Towards Doll based design – framework, guidelines and research potentials

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ABSTRACT

Users are represented for many purposes and take many forms in design. This paper is concerned with potentials of representing users and use via dolls and doll play. The contribution of the paper serves as steppingstone for further investigations of Doll based design.

The paper introduces a conceptual framework which offers design research a vocabulary for understanding and articulating two central aspects of Doll based design: perspective taking and role taking. The framework is developed through a case study and theoretical investigation in the fields of Psychology and Play theory.

Based on the framework and case study, practitioners are offered two basic guidelines which support the initiation and continuing progress of Doll based design: *endow the doll with a motive* and *be an empathetic facilitator*. Moreover research potentials, based on the case and framework, highlight interesting future work.

Author Keywords

User representations, Representing users, Design process, Doll based design, Technology augmented environments.

ACM Classification Keywords

H5.m. Information interfaces and presentation

INTRODUCTION

Doll based design is the centre of this paper and denotes an approach where users are represented via physical objects with bodily form, called *dolls,* and use is represented through *doll play*.

The motivation of studying dolls and doll play as representations of users and use, derive from a challenge faced in the domain of designing technology augmented environments: environments where technology is distributed across or embedded into physical space and augment these with novel possibilities for interaction.

The author and college designers conducted a workshop experiment where ludo pieces were used as a means to represent users and promote considerations on use of a not yet build technology augmented environment. Through the workshop it occurred that representing users via objects in design is far from straightforward: The ludo pieces were not used, and the final concept ideas mainly focused on building aspects, lacking the focus of users and use.

Studying existing research, it is found that the topic of representing users' via objects, such as dolls, in design sessions is sparsely addressed. The aim of this paper is to address this gap in design research and practice, by focusing on how researchers and practitioners can understand and utilise dolls as objects representing users in design.

The paper is based on a design case with the aim of creating unique experiences for future library users by developing concept ideas for augmenting a future, not yet built library with technology. A workshop was conducted in order to create a shared understanding of visions of the future library among the designers and architectural project owners. This served as common ground for the collaborative establishment of a technology design project.

The contribution of the paper is:

a) A *Conceptual framework* which provides researchers with a vocabulary for understanding and articulating two central aspects of Doll based design: perspective- and role taking.

a) Two basic *guidelines* which support the initiation and continuing progress of Doll based design.

b) *Research potentials* which highlight future research which can enrich designers understanding and future conduct of Doll based design.

The concepts of the framework have been developed through interplay between: the case study and theoretical investigation in the fields of Psychology and Play theory. Guidelines and research potentials have emerged as a result of the framework and case study.

At the present time Doll based design is in the exploratory phase.

REPRESENTING USERS IN DESIGN

User representations fulfil many purposes in design context, including the collection of knowledge about users [14], idea generation [3] and design evaluation [1]. Moreover, representations of users take many forms - In the following, three different categories of user representations are introduced in order to position the contribution of the paper: *Text and visuals*, *Body and drama* and *Objects and role play*.

Text and visuals

Personas provide one way in which users are represented through text and visuals in design. Personas are fictional user archetypes based on behaviours, attitudes, and goals of target consumers and/or end users [10]. The approach was introduced as designers frequently had an unclear understanding of the user, often skewed by unforeseen assumptions, or based on preferences or skills of people similar to themselves [21]. Personas evoke empathy and understanding of the people for whom the design is for [16, 24]. Scenarios provide another approach of representing users textually in design. Scenarios are stories about users and their practice. Traditionally scenarios were used in the design of task and work-oriented systems development as a means for representing users and their context of use [8, 9].

Personas have been proposed to "come to life" in the minds of the people using them [21] and scenarios have been criticised for being too difficult to remember and not being engaging [12]. Addressing these aspects some have experimented with the use of drama in design [17, 19].

Body and drama

In drama users are represented, not in a textual and visual format, but using the bodies of one or more persons.

In the technique Future laboratories user representatives experiment with future technologies in as realistic as possible conditions. The technique allows designers and users to define both opportunities and constraints for design [7]. Binder [2] argues that improvised scenarios in the real setting of the users should not be seen as a substitute for having designers themselves working emphatically with scenarios. In Informance design, also known as bodystorming, designers act the role of users in a staged environment [5, 6]. In the case of Burns et al.'s [6] two male designers played the role of a female hairdresser and her female costumer. Their conclusion is, that designing in an enactive way increase empathy for the users. Besides user representatives and designers, professional actors also represent users in design sessions. This for instance occurs in the Focus troupe technique where actors represent users while potential users play the role of audience when a dramatized vignette introduces a new product concept [23, 25].

Body and drama is a well addressed approach of representing users and use in design. A disadvantage, however, is that the approach demand courage from both designers and users. Far from all people feels comfortable engaging in drama [3].

In the above review users are represented in a textual, a visually format or through the body of user representatives, professional actors or designers. When physical environments are augmented with technology, the environment and bodily presence of users is closely connected and need to be taken into consideration, during the design process. Where textual and visual user representations sparsely support this aspect, bodily presence is particularly central to the approach of representing users through bodies and drama. A challenge, however, occurs when environment and practice within it is inaccessible. One way of approaching this is to direct attention towards the use of objects and role play as representations of users and use.

Objects and role play

In the context of designing product networks Lerdahl et al. [18] have explored the use of small scale, space modelling combined with scenario play using foam pieces to represent users, as a means for mastering the increased complexity when designing product networks. They report that small scale modelling helps keep a context perspective on design tasks, and foam pieces, representing users, makes it less scary for users to talk about themselves and their practice.

Lacucci et al. [15] have explored the use of toy characters and role play as objects for approaching challenges to the design of mobile services and devices. They report that role games using toy characters, contextual and environmental representations provided a platform which helped players envision and act out new mobile product concepts. Moreover, they state that role play helped the process of projecting the group of players into the future situation.

In the above studies the role of objects, representing users, has been relatively central. Traces of designers' use of objects as user representations often occur in research papers, but often mentioned in passing remarks. For instance Petersen and Buur [20] assign one sentence to mention that they have used Lego characters as springboard for talking about operator roles in a future wastewater plant, and Brandt and Messeter [4] briefly mentions having provided game pieces of potential users in collaborative design sessions.

Using objects as user representations enable designers, stakeholders and/or users to enact scenarios as in body and drama approaches. This makes the representations dynamic, rapidly formable and engaging unlike the written text of scenarios. Compared to drama, objects and role play: allow many scenarios to be explored in a short timeframe; easily gives a contextual perspective [15, 18]; does not dependent on the accessibility of the physical environment; and is useful in creating a common language between stakeholders in collaborative design sessions [13]. Despite the many

values of representing users via objects and role play, limited attention has been directed towards the topic in existing research. In the above review different objects has been utilised in order to represent users in design including foam pieces [18], game pieces [4] and Lego characters [20]. The approach of attention in this paper resembles the later where users are represented via bodily representations.

The aim of this paper is to contribute to the knowledge gap in design of how practitioners can understand and utilise dolls as objects representing users in design.

RESEARCH METHOD AND PARTICIPANTS
The contribution of the paper has been developed through a case study, theoretic investigation and framework development.

In brief, the case study was conducted as part of a collaborative design project with partners from the municipality of Aarhus, Denmark, and the research center Digital Urban Living at Aarhus University. The project concerned the development of concept ideas for augmenting a future library building with technology. The municipality is project owners of the construction of the future library.

The project was characterized by being an open space of opportunities only defined by its focus on creating unique technology enabled experience for future users inside the public library space.

The case study has been conducted as part of a workshop, which lasted three hours and was conducted at the main municipal library. The workshop contained three activities; doll creation, doll play and scenario presentation. The *doll play* activity has been chosen as the foundation of this study, since it provided the most intense use of Doll based design as representations of users and use.

Seven participants from the municipality played with dolls; one man and six females age 29-54. The participants had different backgrounds and interests in the construction of the future library building. The group included: the project manager of the architectural project; librarians from the children's department, non-fiction department and from the desk area of the current library; an employee from the citizen service centre and a development consultant from the library. In addition three design researchers facilitated the workshop.

The participants were divided into three groups mixed by age and interests: one three-persons-group and two two-persons-groups. The groups were divided into separate rooms and had one hour for the doll play activity. In each room a video recorder documented the activity which in total provided the study with three hours of video material of the doll play activity.

The three hour video material was transcribed and along with the video it was analysed by utilizing NVivo 8 (software for qualitative analysis) which displays video and transcription in parallel. The case material and theory from the fields of Psychology (perspective taking), and Play theory (role taking) was examined in interplay. When observations in the case material were not supported by the above theories, additional concepts were developed through grounded theory [26]. Case analysis and concept development occurred through interplay and has served as foundation of the framework, guidelines and research potentials which the paper will introduce.

DESIGNING THE MEDIASPACE LIBRARY
The case study were conducted in the context of a design project as a part of a large scale architectural building project with the aim of designing a technology augmented environment.

The project concerns the design and construction of a new main library, Mediaspace, which is planned to be finished in 2014. The building will be placed centrally at the harbour front, near the city center, will cover 28.000 square metres and is expected to attract 3500 daily visitors.

The core value of the project is for Mediaspace (the building) to build bridge between citizens, technology and knowledge and offer state-of-the-art of information technology[1]. Addressing this, the municipality of Aarhus, Denmark, as architectural project owner, and the research center, Digital Urban Living, planned the establishment of a collaborative design project. The aim of the project was to create unique library experiences for future users by developing concept ideas for augmenting the future library building with technology.

The establishment of the project was challenged by the inaccessibility of the building and the agency and practice of users within it. With only a blueprint as representation of the building, it was found difficult for designers and project owners to establish the design project, as they lacked a shared understanding of the visions of the building and use which could serve as common ground to discussions. In order to address this challenge, the Living Blueprint workshop was conducted as part of the preliminary efforts of establishing the design project.

The Living Blueprint Workshop
The aim of the workshop was to create a shared understanding of the future building and use, between designers and a group of project owners, in order to serve as common ground for collaboratively establishing the design project.

The workshop consisted, as earlier mentioned, of three activities: doll creation, doll play and scenario presentation. First, the participants in groups co-created their fictional

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[1] More core values and visions can be found here: http://www.urbanmediaspace.dk/en/mediaspace/core-values

doll characters' by choosing a human silhouette made from plain paper which designers had made before the workshop (see Figure 1). Second, they envisioned their doll characters visit in the library through doll play on blueprints, and finally, the doll scenarios were presented and shared in plenum.

The doll play activity, as foundation of this paper, was initiated by a designer who demonstrated the doll play activity to the participants. Subsequently, the participants played the scenarios of their dolls visit in the new library. It is important to note, that participants were not told to generate technological ideas as part of the doll play, since the focus, similar to field studies, was to get a shared understanding of the visions of the place and practice of the future library.

The workshop was conducted prior to the creation of the framework presented in this paper; thus, neither perspective- nor role taking was intentionally facilitated.

The result of the workshop feed into the architectural building process as well as the design project of technology. The participants had, prior to the workshop, primarily been working on separate parts of the building such as for instance the children's or entry area. The workshop provided the participants with a more coherent sense of users' visits in the building, from they arrive at the entry until they leave, which supplemented their current perception of users' visit in separate areas. Moreover, the participants through doll play found several potential shortcomings concerning the physical structure, arrangement of departments and user support in the present plans of the future building. As an example the doll play activity revealed a lack of space in front of the main elevator, which could have resulted in a considerable bottleneck in the arrival area. Furthermore, the workshop increased the understanding of work tasks among participants with different focus areas of the building.

Even though design of technology was not the main objective of the workshop, several design potentials emerged through the workshop, both in relation to specific places and to the activities in the building. Contrary to the workshop with ludo pieces which motivated the study of Doll based design, the design potential which emerged from this workshop was based on aspects of use rather than merely building elements.

Subsequent to the workshop, the doll scenarios served as a valuable common ground, which enabled designers and project owners to discuss and make decisions concerning the direction and focus of the establishing design project. The project was decided to focus on users' experience in the entry area: a major open space with many design potentials to explore in further workshops.

Figure 1 – Dolls of the workshop

FRAMEWORK OF DOLL BASED DESIGN

This section introduces a framework which crystallises two central aspects of Doll based design; perspective- and role taking. During doll play, perspective- and role taking occur intertwined, in the following they will, however, be described separate in order to crystallise the nature and influence of each aspect in turn. The framework serves as a steppingstone for developing researchers and practitioners understanding of Doll based design.

Doll based design as perspective taking

The notion of perspective taking derive from the field of Psychology and is described as a more or less conscious process of suppressing one's own egocentric perspective in order to imagine the thoughts and feelings of other people.

Besides taking the perspective of other people, perspective taking also occurs in relation to dolls; during doll play participants view the world through the eyes of the doll; taking the perspective of the doll [25].

In psychology perspective taking is referred to as a mental and multifaceted social skill that is classified as either cognitive, affective or perceptual [11].

Through case analysis, it has been found that Doll based design contains six instances of perspective taking which are central in the use of dolls as user representations in

design sessions. The three first perspectives in Doll based design resemble those found in psychology while additional three perspectives are found particular to Doll based design in the Living Blueprint workshop. The six perspectives are presented in Table 1. Each of the concepts of perspective taking proposed, are based on numerous observed occurrences in each of the six doll scenarios from the three groups.

PERSEPCTIVES	DESCRIPTION
Cognitive	What does the doll think?
Affective	What kind of emotional experiences does the doll have?
Perceptual	What does the doll see and what does the doll feel with its physical/bodily senses?
Action	What does the doll do? Where does the doll go? What does the doll interact with?
Social	Who does the doll meet? What does the doll do with others?
Time	What time of the day, year, season, is it and how does it affect the doll?

Table 1- Framework of perspective taking

In the following the perspectives and the dynamics between them will be empirically demonstrated through an extract of the doll scenario of Jan-Henrik (Figure 2), a scenario developed by a group containing two participants.

When reading the scenario, it is central to keep the situation of the participants in mind; the participants are sitting in a meeting room equipped with no more than two pieces of paper – a large paper, the blueprint (representing a future building) and a smaller paper, the paper doll (representing a future user).

Example: Perspective taking in the scenario of Jan-Henrik

Jan-Henrik is an imagined future user of the library (Figure 2). The doll play is initiated as the participants take the cognitive perspective of the doll by envisioning the motive of Jan-Henriks visit in the library; Jan-Henrik is visiting the future library as he is interested in the technical installations of the building and especially the solar cells on the roof top.

Jan-Henrik arrives at the entry of the new library, and a participant says:

> "He is standing here and looking – I think, that he thinks, that there is quite a lot of people here."

Figure 2 - The doll Jan-Henrik

Viewed through the lens of perspective taking, this short quote contains four perspectives: action, perceptual, cognitive and social.

First the action perspective of the doll is taken, as the participant state that the doll is *standing here*. The action perspective is represented as a combination of statements of the doll's action (standing) supplemented with adverbs of place, which indicates where the act is happening (here).

The next perspective of the quote is perceptual perspective taking, where the participant ascribes to the doll, the ability to see. Besides being *standing*, Jan-Henrik is envisioned *looking* around in the entry of the library.

The last two perspectives of the citation are the cognitive and the social. With the cognitive perspective, the participants ascribe thoughts to their paper doll and with the social perspective, they relate the doll to other imagined users of the library; Jan-Henrik *thinks* that there are quite a lot of people in the entry.

After a couple of minutes envisioning of the entry, a break down occurred in the doll play; the participants hesitated not knowing how to continue the scenario. The doll play re-establishes as the participants return to the cognitive perspective taking of doll's motive, which also started the doll scenario; Jan-Henrik leaves the entry and walks around in order to inspect the technical installations. It is the motive of the doll that brings the doll play back to live and supports the progress of the play.

In the Citizen's service center, there is a long queue of people, and a participant says:

> "Jan-Henrik does not want to stand there waiting if he is number eight in the queue – that would irritate him a lot."

As the former quotation, this contains several instances of perspective taking. Firstly, the participants take the cognitive and action perspective by stating that Jan-Henrik *does not want* to *stand* waiting in the queue. The subsequent two perspectives extend the examples of the former quotation. In talking about the aspect that Jan-Henrik does not want to stand there *waiting,* the participants enrich the scenario with the perspective of time. Moreover

the last part of the quotation adds the affective perspective of irritation to the doll. Viewed literally, the situation of a small piece of paper standing on a larger piece of paper does neither contain the concept of waiting time or the affective state. However, as the participants during doll play operate in a 'parallel reality' where a small piece of paper is a human and a spot on a blueprint is an actual queue in front of the Citizen's service centre, the perspectives emerge.

Summary: Perspective taking in Doll based design

The above example illustrates how participants vitalise dolls through the creation of successive chains of intermixed perspectives; one perspective follows the next whereby scenarios of the future emerge.

The scope is wide concerning what users represented through paper dolls can be envisioned doing in the world of pretend. The case study reveals that paper dolls can think, run, sit, feel, smell, feel hot, be impatient, relate to other people and have a notion of time during the doll play activity.

This paper introduces six perspectives found in the Living Blueprint workshop. As this paper represent initial inquiries into Doll based design, it is likely that additional perspectives will emerge in future inquiries.

The concept of perspective taking provides a vocabulary which can help us understand and articulated Doll based design. The framework of perspective taking and the case material, will serve as foundation for proposing a basic guideline which support the initiation and continuing progress of Doll based design. Moreover, it will serve as foundation for highlighting research potential that can translate the framework into operational tools for designers.

Doll based design as role taking

In the field of Play theory, it is described that children undertake three different roles during doll play: the role as vicarious actor, stage manager and narrator [23]. In design, however, doll play foster a two level dialog among participants; one level centred on the enacted situation and another level centred on discussions between participants [18].

Through case analysis, it has been found that six different roles presented in Table 2 occur central to Doll based design. The first three roles resemble the roles which are undertaken by children during doll play and which are centered on the enacted situation, while additional three roles are found important to Doll based design in the Living blueprint workshop – two centred on discussions between participants and one supporting the doll play conduct, when an outside party is involved during doll play.

As with perspective taking, each of the roles are based on numerous observed occurrences in each of the three groups and six doll scenarios. In the following the roles and the

ROLES	DESCRIPTION
Vicarious actor	Participants take the role of the doll speaking for it or/and animating its actions.
Narrator	Participants comments on or explains the action of the doll to co-players
Stage manager	Participants create sound effects, motions and constructions to simulate the complexity of events and settings.
Generalist	Participants generalise the doll scenario and reflect on how the experience will affect other people
The self	Participants engage personally in doll play either with their personal or professions competences and interests.
Facilitator	The facilitator guides and supports the doll play conduct.

Table 2 - Roles in Doll based design

dynamics between them will be demonstrated through further extracts from the doll scenario of Jan-Henrik.

Example: Role taking in the scenario of Jan-Henrik

The example starts where it was left in the former example concerning perspective taking. Jan-Henrik was envisioned being irritated if he was limited to stay in front of the Citizen's service center if he was number eight in the queue. A participant then says:

> "it would irritate him a lot, - then he stands shuffling his feet."

Focusing on the spoken words of the citation, the participant undertakes the role as narrator. The narrator explains the emotion and action of the doll to the co-player. Without this role, collaboration would be difficult in doll play as the narrator comments on and explains the context of the play creating a shared frame among participants.

Besides the spoken words, the participant simultaneously knocked three times under the table simulating the sound of Jan-Henrik shuffling his feet. In this example the participant acts in the role of stage manager. The participant supplements the verbal utterance with sound effects in order to stress the affective state of the doll being impatient. Subsequent, to the quoted, the participants undertake the role as generalist. This occurs as they generalise the situation of Jan-Henrik and reflect on the experience of other users: the participants agree that other users, similar to Jan-Henrik, would find it desirable not to be limited to stay in the area of the Citizen's service center, if the queue was long.

Continuing, the next thing, Jan-Henrik meets on his technical inspection of the new building, is the passport machine. The participants agree that he would be interested in this, as it is based on self-service and new on the marked. Jan-Henrik is envisioned examining the pass port machine:

> "Then he lies down his head here and places his finger here, and then it takes a picture."

In this example the participant acts as narrator and vicarious actor. In the context of the scenario the participant uses the narrator role in order to frame elements which are not self-evident for or visible to the eye of co-players. For example the former time perspective of waiting time is not visible for the eye, however, in the role of narrator the participant explains.

The role of vicarious actor relates to what the participant did when saying the above. While explaining how Jan-Henrik uses the passport machine the participant illustrates the acts of Jan-Henrik by using his body. Figure 3 illustrates the situation through a picture from the workshop. Through the role of vicarious actor the participant compensates for the acts which are not supported by the format of the doll.

Figure 3 – Participant acting as vicarious actor for the doll

The situation of Jan-Henrik using the passport machine evokes a discussion among the participants concerning how the machine works, and a participant states that the photos should be good or it would cause problems. The topic is continued as follows:

> K: "yes, yes – do you know why we are so strict?
>
> M: it is because the police are strict!
>
> K: yes, because we cannot get them printed then. Then they are just returned to us. So we may as well take them up front."

In this citation the female (K), who is working in the Citizens service centre, speaks in the role as the self. In this role, she shares her professional knowledge of the qualities of the photos with the other participant, who works as a librarian.

Subsequent to the discussion of the passport machine, Jan-Henrik is envisioned standing at the ramp which connects the first and the second floor of the building. The participants hesitate whereupon the designer, who has been following the doll scenario on the side, asks:

> "Does he find something interesting?"

With this question the designer speaks in the role as facilitator. By asking within the space of the play, referring to the inanimate doll as 'he', the question supports the progress of the play. The facilitator, and the question, thus, support the continuing progress of the play and Jan-Henrik and his studies of the technical installations of the library is continued.

Summary: Role taking in Doll based design
The above example illustrates how participants undertake a variety of roles during Doll based design; one role seamlessly succeeds the next in successive chains of roles.

The roles have each their unique contribution to the play. The vicarious actor endows the doll with speech, gestures and motion; the narrator comments on or explains the action of the doll to co-players; the stage manager simulate the complexity of events and settings of the doll play; the generalist reflects on experience of the doll and how the experience will affect other people; the self contributes to the doll play with personal or professions competences and interests; and finally, the facilitator guides and supports the doll play conduct. Combined, the roles serve to create, uphold and inform the vitalization of the inanimate doll.

Six roles have been introduced, found in the Living Blueprint workshop. As with perspective taking, it is important to note, that the roles represent initial inquiries into role taking, and that additional roles might be identified in future inquiries.

In the following focus will be directed at the practical aspect of design. Here the framework of perspective- and role taking and the case study will serve as foundation for proposing two practical guidelines for designers' planning and conduct of Doll based design.

PRACITAL GUIDELINES
Existing research offers limited practical guidelines for practitioners' use of physical objects as representations of users in design.

As dolls are inanimate it is important to support the initiation and continuing progress of Doll based design, in order to vitalize the dolls. Based on the framework and case study, two basic guidelines are crystallised: one from the framework of perspective taking, concerning the cognitive perspective of the doll's motive; and one from the framework of role taking, concerning the role as facilitator.

The following two guidelines are proposed: *Endow the doll with a motive* and *be an empathic facilitator*.

Endow the doll with a motive

In the Living Blueprint workshop, participants were encouraged to ascribe motives to their doll simultaneously with their creation of the doll. Through the analysis of the workshop with the lens of cognitive perspective taking the motive was found to have a particular important role concerning the initiation and continuing progress of Doll based design. In the initiation stage of the scenarios the motive of dolls served as common frame to participants and guided the vitalisation of the otherwise inanimate user representation.

In the scenario of Jan-Henrik, the motive initiated the scenario: Jan-Henrik was envisioned visiting the library as he was interested in the technical installations of the building and the solar cells on the roof top. When a break down occurred in the doll play, the participants naturally returned to the motive in order to find common ground and inspiration for continuing the doll play.

In all six scenarios breakdowns occurred in the doll play. The common ground of the participants was the motive of the doll whereby the motive served as instrument for getting the scenario back on track, supporting the continuing progress of the play.

Where the motives in the Living Blueprint were decided by the participants, and given to fictional users, designers might find it fruitful to consider alternative approaches depending on the conditions and aim of the specific workshop. An alternative approach might be to utilise motives of personas [22] developed on the basis of field study data; if participants are users themselves, the motives might be based on personal or work related preferences or dreams; or the motives could be decided by the designers in order to guide the scenarios in a certain direction or for instance evoke out of the box ideas.

The first guideline - endowing the doll with a motive - contains the following considerations for designers planning and conduct of Doll based design:

- During the planning of Doll based design, decide which kind of motive that supports the design goal:
    - an open motive decided by participants;
    - an directed motive decided by designers;
    - a combination, where the participants are given boundaries wherein they can develop the motive;
    - other origins of the motive.

- Before the workshop allocate time for the creation of the motive either by designers or participants.

- During the workshop support the motive as an empathic facilitator (see the guideline of the following section.).

Be an empathic facilitator

The motive of the doll provides one way in which designers can support the initiation and continuing progress of Doll based design. The role as facilitator similarly plays an important role concerning the initiation and continuing progress of Doll based design, however, the facilitator has to be empathic.

What characterizes the empathic facilitator is the way in which the facilitator enters into the doll play activity. If doll play for instance faces a breakdown; the empathic facilitator acknowledges the space of pretend by asking questions which support the continuing progress of Doll based design.

These questions are characterizes by their resemblance with the questions which participants in their role as narrator, ask each other during doll play. The resemblance is to be found in the way that the facilitator refers to the paper doll with a personal pronoun and using perspective taking. For instance the facilitator could formulate the question:"Does he find something interesting?": using the pronoun *he* when referring to the small piece of paper.

In asking questions empathically the facilitator invites the players to continue the play activity, rather than disturbing the play by withdrawing participants to the literal reality by for instance saying "try to consider if the paper doll finds something interesting".

The role as facilitator is a valuable tool for the designer during Doll based design. In the role as empathic facilitator it is possible to support the vitalization of the inanimate doll. Moreover, the role offers designers an approach through which they can get the doll play 'back on track' if for instance: the doll scenarios are assessed moving in an unwanted direction in correlation with the aims of a specific design case; or if a breakdown occurs.

The second guideline - acting as empathic facilitator - contains the following considerations for designers planning and conduct of Doll based design:

- Before the doll play allocate time for designers to get a clear understanding of the motives of the dolls (See the guideline in the previous section).

- During the doll play support the play as empathic facilitators:
    - When doll play is moving in a unwanted direction, regarding the object of the workshop;
    - When a breakdown in doll play occurs.

- When entering a doll play scenario as facilitator, consider how the workshop is best supported:
    - With open questions which have no specific direction;

- With focused questions, which are directed either toward the motive of the doll or an object of particular interest to the workshop.

- When asking questions, refer to the doll by using a personal pronoun and perspective taking.

RESEARCH POTENTIALS

The framework of perspective- and role taking opens up an undisclosed space of research potentials which can enrich designers' future understanding and conduct of Doll based design.

The motive of the doll and the role as empathic facilitator provide two practical examples of how designers can promote and guide doll play in a given direction. In order to support designers in planning the support of certain perspectives and roles, first step is to study the possibilities of each perspectives and roles in design sessions.

This research potential of Doll based design concerns the exploration of how designers through the planning and conduct of doll play can promote perspectives and roles of special interest to a concrete design situation. As design situations are unique (for instance with respect to users, the context of use, conditions and points of focus) it is relevant for designers to facilitate a workshop which supports the needs of the specific situation at hand. For instance the perspective of time or affective state might be important to a particular design situation, whereby it is important for designers to be able to promote the perspective as part of both the planning and conduct of doll play.

Two design potentials will serve as examples: social perspective taking and the role as stage manager.

- Social perspective taking:

  - How can social perspective taking be supported in Doll based design?

  - How can crowds be represented and are physical representations needed?

  - Contexts for examining social perspective taking include: music festivals, sports events and shopping malls.

- Stage manager:

  - How can the roles as stage manager be supported in simulating the complexity of events and settings?

  - How can the stage manager for instance support the notion of time (night/ day, winter/ summer), the change between on and off rush hour and between different weather types?

  - Contexts for examining the role as stage manager include cases where the doll and

environment as representations are not sufficient.

Over time the framework of perspectives and roles and the practical understanding can provide designers with a practical approach for choosing and supporting the deliberate planning and conduct of Doll based design.

CONCLUSION

Doll play is known and has been practiced across genders by mostly everyone. This quality is particularly attractive to design as we conduct collaborative design processes which involve a multitude of people with different interests and competences. In the context of design, doll play offers an approach of representing users and use, which does not demand sophisticated theoretical understanding or knowledge of participants: Everyone knows how to play with dolls.

Despite this attractive quality, and the need for designers to be able to represent users via objects in the design of technology augmented environments, research has given little attention to users represented via objects, such as dolls, in design.

The contribution of this paper serves as steppingstone for exploring Doll based design, where users are represented via physical objects with bodily form. The paper has provided design research with a framework which offers a vocabulary for understanding and articulating perspective- and role taking in Doll based design. The framework has been developed through case analysis and theoretical investigation in the field of Psychology and Play theory. Based on the framework and case analysis designers have been offered two basic guidelines which can support the initiation and continuing progress of Doll based design. The case study showed that doll play provide a natural instance of perspective- and role taking, where participants seamlessly undertake different perspectives and roles without significant disruption of the play. However, where this occurs natural it also occurs coincidental. Without particular attention doll play might unfortunately get to lack the enrichment of important perspectives and roles. Finally, research potentials which can enrich the future understanding, planning and conduct of Doll based design, has been highlighted, which in the future will help practitioners guide and direct Doll based design.

The framework and guidelines of this paper are based on studies of doll play in one design project. In order to qualify and substantiate these, further explorations is needed where they are explored in relation to different design contexts.

A limit of the above case study is the fictional character of the dolls. As with personas, fictional dolls do not provide valid knowledge of users but represent stereotypes. In order to overcome this limit, it could be interesting to explore the applicability of Doll based design as an approach for engaging users into the design process. Future work

includes the engaging of users as puppeteers animating dolls which represent themselves.

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