micro-system, in which the rest of the food turns into a plant. The smart material allows the plate to absorb the rest of the food and turns it into fertiliser in the small greenhouse beneath the plate for growing herbs to be used in the meal.
5.3 Public Presentation

In this project while children’s role was being the co-creators of future scenarios for smart objects, adults were involved in the reflection session as “active imaginers”. As a first public presentation, we organised an event in the primary school where children and their parents were participated. In this event, the children had the chance to see how their ideas turned into tangible objects. Although the mock-ups were not functioning, this experience made children aware of the power of their creative potentialities. The mock-ups evoked surprise and curiosity both in children and parents. As a second step, the mock-ups were presented to a wider public which was out of design context to trigger discussions on smart objects and their role in the future. In order to visualise the context in which our fictional products would exist, we created an interactive digital platform, illustrating a future house (Fig.7). By clicking onto objects placed in different context in the house, the visitors could reveal information about their role and stories written by children. The mock-ups of the smart plates were placed next to the digital platform. The visitors were able to interact with the mock-ups and simultaneously see a video on the wall that was animating the plates in order to give a mild idea of how they function (Fig.8).

![Interactive platform exhibited at the public event](image-url)
6. Reflections

Our results show that storytelling sessions worked as a trigger of creativity and new ideas about human-object relationship. It was observed that the interaction with physical objects gave children more possibility to be creative in idea generation. Some children started talking with objects, as they were alive, giving them names and even showing affectionate behaviours towards the object, such as hugging, caressing, etc. Having physical interaction led to serendipity, as observed during the workshop with physical objects. For instance, by putting a glass bottle close to her ear, one child imagined that the bottle could whisper messages to her. Rolling a spool of rope on the ground gave another child the idea that the spool could direct him to a place. Noticeably, the card game helped them to organise their thoughts with predefined questions, and became a guide for them to conduct brainstorming session autonomously.

Triggering the imagination of children through providing them a game environment gave us more freely created and unbiased results. We have found out that during our sessions although children were creating fictional scenarios, they were strongly linked with real phenomenon, such as environmental problems, elderly care or health care. As says Vygotsky (2004, p. 13), designing fiction is “nothing other than a new combination of elements that have ultimately been extracted from reality”. Therefore, fiction cannot be totally omitted from reality, it always has traces from what we have lived or learned. However, being in a game setting gave us the possibility to form these realities freely without having rigid rules or restrains of real life, hence this affected the originality of their ideas.

Besides, the “performative prototypes” helped others to connect themselves to the fictional world that we created together with children. Therefore, many discussions were emerged on smart objects theme. One of the common discussion was about the shift from natural to artificial. The visitors of
the second public presentation were concerned about the “uncanny” (Freud, 1990) aspect of the mock-ups that were in between artificial and living-like. Thus, the mock-ups attracted their attentions and led to debates on how these objects might find their place in our everyday lives. Most of them stated that they would only accept these objects only if they could improve their life quality or assist them to enhance their abilities. The smart objects reflecting ideas on eco-sustainability were found preferable and opened up discussions on technology’s role in behavior change towards a more eco-sustainable life styles, rather than enabling us to consume more.

7. Conclusion

Children have powerful imagination that combines reality and fiction in making up stories in a play setting (Vygotsky, 2004). Our experiment shows that children as “design partners” can bring novel ideas, expanding the notions of smart objects through the use of storytelling technique. This paper represents an example of integration of children in a design project and harnessing their unbiased and free-spirited imagination towards the creation of ‘the new’, of new future scenarios. As a result, we must consider that use of design tools (card game or object-based storytelling) can guide children’s imagination towards a more creative ground, giving them possibility to form their ideas in a game setting, where the boundary between fiction and reality blurs. Design for emerging technologies can benefit from game based fictioning methods in which constrains of real world has less influence on idea generation and thereby can lead to originality. According to Schon (1983), “surprise” that happens in an experiment can generate both a new understanding of the phenomenon and a change in the situation. Hence, our project shows that serendipity that lays in game play and storytelling can give rise to new ideas and future scenarios in designing interaction for smart objects.

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