

Nordes 2013
Online proceedings

Nordes 2013:

Experiments in design research

Online proceedings

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Introduction

Welcome to Nordes 2013 the 5th biannual Nordes conference; welcome to Malmö and Copenhagen! Since its establishment in 2005, the Nordic design research conference, Nordes, has established itself as perhaps the most important scholarly event in the field in the Nordic countries, and over the years, Nordes has attracted still more participants from the rest of the world. The ambition of the Nordes design research conference is to develop into an international conference of the highest academic standards with close reference to design practice as well as to the more traditional research approaches to design; a conference which gathers scholars from the so-called artistic institutions as well as from the universities, the business schools, and the polytechnical universities, including also independent scholars and still other environments. Nordes wishes to be a vital, inspirational forum in a still emergent field of design research, where the first generation of pioneers is still active, where promising research talents try out new paths, and where you constantly see newcomers settle with their strange seeds and wonderful new kinds of crops. This Summer, Nordes “returns” to the place where it all began—the Øresund region—and indeed, partly, to the venue where the Nordes conference was held back in 2005, Holmen, the old naval base in central Copenhagen, where the Danish Centre for Design Research hosted the conference along with colleagues from Malmö as co-organisers. Since then, Nordes has visited Konstfack (Stockholm, 2007), Oslo School of Architecture and Design (2009), and the School of Design at the Aalto University (Helsinki, 2011).

At this conference, focus is on experiments. As a probing undertaking, design is closely affiliated with the experimental and the exploratory. But what does this mean in the context of design research? In one corner, experimentation is conceived of as designerly exploration into, for instance, materials, technologies, and expressions. In another corner, design experimentation is shaped according to hypothetical-deductive models of knowledge production inherited from science and engineering. Yet, in a third corner, design experiments are explored as a means for promoting social change or as a critique of political and ethical values. For instance, this can take the form of critique through fiction and utopias.

This raises a set of central questions for design research: How is design experimentation similar and different from experimentation in other research fields and areas? What is the role of exploration vis-à-vis experimentation in design research? How is it possible to provide a consistent account of research methods underlying experimental design research? Is it possible to stage design experiments other than as highly idealized probing situations? Can design experiments act as part of a critical aesthetic practice?

As experiments are the core of the present conference, the ambition has been to give both workshops and the design research exhibition a central place in the programme. We have dedicated a full day for workshops in order to enable designers and design researchers to explore and discuss the many aspects of design research in an experimental and “designerly” way. The workshops will take place at STPLN in Malmö (see “venue” for further information). The intention is to create common experiences and to provide different kinds of platforms for the exchange of ideas and the exploration of new views. The Nordes workshops take many forms and contribute to various fields within design research, among them Codesign, Critical Design, Sustainable Design, Health/Ageing, Design Thinking, and Experimental Sketching. All conference participants are encouraged to take part in a workshop. We are proud to present an exhibition with 27 items in the main Ceremonial Hall where also one of the keynotes and the plenary paper sessions will take place. The vision with the design research exhibition is to present the materialities of design experiments in ways that communicate knowledge of research and of practice. The exhibition may thus both (be used to) present the outcomes of the research, and as a tool to express and communicate research enquiries. Some of the exhibition themes are: Experiments as design fiction & critique, exploration & making methods, and stretching the boundaries of material use.

We hope that you will enjoy our four-day selection of keynote speakers, papers, exhibition entries, workshops, and social and artistic events with experimentation as its overarching theme. This year, we have received more submissions than ever. All proposals have been through a double blind peer-review process. We are thus proud to be able to feature 34 full papers, 23 exploratory papers, 13 workshops, and 28 items for exhibition. We thank you all for your scholarly and artistic contributions to the Nordes environment, and we thank all reviewers and co-organisers for your tireless efforts to keep the Nordes machine running. Today we can all enjoy, celebrate, and nourish from the outcome. On behalf of Nordes and the organizing committees, we welcome you to Nordes 2013 and to Malmö and Copenhagen.

Finally we would like to express our gratitude to the generous financial contributions and support to the Nordes 2013 conference from the The Swedish Faculty for Design Research and Research Education (Designfakulteten), The Danish Council for Independent Research (Det Frie Forskningsråd/FKK), Letterstedtska Föreningen; School of Arts and Communication (K3), Malmö University, and The Royal Danish Academy of Fine Arts, Schools of Architecture, Design, and Conservation.

Enjoy!

Eva Brandt, Pelle Ehn, Troels Degn Johansson, Maria Hellström Reimer, Thomas Markussen, and Anna Vallgård

Program

Time	Event	(Location)
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(F) = Full paper

(E) = Exploratory paper

(Exh) = Exhibition paper

Sunday (Copenhagen)

(Registration is open from 08.30 - 20.30 in the reception)

09.00 - 12.30	Doctorial consortium	(90.1.25)
12.30 - 13.30	Lunch	(Cafeteria)
13.30 - 17.00	Doctorial consortium	(90.1.25)
17.00 - 17.30	Conference opening	(Ceremonial hall)
17.30 - 18.30	Papers (plenary #1)	(Ceremonial hall)
<hr/>		
Design research I:		
<ul style="list-style-type: none">◦ Characteristics and interferences of experiments in science, in the arts, and in design research (F) (<i>Dagmar Steffen</i>)◦ Experiments all the way: Diagrams of dialectics between a design research program and experiments (F) (<i>Mette Agger Eriksen, Anne Louise Bang</i>)		
18.30 - 19.30	Keynote: Usman Haque	(Ceremonial hall)
19.30 - 20.30	Buffet	(Cafeteria)
20.30 - 22.30	Exhibition opening	(Ceremonial hall)

Monday (Copenhagen)

09.00 - 10.30

Papers (parallel track #1)

a) Experiments in design education: (Auditorium 5)

- Discursive structures of informal critique in an HCI design studio (F)
(*Colin Gray*)
- Story of use: Analysis of film narratives to inform the design of object interactions (E)
(*Silvia Grimaldi*)
- Why hypothetical? Grounding “the guess” in experimentation (E)
(*Mary Anne Beecher*)
- Articulating material criteria (E)
(*Karen Marie Hasling*)
- Translations: Experiments in landscape design education (E)
(*Anne Tietjen*)
- Design argumentation in academic design education (E)
(*Peter Dalsgaard, Christian Dindler, Jonas Fritsch*)

b) Design for the social: (90.1.20)

- Designing social play through interpersonal touch: An annotated portfolio (E)
(*Mads Hoby, Nicolas Padfield, Jonas Löwgren*)
- Designing in the emergent city. Assemblage, acts, performance (E)
(*Kristine Samson*)
- Sustainable infrastructure for ad hoc social interaction (F)
(*Lone Malmborg, Signe L. Yndigegn*)
- The social fabric: Exploring the social value of craftsmanship for service design (F)
(*Michelle Baggerman, Kristi Kuusk, Daniëlle Arets, Bas Raijmakers, Oscar Tomico*)

Monday (Copenhagen)

10.30 - 11.00

Coffee break

(Reception)

11.00 - 12.30

Paper (plenary #2)

(Ceremonial hall)

Politics of design I:

- Storm system: Wearable shelter for the alpha time era (F) (Exh)
(*Miguel Rios*)
- Becoming the energy aware clock: Revisiting the design process through a feminist gaze (F)
(*Karin Ehrnberger, Loove Broms, Cecilia Katzeff*)
- Sacred services: The potential for service design of theory relating to the sacred (F)
(*Ted Matthews*)

12.30 - 13.30

Lunch

(Cafeteria)

13.30 - 15.00

Paper (parallel track #2)

a) Politics of design II: (Auditorium 5)

- Design experiments for sustainable eating in Finland (E)
(*Young-Ae Hahn, Marja Seliger*)
- Making as using: Design research that deciphers value (E)
(*Tania Splawa-Neyman*)
- Balancing food values: Making sustainable choices in cooking practices (F)
(*Annelise de Jong, Lenneke Kuijer, Thomas Rydell*)
- Designing sustainable futures (F)
(*Sara Ilstedt, Josefin Wangel*)



Monday (Copenhagen)

b) Co-design I: (90.1.20)

- Designing for self-leadership (F)
(*Kirsten Bonde Sørensen*)
- ‘Designerly’ analysis of participation structures (F)
(*Jacob Buur, Marie Rosa Beuthel, Agnese Caglio*)
- Mapping children’s experiences: Adapting context mapping tools to child participants (F)
(*Mathieu Gielen*)

15.00 - 17.00

Exhibition

(Ceremonial hall)

17.00 - 18.30

Paper (plenary #3)

(Ceremonial hall)

Enabling design experiments:

- Can design go beyond critique? (Trying to compose together in opening production) (F)
(*Anna Seravalli*)
- Experimentation as making knowledge: Two models of research in the design studio (F)
(*Michael Jasper*)
- Non-directive experience design (F)
(*Morten Winther*)

Tuesday (Malmö)

09.30 - 12.30

Workshop (part 1)

(STPLN)

Full day workshops (through part 1 and part 2):

- Ageing & ingenuity: What is your design story?
(*Yanki C Lee, Sara Hyltén-Cavallius, Virginia Tassinari*)
- An experiment of reflection on design game qualities and controversies page
(*Mette Agger Eriksen, Maria Hellström Reimer, Eva Brandt, Kirsikka Vaajakallio*)
- Electronic sketching: Using IdemoBits as tools for synthesis in design research
(*Vanessa Carpenter, Mikkel Leth Olsen*)
- Experimenting with design: Playing with data derived from unusual locations
(*Laurene Vaughan, Andrew Morrison, Aisling Kelliher*)
- Experimenting with design experiments
(*Anna Rylander, Bo Westerlund*)
- New ways of networking: A hands on workshop exploring the workspace:lab and its equipment
(*Christina Lundsgaard, Carolina Souza Da Conceição, Johanna Eriksson*)
- The Fat Factory: Chewing the fat
(*Mike Thompson, Daniëlle Arets*)



Tuesday (Malmö)

Half day workshops (part 1):

- Creative communities, creative assets: Exploring methods of mapping community assets
(*Catherine Greene, Gail Ramster, Katerina Alexiou, Theo Zamenopoulos, Giota Alevizou, Alan Outten, Cristina Gorzanelli*)
- Fungutopia workshop: Grow it yourself design
(*Laura Popplow*)
- Playful design for Alzheimer's disease
(*Hester Anderiesen, Laura Eggermont*)
- Experimental sketching
(*Judith Marlen Dobler*)

12.30-13.30

Lunch

(STPLN)

13.30 - 16.30

Workshop (part 2)

(STPLN)

Half day workshops (part 2):

- Designing value and reframing challenges
(*Andrea Augsten, Frederike Beha*)
- Expand your design space with energy harvesting
(*Johan Pedersen, Vanessa Carpenter*)

16.30 - 17.30

Coffee break

(MEDEA)

17.30 - 18.30

Keynote: Massumi & Manning

(MEDEA)

18.30 - 19.30

Refreshments

(STPLN)

19.30 - 22.30

Conference dinner:
Nordes popup restaurants

(STPLN)

Wednesday (Copenhagen)

09.00 - 10.30

Paper (parallel track #3)

a) The role of the designer: (90.1.20)

- Discursive design basics: Mode and audience (E)
(*Bruce M. Tharp, Stephanie M. Tharp*)
- Utilizing the designer within: A healthcare case study (E)
(*Alastair S. Macdonald*)
- Ageing as design culture (E)
(*Ozge Subasi, Lone Malmborg*)
- The in-between: An experimental venture into the position of the designer (E)
(*Susana Cámara Leret, Bas Raijmakers*)
- The ingenuity of ageing: An experiment to explore the role of designers as a moral subject (F)
(*Denny Ho, Yanki Lee*)

b) Design research II: (Auditorium 5)

- Artifice, the semiosphere, and counter-consciousness -or- a model for a counter-design and design research (E) (Exh)
(*Joshua Singer*)
- Experiential design landscapes: Design research in the wild (E)
(*Michel Peeters, Carl Megens, Caroline Hummels, Aarnout Brombacher, Wijnand Ijsselsteijn*)
- The travelling transect gels: Capturing island dynamics, relationships and atmospheres in the water landscapes of the Canaries (E) (Exh)
(*Ellen Braae, Lisa Diedrich, Gini Lee*)
- Double vision: Researching fashion design practise by use of qualitative techniques (E)
(*Ulla Ræbild*)
- A differentiation of the notion of resistance, based on two ways of operationalizing textiles in architecture (E)
(*Elisabeth Heimdal, Astrid Mody*)

Wednesday (Copenhagen)

10.30 - 11.00

Coffee break

(Reception)

11.00 - 12.30

Paper (parallel track #4)

a) Design fictions: (90.1.20)

- The role of fiction in experiments within design, art and architecture (F)
(*Eva Knutz, Thomas Markussen, Poul Rind Christensen*)
- A foray into not-quite companion species: Design experiments with urban-animals as significant others (F) (Exh)
(*Tau Ulv Lenskjold, Li Jönsson*)
- Open wearables: Crafting fashion-tech (F) (Exh)
(*Valérie Lamontagne*)

b) Designing through cross-media: (Auditorium 5)

- Invisible man: Literature and the body in design practice (F) (Exh)
(*Tarryn Handcock*)
- Enstasy: Immersive drawing as a design process (F) (Exh)
(*Welby Ings*)
- Design experiments with social media and museum content in the context of the distributed museum (F)
(*Dagny Stuedahl, Sarah Lowe*)

12.30 - 13.30

Lunch

(Cafeteria)

Wednesday (Copenhagen)

13.30 - 15.00

Paper (parallel track #5)

a) Experiments as (material) explorations: (90.1.20)

- 3 contiguous experiments on a design historical case (F)
(*Pia Pedersen*)
- Towards a manifesto for methodological experimentation in design research (F)
(*Henry Mainsah, Andrew Morrison*)
- Demonstrating color transitions of leuco dye-based thermochromic inks as a teaching approach in textile and fashion design (F)
(*Marjan Kooroshnia*)
- Printed material and fabric (F)
(*Jussi Mikkonen, Reetta Myllymäki, Sari Kivioja, Santeri Vanhakartano Helena Suonsilta*)

b) Co-design II (material practice): (Auditorium 5)

- Cardboard hospital: Prototyping patient-centric environments and services (F)
(*Juha Kronqvist, Heini Erving, Teemu Leinonen*)
- Oops! moments: Kinetic material in participatory workshops (F)
(*Robb Mitchell, Agnese Caglio, Jacob Buur*)
- How experimenting with networks and the data they generate can create layered semantic and visual communication design? (F) (Exh)
(*Miglena Minkova, Maria Martin Carrasco*)



Wednesday (Copenhagen)

c) New design methods: (90.2.01)

- Method-making as a method of designing (F)
(*Jung-Joo Lee*)
- Escaping the obvious: Skewing properties of interaction (F)
(*Sus Lundgren, Dimitrios Gkouskos*)
- Multimodal experiments in the design of a living archive (F)
(*Laurene Vaughan, Reuben Stanton, Lukman Iwan, Jeremy Yuille, Jane Mullett, David Carlin, James Thom, Adrian Miles,*)
- Proto-p experiments: Entering a community of circus practitioners (E)
(*Camilla Ryd*)
- Exploring reflective design: An approach to digital archives (E)
(*Reuben Stanton, Laurene Vaughan, Jeremy Yuille*)

15.00 - 15.30

Coffee break

(Reception)

15.30 - 17.00

Paper (plenary #4)

(Ceremonial hall)

Ideologies for prototyping the future:

- An experiment with the voice to design ceramics (E) (Exh)
(*Flemming Tvede Hansen*)
- Postcards from a (better) future: Process as making (E) (Exh)
(*Danielle Wilde, Kristina Andersen*)
- Complicating machines: A call to infect architecture with the mechanism of 'politics' (E)
(*Johan Liekens*)
- Design for future uses: Pluralism, fetishism and ignorance (F)
(*Cristiano Storni*)

17.00 - 18.30

Nordes commons

(90.2.01)

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MAPPING CHILDREN'S EXPERIENCES: ADAPTING CONTEXTMAPPING TOOLS TO CHILD PARTICIPANTS

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ABSTRACT

Within the area of user-centered design, Contextmapping is an approach to participatory user experience research that provides designers and user researchers with a clear workflow and hands-on toolkit. It acknowledges the user as the expert of his or her own experiences and aims to deliver rich insights to designers: deep, authentic and inspiring views into the personal lives and experiences of prospective users.

This approach is originally developed for use with adult participants. As it gets applied with child participants, some adaptations are necessary to meet children's skills (both cognitively and social-emotionally) and motivations. We conducted a series of research projects on aspects of Contextmapping and design cases where Contextmapping has been applied in child-centered formats. Some barriers and enablers were identified with which the role of children as informants in a design process can be further enhanced.

KEYWORDS:

design methods, co-design, informant design, children, Contextmapping

INTRODUCTION

One of the challenges for a designer is to understand the place and role of a product-to-be in the lives of its users. Various approaches have been developed for designers and design researchers to incorporate insights on users' experiences, wishes and needs in the design process. Sanders and Stappers (2008) present an overview of contemporary approaches, such as applied ethnography, contextual inquiry, design probes, generative design research, participatory design. Though developed from various sources and in different design domains (ICT, architecture, product design, interaction design), they all aim to inform those who create about those for whom it is created, in order to relate the characteristics of what is created to those for whom it is created. Some of these approaches are meant to be applied by experts in research, others are more open to application by designers within their own workflow.

Within Delft University of Technology, it has been an on-going effort in the last decade to develop and teach a hands-on procedure for design practitioners to collect user insights in the front phase of design. This Contextmapping procedure (Sleeswijk Visser et al., 2005) aims to elicit deep, empathic, inspiring insights on users' experiences, wishes and needs through the use of generative techniques.

As with most other approaches for user research, the main focus is on a mainstream group of adult users. The techniques used in the approach require adult skills, such as understanding of abstract concepts and verbalisation skills. Such skills are less easily applied by children. If children's perspectives are to be included in the research, an adaptation to their characteristics, skills and mind-sets is necessary. This paper explores some barriers and opportunities in this domain, based upon a series of research projects and design cases carried out within our academic educational setting.

CONTEXTMAPPING

Contextmapping is a form of generative research with users, aiming at creating context awareness by eliciting emotional responses from participants, including users'

concerns, memories, feelings and experiences of these explored contexts (Sleeswijk Visser et al., 2005). The pivot of the Contextmapping approach is a 'make and say' session where participants explore their experiences through creative tasks and discussions under guidance of a researcher. A characteristic of the approach is a thorough preparation by the researcher (who develops the exercises to steer the exploration), and by the participant (who is sensitized for the subject through tasks carried out prior to the session). After the session, the collected data are further analysed and processed for application in the design process. The general sequence of the approach is depicted in figure 1.



Figure 1: general Contextmapping sequence (Sleeswijk Visser et al., 2005)

At the core of this research are tasks and materials that facilitate diverse forms of expression: maps to indicate highlights on daily routes, timelines to summarise a day's activities, emoticon-stickers to express feelings about these activities, etc. Figure 2 shows participants working with such materials during a session. Participants create artefacts and subsequently express themselves verbally about it. This 'make and say' principle, together with the diversity of tasks and materials, helps reach deeper reflection, beyond explicit knowledge into the domain of tacit and latent knowledge.



Figure 2: Participant of a Contextmapping session explaining his creative artefact to the group.

CHALLENGES OF CO-DESIGN WITH CHILDREN

Contextmapping fits within the broader domain of co-design, where designers and end-users cooperate within innovation and where information and responsibilities are shared. Several researchers have developed or

modified co-design methods for application with child participants, to provide for the needs and skills of children.

Druin (1999, 2010) developed cooperative inquiry, a set of co-design methods for use by children and adults together. This procedure addresses issues of imbalance of verbal skills and power differences between children and parents, as these are important factors to overcome to make such a project successful.

Bekker et al. (2002) propose to motivate child participants for user research tasks by letting them adopt a journalist's role and having adults put their findings within a nicely designed journal paper.

Wyeth et al. (2006) explored the use of technology probes (adapted from cultural probes as presented by Gaver (1999)) with children and point at the relevance of capturing diverse data during the sessions: next to a log of children's actions with probes, also spontaneous utterings and visuals of their interactions during a session should be captured to provide richer data and inspiration.

Vaajakallio, Lee et al. (2009) report that children aged 7 to 9 can use 'make tools', but have challenges in group dynamics and in reflecting everyday experiences into design ideas, and Vaajakallio, Mattelmaki et al. (2010) point at the difficulties children may have at constructive conversations and negotiations within a group, which are prerequisites in co-designing with a group of people.

Van Mechelen et.al. (2013) elaborated on the problematic aspects of group dynamics in co-design with children and reports on process difficulties (dominance, free riding and polarization within the group, teaming up against the assignment) and outcome deficiencies (final results being aggregated, but not integrated clusters of ideas).

As these sources indicate, co-design with children at large is possible though problematic in some aspects. Co-design approaches need to be adapted to children; it is to be expected that this holds true for Contextmapping as well.

SIX CASES OF CONTEXTMAPPING WITH CHILDREN

In 2008, the author of this paper reported on first attempts to adapt Contextmapping to children (Gielen 2008) and listed guidelines and rules of thumb to tailor sessions to children's skills and characteristics. This paper aims to bring more background and depth to this issue, by presenting six research projects and design cases in which Contextmapping with children has been adapted to child participants. Some subjects were addressed in special research projects, others in the research phase of design projects. All but one projects were executed by Industrial Design students at Master-level, mostly in semester-long exam projects, and supervised by the author. In the design cases, insights

were collected through careful planning of Contextmapping sessions and retrospective evaluation of the process and outcomes by the student. In the research projects, a formal research set-up was used. The nature and extent of the projects allowed for qualitative analysis.

Based upon prior experiences and literature on co-design with children presented above, special focus was put on cognitive skills (language and abstract thinking), social-emotional skills (shyness, adopting an open attitude), and children's motivations to participate. We followed a twin approach of building an understanding of what children are able to do while also developing the tools to advance Contextmapping with children. Table 1 shows an overview of cases and topics, names the researchers involved and summarizes the main findings.

1. COGNITIVE SKILLS: LANGUAGE AND ABSTRACTION LEVELS

Though Contextmapping uses a multitude of expression forms to uncover deep knowledge, it heavily relies on verbal expression to explain and exchange this knowledge. With language skills still under development, how can children participate in verbal

exchange of abstract concepts like emotions and describe the backgrounds for preferences they have? In this study, it was researched if children can be stimulated to reach higher abstraction levels in their speech; through the influence of more capable peers, through verbal guidance by the researcher, and through providing ambiguous or unambiguous pictures as conversation tools. The researcher also measured if children with higher abstraction level in their verbal expressions share more rich and personal information.

In this research, 28 children participated: 17 five- and six-year olds and 11 eleven-year olds. Their sensitizing materials and group session recordings were analyzed for amount of personal statements. Their language use was scored for abstraction level using micro-thinking levels (Reed Geertsens, 2003) and abstract thinking skills as defined by Blank and Solomon (1967).

The results showed that none of the efforts to stimulate children to use more abstract language had an effect. The richness of information also was not strongly related to abstract thinking level. For younger children there was a small relation between abstraction level and richness of information, but this was probably not a causal relation, rather a by-product of developing general language skills.

Table 1: overview of cases and main findings; all reports can be retrieved in the University's online repository at <http://repository.tudelft.nl>

case nr, domain	subject	author&year	title	main findings
1. cognitive skills	language and abstraction levels	Evelinde van Dorp, 2010	Contextmapping an abstract future with children	Researchers can't influence the levels of abstract thinking of children during Contextmapping sessions. With abstract topics, they should provide clear language and examples.
2. cognitive skills	abstract thinking versus direct experience	Evita Ooms, 2010	Nature experience of children with physical disabilities	If children lack sufficient abstract thinking skills, bringing a group of children in the concrete circumstances they are to reflect on is an alternative. Group discussion is stimulated through providing them with shared tools for documenting.
3. social-emotional skills	shyness	Kasia Tabeau & Anna Sosinowska, 2010	Involving shy children in Contextmapping research	Shy children can participate in Contextmapping if they can also do some individual assignments. In mixed groups, talkative children can help others overcome their shyness. Shy children want to be able to foresee when they will be asked to speak.
4. social-emotional skills	adopting an open attitude	Mathieu Gielen & Fenne van Doorn, 2011	(as yet unpublished)	Icebreakers help children to understand and adopt an open attitude towards creative exercises. Icebreakers that involve repeated instances of direct spoken exchange of ideas within a group are most effective.
5. motivation	competition and creativity	Asli Deniz Özakar, 2010	Harnessing children's creativity in Contextmapping activities	Especially boys (aged 10-11), who tend to look for competition, are more motivated and produce more creative outcomes when mild competition is included within the Contextmapping task.
6. global exploration of Contextmapping with children	children's fears	Kasia Tabeau, Anna Sosinowska and Enrico Wasch, 2007	Kinderen en hun belevingswereld (in Dutch only; meaning 'Children and their world of experience')	Compared to an online survey, a Contextmapping study enables children do express deeper and richer experiences on their fears. The most personal experiences are shared through talking-while-creating but not expressed in the artefacts they make.

Although children needed to be able to express themselves verbally to participate in Contextmapping sessions, they could handle difficult and abstract topics, as long as the researcher provided concrete and everyday examples. Therefore, in Contextmapping with children, the focus should not be on stimulating higher abstract thinking levels but rather on clarity and concreteness.

2. COGNITIVE SKILLS: ABSTRACT THINKING VERSUS DIRECT EXPERIENCE

Contextmapping aims to stimulate participants to reach memories and experiences that lie within the domain of tacit and latent knowledge and to make those explicit. In some cases however, experiences might be retrieved 'in vivo', by re-entering the direct circumstances where they appear. It is relevant to know if such direct experiences can be captured using Contextmapping techniques. If so, this would also offer opportunities in cases where children are unable to address their memories, e.g. when they are too young to understand the task or have limited cognitive skills.

In one project this topic was studied somewhat by chance. As part of a design project directed at creating a natural playground for children with physical challenges, the researcher carried out a Contextmapping session at a children's rehabilitation and holiday centre. Apart from their physical challenges, most of these children also were lagging in cognitive development or had cognitive challenges. Twelve children, aged seven to thirteen, participated. The researcher cooperated with the center's staff to make the session as accessible as possible, and used only two assignments: the sensitizer task asked the children to draw a loved element of nature on a postcard, the second task was to join the researcher on a group walk through the park, to discuss and make photos of things that were 'nature'. The aim was to use these photos in a subsequent discussion. As the session evolved, it became clear to the researcher that she had still overestimated the cognitive capabilities of the participants. The value of the session was not in discussing afterwards, but in the direct reaction to everything the group encountered and the discussion whether it was or wasn't nature, and why. The idea of 'being on a mission' was motivating for the children. The possession of a photo camera further intensified their attention to the task. As there was only one camera, children needed to reason why a picture needed to be taken; thus, discussions and argumentations were elicited on the spot.

It was concluded that researching a group of child participants within the context that is being explored offers opportunities for capturing more direct reactions to and interactions with that context, and that simple Contextmapping tasks can help to heighten the intensity of that interaction and expressions of it.

3. SOCIAL-EMOTIONAL SKILLS: SHYNESS

For practical reasons, Contextmapping with children is often done in settings where many children are assembled under adult supervision, such as schools and day care centres, sports clubs and the like. Often, adults pre-select the children for the sessions; they choose individuals who can easily skip a lesson, who are cooperative and extravert. Though done with best intentions for the children and the research, this pre-selection causes the risk of missing out on the needs of the introvert.

In a research project, the inclusion of introvert children in Contextmapping was explored. We wanted to find out if shy children can be made to comfortably engage in Contextmapping.

Two types of shyness exist: fearful shyness (fear for strangers) and self-conscious shyness (Buss, 1986). Self-conscious shyness is related to embarrassment and requires self-reflection, it is prevalent from ages eight and up (Crozier and Burnham, 1990). As we wanted to include this form of shyness in the research, we chose participants at the age of eight.

Children are very well able to recognize and describe shy peers. Younger et al. (2008) composed a list of 11 indicators children mention for shyness. In our research, the teacher selected the shy children with the help of this list. We did not want the children to select their shy peers, as this would influence the research.

The research used a sample of 12 children, divided in three different groups: 4 extravert children, 4 shy children and a mixed group of 2 extravert and 2 shy children. Each group was presented with the same session set-up of seven activities, which included individual activities like drawing and group activities like discussing and acting and role-playing with a puppet. The sessions were concluded with an interview of each child in the group of how it felt during the session – a probable cause for extra shyness. Beforehand, the researchers formulated expectations of the levels of fearful and self-conscious shyness that would occur during each activity, based upon the shyness literature.

For the analysis, the behaviour of each child was observed using video and audio recordings. The overall flow of the session parts and instances of shyness were compared to the expectations and evaluated.

The participant sample was too small for statistical analysis, but rich in exposed behaviour. Clear indications were found of the relation between shyness and participating in the session. The shy children enjoyed the individual tasks more and worked on them with greater concentration than the extravert children. The extravert children tended to talk more, also in individual tasks, and not all the talking concerns the topic they are working on. But they did give more explanations of their individual work, which helps to

understand its meaning. In Contextmapping, these explanations are usually the most informative outcome.

The cooperation of shy and extravert children within one group helped shy children to get over some of their hesitation.

The researchers also found that their own role was of major importance. To successfully include shy children in Contextmapping sessions, they advise to keep an eye on signals of shyness: take time to let the children feel at ease before introducing the actual topic of research, make sure everyone gets a chance to speak but also that every child knows when it is his/her turn so this does not come as a surprise. In a mixed group, the talkative peers can start conversations and then pass the topic on to the less talkative ones.

We had aimed to also explore if the inclusion of shy children adds to the variety of insights gained. Due to circumstances we were not able to carry out that part of the research.

4. SOCIAL-EMOTIONAL SKILLS: ADOPTING AN OPEN ATTITUDE

Adult researchers working with children need to be aware of the influence they have on children and the expectations children may have from the adult. All children, not only the shy ones, may suffer to some extent from fear and self-consciousness when being involved in a research with an unfamiliar adult researcher. Especially in school settings, children who get asked questions often feel they are expected to give the one right answer. In discussions, they may feel the adult ultimately knows best. This has been one of the main points of focus in the development of cooperative inquiry by Druin (1999, 2010). This approach is targeted at design teams working together over longer periods of time, in subsequent sessions. For Contextmapping, usually such a time frame is not available. Yet it is important to overcome children's fear of the adult researcher, fear of embarrassment and thinking in terms of wrong and right answers, as this may impede their open participation and honest contributions to Contextmapping.

Ice-breakers are used as a warming-up task within Contextmapping and other creative group processes. They have the aim to set the mood for the session and make participants aware of the nature of their participation: every contribution is appreciated, there are no wrong answers, they can speak from the heart and are not assessed or tested in any way.

We explored the use of icebreakers at the start of a series of Contextmapping sessions with children aged 7/8 and 10/11. In each age group, five group sessions were conducted and each of those five sessions used a different ice-breaker. Table 2 gives an overview of the characteristics of each exercise. The ice-breaker sessions lasted between 5 and 10 minutes. The ice-breaker exercises differed on:

- individual or joint activity
- pre-structured and coordinated exercise or improvised/random nature
- spoken output, written or drawn
- direct sharing of contributions or at the end of the exercise

The five exercises were:

- 1 braindrawing: individually drawing one association to a given picture and passing the drawing onto the next child to make a chain of associations, using a drawing sheet with six drawing boxes;
- 2 individual mindmap on a mindmap template;
- 3 group mindmap: as a group mentioning associations to a theme and having the researcher writing them down and creating a mindmap from it;
- 4 individual picture comparison: taking a sheet with two pictures on it, writing one relation between the two pictures (e.g. elephant and cloud: both big, both grey, cloud can be in the shape of an elephant: any answer is acceptable);
- 5 group picture comparison: pulling two random pictures from a stock and as a group naming any relations.

Table 2 the characteristics of the five different ice-breakers

<i>characteristic</i>	brain-drawing	individual mind-map	group mind-map	individual picture comparison	group picture comparison
<i>individual/group</i>	individual	individual	group	individual	group
<i>structure</i>	-	+	--	++	+
<i>expression</i>	drawing	writing	saying	writing	saying
<i>exchange</i>	direct	after-wards	direct	after-wards	direct

For the analysis, the two researchers who conducted the research evaluated the exercises on the following aspects:

- making the participants feel comfortable
- inviting to participate and share
- breaking the wrong/right answer doctrine.

It appeared that group exercises were most beneficial. They allowed for many instances of direct feedback from the researcher, reconfirming the notion that every contribution is appreciated. The children also learned from others that speaking out is appreciated and they get stimulated by unexpected contributions. Individual exercises were sometimes perceived as invitations to perform, and children would complain of getting stuck by not having 'good' or 'right' ideas.

Spoken contributions allowed children to react more easily and quickly than written or drawn contributions and helped set an atmosphere of quick, informal associations and playfulness.

The researcher writing down the children's contributions helped to present the researcher as an 'assistant' rather than as an assessor, and made it clear that each contribution was welcomed and collected.

The easiest and funniest assignment was the group pictures comparison – it helped to get a playful, lively energy in the group. The researchers deemed this assignment most useful to let the children experience the intended atmosphere for the whole Contextmapping session.

The sessions then continued with a focus on children's physical outdoor movement and play, and the participation of elderly in it. The sessions were conducted as part of the ProFit project, which is funded by the European Union, under the Interreg IVB North West Europe program.

5. MOTIVATION: COMPETITION WITHIN CONTEXTMAPPING

The quality of the outcomes of Contextmapping sessions depends heavily on the willingness of participants to invest their energy and contribute wholeheartedly. A primary source of motivating the participants can be found in the nature of the approach: as Contextmapping aims to uncover the daily life experiences of participants and acknowledges users as the experts of their own experience, participants feel they have something valuable to contribute and may derive pleasure and motivation from the interest with which their contributions are met.

Sometimes, however, it can be hard to motivate participants. In practicing Contextmapping with children within the design education curriculum at Delft University of Technology, the group that is most often reported as unwilling and difficult to motivate are the boys aged 11-12. As they approach puberty, they may be reluctant to share personal thoughts, or just find the exercises childish at first sight and have more interest in challenging the researcher.

As these boys are often interested in competition (e.g. in computer games and sports activities), the idea was raised to use competition within the Contextmapping set-up. There may however also be effects of competition that are detrimental to the outcomes of the session. Contextmapping uses generative tools (like collage-making, acting out and quick prototyping) to help elicit deeper knowledge, and these tools rely on creativity. Would creativity not be smothered by competition?

In popular speech, children are regarded as very creative. This often refers to their uninhibited engagement in activities like drawing and the expressive

quality of their artefacts. Play theorist and psychologist Sutton-Smith (2001) in a televised documentary once called this 'laybilty'; the layman's ability to think and perform freely, by lack of notion of the standards, rules or customs that withhold experts (or adults in general). A more in-depth review of children's creativity should also incorporate the originality of the solutions they present in the light of given problems (De Bono, 1972).

Of the many definitions of creativity used in the scientific creativity discourse, Amabile (1983) clearly discerns the elements of task motivation from domain-relevant skills and creativity-relevant skills. Competition may replace the intrinsic motivation of performing a creative task with an intrinsic motivation to compete, which is an extrinsic motivation to be creative (as a means to the end of winning the competition).

The effects of competition on creativity have been widely researched, but researchers still do not agree whether such competition is detrimental or rather stimulating creativity.

A research project was executed to explore the relation between motivation, competition and creativity within generative sessions. The definition used for creativity was "The individual or group process that results in an artefact that is judged as novel and appropriate"; comprising both the element of 'not seen before' and 'fitting to the task given'. For this research, six sessions were held with a total of 24 children. In setting A, four children were divided into two duos that were told to cooperate within the duo to deliver creative outcomes. In setting B, the four children were divided into two duos that were told to cooperate within the duo to compete against the other duo on creativity of the outcomes. In both settings, there were three varieties: boys duos, girls duos and mixed duos.

For the analysis, their behavior was evaluated on instances of competition and cooperation, and the outcomes of their work was rated by 10 independent design students on novelty and appropriateness, the two factors defining creativity.

In figure 3 (next page), a graphic depiction of the findings of the research is given. Overall, it was found that competition is a motivating element and has positive impacts on children's creativity, it increases children's motivation towards the Contextmapping tasks and the outcomes of the sessions are more appropriate to the expectations of the task. One important finding was that as especially boys at this age level are often likely to engage in competition, it is best to have this competition happen within the task rather than to have it disturb the task. This was most clear in session A2 and A3, where competition was not proposed but happened outside the task and distracted the participants from the task. No evidence was found that competition on the task would make children unwilling to experiment and drive them towards safe, uncreative outcomes.

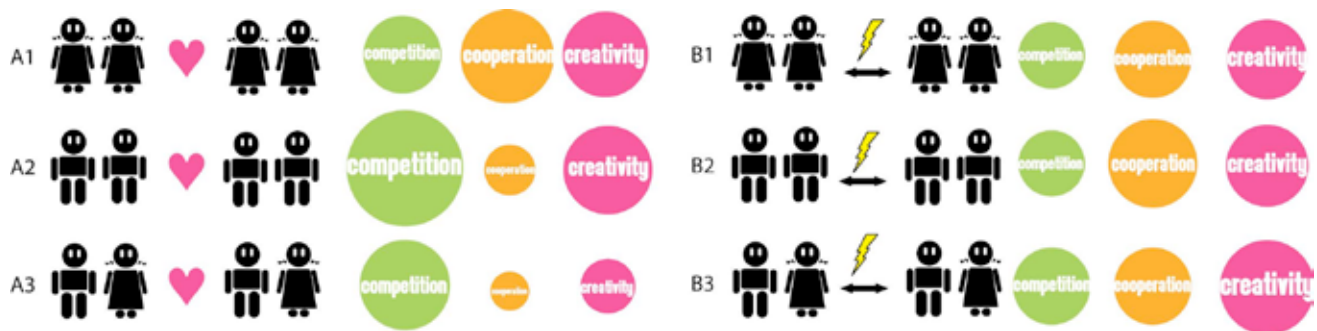


Figure 3: Overview of the competition, cooperation and creativity by groups. The size of the circles represents the degree of occurrence of each. Hearts stand for cooperation, lightning bolts and arrows for competition.

It was concluded that mild competition does function as an extra motivating factor – though motivation to participate should foremost be achieved by making the topic relevant and the tasks rewarding to the participants.

6. UTILITY: CHILDREN'S FEARS

All the above research projects and cases addressed methodological aspects of conducting Contextmapping research with children. To conclude, one research project is described that, next to experimenting with Contextmapping tools that are suitable for children, made a direct comparison to other child research. The methodological focus of this research project has been described shortly before by the author of this paper (Gielen 2007, 2008) but we'd now like to briefly focus on some of the results that were generated.

Unicef Netherlands (2007) published a research report on Dutch children's fears. The research had been undertaken through an online survey with 400 respondents, and the results communicated were that the top-3 of reported fears were spiders, darkness and thunderstorms. Subsequently, in media outings this was compared to what children in less fortunate parts of the world had to fear.

At Delft University of Technology, curiosity arose about what the outcomes would be, had the same question been addressed through Contextmapping with children. In the research, 13 children aged eight to eleven from one school participated in a Contextmapping session that included:

- drawing something/someone that protects me;
- make a collage-map of home, school and other locations and fill them with pictures and words describing amongst others emotions connected to each place;
- after selecting a location related to self-reported fear, filling out a timeline of what happened before, during and after the fearful moment;
- writing a secret letter about the fear.

The results show that children easily report common and stereotypical fears like sharks, 'bad people' in general, rollercoaster rides and indeed spiders. These are the fears that are predominant in the writings and

drawings. However, during the Contextmapping sessions the children would also discuss the theme while working on the tasks, and quite different fears were mentioned then, related to their personal experiences: a mother running away from home, the loss of family members, having to perform a dance in front of an audience, being in bed alone after having watched a scary movie. These fears were shared during almost casual conversations first, and only later reported on paper – if at all.

It were insights like these, with the richness of example and the empathic quality of personal reporting, that were deemed most important, informative and deep by the researchers. It strengthened the researchers' confidence that Contextmapping with children, when applied with the right toolbox and an open ear, can elicit insights beyond the domain of readily available explicit knowledge a survey could reach.

DISCUSSION

The body of work described in this paper explored barriers and opportunities for user experience research with children through experimenting with new and adapted tools and methods. It was found that Contextmapping with child participants can yield workable insights if proper adaptations are made to their needs and characteristics.

We explored such adaptations in a combination of classic qualitative research, research through design and what the author would call 'research through design education': generating insights through supervising a number of talented and task-devoted students. It is an uncertain endeavour: we had great insights from failures and promising projects which disappointed, as we were exploring within a new area. In that sense, the paper as a whole presents a case of the experimentations in design that are the core of the Nordes 2013 conference.

The research does not give the complete answer to the question how Contextmapping tools should be applied with children. We don't think there is such a definite answer, as the approach is open-ended and will always need adaptation towards the context of the specific research. Instead, the paper addresses a broad set of aspects to take into account when conducting

Contextmapping research with children. We have developed a more comprehensive picture on what is possible, what difficulties are met and how these can be overcome. New questions have also arisen from this work, giving directions to future research in adapting the tools to children. Three important themes have been summarised below.

ALTERNATIVES TO VERBALIZATION

As the research on abstract thinking levels indicated, outcomes of Contextmapping research are related to language skills of participants. For younger children, but also for those who are gifted in other areas than verbal communication, this is a disadvantage. Future research could study the use of aids and stimulants for verbal expression.

But apart from compensating for under-developed skills, the attention could also go to the talents and characteristics children naturally do have. Research could explore the feasibility of other ways of communication. How much of the drawings, role-playing or prototypes need to be explained through verbal language and what are the alternative channels of communication – between participant and researcher, and later between researcher and design team?

CLOSE CONNECTION TO THE SUBJECT

At the core of Contextmapping is to bring to the surface participants' memories and implicit or tacit knowledge on subjects regarding their daily life context. The sessions often occur in a creative workshop format, within a dedicated room. As the case with the cognitively challenged children demonstrated, there can be advantages in bringing participants closer to the actual context that they are to report about. In this respect, there lies an interesting possibility in involving children as co-researchers. They can perform research tasks within the natural context they share with their peers, as described by van Doorn et al. (2013).

It may also be worthwhile to research whether the model of uncovering tacit and latent knowledge holds true for children. Are their memories stored and retrieved in ways comparable to those of adults? This may not be the case, for instance when time durations and succession are an important part of the experiences a researcher wants to explore.

MOTIVATION

The motivation of adults to participate in Contextmapping research is often taken for granted; otherwise they would not have shown up. With children, this may need further attention. Children are often approached through schools and clubs and the decision to participate is made for them. The goals of the research and relevance of their contribution need to be clear to them to enhance their motivation. In the ice-breaker sessions described in this paper, children came to understand the manner of working through doing. Likewise, communicating the relevance of the research

may benefit from an introductory activity rather than explanations – it remains to be explored, what kind of activity that could be.

CONCLUSION

From the series of researches and cases presented in the paper, insight is gained in the possibilities and restraints of performing Contextmapping research with children. It has become clear that Contextmapping with children can be fruitful, as long as the researcher takes good note of the skills of these children and the differences between them, and adapts the Contextmapping tools to these. Flexibility in session set-up and execution is even more important than with adults, to cope with wrongly estimated skills, interest and behaviours of children. Fostering the right motivation to participate needs more conscious effort than with adults.

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ESCAPING THE OBVIOUS: SKEWING PROPERTIES OF INTERACTION

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ABSTRACT

Most design methods used within interaction design originate from other disciplines. As a result, there are few methods which can focus on designing or redesigning interaction in itself. In this paper we present a structured ideation method called Skewing, which is based on changing already identified, interaction-related properties of an artifact. Hereby, designers can generate interesting re-designs whose interaction design differs from the original product. Moreover, the structured approach in Skewing helps in finding the unusual design solutions in the outer rims of the design space. Lastly, Skewing can also be used as a means to teach the materiality of interaction.

INTRODUCTION

The interaction designer, being at the core of the process of inventing and developing interactive artifacts, is naturally using a toolkit of ideation design methods to support this work. Interestingly, most of these methods are adapted from other fields, and several are just “general” design methods, as found in for instance Jones (1990), Martin & Hanington (2012) and several others. Arguably, some methods that are commonly used by interaction designers were developed in an interaction design context, e.g. Extreme Characters (Djajadiningrat et al 2000), Cultural Probes (Gaver and Dunne 1999), personas (Cooper 2004), bodystorming (Burns et al 1994), 6-3-5 (Löwgren and Stolterman 2004) and many more. Despite their origin in interaction design, none of these methods, targeted specifically towards inventing and shaping interactive artifacts, are particularly focused on *interaction per se*. Overall, there are very few such methods.

Addressing this issue we here present a new ideation method and design exercise that can be specifically targeted towards interaction and interaction-related properties of interactive artifacts. The method is called *Skewing* as in shifting, changing, or turning, and this is the core of it. In short, an existing interactive artifact is being analyzed using a framework of terms or properties describing interaction, and then these properties are deliberately changed.

Skewing first originated as a teaching method, and it has been tested in a teaching context. As a result, the paper has the following structure: First, we will describe ideation methods related to skewing. Second we will frame this research in an action research context, grounded in our teaching. Thereafter we will describe our work with Skewing, which includes exploring possible frameworks to use. Lastly we will describe the method in itself, and discuss its pros and cons.

BACKGROUND: RELATED METHODS

The first steps of most design processes are focused on framing the problem. After the problem has been defined to a satisfactory degree, the designers must come up with creative ideas that address the problem. This phase is also known as the ideation phase, although Jones (1992), refers to it as transformation. Shah et al. (2003) suggest a classification of ideation methods into two discrete groups: logical and intuitive. Logical methods are based on a systematic approach in order to decompose and analyze the problem at hand. This is accomplished by utilizing already collected information, such as preexisting solutions. Intuitive methods instead aim to break mental blocks by using various mechanisms. We see Skewing as such a mechanism. Shah (1998) and Shah et al. (2000) have further classified intuitive methods into five types: Germinal (generating ideas from scratch) Progressive (improving an idea using repetitive steps), Organizational (grouping of ideas), Hybrid (combined methods) and Transformational (idea generation by modifying existing products or solutions). We see Skewing as a transformational method, albeit with some traits from germinal methods.

Below, we will describe the methods we have found to be the most close to Skewing; a comparison will be made in the Discussion

Two transformational methods, suggested by DeBono (1970), are the PMI Method and Random Stimuli. The PMI-method helps designers list Plus, Minus and Interesting aspects of a situation or action, to widen their view. In Random Stimuli, the designers' objective is instead to think of a random object and link it to their design goal by using characteristics of the random object as inspiration for design, e.g. a paper clip can be used to hold papers together which in a photo-app could be interpreted as being able to make collections of photos. This characteristic makes Random Stimuli similar to Interaction Relabeling (Djajadiningrat et al. 2000), albeit the latter focuses on transferring interaction in itself.

Another transformational method is SCAMPER—Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse.” (Chulvi et al. 2012). The method requires an existing artifact, and aims to produce ideas by pushing the design team to alter features of the artifact. Example questions are: ‘what can be substituted?’, ‘what can be combined?’ etc.

Looking at similar methods focused on widening or exploring the design space we find Critical Incident Technique, Morphological Charts, and Boundary Searching. Of these, The Critical Incident Technique (Martin and Hanington 2012) helps to open up the design space by looking specifically at critical incidents, i.e. when interacting with an artifact results in a surprising outcome that can be either delightfully positive or disappointingly negative. The designer then, redesigns towards the positive incidents and tries to omit negative ones. Another method to widen the area of search for solutions to a design problem is Morphological Charts (Jones, 1992). Here, designers identify the functions that a satisfactory design solution *must* be able to perform, and then create a chart of many possible ways of performing each of these functions. Finally, an acceptable combination of sub-solutions is selected. The charts therefore combine an ideation method with an evaluation method, since ideas that do not seem to serve pre-identified important functionality do not make the cut. Boundary Searching (Jones, 1992) is similar in that design teams search and attempt to define the range of the design space within which acceptable solutions exist, and then limit design solutions to the defined space. The difference between the two latter methods is that Boundary searching defines the design space in terms of parameters, whereas Morphological charts is more specific in that possible, suiting sub-solutions (already within the boundaries) are evaluated.

Both Morphological charts and Boundary Searching can be considered as germinal methods (Shah et al. 2003). Many germinal methods are based on brainstorming (Jones 1992; Martin & Hanington 2012), which has been criticized for not addressing specific domains, user needs or specifications (De Bono 1995). There are therefore a series of techniques that modify brainstorming in different ways, either in improving the

process in itself or by adding means to sort, evaluate or refine brainstormed ideas, or refining them, e.g. The KJ-method/Affinity diagram (Kawakita, 1982), the 6-3-5 (Löwgren & Stolterman, 2004), and various Brainstorm graphic organizers (Martin & Hanington, 2012). This is interesting since it points towards a need for structure when generating ideas.

Albeit several of these methods above deal with idea generation, an opening of the design space, and the transformation of an existing artifact – aspects which Skewing fulfills, only *one* of them, Interaction Relabeling (Djajadiningrat et al. 2000), focuses on interaction-related properties, albeit applied to everyday things as opposed to interactive artifacts. Arguably, there are other methods that are designed specifically for application on interactive artifacts, e.g. Animal Expression Transfer (Landin 2006, Lundgren 2007) where animal traits and behaviors are mapped onto an artifact, or Temporal Themes (Lundgren and Hultberg, 2009), where only the temporal behaviors of an artifact are changed. Firstly – and unfortunately – these methods are not commonly used within interaction design, despite their interaction focus. Secondly, these methods are more specific and less structured than Skewing. Thirdly, this sums up to only four ideation methods (counting Skewing) explicitly focused towards interactive/interaction design aspects of products.

RESEARCH METHOD: ACTION RESEARCH

Since Skewing originated as a design exercise, it has been used and developed in an educational context. We are thus framing this study as an action research project. In short, action research is an iterative process where an active practitioner first studies her or his practice, framing an area of improvement. Using whichever facts available (observations, suggestions, ideas, analysis), a change is introduced, and after analysis and reflection, the iteration begins anew, until the initial issue has been resolved (Costello 2003). As stated by Carr and Kemmis (1986) the action part is the part of the cycle when a change is introduced, i.e. when reflection is turned into action.

Action research has the benefit of being directly applicable to the teacher's own teaching situation (Costello 2003, pp. 15-26), but it is often being criticized for not being general or scientifically valid enough. Ways to counter this can be to very explicitly describe the context of the study, so that others can judge if the findings are useful for them. As a means to increase reliability and validity, one can attempt to triangulate the data used for analysis (Costello 2003, p. 45; Herr and Anderson 2005 p.56, 61). In this study, the different data sources are observations made during teaching, the designs, and students' reports on the designs, i.e. rationale, analysis and scenarios.

BACKGROUND: THE ORIGINS OF SKEWING

Teaching interaction design is to a great extent coupled to design methodology combined with learning about

the materials one is designing with, and the people one is designing for. As for interactive artifacts, it has been argued that apart from physical materials, they also consist of ephemeral materials like code, behavior and interaction, all of which are closely intertwined (Cooper et al. 2007), Hallnäs and Redström 2006, Lim et al. 2007, Löwgren and Stolterman 2004, and many more). In conclusion, students in interaction design need to learn about interaction as being one of the materials they shape. This is a complicated endeavor since interaction is invisible and appears “only in use” (Löwgren and Stolterman 2004). Moreover, it can only be *afforded* in design (Baljko and Tenhaaf 2009, Landin 2009, Norman 1998 and many more), and to make matters even more complicated, the actual interaction carried out can be unexpected and unwanted (see Landin 2009, . Lim et al (2007) conclude: “*To develop such insights about material properties is not easy, especially when it comes to interaction. [...] The material we need to understand for interaction design is flexible, ungraspable, and phenomenal.*”

As in any other teaching, teaching interaction-as-material benefits from a deep-learning stance. Deep learning (see Marton and Säljö, 1976a, 1976b) has been advocated within pedagogy for a long time, and states that the desired aim within teaching/learning is to attain deep learning by promoting activities such as interpretation, meaning-making and relation of concepts, rather than learning facts, figures and processes (Ramsden 1992; Bowden & Marton 1998; Marton et al 1986). Biggs (2003) specifically lists cognitive demanding activities, like analyzing and explaining, as a means to achieve deep learning. In design teaching, the application of concepts coupled with analysis and reflection on the outcome has always been a common approach (Baumann 2004; Wick, 2000), e.g. Baumann (2004) found that exercises seem to be the most common teaching activity across design disciplines.

As a response to the issue of teaching material aspects of interaction, we set out to design a design exercise aimed towards understanding and utilizing different interaction-related frameworks – this was the origin of Skewing as a design method. Being an exercise, it would contain many of the activities resulting in deep learning.

IN SEARCH OF A SUITABLE FRAMEWORK

Several approaches have been taken when it comes to describing interaction in itself. Rullo (2007) has explored ambient systems and for these, she proposes what she calls soft qualities of interaction, related to dynamics like access, interferences, varying visibilities, separation/interpenetration, overlapping, layering etc. Looking at interaction from the viewpoint of movements, and based on Laban’s denotations (cf. Hutchinson 1977), Vedel Jensen et al. (2005) discuss aspect like flow, weight, space and timing.

Djajadiningrat et al. (2004) also take the approach of looking at interaction as movement, and introduce the concepts Freedom of Interaction, Richness of Motor Action and Interaction Patterns. Building on the same work, Vensween et al. (2004) present an interaction framework called frogger: here a product’s reaction to a user’s interaction are coupled to time, location, direction (of movement), dynamics, modality and expression. These “unification aspects” are then used in a framework, coupling action to different types of information on possible means of interaction. In a similar vein, studying the “interaction gestalt”, Lim et al (2007) list in total twelve gestalt attributes, expressed as bi-polar scales.

In addition to the approaches mentioned above, there are two frameworks that were used by us, and thus deserve a closer explanation. Firstly, the set of use qualities listed by Löwgren & Stolterman (2004). These come in five categories, and are as follows:

- **Motivational** qualities: Anticipation, Playability, Seductivity, Relevance, and Usefulness
- **Interaction** qualities: Pliability, Fluency, Immersion and Control/Autonomy
- Qualities related to **social relations**: Social Action Space, Identity and Personal Connectedness
- **Structural** qualities: Transparency, Efficiency and Elegance
- Qualities of **meaning-making**: Ambiguity, Surprise and Para-functionality

As the name suggests, use qualities appear in use, and are experienced by the user. Secondly, we have used Lundgren’s interaction-related properties (2011). This is an attempt to merge many of the previously mentioned sources as well as on others. The result is a list of 30 interaction-related properties expressed as scales, divided in the following six categories:

- Properties related to **Interaction per se**: Input modalities, Interaction flow, Directness, Freedom of Interaction, Precision and Tasking
- Properties related to **Expression**: Output modalities, Presentation, Clarity, Feedback and Information Order
- Properties related to **Behavior**: Approach, Level of Dependency, Forgiveness, Robustness, Adaptability and Openness
- Properties related to **Complexity**: Posture, Versatility, Predictability, Connectivity and Difficulty
- Properties related to **Change and Time**: Evolution, Movement, Response Time and Temporal aspects
- Properties related to **Users**: Company, Locality of Users, Privacy and Behavior analysis

To some extent we also incorporated Landin’s (2009) expressions of interaction into the exercise. She has discussed unexpected or unwanted use, exploring possible interaction forms – the relation between interaction and function – and expressions of

interaction: “how people might relate to the interaction with a device” (ibid, p. 46.). The listed expressions of interaction were not used as a part of the design process, but only as a tool for analyzing the outcomes.

SKEWING EXPERIMENTS

Skewing has been carried out in different variants in three different classes of interaction design students. The exercise originated during a literature session where we discussed interaction frameworks, and the students stated that they did not quite understand. This resulted in a spontaneous analysis of a software using one of the frameworks, which was much appreciated. Next year, a light-version of this was used in an exercise where students brought one specific property to a design, which meant that they only learnt that single property well.

Based on these pre-observations, the Skewing-exercise was created. Throughout the years we have experimented with different settings as is shown in Table 1. Despite the differences in setting, designs were similar between iterations, meaning that Skewing as design method seems to be rather stable. The collected material consists of 37 designs, designed by 68 students working in pairs or groups of three. The exercise has several steps:

- 1) Analyze the given object with the given framework
- 2) Ideation: redesign the object using the framework
- 3) Describing and discussing design ideas
- 4) Refinement of a chosen design idea
- 5) Analysis of refined design ideas using the given framework.
- 6) Deliver concept description, a scenario of use and a reflection which properties (in the framework) had changed and how use, and situation of use, had been changed accordingly

OBSERVATIONS

Already in the analysis-phase, it became evident that students got acquainted with the terms since they needed at least a brief understanding of them in order to carry out the analysis. There was sometimes a lively debate on whether, or to which extent, a certain quality or property existed. This of course opened up for an inherent issue with briefly described frameworks: different interpretations of a certain concept, and that a general concept sometimes can be hard to apply on a specific item. We do not see this as a negative issue since it opens up for discussion, analysis, and reflection, which are deep learning activities.

Throughout the process, and in the task description, students were encouraged to do “wild and crazy” things in order to explore not-so-obvious properties or combinations of properties.

Some general observations were made for all classes. Firstly, some students had a hard time breaking free; they believed the focus of the exercise was idea generation, rather than exploring the materiality of interaction. As a result, they tried to stick to sensible ideas, rather than just any designs. We had to repeatedly point out that efficiency or a working product was not the goal. Others reveled in the lack of boundaries and very explicitly toyed in designing strange, useless or provocative devices (see “Outcomes” below).

Secondly, when asked to write scenarios, students were typically over-optimistic. In at least half of the cases where social exchange of some sort had been added to the artifact, the two protagonists in the scenario fell in love and lived happily ever after. This is another effect of wanting to design products that “work”.

In 2010 and 2012a, students had rather strict boundaries; they were to change one, and only one quality at a time, but as it happened, others changed accordingly. The last group of students were instead asked to change several properties more or less at once. First, they should choose about five properties from at least four different categories and change them, and in

Table 1: How the Skewing-exercise changed over the years. It ran twice in 2012, but with different groups of students. In 2010 and 2012a, strictly speaking there was one group of three, and the rest worked in pairs. Bold text indicates changes from previous year.

<i>Year / Students</i>	<i>Framework(s)</i>	<i>Artifact</i>	<i>Analyze</i>	<i>Ideation</i>	<i>Describe, discuss</i>	<i>Refine</i>	<i>Analyze</i>
2010 / 13	Use qualities (Löwgren & Stolterman 2004)	Mp3-player	In pairs	In pair, 5 designs as result of skewing one quality per category	In pair	Alone	In pair
2012a / 13	Use qualities (Löwgren & Stolterman 2004)	Mp3-player	In pairs	Alone , 5 designs as result of skewing one quality per category	In pair	Alone	In pair
2012b / 42	A subset of Lundgren's (2011) Interaction-related properties	Mp3-player or camera	In groups of three	Alone, 2 designs. One design by skewing five properties. One by skewing all properties in one category.	In group	In group	In group

their second design they should change all properties in one category. As it turned out, they started changing one and let others “tag along” as an effect of the change. This too, was an effect of students wanting to create feasible designs. This approach was possible since most of Lundgren’s properties can have more than two states, i.e. it is not so simple as to say that an artifact has, or does not have a property. Therefore, the students’ approach of changing one property in a category and then let the others change accordingly worked. If one really strives for unusual designs, one should probably clearly state – before starting the ideation process – which property to change, and to what state.

OUTCOMES

The handed-in conceptual designs were in the form of rationale, scenarios, sketches and analysis, and point towards an understanding of the properties used in skewing. In total, 37 re-designs were produced. Of these, roughly ten were designed for enhancing social interaction – there was a strong influence from the social media-realm. In most of these designs, users could spot nearby users with similar taste in music with which they could then make contact in order to share songs.

Thirteen of the designs featured input devices other than buttons. Some were context-aware, using various sensors as means to change what music they were playing, e.g. picking up the user’s pulse whilst running and playing faster/slower songs accordingly. Others toyed with more tangible input means, e.g. shaping the player itself as an input command.

Six concepts were critical designs (Dunne & Raby 2007). The reason could be that students had done a critical design exercise in the same course, but also that many of them were passionate music lovers and wanted to make anti-mainstream designs. In one of the designs, the player adapted itself to a mainstream music taste as a comment on the power of record companies. In another, users ran the risk of getting a small electric shock if they skipped a song. Another approach in this vein was to retro-design back to the cassette player’s limited interaction abilities in that you could not skip songs easily, had limited playlists etc. Other types of critique dealt with laziness and required users to move along or dance with the music. Another design presented music as an addiction, by rewarding users with nicotine(!). Five of the designs were also outright useless, designed for non-efficiency and non-relevance.

Out of the 37 designs, there were a few that are promising or interesting. One is a social player, designed by Elin Lindberg. Unlike most social players students came up with, it is designed for people that are already acquainted. In her design, friends agree to share a playlist, which they both listen to simultaneously. Both can edit the playlist, which opens up both for flirting, sharing and regular “song wars.” (Note that this design was made before Spotify’s service of sharing

playlists!) In her design, Elin addressed the lack of Social Action Space and Identity; when adding these she to some extent weakened Anticipation and Efficiency, adding Surprise. These design changes moved the player from a tool to play music towards a tool for communicating and expressing oneself.

Several groups designed cameras that could fly or be thrown around corners, or that photographed social spaces, and in all cases uploaded the images on the fly. In all cases, the property of being dependent (i.e. awaiting user’s actions) was changed into an autonomous behavior, and similarly the property of not being connected changed to being connected to the internet. As a result users’ relation to, and interaction with changes from seeing the camera as something that requires their attention and guidance to something that one might potentially want to avoid; a tool that can be both fun and scary in its unpredictability. Note that regardless the ethical issues, there are already similar products (for more extreme situations like burning buildings, crime scenes and warfare).

Other interesting designs were a social/context aware player by Mikael Hjorth. His *geoPod* picks up the soundscape of the city, i.e. the songs that are being played often in a certain neighborhood. As such, the design rhymes well with thoughts on sustainability and openness towards new ideas. In his design, Mikael toyed with Control/Autonomy, moving towards Autonomy. As a result the design now features Ambiguity and Surprise. In combination, these changed properties turn the *geoPod* from an efficient tool for music playing into a tool of exploration – and possibly reflection on the inhabitants in an area; instead of controlling it, users get insights from it.

Lastly, Sara Johanna Nilsson has designed a music player with personality: “*The iPod has its whims. Some days it might only play rock, or classic, or British 90's pop. Some days it might not play at all. The more differentiated your taste, the less extreme the whims.*” Sara aimed for increasing Surprise in her design, as a result also moving from Control towards Autonomy. Again, we see a shift from the player as an efficient tool for playing music into a suggestive tool that encourages exploration rather than control.

CONCLUSION

In conclusion we have strong indications that Skewing works well as an exercise for understanding various interaction frameworks. Firstly, it requires that students engage in deep-learning activities such as analysis, application, comparison and reflection. Secondly, the observations in class as well as the written material students handed in, point towards them having understood the various concepts used in the used frameworks.

Despite the fact that skewing interaction properties was conceived for teaching interaction frameworks, the method has also shown promising results as a

structured, easily steered ideation tool that can produce a multitude of ideas, some of which can be very promising in solving the design issue at hand.

SKEWING: THE METHOD

Many of our students commented on the exercise as also being a design method for coming up with new and interesting ideas, and as shown by some of the examples above, several of the designs presented have become, or could become products. Also, some redesigns turned the music player into another product, e.g. a radio or cassette player. This indicates that by skewing, one may well end up with something useful.

Given our findings from observing Skewing in action these 37 times, we can summarize it as containing the following steps:

- 1) **Select an interactive artifact to redesign.**
- 2) **Select a suitable framework for analysis and redesign.** The choice of framework, or the selected parts of a larger framework (or, as in the case with Lundgren's 30 properties) serve as a steering instrument in how the designs will be geared. If using frameworks primarily describing movement and movement patterns (e.g. Vedel Jensen et al. 2005, or Djajadiningrat et al. 2004), naturally the focus, and the changes, will regard movement. If selecting Lundgren's (2012) user-related properties, "social" designs may appear – or disappear, if already existing.
- 3) **Analyze the chosen artifact using the chosen framework.** Here, it is not extremely important that the analysis is entirely "correct", which is a benefit if the terms in the frameworks are sparsely described. The important thing is that designers know what they mean when they attribute a certain term to the artifact – because they will then change it.
- 4) **Start the skewing process by changing one or more properties.** This can be done in three ways, all observed in the exercises.
 - a) Skew one, and only one property at a time and see what happens.
 - b) Skew a property and let others change accordingly.
 - c) Select five random properties and skew all at once. This approach will generate the most of odd ideas.Write down all design ideas collected this way.
- 5) **Select the most promising/odd/interesting ideas or changes.** Explore these further by constructing negative and positive scenarios of use.

In Jones' (1992) design process model Skewing fits within the divergence methods. As such, results from skewing require the use of convergence methods – feel free to replace step 5 – in order to be tailored towards specific user needs and other potential requirements.

DISCUSSION

Initially we stated that the interaction design community lacks design methods related to interaction per se, and we have argued that Skewing in fact does this by use of the interaction-related frameworks. However, we also presented other similar methods already used by interaction designers, and one may question whether there is really a need for yet another method. As for the Random Stimuli-method (De Bono 1970), as well as for Animal Expression Transfer (Landin 2006, Lundgren 2007) these are in comparison much less structured – the success of the method to a great extent relies on finding a good "random" object or animal from which mappings work. Moreover, Random Stimuli focuses on *any* property (material, appearance, use) of the stimuli object, not specifically interaction. The same argument goes for SCAMPER, which in other ways is very similar to Skewing.

As for methods targeted towards exploring and widening the design space, Skewing and the Critical Incident Technique share some common ground in that they both discuss and utilize fringe conditions. In Skewing however, these are however created in the skewing process, not passively looked for via observation. In comparison with Morphological Charts (Jones 1992) instead, Skewing intentionally pushes designers into exploring ideas that might seem irrelevant to the limitations that the design requirements impose – strange ideas that once in a while can be very good. These are the novel ideas that are hard to foresee, and it is in this that skewing excels, and charts fall short. Another important difference is that charts-generated ideas are limited to perceived usefulness whereas skewing-generated ideas are limited to the interaction-related properties that have been chosen. Similarly Boundary Searching (Jones 1992) limits designers to design within the boundaries of the requirements, whereas Skewing allows for breaking them; they are tackled with at later stages in the design process. Both Skewing and Brainstorming are geared towards producing a wealth of ideas that could potentially solve a design problem. Skewing however differs in that it focuses on interaction properties of pre-existing artifacts; it is therefore only suitable for redesigns. Another differentiator is that Skewing can be used with different, targeted frameworks. This characteristic makes skewing a method that can focus on different types of design depending on the property framework that is being used with it.

In conclusion, Skewing has a place in the range of structured, transformational ideation methods, and it definitely has a place within the interaction designers' toolkit, since it can be utilized to focus on redesigning interaction and interactivity.

Note that while Skewing in itself is not limited in its potential design uses, if an interaction design framework is selected, the Skewing focuses on redesigning interactions; the focus of the method is strongly coupled to the chosen framework.

Even though Skewing has many uses and offers certain advantages, it is equally important to recognize the limitations of the method. Firstly, it is as good as the framework that it is used with. It is the framework that sets and limits the properties that can be skewed and this greatly impacts the quality of the produced ideas. For instance, the framework needs quite clearly defined terms, rather than overarching concepts; e.g. the idea of using Löwgren's (2009) four aesthetic interaction qualities (Fluency, Pliability, Rhythm and Dramaturgical Structure) was abandoned at an early stage since they are too generic.

Additionally, since Skewing does not take user needs and other requirements into account, many of the ideas that are produced may not be realistic and may not correspond to the design requirements. However this is the case – should be the case – for any initial ideation method. Also, when it comes to designing as opposed to re-designing, Skewing does not work since it requires pre-existing artifacts. Finally, at least when applied by students, we have observed a trend to lean towards wishful thinking in how well the designs would work in a real-life context. This is however not an issue coupled to Skewing in itself.

With that being said, Skewing has the advantage of being easily adaptable to different design disciplines and approaches given that one has a sufficiently capable framework to “feed” into the method. For instance one could use Jordan's (2002) dimensions of product personality as a means for designing for specific emotions e.g. designing for joy as in “How would you change the properties of the artifact so that users will experience joy when using it.” Again, the possibilities are only limited by the framework that is being used, and by the imagination of the design team. Moreover, Skewing is very affordable as it can be carried out in a few hours without any special tools.

CONCLUSION

In this paper we present an ideation method, called Skewing – skewing as in shifting, changing, or turning. The method is particularly useful within interaction design, since the main idea is to explore interaction-related properties of an artifact. The artifact is analyzed using a framework of terms or properties describing interaction, and then these properties are deliberately changed.

Albeit limited to redesign and to the applied framework, Skewing is a cheap, fast method that helps designers find unusual design solutions otherwise overlooked.

Additionally, although Skewing was created and has only been tested as an interaction design method, there are no set limits that prohibit Skewing to be used with other types of frameworks in a variety of contexts. As long as the limits and capabilities of Skewing are understood, designers can have one more tool in their inventory of methods, to help them navigate the chaos that is the design process.

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3 CONTIGUOUS EXPERIMENTS ON A DESIGN HISTORICAL CASE

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ABSTRACT

This paper contributes to the field of practice-based research and includes insights from research through design, both research perspectives that apply methods and processes from design practice as basis for knowledge generation. The objective of the paper is to introduce a design historical case and demonstrate that it can inform and produce relevant knowledge to practice-based research and research through design. It is the assumption that – by forming the basis for making an epistemic artefact – a design historical case can construct knowledge on how to transform statistics into visualisations. It is also the assumption that the combination of design history and designerly experiments can extend the theoretical scope of practice-based research, which is normally defined by focusing on the present and the future. Three contiguous experiments are demonstrated through dynamic research sketching, a new explanatory tool, with the purpose of showing how, by building on each other, they form a medium for knowledge expansion. Finally the paper reveals visual research methods and tools that should be acknowledged as valuable for knowledge production within the growing field of practice-based research.

INTRODUCTION

In the fields of practice-based research (PbR) and research through design (RtD) it is now widely accepted that design practice and design can generate new knowledge (Chow 2010, 1). PbR, a term sometimes replaced by practice-led research (Rust, Mottram, and Till 2007), has been defined as “research in which the professional and/or creative practices of art, design or architecture play an instrumental part in an inquiry” (Ibid, 11). RtD is therefore seen as a perspective within PbR where methods and processes from design practice are utilized for research. These perspectives become valid only when we are able to show and explain how the practice-based approaches are informed and employed, and what kind of knowledge contribution they provide. For that purpose, several frameworks have recently been developed, for instance the programmatic approaches (Binder and Redström 2006; Brandt and Binder 2007; Redström 2011a) and the explanatory tool Dynamic Research Sketching (Christensen, Markussen, and Knutz 2011; Markussen et al. 2012).

PbR and RtD force the researcher to focus on the future, as existing situations are changed into preferred ones (Simon 1969, 111; Zimmerman, Stolterman, and Forlizzi 2010, 310). Consequently the novel aspect about the present practice-based project is that it employs a design historical case as the starting point to producing knowledge about the visual communication of statistical data. The aim of the project is to find ways of preventing uncommunicative data visualisations where numbers are simply replaced by perfunctory graphical tools. This knowledge could be demonstrated through several design approaches, the most outstanding being the notion of “transformation” inherent in ISOTYPE (International System Of TYpographic Picture Education), which is defined by its founders as the process of extracting, arranging and simplifying data into visual form (Neurath 1974).

The present research has primarily been informed by the Isotype founders Marie and Otto Neurath’s writings and secondly by previous research on Isotype (in particular Macdonald-Ross and Waller 2000; Kinross and Neurath 2009). These sources did not focus on expanding and exemplifying what actually happens throughout Marie

Neurath's sketching process, however, so the aim of this research is to do precisely that: revive the notion of transformation by making a close study of all the material related to a specific project. This research hopes to demonstrate that Isotype charts are more than just a styling feature, and that they could be the first step in formulating a valuable philosophy for today's designer. With help from archivists and design historians at the Isotype Collection at the University of Reading, one suitable case was found (apart from loose sketches), namely a project named the Bilston Venture, an exhibition from 1947, containing 12 charts on plans for a new housing project in Bilston, England. Some of the reasons for choosing this case was that the principal transformer, Marie Neurath, produced it in a mature period of Isotype; furthermore there had to be sufficient material to represent the whole process.

Thus, the first purpose of this paper is to explain how the criss-crossing between experimental and design historical work extends theory. This issue will be answered by zooming in and out of the three contiguous experiments, namely from the overall research position and program to the details that constitute each experiment. The second objective is to show that an epistemic artefact can construct knowledge about how and why people design. Thus the paper visually demonstrates and discusses how knowledge has been generated through the methods and tools employed.

POSITION

The term PbR can be applied to "research in which practice is integral to the method and not just the medium of the output" (Biggs and Buchler 2008, 5). It is often used interchangeably with the more recent term RtD, originally coined by Sir Christopher Frayling, who in 1993 made three characterizations of design research: research into, research through and research for art and design with the purpose of giving design research equal status to traditional research disciplines (Frayling 1993). *Research into art and design* is research such as traditional historical research. *Research through art and design* is materials research, development work or action research defined as research "where the action is calculated to generate and validate new understanding" (ibid, 4). Finally in *research for design* the end product is the purpose and the thinking is embodied in the artefact. These three categories are employed as the widespread labels for the present research approach and as a steppingstone for further clarification.

The first position, research into design, relates to the object of study of this project—a design historical case. My investigation of archival material includes design historical references and methods meant to frame and understand the empirical material. Some of the addressed issues, namely the description of Marie Neurath's design process within the social and cultural aspects of the empirical periods (which again is described within the whole development of the transformation approach) is directly inherent in the

design history field of research and relies on design historical methods. The last two positions are integral to the practice-based part of the present research. I am primarily researching through design, because I am doing action research, i.e. employing methods and processes from data visualisation and communication design as a basis for formulating empirical data. One could argue that I am also researching for design, as the artefact is informed by the research. However, the purpose is not to make an artefact in itself, but to use the design of the artefact as a way to produce and communicate knowledge.

Recently RtD has been applied for instance within Interaction Design and Human-computer Interaction (Zimmerman and Forlizzi 2008; Zimmerman, Stolterman, and Forlizzi 2010). Here RtD is defined as a research approach that employs methods and processes from design practice (Zimmerman and Forlizzi 2008, 42). It forces the researcher to focus on the future which "allows researchers to become more active and intentional constructors of the world they desire" (Zimmerman, Stolterman, and Forlizzi 2010, 310). RtD centres on the making of an artefact, in the form of a prototype, a model or a product, which forms the basis for understanding and framing the problem and proposing a preferred state (Zimmerman and Forlizzi 2008, 42). Zimmerman and Forlizzi distinguish between two approaches within RtD: 1) the *philosophical approach*, characterized by the investigation of a "previously articulated theory" and 2) the *grounded approach*, focusing "on real-world problems that force a concrete framing of the problem" (Zimmerman, Stolterman, and Forlizzi 2010, 313).

Both approaches are applied in this PhD-project: The grounded approach, because this project is driven by a real-world problem, where I have experienced and observed problematic situations of the visualisation of statistical data within educational and professional practice; the philosophical approach, because the real-world problems could not be solved through previously articulated theories, which further emphasized the real-world problem. As a consequence the project investigates previously articulated theory with the purpose of solving real-world problems. Even though this distinction has been criticised for being based on a false separation, it has been discovered that theory construction occurs in the link between the two approaches (Christensen, Markussen, and Knutz 2011, 3).

A new approach to conducting practice-based research has been developed in recent years (Binder and Redström 2006; Brandt and Binder 2007; Redström 2011a). It centres on the notions of program and experiments, where the program can be seen as a provisional knowledge regime that forms the frame for running experiments (Binder and Redström 2006, 10). The programmatic approach proves to be suitable for the present research, because the current knowledge about transformation is constantly expanded and refined

through the experiments. The experiments are not used to prove or falsify the existing theory on transformation; rather it is a way of exploring the material. The approach was recently subject to further development as Dynamic Research Sketching (Christensen, Markussen, and Knutz 2011; Markussen et al. 2012), an explanatory tool that aims to show how practice-based design research is able to feed back into and transform theory. By integrating theory construction and by being dynamic in its ways of showing the dialectics between components and ways in which experiments and theory inform each other, it forms the central tool for an elaborated explanation of the present research.

Consequently this Ph.D.-project, principally positioned within the perspective of PbR and using insights from RtD and research into design, aims to improve an undeveloped practice, the visualisation of statistical data within visual communication design, by producing knowledge on the past. Reference studies, material collection and sampling procedures form the basis for a further investigation where the process of creating artefacts is central for the knowledge production.

RESEARCH ARTEFACT

I will borrow the term *epistemic artefact* (Hansen 2009) to describe my artefact. It is epistemic (involving knowledge) because it came through the archival material, being bound to the material in such a way that it cannot be seen out of context or used as a commercial artefact in itself. It is, indeed, a tool for understanding and developing theory on the historical work of Marie Neurath from a designerly perspective. Being a visualisation, it also becomes a tool for explaining the research outcome, as pointed out by Sadokierski and Sweetapple, who unconventionally explore ways of visually analysing texts (Sadokierski and Sweetapple 2012). Using Zimmermann's characterizations: *theory on design* (creating knowledge about how and why people design) and *theory for design* (conceptual frameworks, philosophical guidelines, and design implications) (Zimmerman, Stolterman, and Forlizzi 2010, 313) classifies the artefact as theory on design since it shows how Marie Neurath designed. In addition, in that context, it is also a theory for design, because it extends the theoretical foundation of how to transform numbers into pictures.

KNOWLEDGE FLOW

In order to comprehend how the criss-crossing between experimental and design historical work extends theory, I will explain the relationship between research questions, program and experiments. When looking at Zimmerman and Forlizzi's two approaches it becomes evident that the tension field between the grounded and the philosophical approaches drives the program. Real-world problems motivated me to try to establish the right balance between data and picture in a statistical chart and in this context the role of the designer. Subsequent literature studies directed the research

towards the notion of transformation inherent in the theory on Isotype and to empirically investigating how transformation influences the statistical chart. Thus a tension exists between wanting to contribute to today's practice and achieving this by looking into the past. The result is the program: *Recover the notion of transformation*, where the purpose of the experimental work is to *recover*, and the historical work included in *the notion of transformation*. The program becomes the temporary knowledge regime materialised over time by the three experiments X1, X2 and X3, which are based on design historical references and the framing and collection of suitable material.

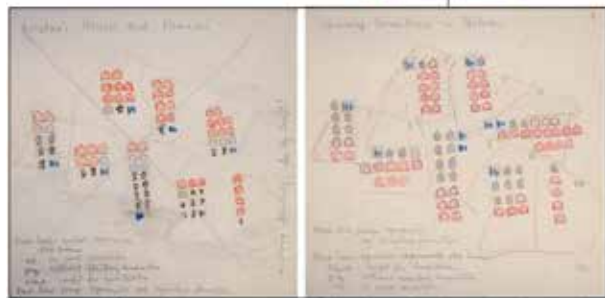
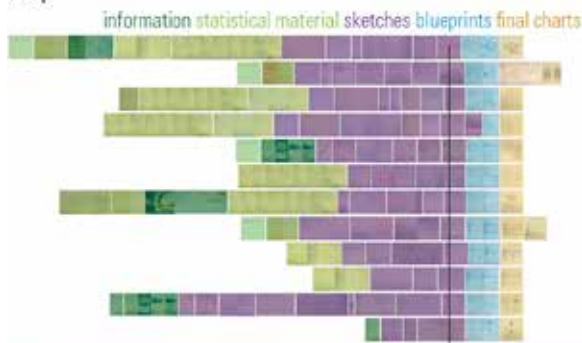
X1

The first study of the material clarified that Marie Neurath's way of approaching the visualisation of statistics has enduring value for today's designer, but exactly *how* remained unclear. The vast amount of statistical material, journal articles, sketches and black & white photographs of the final charts related to the Bilston case had to be explored. The idea was to identify the essential principles of transformation looking "from the table to the graph and from the graph to the Isotype chart" (Neurath 1955, 34). However, this presented a conflicting agenda, because showing transformation as a set of principles or a list of rules would be misleading, as the work was constantly modified, refined and influenced by real life (Kinross and Neurath 2009, 103).

The material therefore had to be approached in an exploratory fashion, starting by looking for fixation points to map the work. Final charts with their respective blueprints (an instruction drawing for the artist who finished the artwork) were placed vertically from chart no. 1 to 12 in the order they appeared at the exhibition. Subsequently the process of transformation was rewound as the blueprints were the starting points from which to move back in time vertically (see Pia Peder 2012a, 7–8). When a map had taken shape the different types of material were given different colours. A more systematic way of understanding relationships and patterns in the material was needed, however, a problem that was solved through data visualisation. Every time a transformation was observed from one sketch to another a new symbol was designed. Every time a symbol could be reused its significance was revised and refined. The process occurred in loops of observing, visualising, checking, comparing and changing (e.g. several sketches were repositioned in the mapping). Finally the symbols of each sketch were placed on top of each other as a combined symbol and placed into a grid based on the mapping. It became a diagram, the content of which could be split into categories. Now it became possible to analyse the relationship between the detailed transformations in their corresponding category from the single sketch to the whole process landscape.

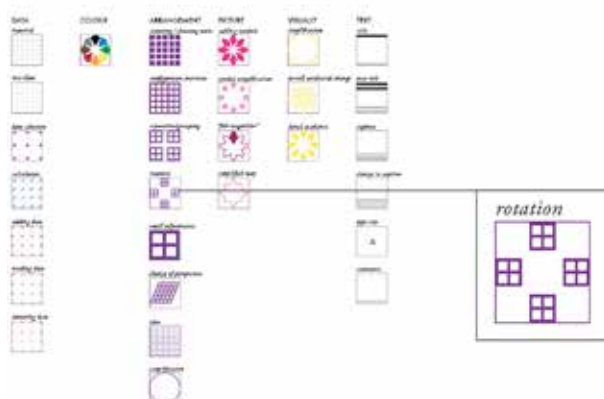
Experiment 1

Map



Material example (Isotype Collection): sketches showing rotation

Symbols (in 6 different categories)

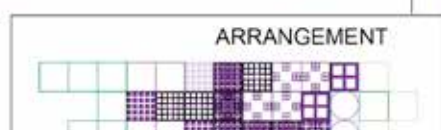


Diagrams

Overall process



Process within categories



Mapping of the sketches—a set of symbols portraying the principles of transformation—and diagrams showing the transformation landscape, expanded the knowledge of transformation (see Pedersen 2012a). A case in point was how the message in the chart was developed along the process; for instance by rotating units over and over the setting in a given chart, and hence the message, was reframed. However, certain things remained unclear e.g. how Marie Neurath proceeded in the selection process. Luckily additional material in the form of letters was collected in the course of X1. They had remained unread in order to let the sketches speak for themselves. So how would the collaboration presented in approximately 100 letters exchanged between Otto/Marie Neurath and Bilston Town Clerk Williams change the picture?

X2

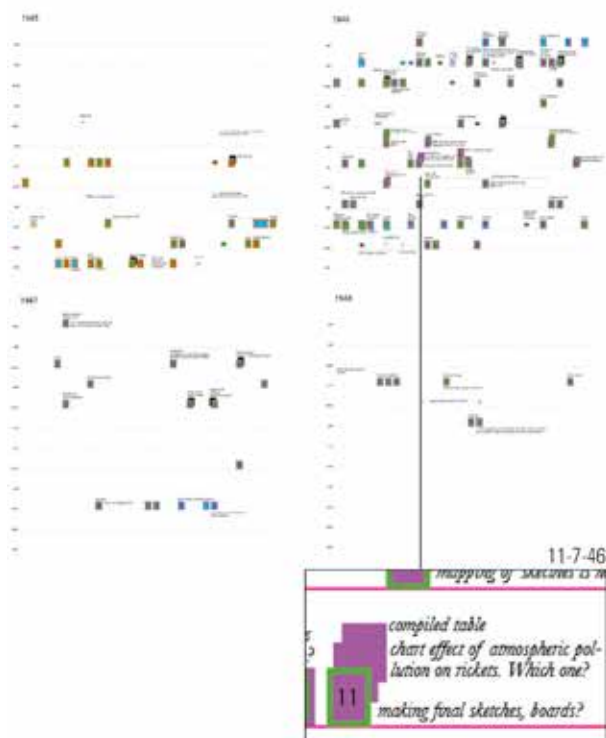
The letters would hopefully provide more information and help re-evaluate the findings from X1; but the first reading did not answer the questions I was asking. The letters were then simply arranged chronologically according to month and year (1945-1948), but that just revealed certain facts e.g. that there are fewer letters in May than in October 1946. A new and more precise timeline with additional information that could help keeping track and create an overview of the letters was needed. I now gave the letters colour codes that differentiated between sender and receiver, and additional symbols were designed to represent enclosures, phone calls and meetings. On top of the symbols I inserted keywords referring to important content or reference points in the sketches; hence I could see the flow of the collaboration and discover when material was missing. I could directly track facts like “a few days after Marie Neurath met With Mr Williams she sends him a letter in which...” or “Marie Neurath mentions a letter, but on that date there is nothing on the timeline. Does it really exist, and if so, is there any information on its content?” The timeline was a tool and a key to the historical investigation and to the next step: to illustrate the connection between the letters and the transformation process.

The letters provided hints on details to look for in the sketches. When building up the timeline, these reference points were represented on the map from X1 as black spots (for examples see Pedersen 2012b, 9–20). They indicated that the map needed to be re-evaluated and visualised once again in a process of zooming in and out, between the map, the sketches, the timeline and the letters. Hints from letters compared with the sketches had provided a new fixation point, namely a miniature exhibition produced early in the process for a meeting with Mr Williams in the form of 12 numbered sketches.

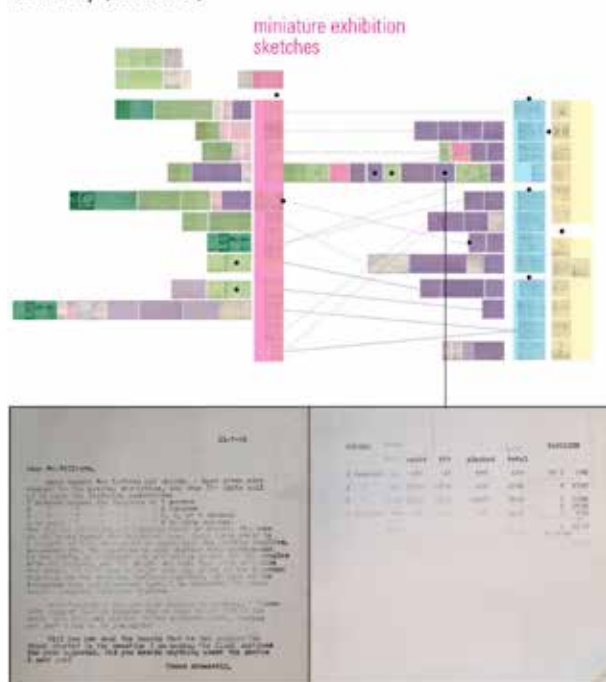
Figure 1

Experiment 2

Timeline 1945-1948 (letters)



New map (sketches)



Material example (Isotype Collection): Letter by Marie Neurath (11-7-46) linking to a table found among the sketches and resulting in map changes

Figure 2

The new insight required a rethinking of the whole transformation process, and in rewinding the process according to this information new links and relationships within and between the sketches fell into

place. It became evident which sketches were made before or after the miniature exhibition, for instance sketches produced with data received after the meeting could not be placed before the miniature exhibition. On the map the changes appeared as rearrangements of the sketches and connecting lines.

Historical details, timelines and a revised map of the sketches expanded the knowledge of the process further (see Pedersen 2012b), ranging from details about the single sketch to the overall process. For instance by rewinding the map according to the new fixation point, it was discovered that Marie Neurath had reorganised the order and the content of some of the charts (i.e. connecting lines) and had sometimes gone back and made changes in the sketches. However, further elaboration on how these new findings would influence the findings from X1 was needed.

X3

It was necessary to go one step deeper into the material and explore how the relationship between the small transformations had changed with the new knowledge; hence the previous two experiments had to be combined and extended by reusing and revising the symbols and diagrams used in X1 and incorporating the knowledge gained from the letters in X2.

Based on knowledge and experiences acquired through the earlier experiments, the way the symbols were used was refined into a more thorough analysis. The material was analysed from a wider perspective, namely looking at the process four charts at a time rather than one chart at a time. When a symbol from X1 was reused it was re-evaluated to ensure that it fit the observations. If something new was found in the sketches, and a new symbol thus needed to be designed, all the material was examined once again to see if anything was missing. I was continuously looking for discrepancies with the first experiment, and if so, I went back and forth between the visualisations and the historical material. For instance new insights into the sketches indicated that the material needed to be reorganised, and the process of rewinding the map was repeated revealing new patterns. Finally, the symbols were placed (like in X1) into the new grid illustrating how the whole picture had changed. A new mapping, sets of symbols, and diagrams were created helping to further analyse and expand the content of the process of transformation. For instance, it was discovered that the process of selecting data took place throughout the whole process and not only in the beginning.

The research traces in detail how the Isotype approach was put into action and can teach the designer how such a process of transformation helps to discover and create meaning from statistics. Further research will juxtapose the knowledge on transformation with other perspectives by feeding into the tension field between the grounded and philosophical approach.

Refined & new symbols

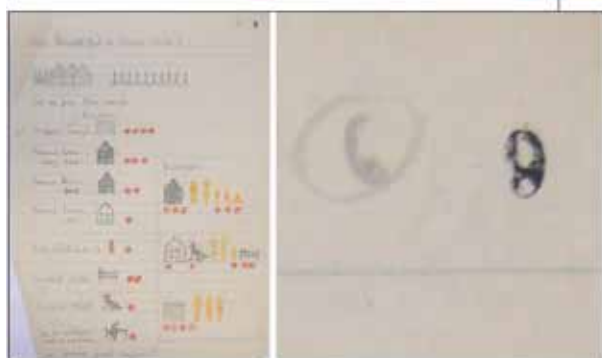
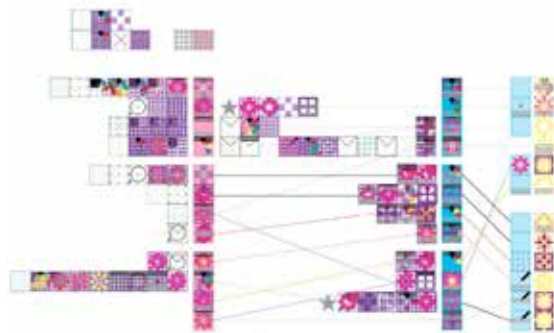
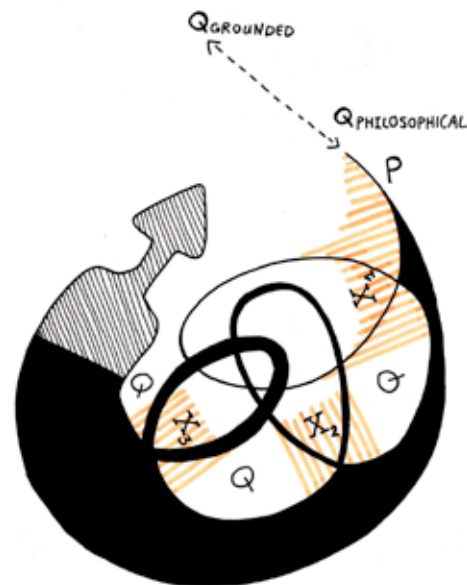


Figure 3

The dynamic research sketch below presents an overview of the relationship between research questions, program and experiments.

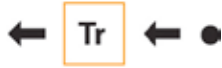


The program circle (P) is a timeline, most of it coloured black as it runs to its end. What has not been completed or defined is striped, emphasizing that this might look different in the future. Each experiment is drawn as a loop that comes out of and into the program like a roller coaster; once a loop is over you re-orient yourself, analysing the situation, asking new questions (Q) from the latest experience and consequently forming the next loop. Throughout the experiments the actual knowledge expansion occurred in a dialogue between material and visual experimentation. The experiments could be completed because the material had been through the historical process (hence the orange spots on the diagram), which again was informed by theory. Going the other way round the knowledge output of each experiment—further analysed through theory on design thinking—feeds into the general theory on Isotype and into the broader purpose of the program. Thus the design historical work, constantly reflected in the experimentation and in the questions, emerges and fortifies a loop. Although the loops overlap because every experiment is an extension of the previous one, they are subsequently guided by different questions or material. As the program grows stronger the experiments become more focused and finally at their closure develop into the knowledge contribution of this research, hopefully feeding into the tension field between the grounded and philosophical approaches, both in practice and in theory.

Like in physics, a further explanation of the properties that come into play within a loop enables our understanding of the way the construction holds. By

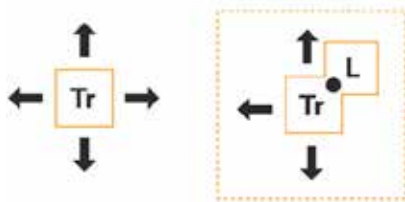
taking a closer look at the tools and methods applied, it will be evident how much the knowledge flow within each experiment depends on the criss-crossing between historical and experimental work.

1. REWIND MAPPING



Using logic and finding fixation points from which to move back in time, rewind mapping has been a way of mapping the transformation process. From a fixation point (e.g. a blueprint) the mapping proceeded to search for the sketch that most resembled the fixation point where good indicators could be the title or the configuration. Subsequently this sketch became the fixation point for choosing the next sketch and it continued in this fashion in a process of comparison and evaluation between the single sketch and the whole. Like building a puzzle, some knowledge is needed about the picture that the puzzle becomes; in this case it was roughly traced through design experience and knowledge of Isotype. The X1 process was very time consuming, as the mapping was built from the bottom. One sketch with more similarities with the fixation point would often replace another. In X2 and X3 new fixation points were discovered and the rewind mapping process was resumed.

2. REFERENCE MAPPING



The outcome of rewind mapping is a map with thumbnails of the sketches in which a sketch can be seen as part of the whole by zooming in and out. As the map forms the reference for further experimentation it is crucial to view it as a projected and not a true picture of the process. It becomes a reference point in the way colour codes represent different kinds of material; lines represent links between sketches; and black spots represent links to the letters. Furthermore the colour codes helped explain how the map changed throughout the experiments.

3. COMBINING SYMBOLS

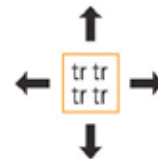


Both in their design and usage the symbols are a way of illustrating what happens from one sketch to another. Making a symbol for an observed transformation forces you to understand and reflect on what kind of act this represents. In addition, when placing a symbol below a sketch you are forced to make a decision not only of

what is happening in the sketch, but also go back and see how this symbol has been placed in other sketches. If for example two different symbols can be used for the same act, the system is challenged. It is therefore impossible to place the symbols without understanding the whole process. Similarly when something new is acknowledged in the sketches, and another symbol therefore needs to be designed, you have to go through all the material again to see if there is something you missed.

The symbols are a vehicle for continuous discussion, self-evaluation, reflection and creation of knowledge about the material, based on a comparison with adjoining sketches, with the whole project, and in the case of X3 also the symbols from X1. It is a comprehensive way of generating knowledge, by detecting patterns in a constant interweaving of reflection and visualisation. The symbols become data in themselves and a tool for reviewing what is happening in the sketches. While the data was the result of a certain amount of subjectivism, it was challenged through the letters in X2. Furthermore one of the purposes in X3 was to evaluate the initial finding in X1, as illustrated by this research note, "I am in constant competition with my earlier experiments".

4. DIAGRAMMATIC GRID



The diagrammatic grid moves away from the sketches by contextualising what is happening in them. Based on the mapping and the way in which all symbols have been placed, the diagrammatic grid, in spite of its complexity, points to patterns and relationships between the combined symbols representing transformations within one sketch. For instance, in the diagram none of the combined symbols were similar. When separating the diagrammatic grid into different layers of categories other patterns and relationships can be revealed in the data. It is possible now to move back and forth from details of single actions to the overview of the flow of the actions. The diagrammatic grid becomes a tool for analysis, but every finding should be evaluated thoroughly as it relies on the map and the symbols. In X1, comparing the two categories' title and arrangement revealed how Marie Neurath formed the message in the data.

5. COMPARATIVE TIMELINE



The comparative timeline was applied primarily in X2 and occasionally in X3 to keep track and create an overview of the letters. Attaching a letter symbol on a

precise timeline makes it easier to see the flow of the collaboration. Keywords above the letters assisted in remembering and noticing the most important content like points of reference with the sketches. Furthermore, colour codes differentiated between sender and receiver, and symbols representing enclosures, phone calls and meetings helped indicate missing material among other things. In X2, the map from X1 and the timeline were constantly compared, which was a step forward in an improved mapping of the process.

THE COMBINATION OF METHODS AND TOOLS

The second dynamic research sketch below (figure 5) elaborates on the relationship between the presented methods and tools (represented by numbers) and indicates how they assist the knowledge production in the broader aim of the program.

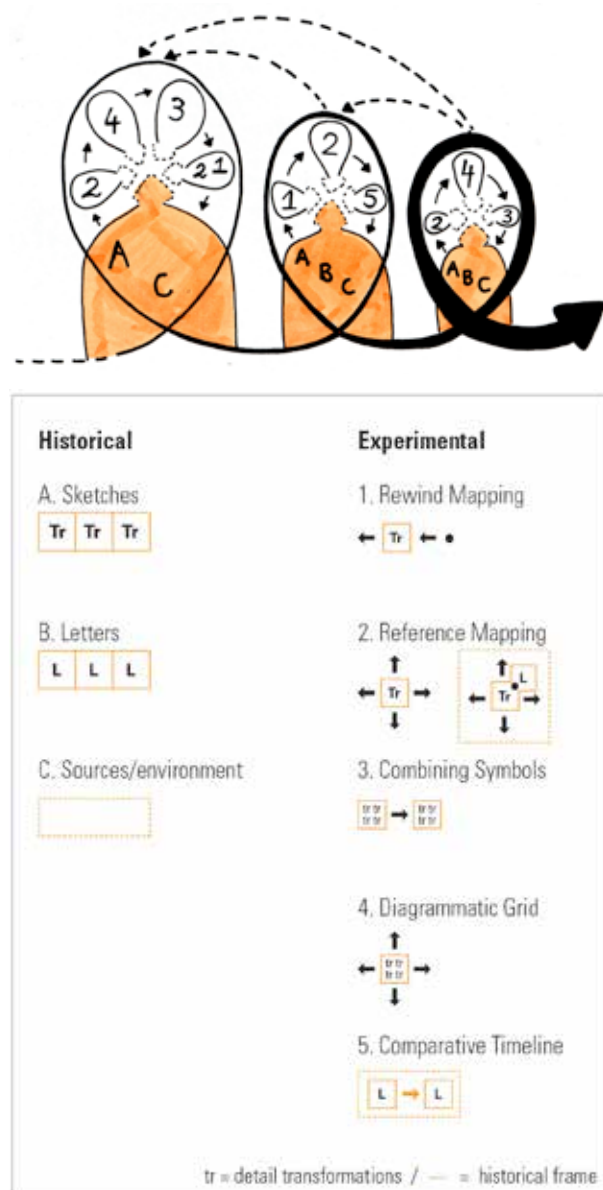


Figure 5: Elaborating on dynamic research sketch with its legend portraying historical and experimental work

Each experiment was based on several tools and methods. They were connected because they were all shaped around the material. When a new tool was developed, guided by new questions or aims, it was constantly reflected in the previous one, hence the arrows pointing back. New tools were employed to correct the previous limitations or outcomes. The process moved towards knowledge expansion by constantly comparing, challenging and freely moving between the different components (arrows pointing to the middle), e.g. from a diagrammatic grid to the detailed words within a historical letter, like a structure that becomes stronger and stronger in an interchange between making and thinking. In X1 a lot of energy was put into the development of the tools and methods, whereas in X3 they were simply refined. Furthermore, it was not only the tools within one experiment that built on top of each other; the process also expanded from one experiment to the next. This is knowledge expansion in its widest sense.

DISCUSSION

The present research, with its criss-crossing between research into and through design, is unconventional. By means of dynamic research sketches we have seen the flow of knowledge production from the overall program to the single experiments built on top of each other. It became evident that the tension field between the grounded and the philosophical approach drove the program and that each experiment was initiated through and ended back in the program. When taking a closer look at the tools and how they were employed it is obvious that the border between thinking and doing has been eliminated, as these elements are more tangled than shown in earlier dynamic research sketches (see Markussen et al. 2012). Furthermore it was obvious that the historical work not only forms the basis for an experiment, but is also part of the experimental work.

The tools in the present research work differ from those that are usually employed for an investigation of such material. First one must understand that most of the analysed materials are sketches that are in a stage between numbers and image, not a finished image. Second, when looking at the traditional methods for investigating images, termed *Visual Methods*, they are rarely visual by nature. Gillian Rose, among others, explores the making of photographs as part of a research project, but merely mentions diagrams, maps and drawings (Rose 2007, 237). Hence visual tools and methods such as the ones presented here should be explored and further acknowledged.

The purpose is not to replace traditional methods but to explain that the present method and tools can add to those that already exist. Traditional methods, like the good eye (often employed for the compositional interpretation of painting within art history (Rose 2007, 57)), would be a way of approaching each sketch, as well as a way to help the rewind mapping, but it would not provide an overview or a detailed picture of the

process. Symbol thinking resembles certain aspects of content analysis, which in visual contexts is used to explore large amounts of images, mostly in a quantitative manner. Although the symbols become a kind of coding system, their purpose, as we have seen, is not to count how many times Marie Neurath rotated within one sketch; rather they were—inspired by the words of Archer—a way to *shed light on, enact and embody* the process (Archer 1995, 11).

Many other visual methods stem from theory, for instance semiology and discourse analysis, which are established in theoretical frameworks that understand the visual in particular ways (Rose 2007, 238). Semiology would be relevant in the interpretation of how the Isotype language works and creates meaning, but it does not help in for instance discovering new links between the sketches. For example, I responded to new discoveries in the sketches by revising the mapping and subsequently discovered indispensable aspects of the transformation process. Furthermore, the visualisations were a way of moving away from the symbols and the visual style of Isotype in order to embody the process of transformation.

The outcome, namely the maps, the symbols and the diagrams, becomes a prototype for looking into the rest of the archival material. The prototype then progresses by moving back and forth between visualisation tools and historical work in a series of experiments that build on each other. Hence we are dealing with an epistemic artefact that in a research context is used for enacting, understanding, and reflecting on design historical material. How the artefact advances through the research becomes an illustration of how the program is constantly challenged through the experiments. Furthermore, when the artefact is based upon design historical research, it becomes a path from the past to the future. In the present case, the artefact was both an analytical tool and a communication about the newly gained knowledge about the past, as well as a basis for a philosophy to guide the future.

This interdisciplinary approach therefore contributes to the fields of design history, design research and design practice. We have seen how design history can contribute to an extension of the scope of RtD, both in terms of the object of study, but also in the way design history has informed the artefact. We have seen how the process of creating an artefact based on design historical material and methods can contribute with expanded knowledge about the material and the visualisation of statistical data.

Hopefully this paper will encourage more researchers to believe in and describe their particular visualisation methods and tools and also inspire more visual communication designers or design historians to conduct research into design history through design. Finally this is a step on the way to widening the conceptual foundation of RtD.

CONCLUSION

By incorporating tools and methods into dynamic research sketches, the border between thinking and doing is eliminated, and it becomes evident that design historical and experimental work can easily blend together. Consequently RtD is an approach which also benefits the past by crisscrossing between design historical and experimental work. Visualisation tools and methods have shown patterns and relationships in archival material, which would have been incomprehensible without these supporting components. Their particularities are inherent in the way their on-going outcomes challenge and build on each other through new experiments. Consequently the present epistemic artefact is in a constant move towards reviving the past, a past that becomes visually communicated and relevant for the field of data visualisation because of the designerly methods and tools, thus tapping into a growing field of research. Finally, acknowledging an age-old object of study within RtD, the visual tools and methods presented here are a step on the way to widening the conceptual foundation of RtD and PbR.

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DESIGN FOR FUTURE USES: PLURALISM, FETISHISM AND IGNORANCE

(OR THE EPISTEMOLOGICAL AND CHRONOLOGICAL POLITICS OF DESIGNING FOR TYPE 1 DIABETES)

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ABSTRACT

In this paper, I question the epistemological and chronological politics of design. Concerned with the role of technology and design in a democratic society, I problematize the divisions between expert and lay knowledge, and between design (before) and use (after). I argue that designs that assumes those divisions risk of colonizing the future, and limiting the possibility of appreciating different forms of knowledge that are not available/voiced at design time. Drawing on a series of Science and Technology Studies about the interplay between knowledge and ignorance in our society, I argue for an approach to design for future uses that acknowledges our present ignorance and lack of control, and that aims at procrastinating and delegating design decisions until the actual future time of use. To illustrate this approach, I report on a design project concerned with chronic disease self-management and aimed at developing and evaluating a platform for the personalisation of self-monitoring practices in type 1 diabetes.

INTRODUCTION

The idea of the professional designer is a modern one. Inheritors of the Victorian spirit of progress, specialized designers use scientific knowledge, their skills and

expertise; tools, specialized languages, and machines, to devise efficient solutions for those, the users, who are experiencing (or will experience) a ‘problem’.

Concerned with the hegemonic potential of this modern approach to design and with the establishment of a more democratic design process, participatory and collaborative design emerged to challenge the assumed asymmetry between professional designers and lay end-users with the motto: *we should design together!* (Ehn, 1989, Schuler and Namioka, 1993).

Two issues were raised that are particularly important for this work. The first is that design is *political* because its product has the potential to redistribute power and authority in society. The second, which is a corollary of the first, is that design is *epistemic* because it has the potential to privilege certain forms of knowledge, and to reaffirm the assumptions that are attached to them (for instance, what count as relevant information).

‘*Designing together*’ was therefore concerned with re-establishing the asymmetry between designers and end users as well as between their knowledge, values and expertise. Over the years, these two topics have received a great deal of attention in the fields of Human Computer Interaction and Participatory Design. More recently, a series of recent scholarships have started to ask deeper questions about the meaning of democracy and participation in design (DiSalvo, 2010, *et al* 2010; Ehn, 2008; Björgvinsson *et al* 2012, 2010). Reflecting these concerns, others further challenged the asymmetries of knowledge and expertise between professionals and lay people by opening up the design through post-industrial technologies (like open-source or personal fabrication) or social movements (such as design activism, DiY and DiWO, participatory innovation). In relation to these developments, some have explicitly challenged the separation between design and use, by proposing a series of intriguing concepts such as: meta-design, design-after-design, design-in-use¹ (Fisher *et al*, 2004; Redstrom, 2008; Ehn,

¹ With a less prominent focus on power, this strand of work also reflect early studies in the social shaping of technology (MacKenzie and Wajcman; 1985) and appropriation studies (Egash *et al* 2004).

2008). In this work, I focus on the political and epistemic dimensions of design, and I try to bring two contributions to those concerned with the role of design and technology in the making of a democratic society. The first concerns my focus on the chronological asymmetry between design as future-making, and actual future uses. In particular, I discuss the separation between what is known, and assumed to be relevant at design time (which is therefore incorporated in the design itself), and what can be learned, and become relevant, at the actual time of use. Indeed, design, from traditionally professional to more participatory, is often seen as *future-making*. Like prophets those involved in design predict, prescribe, and script how certain situations will/should/might be handled by future end-users. In this perspective, the design-time represents the ‘present’ that designers are concerned with (as in ‘*we design the future NOW*’); and ‘use’ represents the ‘future’ to be aiming at. In these terms, one might define design as a set of practices aimed at realising a certain desirable future, by the use of the resources and the knowledge available in the present. This sounds rather natural: we take the best knowledge available today, and the most representative experts (being those professionals or potential end-users, specialists or laypeople), and we try to design the best possible future, perhaps together. I argue that, as the settings for which design is required grow in complexity (meaning that available knowledge and control are limited), the epistemic separation between the time of design and the time of use increases. Therefore, design as future-making becomes an increasingly problematic, and perhaps even dangerous, idea. Indeed, when use will occur in the future, what was fixed in a design (especially the epistemological assumptions about what knowledge is relevant or what counts as information) cannot but ignore what has become available as we moved from the past (when design occurred) to the present (for example new knowledge, new stakeholders, new information or issues). The problem is however not so much that what is available to inform the design today has the potential to fall short addressing tomorrow’s contexts of use. This is an old argument that has been discussed extensively in different ambits². The problem, I argue, has to do with the political and epistemological dimension of this separation. I want to discuss that knowledge and categories fixed in a design and circulated through scripts³ can act as colonising forces⁴ that, by affording certain behaviour, actually limit the possibility to appreciate what was not known at the time

of design but became relevant at the time of use. As colonies, those conquered by a design will be likely to lose their language and perspective, and to be imposed a certain worldview. And this brings us to the second contribution of this work.

This concerns the specific application areas in which the chronological and epistemic asymmetry is challenged by opening up the design to future users. This work reports on a design project aimed at developing supports for self-care in chronic diseases, and raises issues about the epistemic and colonizing asymmetry between medical professionals and affected individuals. In particular, this paper reports on the development and evaluation of an open-ended platform supporting the personalisation of self-monitoring practices in diabetes. The next pages are structured as follows. First, I re-frame the traditional separation between experts (designers) and laypeople (users). I do this in light of recent literature in STS that has addressed this division by re-working the notion of democracy and participation in science and technology. I argue that this literature can bring important contributions to those concerned with the political and epistemic dimension of design. I then move to a discussion of the separation between design and use, and I warn against the potentially colonising role of the present (design) over the future (use). Here I draw on a series of STS concerned with the production of knowledge in our society with a peculiar focus on ‘ignorance’. Based on this discussion, I develop a pragmatist view of ignorance in design, and I discuss the paradox and potential danger of design as future-making which seems to overvalue what is known at design time to the detriment of what is ignored. What follows is then the illustrative description of the mentioned case study and its discussion. Mindful of the peculiarity of the case study, specificities and limit of the analysis will be highlighted in the conclusions.

PLURALISM: RE-THINKING THE MODERNIST SEPARATION BETWEEN EXPERTS AND LAYPEOPLE

There is an interesting parallel between recent developments in the agenda of the participatory and collaborative design research, and works in the STS, especially those of Actor-network theorists Bruno Latour and Michel Callon. The notion of democracy and participation is key in both discourses. Latour is concerned with describing our society by *dis-assembling it*, but he seems to be equally concerned with *reassembling the social* (Latour, 2005a; 2008), which sounds quite clearly a design endeavour. Even if not explicitly framed as such⁵, Latour provides an articulated view that evokes the need to establish a *Parliament of Things* (Latour, 2004) and a *dinkpolitik* (Latour, 2005b) based on *making things public* and the *possibility to disagree*, and concerned with the *co-existence of differences* (humans and/or non-humans,

² Early concerns were raised in CSCW (Robinson, 1993), in PD (Henderson and Kyng, 1991) and HCI (McLean et al. 1990), just to mention some foundational works in this area.

³ See Akrich, 1992 for the popular notion of scripts in the description of technical objects; see also Storni, 2009 for its use in design studies.

⁴ Link with post-colonial and feminist studies is clear here. While these approaches are concerned with issues of power and domination of one social group over the other (in different geographical areas, or different social ambits), I here focus on the chronological dominance of today’s presumed knowledge over what is not known (yet).

⁵ An exception in this sense is represented by the initiative Mapping Controversies and its explicit focus on the use of design (graphic and information design) to render social controversies (Venturini, 2010).

their perspectives, ways of being and knowing, politics, associations with others) in a commonly built world. Owing much to these works reworking pluralism, Callon *et al* (2009) similarly argue for rethinking some of the assumptions of the modernist tradition of representative democracy, based on a form of consensual delegation that establishes a separation between the delegated expert and the delegating layperson. According to Callon *et al* this separation is not longer adequate to deal with today's complexity as:

"it bears the stamp of an asymmetry... The former, assuming that they are faced with an ignorant or even obtuse public, take the mission of enlightening and instructing the latter" (Callon *et al*. 2009, pg. 33).

Rather, Callon *et al* argue that today:

"we should accept the fact that the knowledge of specialists is not the only knowledge possible [...] we should recognize the richness and relevance of knowledge developed by laypersons" (ibid. pg. 11).

Similarly to Latour's parliament of Things⁶, Callon puts forward the idea of *hybrid forums*. These are loci for debates that are aimed at generating social learning where the knowledge of the expert (based on formal *experimentum*) and that of the concerned laypeople (based on *experientia*) do not mutually exclude one another. Instead of former being used as a default while the latter is silenced, rather, they confront and enrich each other. They add:

'the procedure to be devised to organize this collective learning, all of which are directed toward the constitution of a common world, must allow for the simultaneous management of both the process of the fabrication of identities and the process of the fabrication and incorporation of knowledge'.

Here the proposed model of democracy does not assume any consensual delegation and says very little about whether consensus is the actual goal. Quite the opposite, the reach of a consensus is seen sceptically because, as Jasanoff noted:

'Agreement is often reached to the detriment of opponents or the recalcitrant who have been unable to express themselves or who have been silenced or ignored. And then agreement reached at a given moment may very well no longer be valid a bit later when the circumstances have changed. Agreement is only rarely desirable!' (cited in Callon *et al*. 2009).

The notion of democracy that emerges from these studies (Latour's call for the possibility to disagree, Callon's forums confronting different forms of knowledge, and Jasanoff's de-emphasis on agreement), resonates with the concept of *antagonist pluralism* proposed by DiSalvo in relation to the work of political scientist Mouffle. In her words, antagonist pluralism:

'creates a space in which this confrontation is kept open, power relations are always being put into question and no victory can be final. ... such an 'agonistic' democracy requires accepting that conflict and division are inherent to politics and that there is no place where reconciliation could be definitively achieved...' (in DiSalvo, 2010)

These models, but more explicitly Callon's, do not acknowledge any *a priori* asymmetry between the knowledge and expertise of the expert and that of the layperson, and challenge the very idea of representation in our democracy. Rather, it describes a dialogical democracy that offers the possibility to contest because it is open to new emerging identities and to the incorporation of new forms of knowledge. To some extent, this dialog and openness reflect what participatory and collaborative design practices have explored and developed over the years. In these terms, the two Actor Network theorists would suggest that the introduction of participatory and collaborative design methods (from future workshops to design games, from iterative prototyping to participatory assessment) and collaborative technological platforms (supporting global collaboration, crowd-sourcing, and so on) can be seen as ways to *fabricate proactive identities* of the participants⁷. In addition they can be seen to be an attempt to *incorporate their knowledge, skills and perspectives* in the design process thus achieving a certain level of social learning and democracy in the design process. This brings us to the second separation that we need to challenge, and that asks us to move our focus from the constituents of the design process (designer and users) to a larger setting examining the interplay between design and use itself.

FETISHISM IN DESIGN: RE-THINKING THE MODERNIST SEPARATION BETWEEN DESIGN (BEFORE) AND USE (AFTER).

As said, this idea is a modern one: designers collaboratively and materially envision and build the future at the present time, which in turn works to bring about a future. Unfortunately, no matter how 'prophetic' a design has been, the future that is brought about will inevitably be different from the one envisioned to inform 'its' design. To re-phrase a popular expression in the PD community: today's transcendence can never really be tomorrow's tradition. For instance, the prototype developed to explore a certain future, changes the very present within which requirements were identified to envision and develop a specific design. As the prototype is introduced for testing, the conditions upon which it was built (a certain user, her expectations and intentions, the context of use) slip away. The same thing can be said about end-users participating in a design process who - most of the time - are different from the actual future users, or - at least - from what they will become. Uses at design-time can obviously be only imagined, simulated, discussed, and represented,

⁶ Latour's discourse is more complex and it articulates a model of pluralism that explicitly considers and problematizes non-human agency which is not a central focus in this paper. A work discussing Latour's model of democracy in design is under preparation.

⁷ See also Callon on the role of hybrid collectives in PD, 2004

but say very little about actual future uses. What I am suggesting here is that design as future-making is surely an evocative metaphor but it should not be taken too seriously: end-users are not the condition of a collaborative design process, they are its results. In these terms, talking about end-users participating in the design process involves a certain level of fetishism. Future-users (as well as prototypes) are made-up entities that are mobilized in the design process: users before the actual use, prototyped uses before the real thing to be used. The issue here is that these participants (being those humans or non-humans) are not neutral, as they bring their attached perspectives, values and expertise. Therefore, in separating design (before) and use (after), we unavoidably tend to privilege present actors whose values, perspectives and expertise get incorporated in a design to the detriment of the ignored and future ones. Through such fetishism and combined with an uncritical emphasis on expert knowledge, these designs have an increased potential to act as colonizing forces for the real users to come. Let me be clear here. This problematic paradox of design (be it collaborative or not) is partly inevitable. We all need a bit of fetishism; just, we do not need to take it too seriously. Indeed, I suggest that acknowledging the fetishist nature of the future enacted at design-time, might be beneficial in order both to recognise the value of our present ignorance, and to re-think the epistemic and chronological separation between design and use. How to address the dangers of a design that acts as a form of colonization of the future then? I want to suggest that a more democratic approach to (collaborative) future-making, that appreciates pluralism and debate, should be based not only on the move of abandoning our separation between professional designers and lay users (as discussed in 2.1), but also by abandoning the division between design (before) and use (after), acknowledging that our ignorance and openness to future surprises is often more important than what we know and want to fix irreversibly through design. Recent STS studies about ignorance offer interesting reflections on this matter.

A PRAGMATIST VIEW OF IGNORANCE

Studies of ignorance (Gross, 2010, 2007; Gross and Krohn, 2005; McGoe, 2007, 2009) are becoming more prominent in Science Studies after realizing that our knowledge society is becoming a risk society (Beck, 1996). Recent STS studies expose this notion to analysis and show how this idea of a risk society assumes and consolidates expertise and knowledge (and so power) in the hands of few (Callon et al. 2009; Gross, 2010). In these works, modernist and hegemonic visions of risk assessment and predictive models (that use the expert knowledge available today to make decisions about tomorrow), are opposed to a more modest *precautionary principle* arguing for a *better safe than sorry* attitude toward decision making in the face of uncertainties (Callon et al. 2009, Jasanoff, 2007, Myers and Raffensperger 2005; Whiteside 2006). To frame this

position within our concern with design, let me rephrase the same statement that Callon used to discuss the asymmetry between experts and laypeople. Adapted to our concerns with the epistemological and chronological separation between design and use, his statement would sound something like this:

'to start with we should accept the fact that the knowledge available at design time is not the only knowledge possible (relevant)... we should recognize the limit of our current knowledge and the richness and relevance of knowledge developed (e.g. by actual future users) after design'.

Rather than assuming the knowledge available at design time as the standard (being the knowledge of the professional designers or the one sparking from their collaboration with various lay stakeholders), it becomes equally important to make room for the future appreciation/incorporation of unpredicted and unpredictable novelties. This consists of the acknowledgement of previously ignored (and potentially surprising) issues, actors, perspectives, information, knowledge, limits, and so on. In some cases, reducing a design issue to resources/perspectives available at design-time, comes with the risk of irreversibly limiting and hindering the very existence of other actors, or the possibility of different perspectives and forms of knowing (potentially disagreeing with the imposed past). The mentioned studies of ignorance suggest that indeed, fixing today's categories for tomorrow come with the risk of transforming our present ignorance (as the opportunity to know – *questions* are unanswered and need to be formed) into non-knowledge (as the impossibility to access – *questions* are simply unasked and cannot be formed any more)⁸. In analogous terms, acknowledging ignorance at the time of design makes room to uses that still need to be formed, while non-knowledge restricts the possibility of unforeseen uses.

I argue that in design as future-making we run the risk that certain uses and the needs behind them are ignored/unaddressed and get irreversibly lost in the rush of fixing today's best categories. Studies exist which try to explore the possibilities for acting in the face of our ignorance, and the impossibility of predicting the future. In this ambit, the idea of experiment is of key importance as a way of linking ignorance and the incorporation of new knowledge, and to learn from and cope with the unexpected (Gross, 2010). Future-making is an activity in the face of uncertainties and, I argue, using a precautionary principle to acknowledge our ignorance can help to minimize the current fetishizing attitude of modern design practices. I suggest that such a principle can help to re-think design as future-making, become more open to different views, and procrastinate design-fixes to the 'time' they should belong to: the future present of use.

In the next section, I discuss a design process that is illustrative of the issues I have raised so far. The project

⁸ See Krohn (2007) for this key distinction.

was aimed at empowering individuals with type 1 diabetes by enabling them to constantly adjust and adapt their self-monitoring practices in the face of the unexpected, the unclear, the unknown (Storni, 2013a, 2013b). I discuss part of the project and what was developed. In particular, I focus on the evaluation of our design, which shows promising results in re-working the separation between design and future uses and that draws on the proposed pragmatic view of ignorance, and the precautionary principle that derives from it.

DESIGN FOR FUTURE USES: ENABLING THE PERSONALIZATION OF SELF-MONITORING PRACTICES IN TYPE 1 DIABETES

When looking at type 1 diabetes self-care practices, a series of key challenges for the design of tools supporting everyday self-management become immediately evident (Storni, 2013a). Diabetes is extremely complex, and becomes part of almost every aspect of one's life in a way that makes it inseparable from it. Type 1 diabetes self-care practices require a series of everyday compromises and delicate balances between different aspects of one's life. This ubiquitous nature of diabetes is clear when individuals were asked about their first diagnosis (names are fictional):

Geraldine: *everything changed. Because you have to think about your blood sugars all the time no matter what you do, you go out for a walk you go into town, you play football with the kids, you go for a snack, you go for coffee with somebody... blood sugar is involved in everything you do...*

Julie: *Because it's constantly in your mind, for example if you go shopping: I don't see the food [...] I only saw carbohydrates 30 grams, 40 grams 3 units of insulin, 4 units of insulin... you just start to think in a complete different way [...]...so it's a constant thought about what's going on.*

As one can see, chronic self-management is extremely demanding and characterized by a series of difficulties, practicalities and intricacies; these are difficult to account for and to foresee and, consequently, to design for. The knowledge that is available to the experts (biomedical and clinical knowledge) has brought huge benefits, but unfortunately falls short in addressing the infinite numbers of mundane difficulties of living with a chronic disease on a daily basis. In spite of the enormous advancements of modern medicine, in diabetes things that worked yesterday might not work today; things that work in the hospital might not work in a domestic environment; and things that work for the patient might not work for the doctor, and vice-versa.

Louise: *even if we did the very same things every day and ate the very same things and the very same time every day it still wouldn't be the same every day because you have things like stress, illness, exercise [...] and then hormones just play into it and you can't measure those.*

These extracts are interesting in many ways. First, they depict the heterogeneity of elements that are associated

with diabetes self-care, and so show its complexity and entanglement with everyday life. Secondly, they offer an insight into how the everyday experience of the disease is populated by uncertainties, ignorance and surprises. These, according to some of the reviewed literature on ignorance, are not necessarily problems but could represent occasions for the development of new knowledge that might be useful to deal with such complexity. The reported extracts also give a hint of the regimental attitude that diabetics are often expected to adopt, according to the medical perspective that is traditionally concerned with the universalities of a disease and not with the idiosyncrasies of those affected by it. Indeed, the clinical perspective and knowledge - that plays a key role in informing the behaviour of affected individuals as well as the design of their equipment - is normative in nature. It derives this status from a set of assumptions (such as the objective and quantitative nature of knowledge, the notion of compliance, the separation between the medical and the non-medical issues, and so on⁹) that tends to treat deviations (such as non-compliant behaviors, the use of different types of information/set of values in self-management, and so on) as violations to be limited (by design). Design and technology can play a key role in this (for instance through the design of persuasive technology, prescriptive protocols, monitoring systems, and so on). This idea of an expert control over a rather passive subject clearly resonates with the discussed attitude of the professional designer over the end-user, and with the epistemic asymmetries that Callon finds inadequate to deal with complexity and uncertainties. As mentioned, biomedical and clinical knowledge is not concerned with the everyday experience of living with the disease and - in a sense - it makes it difficult to give room to the perspectives of the patient, her practical concerns, and mundane problems. Formatted as they are within a reductionist discourse of medical language, practices and technologies that assume a certain perspective, many individuals find it difficult to integrate and ground the medical knowledge in the context of their ups and downs, their subjective experience of the disease, and the situated nature of their problems. Chronic care in clinically uncontrolled settings is indeed uncertain. Much is unknown, unpredictable and out of control, not to mention the fact that each diabetic lives with a uniquely individual set of difficulties. With the exception of a series of established medical categories (such as glucose levels, insulin units), they all learn to pay attention to and deal with a large series of different, practical, and mundane things. In chronic self-care the medical, the para-medical and the mundane cannot be separated, and to reduce this complexity to a series of medical universalities is not enough. It not only belittles the key idiosyncrasies of affected individuals, but also hinders the appreciation of their different perspectives and the lay expertise that they (might) develop as they learn to take care of

⁹ See Storni and Bannon 2011 for a critical discussion of these notions toward patient centric infrastructures.

themselves (Storni, 2013a). Indeed, many of the participants complained about their doctors' reductionist obsession with numbers: *...some doctors would make judgement on one reading only, or, ...she only wants to see the numbers.* The following extract about an individual with diabetes keeping two separate journals - one for her doctor and one for herself - shed some light on the potential conflicts that can emerge between the normative nature of the clinical perspective, and the assumed asymmetry with the lay perspective of patients:

Gabriela: *I type those [extra information] out for my doctor because if I handed that to her she would be like, what is this?? So she has a format where I just put in the numbers, I just put in the readings and the units. That's all! She doesn't want to know anything else. [...]*

During investigations preceding the development of our platform, this friction between the two perspectives and related forms of knowledge was particularly recurrent:

- **Paula:** *'it is hard to find a specialist who acknowledges that the patient knows just as much, here it is always the opinion: "ok I am the doctor you are the stupid patient, you do what I tell you..." but that's not right! [...]* They think you are stupid, they don't realize that you think about what you are doing because they don't live with it, they don't see the numbers they just read it on paper, they go home at night and eat their dinner and don't think about carbohydrates...'

Being open to the concerns of the individuals extending (if not contesting) the clinical perspective became a key design concern for us. At the same time, being able to prefigure what diabetics should be concerned with (the 'extra information' our participant is concerned with) is an impossible design task. How to support everyday diabetes self-care with an appreciation of the limit of available biomedical and clinical knowledge but also be mindful of the impossibility of predicting what each of the potential 'users' will be concerned with? Our proposal became one of extending a traditional and exclusive focus on what we know today (and on the solutions that can be drawn from that) to incorporate the view that what we do not yet know should be equally important. The idea was to introduce – back to the discussed dialogic democracy and the idea of a precautionary principle – the possibility of disagreeing with or extending a design. New evidence which emerges during use could be incorporated into the design, thus potentially turning today's ignorance (on the effect of certain self-management practices) into future new useful knowledge.

Diabetes self-care represents a good case here, as we cannot really know in advance what a 'user' would need. Yes, of course, you incorporate the best knowledge available today in the design of any support for diabetes self-management. At the same time though, you might need to be cautious enough to acknowledge

that diabetics struggle, cope with uncertainties, surprises and the unknown, but they also learn, reflect, experiment, tinker and try new things. Often they learn new facts that need to be incorporated in the design – after the actual design. With this in mind, we envisioned an open-ended journaling system that would enable users to personalize their self-monitoring practices.

The bottom-up personalization of self-monitoring practices was achieved through the creation of unique categories of lay data (called 'tags'). Tags fit the patient perspective and enable the exploration and the reflection on one's own self-care practices, thus potentially generating evidence about certain events or knowledge about the effects of certain actions. The idea is to enable the individuals with diabetes to create 'tags' and to start tracking any particular event that concerns them as well as to attach all sort of multimedia information to more traditional data about glucose levels and insulin intakes. The attached information can be pictures, notes (audio and written) or, indeed, patient-generated tags.

Tags can be countable or not and so, for instance, an activity in the gym can be tracked in terms of minutes of training or - if further equipped with other devices - in terms of burned calories; beers can be tracked in terms of glasses or pints, breakfast in terms of cups of cereals or consumed carbs, and so on). As a new tag is defined, a new button is added in the glucose-tracking page of the journal. This can be used independently or in relation glucose readings¹⁰. The log function allows reviewing (in both textual and graphical way) glucose readings along with lay-generated tags thus supporting further possibilities to compares things, look for patterns, reflect and perhaps start tinkering and experimenting with certain aspects of everyday life.

EVALUATION OF THE TIY PLATFORM'S USE

Tests principally aimed at assessing the general appreciation of the bottom up generation of Tags, and their actual use in everyday life. Tests were also used as conversation points to further investigate issues in self-management. In this sense, evaluation did not follow the logic of clinical trials in complex interventions but followed the logic of constructing a modest but highly detailed case study with a series of participants with type 1 diabetes and, when possible, their formal and informal care-givers¹¹. Two rounds of tests were run for the TiY. The first evaluation trial involved 4 diabetics type 1 and lasted for 2 months (these 4 participants were member of a support group where initial contact and observation were made, see Storni, 2013a and b), and was complemented with home visits and phone calls. Patients were equipped with an Iphone with a developer

¹⁰ Ideally tags could be linked with a series of networked devices that automatically feed in data regarding specific activities (cooking, running, and so on) without relying on manual entry.

¹¹ In this sense, the selection of subjects did not follow a randomized assignment although was somehow guided by a series of principles such as: the user must have a form of diabetes requiring journaling and monitoring (therefore the focus on type 1); the user must a certain level of familiarity with the use of mobile phone; the user fall within the most common bracket for smart-phone owners of 18-50.

copy of our prototype installed. The first test was made on an early version of the TiY which did not feature graphical visualization of the data. The second test lasted for 6 weeks and involved three diabetics (different from the ones participating the first series of tests) who were equipped with a new version including data visualization of the data log. During the first evaluation tests, users were also asked to keep a diary that was included with the iPhone¹². During the series of evaluations all participants created a wide range of different tags reflecting their concerns (also emerging ones): meal tags to highlight pre- and post-meal glucose readings or the different type of meal (e.g. *‘porridge breakfast’* or *‘muffin breakfast’*); tags to track sports and other physical activities (*‘gym’*, *‘walking’*, *‘jogging’*, *‘running’*, *‘swimming’*, etc); diet tags to track intake of, for instance, *‘carb(ohydrate)s’*, *‘fats’*, *‘fibers’*, *‘snacks’*, specific food or drinks (such as specific type of cereals, cheese or beer) or new types of food ordered in restaurant (such as *‘sushi’* or *‘pizza’*); tags for medical tests such as *‘HbA1c’*, *‘Ketones’*, and *‘CBC’*; tags for medications, individual symptoms or *‘sick’* days; tags for different types of insulin (*‘Bolus’*, *‘rapid’*, etc.) tags for daily activities (such as *‘driving’* or *‘travelling’*), and more. On average, almost 40 different tags were created during the tests ranging from only two general tags for one patient (*‘food’* and *‘exercise’* as non-countable tags usually complemented with written notes) to 14 tags for another patient (ranging from specific activities, type of food or drinks, symptoms such as feeling low, and medications usually created as countable in lay units (such as bottles of beer) or units from the provided metric systems (such as minutes for cycling, or grams for carbohydrates)) and rarely accompanied by a note. Some tags were particularly recurrent and used more often among our participants (such as Breakfast, Lunch, Snack, running or jogging). We also noted that some tags were created but then never actually used while journaling. In a couple of case we also noticed participants tunes previously created tags to better fit emerging concerns at use time (as in the case of a tag earlier named *‘pizza’* and then modified as *‘eating out’* often complemented with a picture of the dish in question, or the case of one tag *‘lunch’* then evolved into two tags *‘light lunch’* and simply *‘lunch’*). Interestingly one participant started to create a collection of pictures of nutritional information in food labels to mind and better remember that type of information. We were happy to learn that these labels’ pictures were also used to later support her shopping at a supermarket (e.g. to check different nutritional value of a new brand of cereals). One of the early user’s suggestions about tag’s creation referred to the fact that meal’s tags (and possibly also exercise ones) are so basic in diabetes self-management (at least type 1 which was at focus) that some users would expect them to be

already pre-designed in the journaling system. Even if this point was understandable, it was also true that people used different strategies in creating meal tags. For instance, one participant found it useful to distinguish between different ‘types’ of breakfast, one based on *porridge* and another based on *muffin*. This pattern was recurrent in main meals tags which ranged from generic *‘Lunch’* and *‘dinner’* to more specific *‘light lunch’*, *‘pasta’* or *‘pizza’* or *‘sushi’*. Another interesting case concerns tags created to flag pre and post meal glucose readings whose function was not to solely track what was eaten, but to flag all pre- and post-meal readings attached to a particular food.

COMMENT

Our evaluation of the TiY platform is promising in many senses. It first shows that users are happy to engage in the development and definition of Tags that acquire the form of new design features. Some of the generated tags shared common concerns, while some others displayed unique ones. What is also key to notice is that participants engaged not only in tag creating but also and more interestingly in their ongoing evolution (adaptation, specification, simple deletion). In relation to the specific application field of self-care, especially in chronic disease, our evaluation further suggested how individuals with diabetics find it useful to extend medical records with lay categories and develop different types of knowledge and expertise to better ground medical knowledge in their everyday life (Storni, 2013a). We found that these activities are aimed at generating meaning, understanding and more specific questions about what is relevant in a certain situation (at least generating new hypothesis about the effect of certain actions in self-management). We only have a hint on this key aspect that is represented by a user creating a tag ‘temperature’ with reference to weather conditions. The participant in question is a runner and in monitoring her runs more closely she realized that when is cold and dry then she seems to need more insulin. It is difficult to say if she discovers a relationship between temperature and insulin absorption. We are happy enough to say that from an pragmatic point of view this might offer the possibility to improved one’s control over sugar levels during sport activities, even if the doctor would not show the same interest on this issue. On the one hand though, our idea was also to improve the collaborations with the medical staff by providing a tool for the creation of bottom up evidence to fine tune care practices. For us, tag creation could have been a collaborative endeavour where the different perspectives can enrich rather than exclude one another. Indeed, this was also suggested by one participant who mentioned how the TiY could support an improved and rebalanced discussion with the doctor. The motivation was that the TiY might provides contextualized and potentially key talking points that one would not be possible to discuss otherwise.

Paula: It might be nice...just to see if I show that graph to my doctor and she says try to make that

¹² Inform consents were collected under the guidance of the local ethic committee in all the three series of tests, and patient data were stored and managed according to the guidelines of the local data protection authority.

adjustment and I do it and it's still not working, then I can track more closely, add a comment to the actual graph and use it to discuss it with her and maybe try a new thing.

Doctors (3 specialists and 1 general practitioner) expressed a certain appreciation for the idea (especially in relation with the easy way to recall readouts and related information); they however were concerned with data fabrication, a concerning aspect that they all seem to be familiar with.

DISCUSSION

I have started this paper by questioning a series of modern separations in design, and I have raised issues over the political and epistemic characters of design. In particular, I exposed to analysis the chronological and epistemic separation between design and use, and I discussed the tension between what is known and assumed to be relevant at design time, and what can be learned and become relevant at the time of use. With this focus, I have first re-discussed the traditional asymmetry between experts and laypeople in light of recent discourses around democracy in techno-science (Latour, 2005, 2008; Callon et al. 2009) and in design (DiSalvo, 2010, 2012). Then, I have discussed the separation between design-before and use-after. I argued that the idea of design as future making might come with the risk of colonizing the actual future. To fill the gap between their present and the future they design for, future makers incorporate and fix today's best knowledge and other fetishized entities into their design scripts. However, as fixed scripts reach the actual future context of use, they might prevent, limit, and hinder the possibility of appreciating and producing new perspectives, and incorporating them into the design. In recent STS concerned with knowledge production in our increasingly complex society (also concerned with democracy), we can find an interesting distinction between ignorance and not-knowledge. I argue that this distinction is relevant to rethink design for future uses. In pragmatic terms, we discussed ignorance as an opportunity to develop new lines of enquiry and experiments with the potential of generating new knowledge and expertise. This is possible because in acknowledging that present knowledge and control are limited (precautionary principle), new questions, languages, and perspectives can be explored at any time. Non-knowledge is instead defined as the actual impossibility of developing new forms of knowledge. As an effect of the undisputed authority of dominant perspectives and forms of knowledge, the generation of new questions becomes increasingly difficult also because future explorations of new angles (based on new questions or different languages) can be seen as a violation. In line with those who argue for new models of dialogical democracy, who rework pluralism, and who are critical of the emphasis on consensus and agreement, I suggest a design for future uses that rebalances its colonizing potential through two key precautions. The first concerns the asymmetry between

expert and lay forms of knowledge, and it challenges the assumed authority of the former by avoiding any strong assumption about the respective relevance in future uses. The second concerns the epistemological and chronological asymmetry between design (before) and use (after), and it challenges the colonizing power of the former (uncritically packing available best knowledge into design scripts) by rather appreciating our ignorance (at the time of design) and the lack of control of over future uses. Without these two precautions, design becomes a dominating force imposing a language and a worldview to those who are 'conquered' by it. To support this argument and resonating traditional critiques of the healthcare system¹³, I introduced and discussed an illustrative case study in diabetes care. This setting is indeed rather complex and characterized by different forms of knowledge and a degree of uncertainty. The case study concerns the design of a journaling platform to support the personalization of self-monitoring practices in T1 diabetes. In our approach, we first of all realized that relying on the medical expert view only (the biomedical and clinical one) would reduce a complex issue like everyday diabetes self-management to its universal medical aspects, thus frustrating and failing to fully support the experience of living with the disease on a daily basis. As mentioned, we acknowledged that a normative approach - naturally attached to the authoritative nature of the medical perspective - would limit and constrain the possibility of tinkering with one's own treatment in the attempt to gain knowledge and control of everyday practicalities and difficulties.

In investigating everyday practicalities linked with diabetes self-management, we further acknowledged that it would be impossible to try to foresee all potential requirements and incorporate them in our design. Thus, we realized the need of enabling the possibility to extend (on an ongoing and open-ended basis) the capability of the journal system to better fit the unpredictable and often-idiosyncratic aspects of chronic self-management. The introduction of the tag editor enabling the creation of personal and unique categories of data, extending the clinical ones, represented for us a way to give value to the language, knowledge and perspective of the patient¹⁴. Tags become means to

¹³ This argument clearly resonates with an established tradition of critical studies of healthcare that build on the notion of power and dominance (for instance Foucault Biopower, or Illich's Medical nemesis; see Storni, 2013a for a discussion of some of these works as key for the development of the self-care movement in the 70s).

¹⁴ After the fact, the author came to know a similar project in a rather different context but with an even more prominent anti-colonizing design. This project concerns the TAMI (Verran, Christie, Anbins-King, van Weeren, & Yunupingu, 2007), a custom-made database, for use by the Yolngu Aboriginal Australians, who does not recognize the (Western) ontological division between nature and culture. TAMI's design aims to support the worldview of the Yolngu and not assume the normative Western division. Its designers did not use any pre-set categories for - or relationships between - entities; instead, they enabled users to construct a classification system according to their perspective and understanding of relations at use time. TAMI utilizes a flexible tagging mechanism, which facilitates the creation of personalized data and metadata for each item in the database. The

express one's own concerns in one's own terms at any time (potentially destabilizing the power wielded by design time). For us, tags also represented a way to appreciate that our ignorance and the lack of control with regards to future needs might be even more important than what we know (e.g. from doctors). Our idea of a bottom-up creation of 'tags' can be seen as a way to procrastinate and delegate to future users some key design decisions about what is becoming relevant in use and needs to be incorporated in the design. For instance, one of our interviewees (considered an expert who had perfect numbers for long time) developed bulimia and suddenly had to start journaling many new elements that were irrelevant before. Thanks to our approach to open up the design, she was able to shape the TiY to better fit this new unfortunate health status. In this sense, our design reflects many of the mentioned studies concerned with democracy and the role of design and technology. Resonating with the idea of dialogical democracy and feeding into the one of antagonist pluralism, our design allows the fabrication and incorporation of new knowledge as well as the simultaneous fabrication of new identities. In our case, new forms of patienthood where patients are not simply seen as more or less compliant (with a medical prescription or a fixed design) but rather as proactive and inquisitive explorers tinkering with their body, knowledge and technology (see Mol, 2008 for further support of this argument). Likewise, our design also offered, as noted by one of our interviewees, the possibility to disagree (e.g. with a design or medical advice that turned out to be incorrect or too narrow) so that new concerns/questions can be voiced.

CONCLUSION

Mindful of the political and epistemological dimensions of design, this paper builds a critique of the idea of design as future-making, with its potential of acting as a form of colonization of the future. I argued that this approach is potentially dangerous, and fails to achieve a truly democratic design process where the categories and the limitations of the present are not imposed on the future uncritically. Enabling the possibility of disagreeing, exploring new views, expressing new concerns and incorporating knowledge that was not available at design time, became ways for us to achieve what we might call a diachronic democracy (and a related diachronic pluralism and participatory design). This assumes pluralism and it is based on a precautionary principle where the separation between design and use is blurred because what we ignored at design time is not irreversibly lost into non-knowledge. Recent STS literature on ignorance highlights the importance of experiments *in-the-wild* in asking new questions and challenging authoritarian forms of knowledge. These studies that re-work pluralism and align with those concerned with democracy and

difference here is that the TiY display a more prominent emphasis on experimenting, tinkering and possibly creating new knowledge and not reaffirming an already existing (and exotic) lay world-view.

participation, insinuate the idea of everyday experience as modest experiments with the potential to develop new ways of knowing¹⁵. Our lesson-learned - based on the experience of the TiY - is that instead of developing future scenarios with potential users at design-time (design as future-making), we might need to develop exploring/tinkering devices that enable the making of design scenarios at use-time enabling the open-ended and experimental exploration of unforeseen uses¹⁶. Two issues need to be clarified before to end though. First, I should be stressed that the TiY displays several limits in the way it is actually open to design in use. Many of the aspects of the design are indeed rather closed and irreversibly fixed (the navigation structure of the app, its look'n'feel, the fact that the app only run in a iPhone, and so on). In this sense, these design elements act as colonizing forces imposed on the future user (for instance it imposes the use of an iPhone). Secondly, further research and attention is needed to understand how the proposed approach could be extended to areas different from chronic self-care. Certainly, the proposed approach to design for future uses might open up to a more democratic design when facing highly complex settings characterized by different stakeholders and their potentially conflicting agenda and forms of knowing. The suggestion is to shift from a modern idea of design as future making to a more modest design for future uses, that appreciates not only plural viewpoints but also our ignorance at the time of design. I showed how this could be achieved by not relaying excessively on what is known and available at the time of design (especially authoritative forms of knowledge), and to procrastinate and delegate some design decision to actual future users. This shift in focus represents what I believe should be called the epistemological and chronological politics of design as it gives the ability to rebalance the asymmetries in power among different forms of knowledge, but also to overcome the problematic distance between present design and future uses.

¹⁵ To conceptualize the difference between experimentation in the laboratory and real-world experimentation, Wolfgang Krohn (2007) suggests that both types should be compared to the nomothetic and idiographic approaches to reality that were introduced by the philosopher Wilhelm Windelband (1980). Windelband saw nomothetic approaches to science as having the tendency to generalize from many cases to derive law like statements (as for instance we can see in the production of biomedical knowledge). Idiographic approaches, in contrast, highlight unique elements of single cases (as for instance we can see by acknowledging the unique idiosyncrasies of individual patients). Krohn therefore argued that nomothetic and ideographic approaches are both equally relevant for experimentation outside the laboratory (Gross, 2010). This suggests an interesting distinction between monothetic design (where the focus is on participation at design time via fetishes to realize a design for all in design studios) and idiographic design (where the focus is on enabling a myriad of collaborative future-making at use time *in-the-wild*).

¹⁶ Candidate labels for this might be: *Design for thinging* as a larger category of *design for ignorance*, *controversial design*, *design for exploring*, *design for debate* (as in design noir (Ruby and Dunne, 2001)), *design for ambiguity* (a la Gaver (2003)), *design for users' reflexivity*, or *use as situated prototyping/future-making*, or – why not – *participatory use*.

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OOPS! MOMENTS: KINETIC MATERIAL IN PARTICIPATORY WORKSHOPS

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ABSTRACT

We wish to alert facilitators to the merits of deploying kinetic resources within workshops. Design materials and activities involving unpredictable kinetic aspects such as balancing, bouncing, rolling and falling can lead to surprises that provoke a lively challenging of assumptions. Based on video data from many innovation workshops we show how materials with such dynamic qualities seem particularly suited to scaffold groups in exploring ‘if – then’ causalities. Discussions concerning humour, aesthetics and agency help articulate the qualities of engagement offered by kinetic resources. Although our starting point is experiments in participatory business modelling, a kinetic oriented understanding of material offers insights for developing participatory and co-design activities more generally.

INTRODUCTION

Participatory Design (PD) practitioners utilise a wide range of 2D and 3D physical materials in a wide variety of different ways. Materials range from the figurative to the abstract, including life size props such as cardboard computers (Ehn & Kyng 1991), scale action figures such as dolls (Foverskov & Binder 2011), custom made game pieces (Brandt & Messeter 2004), bricolage (Agger Eriksen 2012), and using bespoke construction kits from other designers (Vaajakallio & Mattelmäki 2007).

An obvious, but overlooked property that all these materials share is a certain inertia and formal stability - the materials do not lend themselves very readily to motion. By contrast, this paper aims to explore the value of design materials with *kinetic* properties. Such dynamic

materials bring surprises when it behaves unexpectedly. In these *Oops! Moments*, participants briskly attempt to explain away unexpected or unwanted actions of the material by improvising explanations that often give lively insights into participants’ perspectives on workshop topics.

To argue the benefits of kinetic materials and their use as a route to *Oops! Moments*, we draw upon our research program of experimenting with designing novel means of facilitating discussions in the domain of business model innovation. This emerges from Participatory Design’s long tradition of using tangible design materials to engage non-designers in developing new products and systems. With the move towards Participatory Innovation there is an incentive to expand such participatory practices also to business issues (Buur & Matthews 2008).

TERMINOLOGY AND STRUCTURE

To distinguish between the individual and collective physical materials in workshops and how they are used, we henceforth adopt the terminology from Sanders *et al.* (2010). So by *tools* we mean the individual bits or ‘material components’ used in activities. Likewise by *toolkit* we mean a collection of tools used together, and by *technique* we mean the processes, procedures and activities that describes how tools and toolkits are used. Collectively we refer to our materials and activities as “resources” as shorthand for encapsulating both the artifacts themselves and the processes or guidelines provided for their use to participants.

The paper is structured as follows: First we outline some approaches to participatory business model innovation and the limitations of some designerly attempts to deploy static tools. Then we present five different kinds of kinetic resources with brief details of the industrial settings in which they were deployed. After reporting on observed responses to these kinetic resources, and an analysis of their qualities, we seek to explain their success by referring to concepts in social psychology, innovation and aesthetics.

TANGIBLE BUSINESS MODELING

Osterwalder’s process of business model innovation banks on the participation of a range of stakeholders, and his business model canvas has become immensely popular in the business world (Osterwalder & Pigneur

2009). There are other suggestions to engage a variety of participants in developing business, such as mapping the value flows between actors as coloured line graphs on flipcharts (den Ouden & Valkenburg 2011); describing business processes using acrylic flowchart symbols (Lübbe 2011); or embodied exploring of stakeholder relations using theatrical techniques (Ankenbrand 2011).

One of the most successful new practices has been the collaborative design of 'tangible business models', which allow participants without a business degree to understand and innovate a company's business through the use of tangible materials like toy bricks, bric-a-brac metal objects, foam pieces, even organic materials. Such materials are particularly suited to support mapping activities where participants together explore who are the stakeholders in the business venture, and how do/can they relate to one another in a value network (Buur *et al.* 2013). In business terminology this would be the key resources and the customer segments of a business model. However, as we shall see, there are many other aspects to discuss when trying to innovate a business model.

Through interaction analysis of video recordings, (Heinemann *et al.* 2009) we have shown how workshop participants co-construct meaning when building tangible maps of inter and intra organisational networks. What an object communicates is a social construct that is dependent upon the on going social actions and the social order that needs to be established or maintained between conversational partners. The objects work as *reifications* of abstract understandings of the actors in a value network; they work as physical metaphors.

LIMITATIONS OF STATIC MATERIALS

Heinemann *et al.* (FORTH) have also demonstrated that participants in these network map-making workshops typically identify one particular salient property of an object (eg. a 'heavy' ball) and then use that property to create a metaphor ('pushes away obstacles') about the organization's situation. Participants tend to use the salient properties of objects in very similar manners, namely to create metaphors with what we call 'negative associations'. In other words, the end result, independently of what object is being used and of what property of that object is invoked, is the creation of a metaphor that portrays an organization's relations as fraught with matters of power differences, competition, struggles.

Of the four purposes outlined by Sanders *et al.* (2010) for Participatory Design techniques, we feel that the "static" toolkits often do very well on the first three. Namely probing company participants, priming participants to be immersed in the topic, (although here in perhaps a more abstract sense than in most PD), and achieving a better understanding of their current perspective. For the fourth purpose, 'the generation of ideas or design concepts for the future' we find it more valuable to facilitate using what we call kinetic resources.

KINETICS AND CAUSALITIES

We have become interested in the assumptions about

dynamic causalities built into every business model: if we as a company do this, then the customers will do that – buy our products and services. This is a crucial and difficult discussion, which can be supported by the use of design materials. Whereas expressing *causalities* in language is easy and non consequential, expressing them with kinetic materials provides an element of chance backtalk. Like in 'real' design processes, this allows the development of a 'conversation' with a design situation (Schön 1992) that can help framing challenges and discovering new opportunities for businesses.

We have seen that tangible materials can play a role here, and not just as metaphoric representations to help participants co-construct meaning. The underlying question is how tangible materials actually allow people in making sense of the business dynamics: In which ways do objects help create shared meaning? How do they help organise participatory practices? And how do they facilitate the creation of new business concepts? This paper presents an initial classification of what we have called 'kinetic materials' for tangible business modeling.

KINETIC RESOURCES REVIEWED

Our study is based on video recordings of how groups of professional participants interact with materials during participatory business modeling activities. Our main data is extracted from video documentation from seven experimental workshop sessions with eight different technology companies across five different projects. The projects involved companies and other stakeholders, users and customers, PD professionals, researchers and graduate students working with themes as different as indoor climate systems, sustainable energy generators, and hearing aids. This is supplemented by observations from activities with internal and external researchers, PhD and graduate students in which our kinetic resources were deployed. We have focused on those workshops where the toolkits involved exhibited some form of dynamic behaviour – where the material reacted to what participants tried to achieve in expected or unexpected ways.

Over the years we have experimented with toy train sets, balls running through hamster tubes, coloured brick towers, kitchenware with dynamic functions, pinball contraptions and others (Buur & Mitchell 2011). In all cases the challenge given to the participants was 'Design your future business using the material provided!' Typically these 20-30 minute building activities gave rise to intense conversations about the way the company in focus presently makes money, and how this may change.

FIVE EXAMPLES OF KINETIC RESOURCES

The activities we have studied are very different in the kinds of material employed and in the ways in which they offer possibilities for assembly and use.

Toy brick towers: Stacked, wooden toy bricks represent a very simple form of kinetics: When the stack gets too unstable they may fall in unexpected fashion. Based on

the concept of Silent Games (Harbraken & Gross 1987), the *Venture Tower Game* was developed to encourage small companies to discuss the challenges of establishing a joint venture (Groskovs 2011). Four participants each have a tower of coloured bricks representing their own company, and are asked to build together a fifth tower, joining their resources (Figure 1). The game is structured in three phases: (1) Build a strong foundation, (2) ‘grow’ the tower without adding any more resources, and (3) take back revenue (bricks) from the joint venture tower. The game was employed in one session with four Danish companies dealing with markets in Africa, and in another session with four small technology consultancies.



Figure 1: Four companies build a representation of a possible collaboration

Toy train set: Wooden railway sets for children lend themselves to building tracks where toy locomotives move along, branch out and circle back. In a project that brought together a ventilation manufacturer with suppliers and customers, we challenged the participants to build a model of how they see their business if they were able to coordinate efforts along the value chain. The toy train set we use is a classic Scandinavian design (Figure 2) that contains not only tracks and locomotives but also carriages for goods and passengers and pieces like stations, a bridge, a tunnel, a shed and a level crossing.



Figure 2: Toy train shown here as representing “dead end” for a business direction.

Tubes and balls: Balls rolling through straight or curved transparent tubes that can be assembled in several ways provide an opportunity to build dynamic contraptions where the paths of the balls may take different meanings. In contrast to the planned moves of the train set, the balls may bounce into unexpected paths. This particular tube tube set was a kit vended as an environment for pet hamsters (Figure 3). We experimented with this set in the same ventilation manufacturer project as above.



Figure 3: A hamster wheel as destination for tube conveyed balls

Pinball models: Originally suggested by one of our graduate student teams, a pinball model may represent customers moving towards a purchase, or streams of money. Marbles run down an inclined surface where levers and obstacles direct or divert the marbles in different directions (Figure 4). Depending on their path, the marbles will end up in one or more ‘receptacles’ at the bottom of the slope, representing for instance the company and its competitors. Our first case of a pinball model was built to show the business of a hearing aid manufacturer (Mitchell & Buur 2010). In a later workshop we challenged company participants to build their own pinball model of, respectively, the business of a new media company and of an amusement park (Buur & Gudisken 2012). Recently it has been in used to support academics in discussing inter institutional collaborations.



Figure 4: Marbles about to be released down a slope

Balancing contraptions Suspended poles and scales lend themselves to experimenting with balance and imbalance in business systems. Our first balancing contraption was developed to illustrate business dilemmas experienced by a lighting technology company. It took the form of a suspended mobile comprising a 2m long dowling pole, and two shorter poles suspended at either length of the main pole (see Figure 5). It was designed to support a discussion of the best relative proportion of resources between sales and development departments.

A later contraption was designed to encourage a smart materials manufacturer to discuss the balance between mutual costs and benefits in a customer relationship (Figure 6). Two weighing pans at opposite ends of beam were supported at its fulcrum by a small tabletop frame. A marble would wobble on the beam until an imbalance was reached, whereupon it would drop down to the table top through a hole in the beam via ramps in the frame.



Figure 5: Balancing sales and technology investments on hanging poles



Figure 6: Negotiating to balance inputs and outputs of a collaboration

OOPS! MOMENTS

Tangible materials in business modeling can facilitate the negotiation of meaning between participants, helping to reflect not only on the characteristics of a certain business, but also its relations to other concepts and ideas. Kinetic materials offer different ways to do so, and with their dynamic behaviour, generate ‘surprises’ and unexpected events that challenge participants to relate those behaviours to something that makes sense in the business model context. We call such occurrences *Oops! Moments*. “Oops!” because the temporary loss of control experienced by participants provokes explanatory exclamations or interjections that can be likened to expressing dismay at making a minor mistake.

What seems valuable is how the *Oops! Moments* are often used as triggers to describe stakeholder behaviour or other unpredictable events that occur while running a business. In this section we will show how participants attribute meaning to elements of the different materials, and how the dynamic behaviour brings in new themes in the discussion between participants.

POOLING RESOURCES

The brick tower is a set that comes already charged with its own meaning: we introduced towers as companies, and bricks as resources. This already shapes the discussion in a certain direction. Some participants immediately accept the definition of ‘bricks as resources’, and concentrate on

the strategies to build the tower. Others first go into detailed negotiations to understand what each brick and combination of bricks might represent.

Finding themselves with a wobbly tower, representatives of the four companies doing business in Africa start a discussion of how important planning is, and of the need to agree upon a strategy before starting a business. Earlier in the activity, the difficulty that one of the participants had in placing a brick in a dangerous position triggered jokes about different mentalities of employees in other countries. In the case of the four consultancy companies, the need to reach a common understanding of the resources was important. At the outset, participants suggested that bricks mean individual competencies (e.g. hardware or software knowledge, designers) that they could bring to a business. Building the tower from the bottom up, participants realised that there are other ingredients necessary, such as the ideas involved, a business plan and so on, before the development of a product.

Oops! Moments: The towers become less stable than expected, and falls or crashes trigger new discussions. One of the consultants, when a part of their Venture Tower fell, blamed a brick representing a “middle manager who sabotaged it”. This brought about a joke about whether to place the manager in charge again or place him in another position. Another accident, in which two bricks stuck together, generated a joke about some resources that are “very close to each other”, implicating how some elements might represent more than isolated entities.

CREATING PATHS

The tubes and the train set present many similarities. Because of the dominant notion of path, they come to represent ‘customer journeys’ or ‘product delivery’. Meaning is attributed to entire sections of the path, such as directions, curves and loops rather than to single track pieces of bends and straight lines. In the case of the ventilation manufacturer model, participants spent most of their time discussing the definition of one particular loop, the ‘requirement specification loop’ as they eventually name it. This loop represented the novel idea of a common access point for customers to all the companies in the value chain (Figure 7). Meaning is also attributed to special pieces such as bridges or joints. In activities using the train set, junctions frequently represent ‘choices’ between two or more possibilities. In a session with the hamster tubes, a rotating wheel became the focus of the model, representing the ‘fun experience’ provided to the customers by a service business. In another example, balls which get stuck in a funnel become customers “that do not try hard enough” during a selection procedure, thus incorporating in the model a discussion on how to evaluate the success of the selection, and number of customers a business needed.

Oops! Moments: The form of dynamic behaviour offered by the train and the tubes is quite different. The train set offers some unexpected challenges during the building

phase, when pieces that are supposed to create a path do not actually fit together, or when loops cannot be established easily in the desired shape: this difficulty brings the ventilation manufacturer team to talk about a “slow process”. Also, the expansion of the paths offers challenges when participants run out of table space. In the final model presentation, the company representative explained the interrupted path as “individual modification for clients”, to be built according to their needs. In another instance, a break in the track was related to customers with too ambitious wishes.

In the tube set, the bouncing balls add the unpredictable: these offer space to imagine characteristics of the users or of the business. During a conference workshop with the case of an entertainment application for outdoor events, one of the participants explained balls falling out of a path as ‘users drop outs’. In the same model, a failure of a net to gather the balls under the spinning wheel was interpreted as an insufficient amount of safety measures.



Figure 7: Three interlinked companies discuss their requirement specification loop

GUIDING CUSTOMER BEHAVIOUR

The pinball model comes already as a strong metaphor, and as such is interpreted by participants. Marbles are seen as customers, or as flows of money, while levers and other elements become representative of barriers or incentives that companies can use to influence customer behaviour. The conversation with these models is very focused on strategies and evaluation of outcomes given by the behaviour of the marbles. Usually participants first create or adjust elements of the pinball field, then let the balls run. The results of the rolling are then evaluated in terms of actions done and possible new improvements in an iterative process of strategic evaluation and simulation.

Oops! Moments: The pinball model offers the highest degree of randomness and unpredictability of all the materials. Also, when teams work iteratively, it offers many possibilities to experiment with scenarios, through the modifications of the levers. Marbles get stuck, slow down, or sometimes follow paths that are not expected by participants. By trying to give meaning to marble behaviour, participants get also to the point of imagining to be in the position of the user: “If (this user) could see that (position of the lever), maybe he would go this way.” This triggers discussions on customer behaviour, possible confusion and factors affecting their purchase choices. In

(Buur & Gudisken 2012) we have reported upon how the participants create their own combined terms to explain model behaviour in business terms. When seeing an unexpected number of marbles running down along the side of the field, the participants coin the term ‘revenue highway’, an elegant construction of both business vocabulary and metaphor.

BALANCING RISKS, STABILISING RESOURCES

The balancing contraptions offer a well-known metaphor – this is about finding an equilibrium state between contradictory influences. The CEO of the lighting company realised that the sales department when under-resourced can ‘float off’ uncontrollably. The different weights of this balancing poles provoked expressions of sympathy as to how managers could predict the weight of many decisions about resources in advance. After presentation at a board meeting, the management decided to increase the number of sales employees.

Oops! Moments: Often small influences can render the balancers unstable. This has proven surprisingly engaging for a full group of people, as it can several participants to keep the balancers in check (e.g. Figure 8). With the balancing poles, it was also unexpected how much action there was away from the main hanging structures. Participants became rather involved in conversations as to the relative weights of the bags that represent resources.. People become human weighing machines, holding pairs of bags, one in each hand, to see which was heavier. Thus they embodied a kinetic simulation of the model themselves.



Figure 8. With many considerations in balance, a potential partner reaches in to steady the whole deal!

KINDS OF KINETIC BEHAVIOUR

Let us try to investigate the main elements and constraints given by the materials to see what capability they have of developing some kind of kinetic behaviour independent of the participants’ intentions. We do not offer this analysis to be prescriptive. Rather it is to aid facilitators’ evaluation of which aspects of kinetics may be of value in developing resources for their own particular project challenges.

KINETIC MATERIALS

Some materials are composed of elements that are *inherently dynamic*. With this term, we mean the capability of the single elements to move or change form

as a result of users' actions or other forces such as gravity. Such elements have the potential to show a behaviour that is not directly dependent on the participants, and thus generate unexpected events such as the ones described earlier. Examples can be hinges, springs, bouncing balls, marbles, or magnetic elements. Other sets, such as the *Tubes*, have a number of kinetic elements, such as the bouncing balls and the wheels. However, components of the *Tubes* do not move independently, but are considered part of a bigger set.

KINETIC ASSEMBLIES

Other materials are composed by static elements that can however develop dynamic behaviour or constraints when assembled or when associated with rules. Considering the hamster Tubes set, we can notice how most of its elements, the tubes, are not inherently dynamic. Only assembling them brings the kinetics in play. Paths rotate and distort with the force of gravity, or offer constraints where a certain combination is not possible due to the radius or length of the tube. The wheel, together with the bouncing balls rolling through the paths, adds a character of higher dynamics to the set. The tubes expand structures into the third dimension thus making it more difficult for the participants to imagine where balls will roll. While, if taken singularly, the elements might not seem to offer many possibilities, their combination brings to the discussion many challenges.

In the case of the Towers, the assembly rules play a big role. The bricks per se are static objects. But when stacked and used within the rules of the Venture Tower Game, (like in the original Jenga® game) the brick towers behave in ways that participants cannot easily predict. The constraints of not allowing top pieces of the tower to be moved directly, or the necessity to take bricks out of the base to keep building in height, force participants to use pieces in ways that generate dangerous combinations and potentially unstable structures. This adds an element of uncertainty: participants need to plan and coordinate their moves carefully in order to avoid the towers from falling.

KINETIC CONCEPTS

A third set of materials is one whose more powerful characteristic relies in the concepts themselves. In fact, while other uses of the material elements would be possible, the concepts are so strong that the participants accept them as such, and build their models according to them. In the case of the toy railway, once in place, the elements are themselves static, except for the trains, that are moveable by hand, and whose behaviour participants can control. The material itself affords ways of connecting and combining pieces into structures with more than one path, always consistent with the concept of a railway.

The pinball set offers a well-known dynamic concept of marbles rolling down a slope, bouncing off barriers and being directed by levers. Barrier angles often do not have the influences on marbles that participants intend.

Running a larger number of marbles at the same time further increases dynamic complexity: marbles bounce off each other too, and participants cannot easily plan what routes the marbles will take.

RESTRAINING KINETICS

In the case of the balancing contraptions, the material plays a slightly different role: There's no stable equilibrium unless participants hold elements in place. This can turn into a collaborative effort, where several participants need to work together to keep materials in shape or prevent them from moving. In a sense, restraining kinetic material here results in kinaesthetic action on part of the participants. The tools provoke people to move. This gives rise to new perspectives and new discussions.

LOOSENING CONTROL - INCREASING SPONTANEITY

These various kinetic tools can give the impression of exhibiting a spontaneity that has an astonishing effect on conversation. Surprising materials leads to more spontaneous conversations. Participation in spontaneous processes can feel very risky due to the need to "loosen control" (Bogers & Larsen 2012). Similarly, Brandt and Grunnet have warned how performing with props can "*cause vulnerability for both designers and users*" (2007:19). The *Oops! Moments* can be seen as what Bogers and Larsen would call *invitations or openings* towards taking "more spontaneous moves together" (ibid) in their conversations.



Figure 9: Marbles stuck at barriers represent pre-users encountering obstacles on route to becoming customers.

DISCUSSION

ARE SURPRISES A GOOD THING?

If one considers surprises to occur as a result of failed predictions (Cast 1994) then it might be considered dispiriting for participants to experience such "failure", particularly within a professional encounter with new acquaintances. However, an aspect of innovation is going beyond expectations, therefore a workshop characterized by materials behaving contrary to expectation seems apt.

The shared experiencing in the workshop of kinetic resources with unclear and unpredictable causalities is a good prompt to discussions of the uncertainties of

business causalities. Furthermore, that the response to apparently unexpected events are collectively performed means that responsibility for any such failure is largely shared amongst participants and thus significantly mitigated. The spontaneous exclamations that ensue from kinetic materials talkback is invariably followed by seemingly good natured laughter. This attests to not only the risks of such spontaneity around *Oops! Moments* but more importantly, to the value of such risk taking. A shared joke can contribute to an increase in social capital (Adler & Kwon 2002) and create a lighter, more creative atmosphere. Furthermore, such laughter can be seen as emblematic of innovation in general. According to Virno, how a joke may play with and disrupt previously taken for granted relations can be seen as innovation and creativity in miniature (2008).

Wagner analysed an exercise in which a group of participants stood up and spread around an open space to make a business model map using their own bodies. He showed that laughter here was often a response to when one or more participants re-position themselves and in this way, breach the game order (Wagner 2012). This is precisely when participants discover a new way of looking at each other's roles and relations. In the case he looked at, Wagner also ascribed some laughter to an embarrassment in status differences between participating executives and students (2012). However, we have not detected discomfort associated with breaches of hierarchy in the kinetic materials workshops we have examined.

To us it appears that kinetic materials can offer some of the enlivening benefits of a more embodied exercise but without the potentially inhibiting factors associated with the prospect of standing up to perform. The kinetic materials might be considered as performing as a sort of surrogate embodiment for participants and so avoids the vulnerability that some participants can feel with more theatrically oriented techniques. In relation to the behaviour of tools and toolkits, laughter seems engendered just as much by the unexpected occurrences of something not happening, as something happening. For instance, when two pieces of train track do not quite fit together or the addition of another block to a quivering tower of bricks does not result in a demolition. Such non-kinetic moments are also often greeted with humour.

ARE THE OOPS! MOMENTS REALLY UNEXPECTED?

Wobbly blocks falling down or shoals of balls inter bouncing away unfathomably might not seem to an observer as particularly unexpected events. However, we would argue that what is important is not whether something is surprising to an observer, or even to the participants, but how, and what happens as a result of participants "doing" being surprised

Surprise in conversation has been argued to be a collaborative performance between the giver of a surprise and the recipient. Ethnomethodologists Wilkinson & Kitzinger (2006:150) showed how through such demonstrations, "co-conversationists collaborate to reflect and reproduce a shared culture". Participants in

simultaneously expressing surprise are subtly but powerfully expressing that they have similar viewpoints concerning expectations of a situation. The shared culture attested to, and revealed by these surprises are both an important means to, and an end of the workshop activities beyond the novel concepts that arise. If surprise and humour can foreground such a shared culture, then this can help as a means towards the levelling of hierarchies and bridging of organisational and disciplinary boundaries that we posit is necessary for valuable innovative concepts to emerge.

WHY MIGHT KINETICS WORK?

Movement has a kind of primacy for human sensing. Sheets-Johnstone was thinking of people's own movements when she declared "Infants are not *prelinguistic*, as is commonly declared; on the contrary, language is *post-kinetic*" (2010:2), but nevertheless, our evolutionary background has made us very alert to surprising movements.

Brandt argued that tangible mockups evoked more reflections from her participants because of being perceived by more senses than paper or computer models (2007). Most of our kinetic resources are highly multi-sensory in having sound in addition to the visual and tactile qualities of Brandt's mockups. The sound of a brick tower collapsing or dozens of marbles ricocheting can be quite startling.

We have yet to experiment with senses of smell and touch. However if, as some scientists do, we extend the notion of human senses beyond the usual five to allow for senses of balance, risk and movement, then our kinetic resource experiments can be considered even more multi-sensory. Other aspects of the value and potential of kinetic materials maybe explained through drawing upon theory concerning aesthetics and perspective taking.

HOW DO KINETICS REVEAL PERSPECTIVES?

The multi-faceted and complex nature of techniques such as our pinball and balancing contraptions means participants' attempts to comprehend the physical workings of the material is an activity that invariably provokes shared sense making in itself. Participants in our sessions do not have the benefit of a slow motion video replay. Upon playback we, as researchers can speculate to a fine level of detail as to which ball ricocheted off which other ball, or which adjustment to a balancing contraption had which effect. However, with many of our kinetic techniques, the "What If" question that participants ask when manipulating a tool requires collaborating to piece together an answer to "What just happened then?"

Participants may often differ in their interpretations and differences in foci concerning the response of kinetic resources. This can be seen as an instance of the value of ambiguity in design (Gaver 2003). The ambiguity here is particularly rich because it partially arises in response to live and immediate action and is given meaning through participants informally building shared narratives and

explanations of events.

HOW ARE KINETICS TRANSCENDENTAL?

Aspects of how our kinetic toolkits perform may be explained drawing upon the writings of the social psychologist Alex Gillespie as we have done to a business audience in (Mitchell 2013). Gillespie argues how going beyond the “here and now” can be achieved through *distanciation*: “stepping out of oneself and reflecting on one’s own actions and activity” and *identification* “empathizing with other actors and participate to their experience” (Gillespie 2010:2). In this light, how the kinetic resources foster perspectives is valuable because they enable a shared and collaboratively “stepping in” or “stepping out” somewhere together.

HOW DO KINETICS HELP REFLECTING UPON SELF?

The kinetic resources offer, in several cases, means to facilitate distanciation from normal perspectives, both to participants and to the designers themselves. As in the words of one of the developers of the Pinball, the marbles unpredictability when released “is a bit like what happens when people use the model – we didn’t really know what people’s reactions would be”. The unpredictability not only can thus support reflection upon individual disciplinary challenges and positioning. In the case of the balancing dawning poles, participants can initially be seen achieving a sort of “extreme” distanciation: people get “caught” up in the dynamics of the model, initially playing with its features, trying not to be whacked by, or tangled up in it. After this initial exploration brings discoveries when people become comfortable with the contraption: after repeatedly trying to balance the poles, the representative of the lighting company suddenly came to realize how the resources of the company were unevenly distributed, being not deployed sufficiently in their sales department sector and thus unbalancing the whole business. It is interesting to note how the sales manager had already tried to bring attention to this point through more traditional means but that the imbalance of the poles, helped him to make his case more visible and compelling.

IDENTIFYING WITH SELF AND OTHERS?

As suggested earlier, dynamic models can also facilitate the development of a sort of empathy in helping participants identify with others’ points of view. With the balancing poles, for example, the bags representing resources that accompanied the balancing poles differed greatly in their load. That the weight of the bags was not visually perceivable led to sympathy concerning difficulties for management for anticipating the “weight” of resources required for different strategies.

Interacting with the *pinball*, while giving a less immersive “god’s eye” view, can also be argued to foster identification with stakeholders, and other influences in their business landscape. An innovation researcher whilst adjusting some barriers and levels on the ramp remarked how such changes would have been helpful for the company. However, upon closer observation, he re-

considered the issues from a broader perspective, and stepped into the shoes of rivals “but the competitors would find out and respond to this”.

We assume the high-powered industrialists in our workshops are not in the habit of considering themselves inert and powerless in the face of internal and external events in their work. However, in their dialogues we can also perceive a keen self-awareness concerning the limitations of their powers. They display strongly that innovative courses they consider will meet various kinds of resistance whether from competitors, colleagues, other stakeholders or regulators. Thus they also report that they can identify with the resistance they experience in attempting to manipulate the kinetic materials.

CAN AESTHETICS EXPLAIN MESMIRAZATION?

We contend that it is not just that our resources are kinetic that makes them valuable, but how they move. Several commentators have identified that design lacks adequate vocabulary, notation or other tools to effectively describe and innovate movement (Hopson 2009). Therefore we have turned to critiques of kinetic sculpture to support articulating how and why our kinetic resources have proved engaging.

Dorin (2009) convincingly argues that many simple mechanical artefacts can induce a state of fascination even if just for a moment. Most of the categories that he articulates as methods by which man made objects can give sensations of the sublime can be detected in our case techniques. The aesthetic principle seen most clearly is that of *Exposing Space* in our suspended balancing poles. Dorin explains this quality with reference to the well-known hanging “mobile” sculptures of Alexander Calder (Lipman & Aspinwall 1981). Although the notion of exposing space was far from our minds, it can be seen that our business model contraption shares similarities.

“Calder’s playful pieces are captivating and elegant for all their simplicity. Their workings are laid plainly before the viewer, all that they are, is apparent at a glance – and yet this is not so, for their movement brings a vitality and opens a space which the static sculpture does not possess.” (Dorin 2009:418)

But instead of “invisible air currents” that move Calder’s components it is largely participant actions that “exposes inner complexity” of the balancing contraption.

Our *pinball* experiments share some qualities with the mesmerizing category of “*Marking Time*” which he elucidates with reference to the flow of sand in an hourglass or the jet of a water fountain. Aspects of Dorin’s category of *intricacy* are found in *pinball*, an elaborate railway system constructed with the *trainset*, and the balancing poles as soon as weights are added.

More outlandish and ambitious brick constructions that develop with the *Venture Tower* can be seen as sharing aspects of Dorin’s quality of *Defying Nature*. And last, but not least, Dorin’s kinetic aesthetic category of *Curiosity* is present in *pinball*, *trainset*, *tubes*, and

balancer. In activating the imagination of participants to discuss the if-then causalities of business, the quality of curiosity is perhaps most important of all.

FUTURE WORK: LEARN FROM SURPRISE MAESTROS

Although we argue that the *Oops! Moments* in our experiments are highly beneficial for participants, we must admit that in reviewing our video documentation, we do not find them in highly plentiful supply.

Thus, we may seek to much more explicitly develop resources for surprising participants. So far our resources are kinetic in common sense kind of way, rather than purposeful tricks or cheats. An intriguing avenue to explore in terms of engaging participants through livelier surprises could be to develop and evaluate tool kits drawing upon strong traditions of surprising objects from circus clowns, joke shops and magicians. The opaqueness and mystery of causalities in such artefacts may up to a certain point, mirror and provoke understandings of the murkiness of causalities in business. While minded that extreme surprise is likely to be counterproductive in terms of constructive dialogue. A prolonged or intense surprise is a shock, and this is often accompanied by a pause in verbalisation. A parallel can be drawn with the Marshall McLuhan adage concerning how every extension of a media results in a corresponding amputation (1964). Kinetic materials can add a lot to a workshop, but it seems probably that one can have too much of a good thing.

CONCLUSION

In this paper we presented a comparison of five kinds of kinetic design materials used to facilitate participatory business model workshops. We compared material characteristics in terms of dynamic behaviours and constraints, and the way in which unexpected events during their use trigger new ideas during the development of tangible business models.

We argue that kinetic materials are enlivening because they offer a balance of constraints and dynamics. The chance of unexpected events supports participants in developing business models that are commercially more robust since less predictable elements have been considered in the discussions. We conjecture that the good natured humour that accompany responses to the *Oops! Moments* may also result in business concepts that are also more socially robust. Thus working with kinetic materials can be said to be literally adding momentum to the outcome of innovation discussions. *Oops! Moments* never pass unremarked. Participants take the unexpected events as a challenge to explain. This questioning of participants by the materials is highly in line with some in the business literature who stress that metaphors in general are prompts to inquiries:

“metaphors do not answer questions, they rather pose new questions that business has to answer. But answering these questions will grant management a fresh look on their business surroundings and depict strengths

and weakness of their business model from a different angle” (Etzold 2008:284)

Although business models may seem a little removed from more typical participatory design practices, we believe that an attention to kinetic materials offers great potential to any workshop which wishes to utilise metaphor creatively or touch in part upon abstract or otherwise difficult to visualise concepts, relationships and feelings. Kinetic tangibles appear to offer great promise in getting discussions of intangible topics moving.

We suggest that kinetic resources can offer an enriching layer to Liz Sanders' (2002) influential model of how design researchers can access user experiences through exploring a combination of user actions, speech, and making. What people say and do, both individually and collectively in response to surprises can reveal additional aspects of their knowledge and feelings. That many of our kinetic resources engage users in some kind of iterative making activities allows for participant to also express their response to surprises through non-verbal means. Furthermore, we envisage that unpredictable materials may enable reflection upon the if-then causalities and other assumptions in relations to participants' wishes and dreams.

We believe that the backtalk and liveliness of the *Oops! Moments* means they may offer a resource to facilitators truly in keeping with the meaning of the Latin roots of the word resource highlighted by Gillespie and Zittoun (2010): *resurgere* – resuscitate, splash back or rise again.

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STORM SYSTEM: WEARABLE SHELTER FOR THE ALPHA TIME ERA

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ABSTRACT

In this environmentally and demographically complex start to a post-industrial millennium, it is urgent to reflect on the transformations that occur from the interaction between individuals, the city they inhabit, its surroundings and protection conditions. STORM SYSTEM, developed by Miguel Rios Design, responds to the question of a first individual nomad clothing protection against weather adversities.

Today's population growth forces a reorganisation of space, in a variety of contexts that individuals face on large urban surfaces, as well as an interiorisation of the impacts resulting from behavioural changes. An unbearable logistic and environmental excess is therefore propagated (and vice versa), favouring unlikely scenarios of human coexistence. Pollution and adverse weather conditions hamper natural and urban ecosystems, resulting in a greater immediate instability of individuals *per se* and the collectives they form.

Thus new logistic, habitation and protection needs arise, which require the evaluation of a new living context for the human being. These needs catalyse crucial contextual design thinking regarding its ability to respond appropriately to the new global

habitat. The territory and the context establish the parameters for the combined intervention of design and technology. Similar to a prosthetic exoskeleton, STORM SYSTEM not only comprises the necessary formal characteristics, but also the symbolic essence we crave today. In its relationship with the human form, STORM SYSTEM is yet another prelude to the era of the redesigned man, a kind of hybrid between the organic and technology, and consequently, with its identity necessarily altered.

Keywords: product design; technology integration; social identity; human protection; environmental changes

INTRODUCTION

DESIGN AND TECHNOLOGY WITHIN THE DESIGN PROJECT

Various models currently connect Design and Technology. So it is not difficult to identify examples of the application and achievements of these two disciplines in the objects that surround us: the Microlattice material by HRL Laboratories, a Smartphone or an item of sports clothing for high level completion.

We do not normally realise it, but we do in fact depend on this symbiosis. We almost consciously ignore the impact of technology on our daily lives, and its consequences are still being assessed. Moreover, as designers, we use available tools and solutions in favour of a better quality of the processes and solutions we envisage, within the contexts we create.

Pondering the motivation and impacts of these results originated the STORM SYSTEM project. It transposes the realm of the object, in addition to being a **statement** and a **call for action**. In other words, **the integration and interaction of technology and the actual design project will condition and restructure the appearance of the human body – the beginning of a new identity, and will elevate STORM SYSTEM to a leading role in a predictably adverse socio-environmental context.**

SCENARIO: ALPHA TIME

“The fact remains that it has no walls, no ceilings, no floors: it has nothing that makes it seem a city, except the water pipes that rise vertically where the houses should be and spread horizontally where the floors should be: a forest of pipes that end in taps, showers, spouts, overflows. Against the sky a lavabo’s white stand out, or bathtub, or some other porcelain, like late fruit still hanging from the boughs. You would think the plumbers had finished their job and gone away before the brick-layers arrived; or else their hydraulic systems, indestructible, had survived a catastrophe, an earthquake, or the corrosion of termites.”

in Le Città Invisibili, Italo Calvino (Calvino, 1972)



Figure 1 - Robinson industrial company, Portalegre, Portugal, 2009. Photo: J. Biscainho (© J. Biscainho)

The context of this project can be a post-civilisation era.

Post-urban landscapes, ravaged by adverse weather conditions, are proof of technical achievements that at

the height of their glory perished into oblivion, becoming inanimate nature. Forests of steel, dense and sterile, doomed to witness intentionally absent men drifting. They are primates of the unique civilisation forged at some point in time, which we call Alpha¹ Time, confining them to a blind acceptance of reality.

So, in this confrontation between our time and Alpha Time, there are mirrors that show Man a civilisational reflection of himself. The new primates are introduced to the memory of the space they inhabit, with the memory of their own condition. It is within this historic perspective that STORM SYSTEM emerges, as a design object.

BACKGROUND AND CONTEXT

The author heads Miguel Rios Design | MR²D, whose core business is design, and fosters regular partnerships with a variety of artistic, commercial and entrepreneurial sectors. These partnerships are highly important for technology-based projects and are supported by strong collaboration with several specialised technological centres, such as CITEVE – Technological Centre for the Textile and Clothing Industries of Portugal; CeNTI – Centre for Nanotechnology and Smart Materials; or FCT | UNL - Faculty of Science and Technology of the Universidade Nova de Lisboa. Miguel Rios therefore encourages a philosophy of rigour and simplicity in processes and methodologies, which manifests as an increase in levels of creativity, combined with the logic of the objects and their functions.

Accordingly, the author defines his work through collaborations, as well as the constant search for new concepts and technical innovation. Of equal importance is the creation of projects that transcend a first, more disruptive phase on a technical and conceptual level, to give way to innovative solutions that are more in tune with the market reality.

Miguel Rios is motivated by the desire to understand phenomena resulting from the transformation we are collectively and individually facing, and the urgency of responding to these new challenges. He has positioned himself at the crossroads of design practice and the contextual analysis of civilisation’s *modus operandi*. In his work, the interaction of design and technology provides a response to the new challenges of urban contemporaneity.

His portfolio includes several projects in which new technologies are an integral part of the product, both in terms of materials used and in terms of incorporating technological devices into clothing, thus creating new properties and functions.

¹ Alpha Time is a scenario envisaged by the author. It is defined as temporal ambiguity.

LITERATURE, THEORY AND STATE OF THE ART

"We are now faced with the fact, my friends, that tomorrow is today. We are confronted with the fierce urgency of now."

Martin Luther King Jr, "Beyond Vietnam" (Address delivered to the Clergy and Laymen Concerned about Vietnam, at Riverside Church, 4 April 1967, New York) in "An Inconvenient Truth", 31 May 2006

In a general but essential way, Miguel Rios references the work of two artists in defining the preliminary phase of the STORM SYSTEM project. They have been influential in terms of their ideals, the results they have achieved and the doors they have opened for new developments. They are: Stelarc, a cybernetic, electronic performance and body art artist (together with Brazilian artist Eduardo Kac), whose work focuses on extending the capabilities of the human body; and Lucy Orta, a designer and visual artist who links architecture to fashion design, social awareness and activism.



Figure 2 - Stelarc Remote Gestures / Obsolete Desires: Event for Scanning Robot – Edge Biennale London – 1992. Photo: M. Burton (© Stelarc)

Regarding the transformation of the human body and its relationship with technology, Stelarc questions this very body. He views it as a not particularly efficient or resistant structure, which in itself is not an appropriate biological form. This artist does not view the body as a subject, but rather as an object whose architecture can be modified to adapt and expand its knowledge of the world. Just as Stelarc's work is a vital reference for this project, in which Miguel Rios also perceives it as a statement for his thought process, Donna Haraway is equally influential as she claims that "at the center of

my ironic faith, my blasphemy, is the image of the cyborg" (Haraway 1991).

Likewise, it is important to mention the work of Lucy Orta. In her Refuge Wear project, and since 1992, Orta has systematically anticipated issues pertaining to the environment, emerging urban problems and natural disasters. Her work aims to capture the attention of an audience that participates in social work, and to create an ethical framework for social development and assistance, by exploring the boundaries between the body, clothing, architecture and the environment (Orta 1996).



Figure 3 – Refuge Wear Intervention London East End - 1998. Photo: Lucy Orta, (© Lucy Orta)

It is clear that these kinds of practices embody the collective conscience that is repeatedly generated by these issues, with which the author identifies. This type of conceptual and project-based approaches is critical for establishing a context of action as a catalyst for change. The crisis we face today is also a context in which a vast field of new opportunities can be identified. Al Gore, politician and environmental activist, made a strong appeal regarding these issues, specifically in the film *An Inconvenient Truth* (2006): "The voluminous evidence now strongly suggests that unless we act boldly and quickly to deal with the underlying causes of global warming, our world will undergo a string of terrible catastrophes, including more and stronger storms like Hurricane Katrina, in both Atlantic and Pacific."

In line with this thought, we can observe that in the last century our *modus vivendi* has undergone various changes due to scientific and technological progress. This progress has provided human beings with more comfort and better living conditions. However, man believed that everything Earth supplied was endless and this led to irresponsible behaviour. Deforestation, water, soil and air pollution, and the depletion of natural resources are destroying the planet, resulting in further environmental changes. These are real indications that the scenario envisaged by the author for this project (Alpha Time) is more than an idea, it is a serious possibility.

METHODOLOGY

The overall creative conception of STORM SYSTEM is based on knowledge of the aforementioned contexts, supplemented by research into current debates and exhibitions about this topic. It employed the following methodology:

Phase 1: Collecting information on the object of study

a) Situation:

Gathering various projects, statements and studies that reflect the state of the art, in addition to indicators that define the reality of cities, in general, and extreme situations that cause deprivation – more or less long periods of social or natural catastrophe.

b) Object of study:

In light of our object of study – people in situations of social and climatic deprivation, analysis focused on information that supported or explored the real life experience and needs of this group, such as journal articles, books, websites and publications.

This research shaped the project's initial specifications, based on:

- Studying current situations, and the future international repercussions of political, social and environmental discourse.
- Understanding reality and awareness of ongoing actions.
- Gathering specific needs in real-life threshold situations – temperature, lighting, communication.
- Perceiving a need to make a discussion of these issues public.

Phase 2: Design

Conceptual and formal research, based on the information and specifications gathered in the previous phase.

- Conceptual and formal research.
- Preliminary studies and sketches (macro and micro design).
- Research into materials, suppliers, manufacturers.
- Technical advice and follow-up of component development by chosen external entities.
- Identification of the most promising solutions in terms of formal, technical (materials and production), and technology components.
- Production of prototypes-proof.
- Validation.



Figure 4 – Preliminary studies for STORM SYSTEM / macro design (© MR²D)

Phase 3: Systematisation and details

- Review of compliance with project objectives.
- Concept testing with direct and indirect stakeholders.
- Decision on materials and development of technical drawings for production.
- Production of four final prototypes with every project component (design/technology).
- Validation.

Phase 4: Presentation

- Project presentation:

Public multimedia presentation of the adopted methodology, end product, and conclusions derived from the process. Portuguese media and relevant bodies are invited to attend the event for a public discussion of the themes addressed within the project.

- STORM SYSTEM website:

Creation of a bilingual website, with a strong communication component. It will illustrate the entire process and results of the project and the presentation / dissemination event. This site will be activated in tandem with the presentation event.

PARTNERSHIPS

To supplement the development of the STORM SYSTEM creative and technical project, firm partnerships were established with one engineering company – IBEROMOLDES, and two technological centres - CITEVE and CeNTI, according to the author's brief and guidelines. The technicality of the project made these partnerships essential, since the inherent constraints of each step of the construction process was basically an investigation of the potential and limitations of the intervening technologies.

Various specifications were considered for STORM SYSTEM:

- Structures (fabrics, trilaminates, spacer fabrics, meshes, plastics).
- Electronic components (conductive strips, conductive wires, LEDs, circuit boards, batteries, buttons).
- Composition (polyamide, polyester, PVC)
- Elasticity and thickness.
- Functional technologies (application of waterproof and breathable membranes, water- and dirt-repellent coatings).
- Printing technologies (transfer, Plastisol, rubber).
- Cutting technologies (blade, laser).
- Bonding technologies (traditional sewing, use of waterproofing tapes, fusion bonding, adhesive bonding).
- Shapes and fittings.
- Incorporation of electronic components, developed by CeNTI, into the prototypes.

For both these partners, the development of the project was based on gathering data on the state of the art, the technical properties of the materials, the technological specifications and requirements for printing and manufacturing, and the inherent performance of this kind of product and its functions.

Technologies belonging to CITEVE's Dyeing and Confection Workshop and CeNTI's Workshops were used to develop this project. Other relevant services, such as embroidery and printing, were outsourced.

The methodology employed to develop the project was divided into two parts:

- Product development (formal appearance of the object, with use of textiles).
- Development and incorporation of electronic systems.

The methodology used to specify and develop the textile element comprised the following core activities:

- Technical specifications of the project - identification and technical definition of requirements, specification of materials and technologies to be used (research into raw materials, state of the art of most appropriate materials), production of solutions, their analysis and validation, and acquisition of materials to produce prototypes.
- Technical development - production of prototypes, their analysis and validation, reengineering (adjustments and optimisation) and production of the four final prototypes.
- Tests / evaluation - study of preservation and cleaning requirements to define the information for the label.

The methodology employed to specify and develop the electronic part comprised the following core activities:

- Idealisation of electrical circuits - Radio Frequency (RF) communication circuits, circuit control devices (two-button control board, which forms the touch pad), circuit monitor for the heating strips, and LED operation circuit.
- Research and requisition of electronic material - listing and ordering all material needed for the various circuits.
- Production of PCBs (Printed Circuit Board) - CAD drawing, PCB of the RF transmitter circuit, PCB with RF receiver circuits, monitoring heating strips, and operation of the LEDs.
- Assembly and testing of electrical circuits - assembly of all PCBs, and electrical interconnection between them and peripheral equipment, functional testing of the system.
- Incorporation of the heating and conductive strips - incorporation of the heating strips in the 3D structure, incorporation of the conductive strips in the 3D structure, and incorporation of peripheral equipment in the 3D structure.
- RF communication - guaranteeing that operating the control buttons affects peripheral equipment as intended.
- Heating strip - guaranteeing temperature control of the heating strip by using the automatic ON/OFF system of the heating, guaranteeing the strip remains within a comfortable temperature range, and creating a protection system to guarantee the temperature of the strip never exceeds a specified value.

STORM SYSTEM: CRITIQUE AND ACHIEVEMENTS

To give continuity to his vision, specifically with regards to the relationship between design and technology as a response to the new challenges of contemporary urban living, Miguel Rios introduces STORM SYSTEM. This product is a conceptual response to the emerging needs of contemporary city living, or a potential post-metropolis or post-civilisation scenario (which the author calls Alpha time) if this kind of political and social situation ever occurs.

STORM SYSTEM, a smart raincoat that is waterproof, wind repellent, and oil and dirt repellent, with integrated heating and lighting technologies, is intended to exceed its immediate clothing function as a first level protection device. It is a body protection device, whose physicality visually and formally reconfigures the shape of its user. This effect is created by a "capsule" that envelops and transforms the body, augmenting its protective nature, particularly in extreme weather conditions.



Figure 5 – Capsule concept for STORM SYSTEM. Interaction between human body and protection. 2010 (© MR²D)

STORM SYSTEM is a solution that encompasses protection, mediation and visibility, as well as an integrated thermal component, all of which were formal stipulations of the project. This item of protection comprises two key elements (interior-vest and exterior-raincoat), which are currently interdependent but may also exist separately in the future. STORM SYSTEM responds to the development paradigm, proposing a new concept of shelter. Similar to a prosthetic exoskeleton, STORM SYSTEM not only comprises the necessary formal characteristics, but also the symbolic essence we crave today. In this context, exoskeleton is a device that extends an individual's organic resistance and which performs the vital functions of protection and mediation. Accordingly, STORM SYSTEM is a test concept integrated into the front end of an industrial production cycle.

In anticipation of an unprecedented technological and civilisational upheaval, STORM SYSTEM, and its relationship with the human form, is a potential prelude of an era of a redesigned man, a hybrid between the organic and technology (Capucci 1994). This man, a possible cyborg with prosthetically enhanced capabilities and limitations, is conceptualised as attuned to the requirements of a *modus vivendi* of a future that has already arrived.

To synthesise the underlying thought process, this project can be defined by four interrelated approaches: Manifesto, Design, Technology and Identity.

MANIFESTO

STORM SYSTEM is a “call for action”, an awareness of behaviour concerning environmental issues, and the consequent modification of our identity through the use and implementation of technology. We live in turbulent weather conditions times. We might not know the immediate causes or the main actors. However, the media send us almost daily warning signals regarding the position of various governmental and non-governmental actors in relation to this issue. So, in light of the current environmental and political conditions, Miguel Rios believes that the future demands the design of a protection system with opposing characteristics (aggression vs. protection), a STORM SYSTEM. **This is not intended as an apocalyptic or Messianic project. The author views it as a call for action and an immediate response to a reality that we may yet have time to prevent.**

According to a new understanding of the human body, in adverse weather conditions, STORM SYSTEM is a statement with a certain degree of aggression and discomfort towards the formal, technological and visual transformations imposed on it. It thus contaminates the canonical body. It is also a metaphor for the emerging individualism of our culture; a symptom of the mediation of technology, where any association with the surroundings is mediated by other devices.

But, in contrast to this renewed concept of individual cocoon, the STORM SYSTEM's visual code communicates the physical presence of its user to others, in an attempt to reach them via this visual language mechanism.

DESIGN

Working from the author's background (reasoned logic, project methodology, R&D resources, and design policy), STORM SYSTEM materialises a concept and communicates the metaphor through shape and by the integration of technology. **It is a conceptual product for an urban environment, pioneering commercial apparel for the cities of today.**

STORM's external component was designed to have a mimetic relationship with the human body. It fulfils its primary function as a shelter for the body in adverse weather conditions by employing smart materials, such as: laminated textiles (PES, PU, PA); Mazzuchelli acetate; PVC; ABS; PU foam.

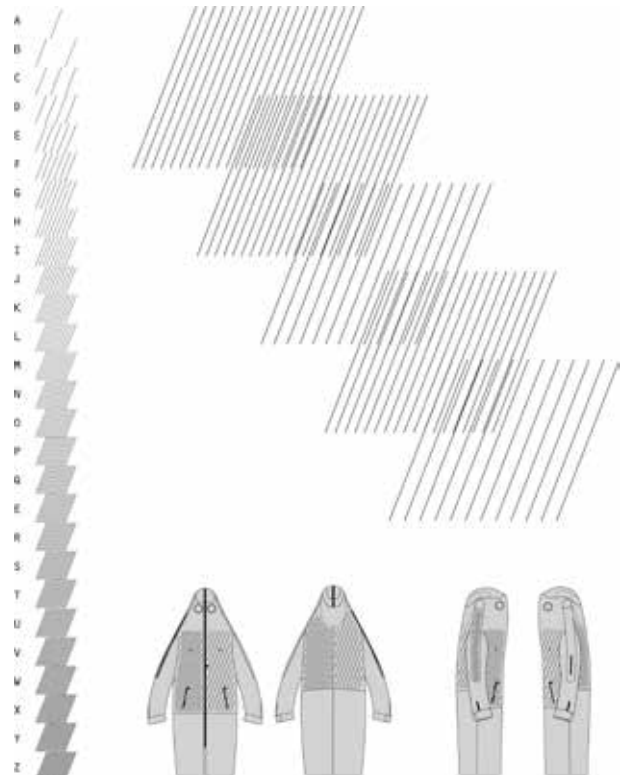


Figure 6 – Rainfall Intensity Code (© MR²D)

Likewise, the premises of an organic shape and body mimicry, in which the user's body is communicated via

STORM SYSTEM's visual code, warrant a new typology of visual system² throughout the surface of the piece. This code, the Rainfall Intensity Code (see fig. 6), accentuates the user in low contrast environments through the use of reflectors (at night) and high visibility (day time) effects. The author feels that it also responds to the expression and communication mediums present in Alpha Time – conceptually a “bio-techno-primitive” time.

Alongside these characteristics, mediation is also achieved through the incorporation of visors, respirators and simple auditory devices. These permit STORM SYSTEM's capsule shape, without compromising its comfort and the performance.

The **exterior piece** can be defined by the following aspects:

- From the perspective of urban imagery, this piece transports us to scenarios of weather-ravaged cities.
- The incorporation of technology into STORM SYSTEM makes it a visual protection, as well as waterproof.
- In a city with a more complex organisation, this project is also an attempt to renovate visual codes, by implementing the Rainfall Intensity Code and pictograms devised for this project - high visibility and reflectors.

The **interior component** is envisaged as an exploration of the aforementioned concept of exoskeleton, which is supplemented by protection of a more physiological nature. Besides transforming the volume of the body through its technical add-ons (devices that foster its technological functions), this piece is a link between the body and the exterior protective component.

The characteristics of this component are divided into:

- Protection of the user via a heating system (vital for heating the torso), which can be regulated via a touch pad to preserve optimal body temperature.
- Protection of the user from light physical collision, focused on areas of the body with greater sensitivity, through the strategic incorporation of three-dimensional technical materials.
- Mediation, through a lighting system that extends the field of vision via frontal LEDs (link to the exterior).

All materials used were tested and certified by their producers. Several performing and shape tests were made to prototypes. Also, a specific series of tests were performed to verify the different production processes (cutting, sewing and finishing).

² The inherent concept of this visual code was created by Detanico Lain, a team of Brazilian visual artists, for the STORM SYSTEM project.



Figure 7 – Interior Component (© MR'D)

TECHNOLOGY

Working closely with Portuguese and international partners, the materialisation of the concept brings added comfort and protection to the user on a wearable level (lighting, heating, and sensors | control | touch pad).

The integration of electronics in the wearable piece has been analysed in order to enhance functionality and minimise constraints in terms of ergonomics and freedom of movement. Another factor that was considered was the cleaning, preservation and maintenance of the piece. Parameters such as weight, size, flexibility and likelihood of contact with water were important premises when it came to choosing the electronic components it would incorporate.

Once the location and most practical position of each component had been studied and established a schematic draft, to scale, was prepared of the proposed layout for the front and back.

Technically, to construct an efficient lighting and heating system for a raincoat that uses LEDs for lighting and strips for heating the back area, batteries were the option as a source of energy and these were commanded and controlled by two electronic systems.

The features presented for the three systems were:

- Lighting system (with incorporation of LEDs).
- Heating system (incorporation of heating strips).
- Control and sensor systems (incorporation of temperature sensors, radio-frequency circuits for controls, and energy control circuits of the heating strips and LEDs).

Certain requirements were specified for development, to enable such development of specific project activities: assumptions for heating and lighting time, area of illumination, sizing of the modules and their location were defined.

These were the premises:

- Heating strips located in the upper back area.
- A duration of four hours for the system, when active.
- Definition of four temperature ranges: 32-35°C, 34-37°C, 36-39°C e 38-41°C, to experience optimal temperature according to environmental conditions.
- LED light projection: 3 metre span for a distance of 3 metres; 5 metre span for a distance of 5 metres.
- Small-sized electronic systems.
- Removable electronic systems for washing and maintenance.

The system comprises heating strips, LEDs, receiver circuit, transmitter circuit, batteries and circuit box.

The heating strips were developed so as to heat the user's back. The areas to be heated were therefore defined, along with the maximum temperature they could reach and the materials into which they are incorporated. Once this was done a thermal simulation study was performed to calculate the spacing of the heating coils to achieve as uniform a temperature as possible.

Sensors are incorporated into the heating strips to constantly measure the temperature. An electric signal is triggered if they exceed the established limits to prevent users from experiencing discomfort.

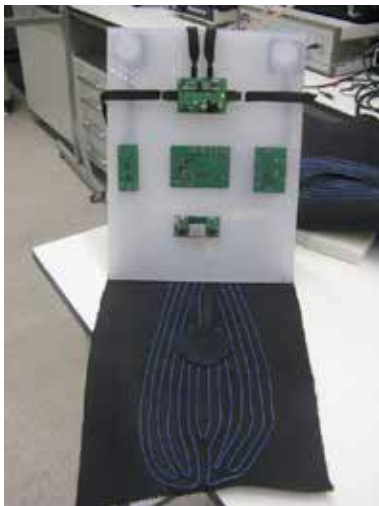


Figure 8 – Electronic components mock up – preliminary studies. Elements of the system – receiver circuit; transmitter circuit; heating strip; temperature sensor, textile bands (© CeNTI)

LEDs have been used for lighting in the STORM SYSTEM, but they had to be adapted before being integrated into it. The LEDs used have a copper dissipator to prevent the textile structure from overheating, with consequent degradation of the fabric.

They are connected to the control circuit by means of a conductive textile strip, which provides better integration and flexibility of the energy transmission system.

The transmission circuit consists of a radio frequency transmitter that sends data via wireless communication to the receiver circuit, indicating the functions of switching the strips and/or LEDs on and off.

The receiver circuit consists of a radio frequency receiver that operates on several electronic power systems that switch the power supply to the associated circuits on or off. When a radio signal is received it is decoded in a decoder circuit that subsequently switches the power on or off, to either the heating strips or the LEDs. For the heating strips there is, after it, a current limiting circuit that stops a higher current than that prescribed from circulating in the strips. This prevents short-circuits.

A box to protect the electronic circuit has been developed by IBEROMOLDES using rapid prototyping methods.

In this field, a new range of tests were performed to make sure all the electronic devices were working correctly and that they could perform on a textile object and close to the human body.

IDENTITY

It was G. H. Mead who proposed that the 'self' of individuals is defined, in terms of sociology, by the exercise of difference, by interaction with and recognition of the other (Mead, [1913] 1982). A. Giddens sees personal identity as an imperative object, fruit of a modernity that glorifies the values of individualism but which simultaneously removes from it the safety of enduring group entities (Giddens, 1982).

In the wake of the discourses of these two thinkers, we expect that users of the STORM SYSTEM will adopt a new identity in the eyes of others, because they will not know them, but they will be recognisable from the other elements of their conceptually abstract community. This new identity, which is reflected in this project, thus arises from the reflections of the author about the Alpha time. This means that users will as much ward off any potential enemies by the aggressive image they portray through the STORM SYSTEM as they will draw near to their peers.

This project focuses on understanding design and technology as extensions of Man on a number of levels. Of particular importance are the symbolic aspect and the way in which any accessory created for the human body can (re)build our identity. **The visual result of STORM SYSTEM, in terms of physical appearance, corresponds to a modification of individual identity as we know it.**



Figure 9 – STORM SYSTEM (© MR²D)

Does technology have the ability to shield and transform the appearance and identity of humans in the new Alfa era? In this sphere of development, the author feels that it does. For the development of this project, the interaction and integration between design and technology gave birth to a wearable object, but it goes beyond common sense's understanding (symbol and signifier) of the human figure. When wearing STORM SYSTEM, the user acquires a new identity and becomes anonymous among its peers.

CONCLUSIONS AND DISCUSSION

As a product, the STORM SYSTEM is highly complex in terms of both the shape and the materials and technologies it uses. To achieve a good result (development of a physical piece incorporating the features planned in the conception phase of the idea for

the product), it was necessary to carry out a detailed study of each step, which required research and development, funded by considerable (private) investment.

Conceptually, as already mentioned, this does not set out to be an apocalyptic or Messianic project. The author sees it as a wake-up call and an immediate response to a situation that we may yet have time to prevent. **The author sees himself as a Problem Finder, not as a Problem Solver.**

The STORM SYSTEM intends to be made public as a **manifesto**, calling for discussion and serving as a platform for interaction between **design** and **technology** – resulting, in the end, in an arguable change of **identity**.

As we had initially hoped, the arrival of technology in the modern world in general, and in design in particular, has profoundly changed the planning approach to and type of all kinds of objects. In recent years we are witnessing the progress made since that arrival in a garment object | wearable object; progress that has influenced the materials that are used, the assets that these objects acquire at various levels (quality, production / fabric, functions and features, and many more besides) and the way we perceive, use, name and contextualise them.

While on the one hand there are significant gains, nonetheless, in an extreme scenario we will be at serious risk of a change of identity, consequence of the technology integration. Taking protection as a primordial objective, and emphasising this as a defensive behaviour, which is itself a prime need, then it is essential to protect the body and the main senses and condition them in an almost obligatory fashion. In this way the expression of identity is regulated, but rather than changing it there is a serious possibility of nullification. **The solution makes us anonymous.**

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HOW EXPERIMENTING WITH NETWORKS AND THE DATA THEY GENERATE CAN CREATE LAYERED SEMANTIC AND VISUAL COMMUNICATION DESIGN?

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ABSTRACT

This paper will look into whether experimenting with networked processes and input in the production of graphic design can challenge the formal relationships between everyone involved in the creative process, stimulate dynamic readings and interactions and make use of contemporary information chaos. Considering economy, social structure and modern technology, parallels will be drawn between theory and practical examples. This will help to better illustrate the mechanics and creative use of the network and the data it produces, while setting up a broader research context for design practitioners to reflect on.

INTRODUCTION

With the imminent collapse of the current economic model, communication design has found itself to be commercially unstable. In order to adequately respond to the shrinking market opportunities and uncertain social moods, many design practices have shifted their focus away from fixed outcomes towards creating more adaptive platforms and environments.

Supported by the networked convergence of technology, the social aspects of Web 2.0 have significantly altered the structure of society over the past decade. Today, the way that people build their identities, relate and

communicate to one another, as a network of interconnected and co-dependent units, is projecting the ontology of a computer into culture (Manovich, 1998). The cybernetic dream envisioned by 1960s Californian ideology, has materialized into a society where connections are more important than division, and human beings linked by computers have the power to collaboratively create their own kind of order (Curtis, 2011).

The rapid democratization of technology and the present economic environment has allowed “distributed labour networks [to be created] using the Internet to exploit the spare processing power of millions of human brains” (Howe, 2006). The ability of technology to connect people globally has also erased the gap between professionals and amateurs: this has cemented the open source movement from which numerous community based enterprises have sprung up, such as *Wikipedia*, *InnoCentive*, *iStockphoto*, *Wordnik* and many more. To further support the collective generation of content, the *Creative Commons* license has fundamentally challenged the former top-down methodologies of the graphic design profession. The free circulation of knowledge and content outside of the market sphere has marked the move “towards a culture of the use of forms, a culture of constant activity of signs based on a collective ideal: sharing” (Baudrillard, 2002, p.9). Recognising that the production of graphic design is no longer limited to a privileged few, designers are slowly abandoning the notion of authorship, in favour of a more important asset: people.

Questioning the way designers are expected to work by welcoming social engagement, and encouraging an open public dialogue about their working methods and role in society as a whole, designers have piloted controversial projects in pursuit of an alternative, non-monetary value

of their work. "No big idea, no one-size-fits-all and no design as an author" (Davies & Parrinder, 2010, p.23)

The social moods of the time are also reflected in the production of contemporary graphic design, through putting considerably more emphasis on research.

Herbert Simon argues that:

design and design research share with engineering a fundamental interest in focusing on the world as it could be, on the imagination and realization of possible futures, as well as on the disclosure of new worlds (Simon, 1996 in Grand & Wiedmer, 2010, p.2).

In this regard, it is no surprise that research-oriented graphic design practices are increasingly experimenting outside of the commercial environment, with alternative production processes, mutant outcomes, social platforms, multiple communication layers and complex interactions. This type of design practices often start off with self-initiated projects that rely on a critical reflection on "the contingencies of our world today, and of the practices for creating, imagining, and materializing new worlds" (Grand & Wiedmer, 2010, p.2). It is exactly the methodology used in these experiments that provide a practical key for understanding the scope of the network, and its relevance to the creative industry today.

CURRENT PRACTICE AND THEORY

Currently, only a few experimental designers are reinforcing a resource-conscious mode of production, increasingly using the public as a "responsive, reflexive, and thereby a responsible and empowered entity" (Varnelis, 2009). Allowing people to exercise a certain amount of control within a set framework, provides a diverse input which could be adopted at any point in the creative process, and used for creating meaning and materiality through collaborative negotiation. This has slowly pushed the design discipline forward through combining production and consumption in a creative prosumption.

Extracting "unexpected but correlative, emergent patterns" by setting up logical "conditions through which the [design] process can take place", has moved the focus towards the logic of the process used, and the resultant "formations rather than [the static final] forms" (Wouters et al, 2008). These formations have enabled graphic designers to detect emergent trends and to use them in the creation of meaningful and response-able communication.

On a larger scale, this methodology has prompted an evaluation of the totalitarian approach to design, and an

elevation of an experimental set of processes that allow dynamic models to be built for communication between people, designers and clients. With the recognition and popularisation of these processes, the mainstream graphic design practice "has [also] become much more fluid, interdisciplinary, it has become collaborative, open sourced, networked and linked by ideas" (Parrinder to Minkova, 2011).

The definition of the term 'networked' is not yet set, as it is broadly used to describe different types of collaborative production: both of material and immaterial content, between everyone involved in the creative process. Even though digital technology is often used at a certain point of the production process, the essence of these network experiments lies in the logic behind the way the communication content is handled, compiled and distributed.

A distinct feature of the work conceived in this way is the visually inconsistent, occasionally disturbed and seemingly arbitrary appearance of the outcomes. In addition to controversial aesthetics, networked processes used in design enable people to experience communication in a subjective, more personal way, demanding greater engagement and attention.

DATA AND METHODS

In this context, it is essential to interpret and understand the complex factors at play within the different networked processes used by graphic designers. Also, it is important to recognise that the qualities of a process are not automatically inherent to the final functioning, or distribution of the work produced. Despite the fact that some processes have the appearance of objectivity and foster greater cultural agency; they still may stem from subjective intentions (Wouters et al., 2008).

In order to portray a coherent representation of these processes, this paper will consider various primary resources: including interviews with experimental graphic design practitioners, visual culture theorists and social innovators. Equally important for gaining a comprehensive view of the subject will be examples of my own emerging design practice, which will serve as case studies in the discussion. These case studies will illustrate the practical difficulties in realising experimental projects, the visual qualities of the outcomes produced and their future potential.

Bearing in mind that networked processes often coexist with one another, their identification becomes problematic without a wider social and cultural context. Also, graphic design's lack of subject specific terminology to describe the dynamic relationships between everyone involved in the creative process further hinders the rigourousness of the discussion.

As “we need to [begin to] develop a vocabulary to talk about it so we can unpick what is really happening” parallels will be drawn between terminology, theory and concepts from other fields (Parrinder to Minkova, 2011).

These parallels could be used to further guide the discussion about possible future developments and large-scale cultural impacts of network-based graphic design. After all, speculation is one of the most underestimated elements of critical discourse, which pushes against graphic design’s persistent attempts to establish a concrete academic base. Without that confrontation, it is often the case that these attempts go in completely the opposite direction to that of contemporary culture.

CASE STUDIES

This, That and the Other

Despite the fact that new media products are considered anti-narrative, it is exactly their limitations and constraints that prompt people to constantly try to draw personal trajectories, through the sheer number of algorithmic options available (Manovich, 1998). One way of doing this is found in the process of tagging. It represents a non-hierarchical form of organisation where individuals can make sense of information, without following a predefined structure. Social bookmarking applications such as *Delicious* and *Diigo* have set the scene for the development of shared online tag vocabularies, known as folksonomies. This decentralised form of content organisation could be used, not only to provide insights into what specific visual or textual content means for different people, but also to foster a variety of readings of the same content.

This self-initiated project *This, That and the Other* aims to examine the application of archival methodology, extensively used as a form of contemporary art practice, as well as the concept of tagging in the context of editorial design. For this purpose, a series of experimental publications are printed - the text of which references key art works such as Gerhard Richter's *Atlas*, Aby Warburg's *Mnemosyne Atlas* and Christian Boltanski's *The Reserve of Dead Swiss* - and illustrates a speculative dialogue on the possible translations of the concept of archiving in the sphere of graphic design.

This practice-based research project is split into three distinct stages, each dealing with different ways of laying down content and culminating in colour-coded copies of printed matter (see fig.1).



Figure 1: Three copies of printed matter from each stage of the project *This, That and the Other*.

The first stage is concerned with the conscious decision-making process in graphic design, where all of the elements are largely dependent on the designer’s experience and skills. Laying down the content for the initial publication in this way marks the first step of a continuous exercise in experimental editorial and narrative combinations (see fig.2).



Figure 2: A flat layout and folded print sample from the first stage of the project *This, That and the Other*.

In the second stage, each element of the layout is taken out of the confines of *Adobe InDesign* software and put into the *Processing* environment: where mathematical

operations govern the composition of visuals and text. The deconstruction of the text into individual paragraphs allows for an automated layout production, with random semantic order (see fig.3).

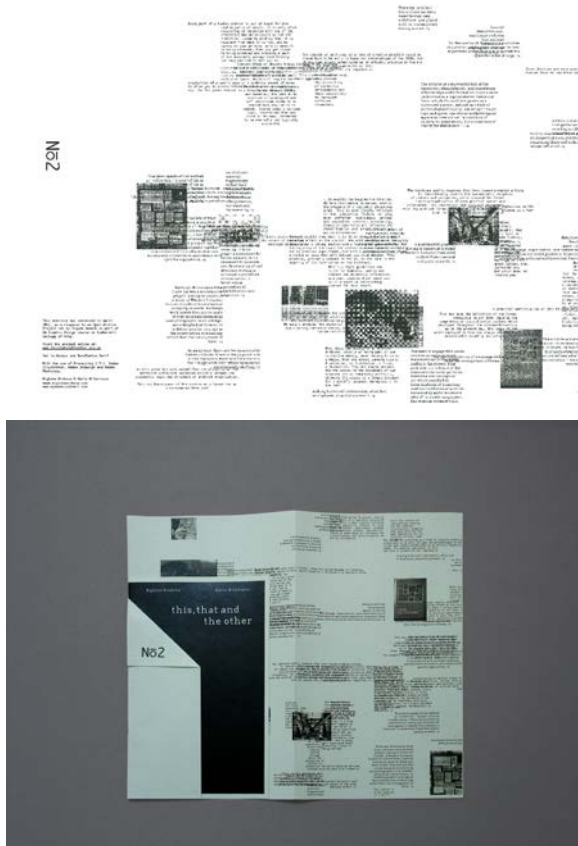


Figure 3: A flat layout and folded print sample from the second stage of the project *This, That and the Other*.

Using a programming platform as design tool to compose the layout, enables a parallel to be drawn between the algorithms embedded in the software, and the conscious decisions made in the process of designing. In order to completely avoid any premeditated outcomes, the random function of the *Processing* library is employed: this allows the possibility for entropy to exist in a designed environment. Every time the *Processing* sketch is run a new layout is generated and exported, ready for print.

The third stage is focused on testing the variety of narrative compositions that could be made through retaining the original location of the elements as anchor points for new arrangements. Each paragraph and image is indexed with parameters: such as time of writing, alphabetical order of the source, character length and the time the content was encountered. Incorporating this data in the *Processing* sketch means that there is the possibility to filter the content in relation to a chosen parameter. In this way the similarity of the structure of the initial layout is preserved, but different meanings and visuals are created "through mutations of connection and disconnection" of the text (Foster, 2004, p.6) (see fig.4).

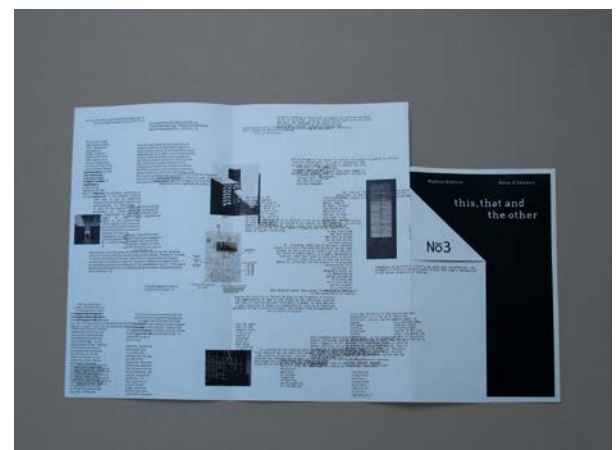
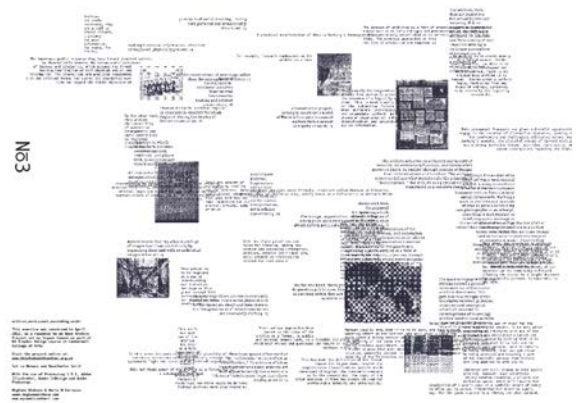


Figure 4: A flat layout and folded print sample from the third stage of the project *This, That and the Other*

The resultant set of printed materials not only illustrates the variety of layout combinations and the plurality of readings that they could have, but also serves to propose alternative orders and association methods of reading. Subjective to these factors the project remains open as "a possible portal between an unfinished past and a reopened future" (Foster, 2004, p.15).

Moreover, it is important to emphasize that despite the textual interruptions and visual chaos; the semantic relations between all elements are preserved and could be altered at any time. This quality was recognised on closer inspection by a small percentage of the audience, who were already familiar with the texts used. From the audiences' point of view, this revealed that a layout system based on cross-referencing and intertextuality of content required much more engagement, but could potentially bring new insights and perspectives.

For the designer, systematically transforming the content and recording the seemingly random visual representations, this provides a playful way for creating an expanding array of unstable and ever-evolving outcomes. The documentation of this project brought up the question of whether visual and semantic order could both be considered on an equal level when "creating a rich editorial experience" (Lucas, 2012) (see fig.5).



Figure 5: A book documenting the project *This, That and the Other*.

The relevance of *This, That and the Other* to the wider scope of *Nordes13*, is the ongoing and experimental nature of the process of its creation. At its core, it questions many of the established rules of layout and legibility, while offering an alternative, equally logical reasoning for the allocation of text. The methodology used in this project uses critical reflection to maintain the relation between the "inner system" of the layout and "the communication goal" of the printed materials, independent of variations in the parameters (Simon, 1996, p.6). Despite that this example only adopts ideas from art in a literal manner; it also shows design's potential to comment critically on its own methodologies.

Although *This, That and the Other* has an editorial focus, contemporary graphic designers experimenting with non-hierarchical and meta processes believe that there is further potential to explore combinations of different elements with the aid of community, and their changing notions of these different elements (Wouters to Minkova, 2011).

Commercially-realized projects include Jonathan Puckey's design of *SMBA's* website, which confronts the art community with their use of language, and allows people to research these changes over a period of time (Puckey to Minkova, 2011); and NodeBerlin's design of the printed publicity for Oslo's Contemporary Music Festival - *Ultima 2011* - which uses Google image search to form the collaborative visual identity of the event.

Greetings from Google

By "inventing protocols of use for all existing modes of representation" contemporary graphic designers are expected to seize "the codes of culture, all the forms of everyday life, the works of the global patrimony", and make sense of them (Bourriaud, 2002, pp.17-18). This colossal task requires them to integrate production

methodologies and processes with technological innovation, in order to grasp the context in which contemporary culture operates. With the ability of technology to freely reproduce content, the artistic question is no longer: "what can we make that is new?" but "how can we make do with what we have?" (Bourriaud, 2002, p.17). Following the pattern of the "immaterial production of information and its distribution through the network", contemporary graphic design practices could embrace the network as a dominant form of organization and a centre of the creative process (Varnelis, 2009). The Internet as a system contains a vast amounts of data - user generated, pre-designed, shared or structural - which offers multiple subtle communication paths for engaging with the public.

For example, online knowledge aggregators such as *Google* provide almost instant access, rooted and hidden behind the algorithmic handling of information, generated by millions. This takes the form of metadata or in other words: unconsciously generated content.

The project *Greetings from Google* presents a collection of such unconsciously generated content, as people become essential and active vehicles of production. This project uses *Google Instant*, a search optimization, which provides users with popular search queries as predictions when they type. This feature is active on the majority of *Google's* local domains. The locality of the predictions given on each *Google* domain is calculated and measured up against a body of popular queries. If a certain local query prevails, it is included as a prediction on the relevant domain. Also depending on the browser settings, *Google* predictions could combine the popularity of personal search queries with communal ones, hence providing a custom-tailored search experience. This pre-designed environment could be used by designers to extract collectively conceived data and meaning on various topics, which could later be used to subvert or enhance their communication goals.

The functionality of this algorithm lies at the core of this project, which aims to capture invaluable semantic knowledge extracted from *Google's* search engine. Based on the predictions derived from conjugating the verbs "to be", "to have" and "to do", the results tackle the question of national identity in a poetic way.

Relevant at the present but slowly updating and sinking into obscurity, the collection of a hundred sixty-six unique predictions produced as a result is committed to print in the form of greeting cards (see fig.6).



Figure 6: A sample of unique search predictions from the project *Greetings from Google*.

They show a mixture of quite ambiguous, current and often humorous search terms, the most interesting of which display clear regional differences and hidden links between the interests of separate nations. The front of each card has the first *Google* image and a map from each of the respective countries (see fig.7).



Figure 7: A display of greeting cards from the project *Greetings from Google*.

In this sense, *Greetings from Google* displays a convenient aggregation of up-to-date information which

reflects the current interests of particular groups of people - through ephemeral snippets of information - making up a temporary and autonomous collection of search memorabilia. Despite some of the nonsensical content extracted from ‘the Internet of things’, which may seem detached from our daily lives, this project illustrates that it “isn’t [really] about the things; it’s about us” (Goetz, 2011). The printed ephemera itself explores the possible stories which data could reveal, as our daily use of technology is enriching the online environment with emotion and personality.

Although the interaction of *Google* users is not intended to be participative, it may seem passive and limiting to a certain extent. The relevance of this project to developing new research paths for graphic designers lies not only in finding creative ways of extracting collaboratively-conceived content and displaying meta-realities, but also in the consecutive use of this additional knowledge. Socially, it resonates with Venessa Miemis’s idea of hyper-connectivity, and shows the potential of graphic designers to become meme creators, as a part of a bigger community change (Lewis to Minkova, 2011).

Text Box

Embraced during 1960’s Cybernetics movement, feedback loops have paved the way for the development of today’s interactive technology. The simple logic of the feedback loop, “action, information, reaction”, is also used in graphic design (Goetz, 2011). Recursion, as a principle, is used not only as a visual effect but also as a way of critically commenting on our present obsession with technology.

Today, many words are falling into oblivion whereas others are constantly acquiring new meanings. The use of technology is mutating the way that we use words, imposing restrictions, confining grammar and creating generic vocabularies. Using voice recognition, the project *Text Box* explores the loss of language and the limitations of technology by continuously playing with the sound present in its immediate environment.

Text Box presents a contemporary approach to the Surrealist technique of writing, known as automatic writing; this consists of writing without being consciously aware of its content. This project uses a letter from Rainer Maria Rilke’s *Letters to a Young Poet* as a starting point, and employs computerised writing without any coercion: so that the process is triggered by the sound picked up from its immediate environment. A critical moment in the functioning of the installation is the software’s ability to interpret the sound, as a word restricted to the grammar file embedded within it - which instead of being a generic everyday vocabulary, consists of over a thousand nouns extracted from Rilke’s original text (see fig.8).

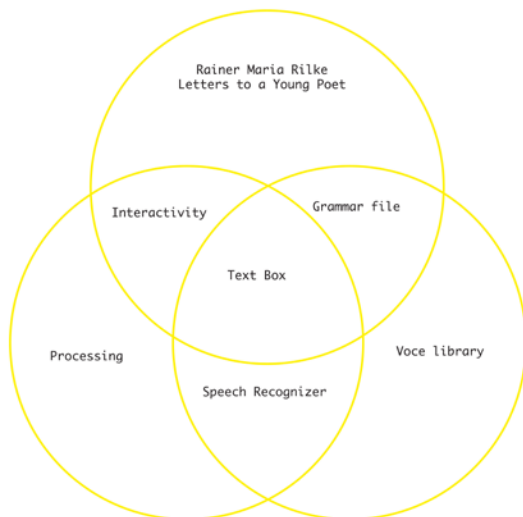


Figure 8: Info graphic explaining the conceptual structure of the project *Text Box*.

The match between the input and the grammar file is then displayed on the screen, continuously reconstructing the original letter; regenerating its content and meaning, while keeping its original grammatical structure intact (see fig.9).

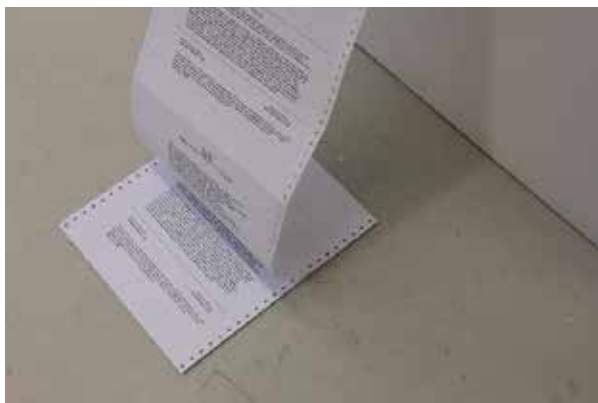


Figure 9: A printout of different versions of Rilke's *Letters to a Young Poet*.

This ambitious use of voice recognition has no functional ends: it is used to rewrite the content using only its source. Each reconstructed version is a subtle product of interaction, triggered intentionally or unintentionally by the public, or inadvertently by the environment in which the installation is placed (see fig.10).



Figure 10: *Text Box* installation.

In this case, the interaction required is reduced to a minimum. As the public is naturally drawn to the familiar read-write aspects of the voice recognition technology, this project confronts people with the inability to influence the results to the extent expected. Instead of obeying the voice of the public and displaying their words, the software uses its algorithms to associate the input with its vocabulary file, significantly narrowing down the options available. This peculiarity becomes the centre of interest for the members of the public, who carefully observe its functioning.

As difficult as it is to say something new within the closed circuit of this recursive process, what is important to recognise, beyond the mechanical aspect of this process, is the potential to convey and amplify information well beyond its immediate use or appearance (MoMA, 2011). It is within the power of designers to experiment with methodologies which derive from technology, in order to communicate the possibility of information amplification to the public. Contemporary graphic designers, fascinated by the critical and psychological potential of the feedback loop, consider that "the key work in this direction is [still] about to be made" (Wouters to Minkova, 2011).

CONCERNS

When considering ethical issues, experimenting with network processes raises some questions concerning the agency, motivation and privacy of everyone consciously or accidentally involved in the creative process.

In this context, when the designer is not the sole creator of meaning and content, it is debatable who should be responsible for determining and applying such ethical judgments. On the one hand, when carefully considering the ethical aspects of the type of processes they use, some designers are guided by the principle that "there are always design constraints and these usually include an ethic" (Eames, 1972 in Wouters to Minkova, 2011);

hence, applying the same ethics to the processes as they would to the end result. On the other hand, network processes “give enough freedom to people to choose whether to be ethical or not” (Puckey to Minkova, 2011). In this case, it is possible that the ethics governing the design process follow the rule of thumb determined by a self-regulating network of people.

Another point that could be an issue is the subliminal sense of a greater degree of social agency that networked processes give. In order to communicate the extent that social agency is real, graphic designers should define the amount of control people have in participatory and collaborative environments, by clearly assigning their role from the outset of every project. “Users are using, not giving, audiences are looking, not acting, and participants are participating, and not creating” (Wouters to Minkova, 2011). This makes the difference between designing something that facilitates a good democratic process or a bad one (Parrinder to Minkova, 2011). However, in terms of infrastructure and accessibility, some parts of this global social agency are still largely a subject of governmental censorship and monitoring.

Motivation is another key element used in network-based graphic design. The proliferation of open source and online media has indicated a shift from extrinsic motivators, such as financial reward, to intrinsic ones. Hence, some of the main reasons for people to take part in creative crowdsourcing are their desire to gain peer recognition, to develop creative skills and to have fun at the same time (Brabham, 2008). Understanding what drives people’s motivation is essential for graphic designers, as it allows them to creatively collaborate with the public. However, the scale at which user-generated content could be used for free remains an ethical gray area, which is only regulated by the satisfaction people get from being a part of something they believe in.

As graphic designers experiment with technology and online content, privacy also becomes an issue of growing importance. The storage and use of personal data, as well as the advances in mining data mean that people can find information more easily than ever before. While the Creative Commons license has brought a lot of public awareness to the royalty-free use of image and text content online, the regulation of metadata and the ethics of extracting content through non-hierarchical processes are still not widely discussed. This moot point, only limited by the ‘creepy line’, is currently confining graphic designers to use only the tip of the available online content (Puckey to Minkova, 2011).

CONCLUSION

Despite ethical reservations, the use of networked processes in graphic design forms an evolving strand of

current design research and development. Through experimentation, designers test the rigidity of the formal roles of all involved in the creative process. Existing between theory and interdisciplinary innovations in current technology, sociology, anthropology and economics; networked processes allow designers to concentrate their practice on extrapolating alternative modes of production and communication. Individually or in various combinations, these processes update the working methods of contemporary practitioners, by engaging them in an open dialogue with the public. The conceptual scenarios that design practitioners build as a consequence of social, political, and cultural interaction expose the diversity of public input and further facilitate the collective generation of content and meaning (MoMA, 2011).

Advocating a more resource-conscious and response-able form of communication, graphic design powered by human intelligence has distinctly behavioural characteristics. Yet these characteristics release design’s creative potential to collect, update, aggregate, display, monitor and influence change on a large scale.

Dr. Gesche Joost sees the graphic designer as “taking on the role of mediator”, able to conduct theoretical research while at the same time having problem solving abilities (Joost in Schmidt, 2009). Operating outside of commercial constraints, designers are able to evaluate situations and find qualitative solutions which are not necessarily associated with any financial turnaround. The combination of networked processes and technology could also activate further applications in documenting and forecasting social trends. With regards to theoretical production most of the changes are “subtle and only appear radical in retrospect” (Varnelis, 2009). For example, extracting semantic knowledge from social networking platforms such as *Twitter*, could help to “determine the attitudes towards various subjects and their evolution over time” (Tambouris, et al, 2011, p.50). The systems that graphic designers create can capture the nuances of change over long periods of time, and explicitly display them in reality. This creatively-conceived data could be invaluable in the context of e-governance and politics, where non-hierarchical methodologies and “modern developments in public choice theory” challenge the bureaucracy of public administration (Ostrom, 1983, p.1).

Currently at an experimental stage, network-based graphic design demonstrates the ability to communicate with an exciting array of visuals, which exists on the border of order and chaos, and requires an in-depth engagement and intellectual input on behalf of the public.

By experimenting with alternative methodologies graphic design can

use the whole world to communicate, transforming it into a live stage for an information parkour and enriching our lives with emotion, motion, direction, depth, and freedom (MoMA, 2011).

In this broad context, the main responsibility of contemporary design practitioners is to recognise the potential of systematic thinking and creativity, to “produce singularity and meaning from a chaotic mass of objects, names and references that constitutes our daily life” (Bourriaud, 2002, p.17).

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IMAGES

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NON-DIRECTIVE EXPERIENCE DESIGN

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ABSTRACT

How do we design ambiguous and non-directive interactive artefacts that offer multiple ways of engagement? This article presents the initial thoughts on the form-giving of tangible interactive prototypes for practices that demand non-authoritative designs without specific functionality. In a project designing for children with profound cognitive disabilities, we adopt a shift towards a holistic user understanding and material and expressional explorations as key strategies for addressing their emotions and senses, rather than focusing on cognitive advances. The result was two exploratory interactive sensory pillows with a variety of different expressions and modes of interaction. We propose how design for non-directive practices can be framed by initial articulations of the desired experiences, emotions and senses, based on empathic insights of the users. From these, we suggest to experiment with various materials to explore potential forms for ambiguous designs that allow for a multiplicity of ways of interacting with them.

INTRODUCTION

In recent years, more attention towards the overall experience of interacting with technology has emerged (Hassenzahl 2011; McCarthy & Wright 2004; Petersen et al. 2004; Wright et al. 2008). New perspectives on the relationship between users and digital artefacts allow for a holistic focus on people's emotional, intellectual, and sensual engagement with digital products. Aesthetically oriented approaches to the design of digital technology allow for explorations on new design domains that do

not solely focus on technology and task-solving. This invites interaction designers to work with new contexts where function is secondary to aesthetic experiences.

In this article, I wish to present the initial thoughts on designing for practices that are non-directive. Non-directive practices are practices that do not have a formal focus on performance or on achieving goals, but instead invites to enjoyable experiences that allow for multiple, ambiguous, and co-existing interpretations from its participants. This article is based on a project about designing for the specific non-directive pedagogical practice of Snoezelen. This will be elaborated in the "Background"-section.

Not designing for a goal or specific function requires us to approach the design process from new perspectives. In this article, I present the initial thoughts on how to approach the form-giving of interactive tangible designs for a practice that has no focus on performance, but instead aims at giving children with profound cognitive disabilities, non-directive experiences that engage their physical sensory systems for the purpose of well-being.

I propose a three-step approach to non-directive design. Initially, the desired experiences are articulated in a design programme. This design programme is manifested in various material experiments, as it will allow us to embrace ambiguity and aesthetic in the design process, rather than focusing on functionality. Finally, these explorations will lead to designs that are open to interpretation by the users.

RELATED WORK

Interaction design is the process of shaping digital artefacts (Löwgren & Stolterman 2005, p.7). Vallgård (in press) explains this process as the practice of form-giving and argues for an understanding of the computer as a design material (Vallgård & J. Redström 2007). With the material turn, interaction designers can give form to interactive artefacts (and environments) with attention to its aesthetic expression. This allows for designing for experiences, rather than functionality. In the following, I will present relevant aspects to this article. I will elaborate on a material view on computers as well as on aesthetically oriented and experience design. Then, I give an overview the role of ethnography in interaction design. Lastly, I briefly introduce how ambiguity can be embraced in design.

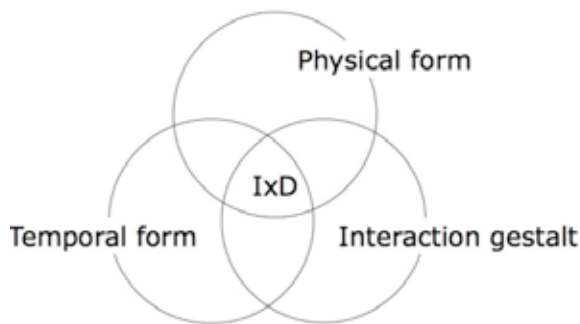


Figure 1: The three form-elements of the interaction design trinity (Vallgård (in press))

COMPUTERS AS A DESIGN MATERIAL

When interactive designs are given physical form, the materiality and expression of them become pivotal elements to consider during the design process. Contributions to a material understanding of computational technology suggest considering computers as a material like any other (Hallnäs & J. Redström 2002; J. Redström et al. 2005; Vallgård & J. Redström 2007; Vallgård & Sokoler 2010).

Understanding computers as a design material allows interaction designers to work with the form and expression of interactive systems (Vallgård & J. Redström 2007; Vallgård & Sokoler 2010). Computational technology will always be part of a composition with other materials, as it does not in itself have any perceivable form (Vallgård & J. Redström 2007). Vallgård (in press) proposes three form-elements, which interaction designers have to consider: Physical form, temporal form, and interaction gestalt (Figure 1). Physical form is the three-dimensional shape of the design that is perceivable through the human sensory apparatus. The interaction gestalt, as Vallgård (ibid) articulates it, “*is the performance of movements that a user(s) will do in relation to the thing*”. The third element is temporal form and is the temporal pattern of computational state-changes.

When designing for functionality, the form or expression of the design is often derived to support these desired functionalities. However, Hallnäs and Redström (2002) argue how it is also possible to take a starting point from the expression of materials and from this, discover various functionalities. This enables designers to explore how compositions of other materials and computational technology can take physical form and bring forth functional qualities. This drives the design experimentation from an aesthetic, rather than functionalistic point of view (ibid). When designing for non-directive practices, we design for ambiguous interaction defined by the user. But still, as designers, we need to invite for this interaction. Later in this article, I will discuss how the three form-elements can be embraced to invite the users in ambiguous interaction.

AESTHETICS AND EXPERIENCE DESIGN

Distinguishing between two overall approaches to aesthetics, Petersen et al. (2004) have introduced pragmatic aesthetics as a framework for discussing the experience qualities of interactive systems; not as an added feature, but as an integral element of digital artefacts. Pragmatic aesthetics enable us to move beyond discussions on immediate attractiveness, instead highlighting aesthetics as something that engages the users in curious and imaginative explorations of the designs (ibid).

Drawing on the concept of pragmatic aesthetics, Wright et al. (2008) have developed the notion of experience-centred design. Central to this design approach is an understanding of the users, not as people using computers, but as persons with feelings, emotions, and thoughts. By always already being situated and engaged in experiences, people’s experiences are constituted as relations between the user, the artefact, and the given situation (Wright et al. 2008).

As interaction designers, we are only able to create digital artefacts without control of how a given user will understand it in relation to a given situation (J. Redström 2008; Wright et al. 2008). Designers can only provide the object. How this object can become part of an experience depends on what the users bring to the interaction. In order to design for people’s experiences, we need insights into the way users are emotionally, sensually, and intellectually making sense of the world (Wright et al. 2008). A shift towards pragmatic aesthetics does not call for a new methodology of user-centred design; instead, our way of approaching it should be with a higher sensibility towards user empathy, rather than defining user needs and requirements (Petersen et al. 2004; Wright et al. 2008).

ETHNOGRAPHY IN INTERACTION DESIGN

Since the early 1980’s, ethnographic methods have been adopted in the HCI and interaction design communities as a resource for user understanding and a way to look into people’s needs and requirements (Blomberg et al. 2003). As Bloomberg et al. (2003) describes, ethnography is anchored in an underlying assumption of understanding activities based on observations of them within the setting they occur. Furthermore, the activities are to be understood within their larger social and physical context; thus, leading to a more holistic view on the activities at hand (ibid).

Crabtree (1998), discussing the role of ethnography in participatory design processes, argues how user understandings, brought about by ethnography, helps to guide the design of future interactive systems and to avoid tunnel vision, that is, “*designing the perfect solution for the wrong problem*” (ibid, p. 61). However, as we wish to design for ambiguity in a non-directive practice, no right solution for the right problem exists. If anything, multiple ambiguous solutions co-exist. Ethnography has thus not been used to avoid designing

for the wrong problem, but rather, to get this empathic and holistic understanding of the children needed to be able to design for experiences in the Snoezelen practice. Furthermore, Blomberg et al. (2003) use the ethnographic insights to frame design problems and create users models. In this article, ethnographic insights are used in the form-giving processes, which in turn give a different use of ethnography than the one presented by e.g. Blomberg et al. (2003).

DESIGNING FOR AMBIGUOUS USE

When we design for non-directive practices we need to embrace ambiguity and co-existing interpretations of the designed artefacts. In their article from 2003, Gaver et al. discuss how ambiguity should not always be considered a problem in HCI, but instead can be used as a resource for design.

Sengers and Gaver (2006) further discuss ambiguity in design as a way not to stress one single authoritative interpretation for the user, but allow for multiple co-existing, possible inconsistent, interpretations. Through an identification of six strategies for designing for ambiguity, they elaborate on how to support multiple interpretations in the design process. One of these strategies is to consider the design as a 'blank canvas' for the user to explore and interpret in many possible ways. With their article they argue how interaction design for ambiguous interpretations must change its focus to how to support and make possible multiple user interpretations.

BACKGROUND

This article is based on a one-year collaboration with the design research project SID – Sensuousness, Interaction, and Participation (in Swedish: delaktighet) – at Certec, University of Lund (SID.design.org n.d.). The project explores the potential of tangible and interactive designs in multisensory environments called Snoezelen (Larsen & Hedvall 2012). Snoezelen is a pedagogical and therapeutic practice that encourages children with profound cognitive disabilities to engage in sensory stimuli and arousal for a sense of well-being (Mertens 2008). The children are supported in experiencing and engaging in their own pace by utilization that places no demands. Snoezelen has no formal focus on therapeutic outcome, but the pedagogical staff adapts the physical sensory environments to each child to help him or her find the needed calmness or impetus to engage in the world (Larsen & Hedvall 2012).

SID is set up around a participatory design process including three Snoezelen centres with staff and 25 children. All children are school age and have cognitive disabilities. Furthermore, some of the children have reduced eyesight, more than half of them are wheelchair users, and none of them have a conscious language.

During our collaboration with the SID project, our design programme (J. Redström 2007) has explored

how textile-based tangible designs could bring interactive qualities to the Snoezelen practice and allow the children to engage in the interaction with the designs on their terms. Designing for Snoezelen opens up a design space that allow for ambiguous and non-directive designs. We are not designing for specific tasks with authoritative artefacts. Instead, we design ambiguous designs for the children to explore because the designs are part of enjoyable sensory experiences.

METHODS AND DESIGN EXPERIMENTS

This article reports a design methodological reflection of the work carried out in our collaboration with the SID project. The project was based on an exploratory and constructive approach, driven by the creation of different tangible design experiments. The approach is similar to that of research-through-design (J. Redström 2007; Binder & J. Redström 2006) and constructive design research (Koskinen et al. 2011). Constructive design research is framed by design programme. The programme defines what the subject of investigation is, and through various explorations our understanding of the design programme evolves; thus, the programme is not statically defined, but rather a dynamic framework (Binder & J. Redström 2006). Although the explorations can be of different kinds, all are constructed and build as tangible experiments. Each constructed experiment is an exploration of the design programme and, thus, becomes an embodiment of theory (Koskinen et al. 2011, p.60). To inform our experiments, we performed a series of observations of the Snoezelen practice. From this we did various in-lab explorations, which led to the creation of two prototypes. These prototypes were introduced to the children and staff at one of the centres.

IN-SITU OBSERVATIONS

To form a basis for designing for the particular practice of Snoezelen, various preliminary in-situ observations were done at the three centres during four months. This allowed for experiencing the interaction between the child and practitioner firsthand; thus, leading to a more natural and holistic understanding of the context (Blomberg et al. 2003).

Although the firsthand observations gave significant insights into the Snoezelen practice, it was not possible to be present at the centres at all times. Therefore, the staff recorded the project children when they were at the centres. This way, we had access to study and analyse the context through the video material, just as it would serve as a medium for collaboration and reflection among the entire project team (Suchman & Trigg 1992).

MATERIAL EXPLORATIONS

To explore how interactive textiles could contribute to the children's sensory experiences, we performed a series of material investigations to get an understanding of different textile qualities. We explored a variety of different types of textiles and how they gave different stimulus when using hands, face or entire body in the

interaction with them. This approach is similar to Schön's (1992) notion of reflective conversations with materials, where we, as designers, explored the textiles in dialogical sketching.

Furthermore, we investigated the possible temporal forms of the textiles through improvised user enactments (Arvola & Artman 2007). Based on our established understanding of the children and the Snoezelen practice, we enacted different scenarios to explore how the different textiles afford different relevant tactile and sensory qualities. Working with the textiles and seeking for material qualities allowed us to get a sentiment and understanding of how textiles allow for various interaction gestalts that give multiple sensory experiences. These material explorations were essential to the further form-giving process, and exploring the expression of the materials revealed potential interaction gestalts (Vallgård (in press)).

In the enactments we gave temporal form to the materials by improvising possible reactions in the textiles, based on the way we interact with them. By enacting as both child and "computer" we sketched possible dynamic aspects of the interaction, exploring how textiles could be in composition with sensors and actuators and behave to the way the children interact with the world (ibid); thus, exploring the intersection between potential interaction gestalts and temporal forms.

SKETCHING AND PROTOTYPING

After the material explorations, we created different prototyping experiments that combined textiles, sensors and actuators to concretise our design space. Where the material explorations were especially investigating the social and sensory aspects of interacting with textiles, the different prototypes were used to explore how textiles in combination with computational technology could actually be implemented in designs to be introduced to the Snoezelen practice (Houde & Hill 1997).

Firstly, we experimented with changes in the expressions of buttons if they were created from soft textiles, e.g. sponge foam. Secondly, with thermochromic ink and a Peltier element, we were curious on what sensory experiences could emerge from temperature and colour changes in the textile itself. We painted different



Figure 2: The two pillow prototypes. Left: Conductive threads of yarn. Right: Tulle.

patterns of thermochromic ink and sewed conductive thread into the textile that would generate heat when powered, to explore multiple expressions. Thirdly, we developed two prototyping designs to be introduced to the children. The two prototypes were both build onto a pillow with a LED-string attached to them (Figure 2). On one, small threads of both conductive and regular yarn were attached to it. When the yarn is stroked the LED-lights change. The conductive yarn is placed in three rows that are individually insulated. When the threads of conductive yarn is put together (through the stroking movements in the interaction) the circuit is connected. The pillow is divided into four areas that can either be switched on or off. Through Arduino, the LED light will in certain colour patterns as a function of the number of activated areas.

On the other, a piece of tulle is placed in a layered setting. Depending on the way the tulle is kneaded the LED-lights change colour. Below the tulle, a piece of conductive fabric is sown on top of the pillow. When the fabric is connected to a circuit, it is possible to measure the distance from the fabric to a person's hand or body as a capacitive sensor. This allows us to measure the distance between the hand of the surface and the pillow. This is used as an input that changes as the child is interacting and kneading the tulle (moving his or her hands closer or further to the pillow). The input from the capacitive sensor is processed through Arduino to an output in the LED light.

INTRODUCING THE PROTOTYPES TO THE CHILDREN

The two prototypes were given to one of the centres to evaluate how the pillows could be a part of their everyday practice. Both in terms the staff's ability to frame possible experiences for the children, as well as, the children's interaction with them and how they would ascribe meaning to them.

Although, the prototypes were designed with the children in mind, it is never possible to foresee all various ways the children would engage with them (J. Redström 2008). As we wished to understand how intelligent textiles could be relevant for the Snoezelen practice, it was important to look at how they were actually being used in the context.

Five children interacted with the prototypes during a two-week period. Introducing new elements to the Snoezelen centres, naturally, changes the social reality and practice of the relationship between the practitioner and the child. Snoezelen is built upon a tradition of placing no demands on the children. This means if the children do not wish to interact with the design it has to be respected.

FINDINGS FROM OUR EXPERIMENTS

ARTICULATIONS OF THE DESIGN PROGRAMME

The design process was driven by an overall design programme about designing with intelligent textiles for the Snoezelen practice, and more specifically how

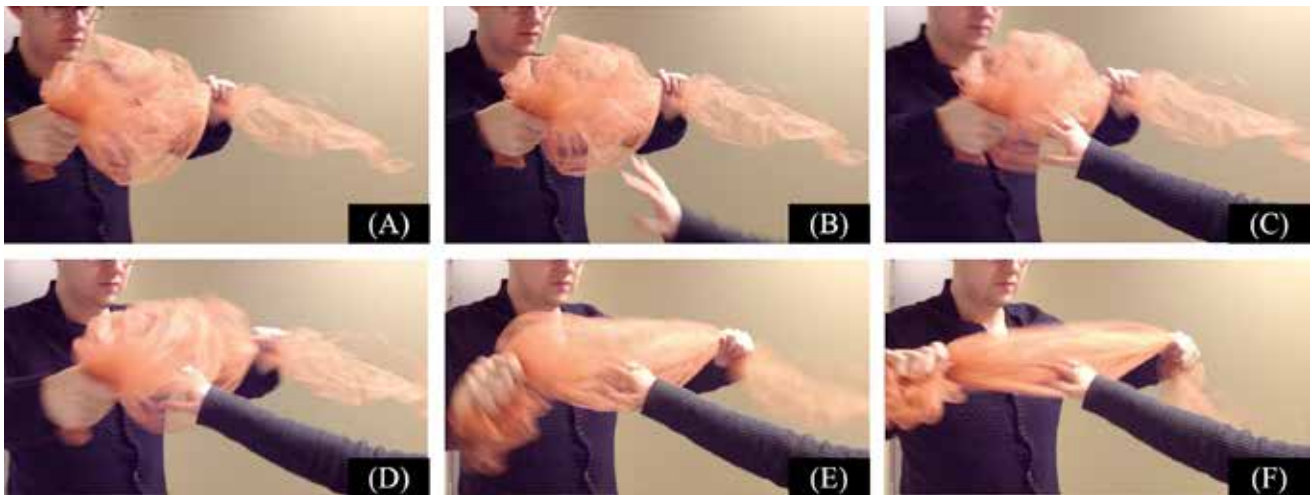


Figure 3: Material explorations and enactments with tulle.

textiles in combination with interactive technology was able to support the children's sensory experiences. Our material experiments were a way to expand and elaborate on the design programme and to concretise certain textile qualities that could possibly be relevant for the children. During our material explorations we explored different types of textiles; for instance, cotton batting, knitwear, and tulle. In the enactments of these textiles we gave temporal form to the materials by improvising possible behaviours in the textiles, based on the way we interact with the textiles (Arvola & Artman 2007).

As an example, the materiality of tulle has a soft feel, yet still stiff property, which allows it to relax in multiple layered settings. When interacting with tulle it responds to the pressure, but when released, it falls back into one of these relaxed positions. This evoked multiple possibilities in expressional properties and potential interaction gestalts to be exploited when designing for the children. Figure 3 shows a series of stills from a video of one of the material enactments with tulle. In frame A the tulle is positioned in a relaxed state, where the tulle's materiality allows it to fold in a certain structure. As the tulle is approached (frame B – F) the tulle changes its structural form, responding to the user's interaction with it. In frame E and F the tulle is stretched which again changes its sensory potential and materiality. Based on our knowledge about the children from our preliminary observations, we knew how many of the children would need guiding or a starting point in their interaction with the world; the designs should support concrete movements. We saw the tulle's ability to sit in a layered structure as a way to support this need, while maintaining a dynamic potential. Likewise, the explorations also defined a thematic curiosity towards tactile contrasts in the textile that would evolve in the interaction.

Beginning our design process with the material explorations allowed for expressional and aesthetic investigations. From these we could then discover functionality (Hallnäs & J. Redström 2002), like how tulle's stiff materiality could function as a support to the

children's need for concrete movement. Exploring the physical properties of different textiles made it possible to consider what interaction gestalts could emerge from them, but at the same time concretise what properties could potentially be relevant for the children. This way, the ethnographic insights were central to the actual form-giving process.

PROTOTYPING FOR AMBIGUOUS USE

From our material explorations we performed a series of different form-giving experiments, where textiles were combined with sensors and actuators to explore possible synergetic compositions. This allowed us to explore how to combine the three form-elements (Vallgård (in press))

We did a series of explorations on how the perceived expression of buttons would change if they were created

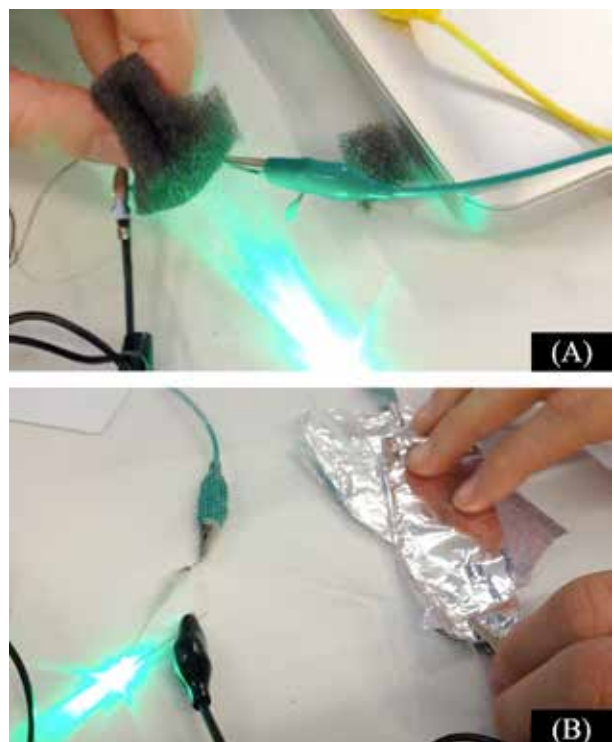


Figure 4: Buttons. A: Sponge foam with conductive threads inside. B: Tin foil separated with a piece of tulle.

from sponge foam and tulle. Many of the children have reduced strength and motor skills, which can hinder them in their interaction with buttons. Furthermore, we would like to explore how the perceived expression of the buttons could appear less digital, but instead more analogue. Figure 4, previous page, portrays two different button experiments. In A, sponge foam is used as a squeezable button with conductive thread sown into it. As the button is squeezed the threads connect and the circuit is made. In B, tin foil is separated with a piece of tulle. The holes in tulle allow the tin foil to connect when a light pressure is applied to it, enabling children with reduced strength to activate the button. In these explorations we were particularly exploring the interaction gestalt. Vallgård (in press) describes how the interaction gestalt is related to the physical form through Gibson's *affordances* and Normann's *signifiers*. By creating buttons from textiles, the affordances from the materials are different than from buttons made of plastic. Textiles are flexible, soft, and have a different tactile feel than plastic. These differences also make us perceive them differently as the interaction gestalt changes, although they may still have the same temporal form (on-off).

With thermocromic ink and the Peltier element, we were curious on what sensory experiences could emerge from temperature and colour changes in the textile itself. We painted different patterns of thermocromic ink and sewed conductive thread into the textile that would generate heat when powered. However, due to some of the children's reduced eyesight, we concluded that the colour changes did not have the sufficient contrasts for them to experience. Based on our understanding of the children, we were able to foresee how the temporal form of colour changes in the textile was not a sufficient state change. In Figure 5 the vague colour changes are shown. Although designing for ambiguous use, the children's multiplicity of interaction forms and patterns did not just allow for all kinds of prototypes, but we had to carefully include these understandings in our design decisions. Furthermore, as several of the children use their mouth and tongue to explore the designs, we were not able to investigate thermocromic ink in the context,

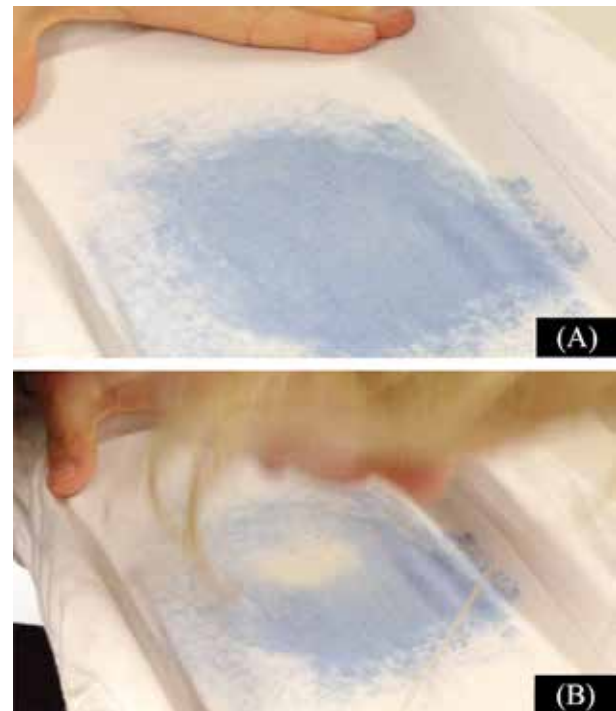


Figure 5: Fabric painted with thermocromic ink. A: The thermocromic pigment is visible. B: The pigment is heated by breath and disappears.

as the ink might be poisonous and thus unsafe.

The results of these form-giving experiments were two pillow-shaped designs. As such, they were syntheses of the explorations we did with materials, sensors, and actuators based on our knowledge about the children and the Snoezelen practice. As previously described we created two different pillows to explore different interaction modalities. The physical form of the two designs was based on the pillow shape, as this would allow flexibility for the staff, but also allow the children to move around the designs. The temporal form of the two prototypes was colour changes in the LEDs, based on different interaction patterns or interaction gestalts. The interaction gestalts in the two designs were the biggest difference between them.

The pillow prototype with tulle framed our hypotheses about the importance concrete movements and explores



Figure 6: A boy with the designs. A–C in his wheelchair with the staff holding the pillow. D–F on the floor resulting in a more bodily interaction.

the layers and depth of the tulle. The LED string would then behave according to the way child interact with the tulle, depending on the distance from the child's hand and the pillow surface. The interaction gestalt in this prototype was based on kneading movements in the tulle, made possible due to the physical form of the tulle.

The other pillow, with short fibres of yarn attached to it, was crafted to explore a different aspect of supporting concrete movement, with the yarn as "touch points" from where the child could begin his or her interaction. The physical form of the small fibres gave an interaction gestalt based on stroking movements on the pillow.

THE CHILDREN'S INTERACTION WITH THE DESIGNS
As the designed prototypes are not thought to emphasize one particular functionality or interpretation, it is essential to recognize this in the way the prototypes are evaluated with the children and the Snoezelen staff. Sengers and Gaver (2006, p.105) argue that in design processes like these *"evaluation shifts from determining whether an authoritative interpretation was successfully communicated to identifying, coordinating, stimulating, and analyzing processes of (evaluative) interpretation in practice"*. As the children are encouraged to interact with the world on their terms, the evaluation should rather be based on the prototypes ability to generate this ambiguity.

As the children were introduced to the designs, we saw how they interacted with the prototypes in a variety of ways. In Figure 6, previous page, a boy is interacting with both the yarn-based prototype (A–C) and the tulle-based prototype (D–F). In frame A–C he is sitting in his

wheelchair while the staff has placed the pillow in her own lap, as the boy is uncomfortable having anything placed onto his legs. In frame A he meets the prototype for the first time, looking at it and reaching for it with his fingers. In frame B, the LED on the pillow is red, while it changes in frame C as a result of the boy's stroking interaction with the conductive yarn.

In frame D–F he is interacting with the tulle-based prototype. In this instance, he is not in his wheelchair, but is sitting on the floor. This allows him to use his body actively in the interaction. In frame D he is lifting the pillow from the floor by holding on to the tulle. In frames E and F he is waving the pillow in the air, resulting in colour changes in the prototype.

These two examples shows how the prototypes have been used in very different ways, but also how the difference in the way the context was framed (in his wheelchair or on the floor) allow the boy to have rather different interaction patterns.

On another day the boy was lying on the floor. This made it possible for him to use his feet to engage with the tulle, which gave him a more subdued experience. We have also seen examples on how the pillows allow for interaction between the child and the staff. For instance, they would invent small playful games around the designs, like taking turns on blowing on the conductive yarn to change the light.

Another story is about the boy in Figure 7. He was introduced to the prototypes in a waterbed. In frame A he meets the prototype for the first time. In B–D he takes the pillow close to his face and looks at it briefly. After a short indication of a yawn in frame E, he pushes the pillow away from himself all the way out over the

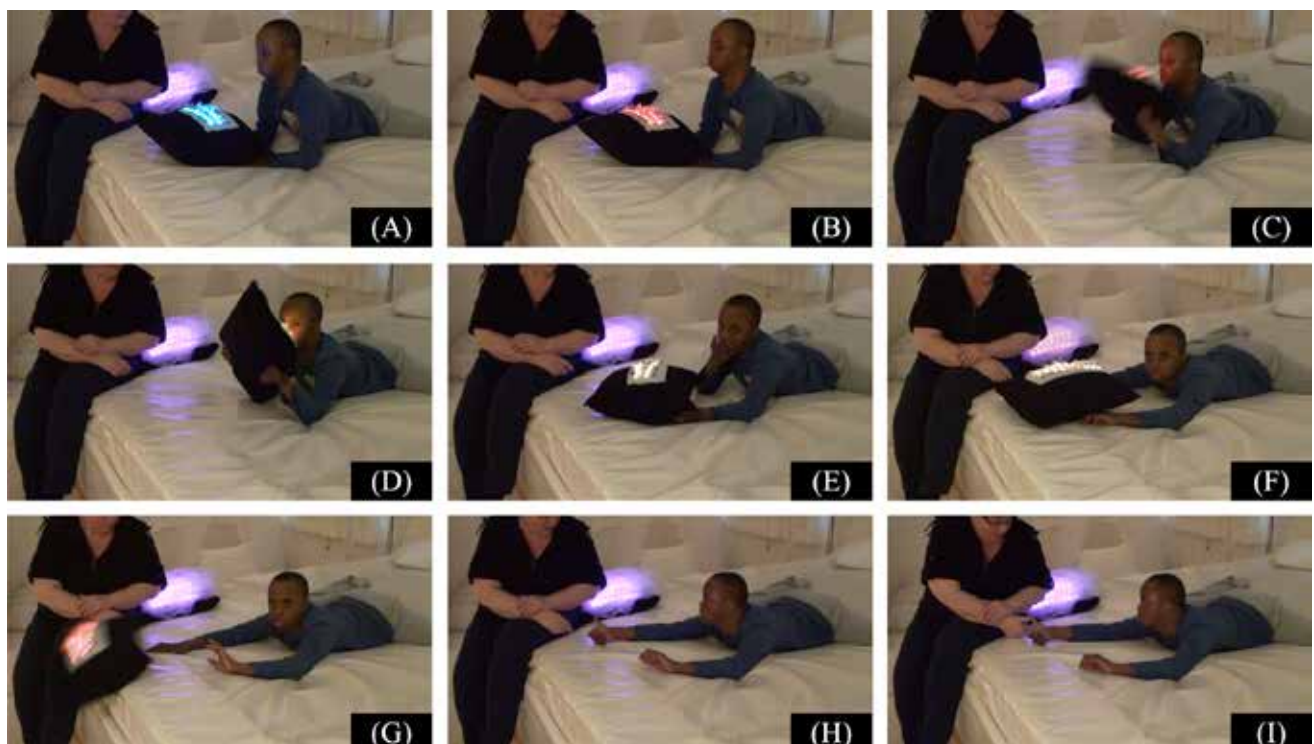


Figure 7: In Snoezelen children are not demanded to interact with the prototypes – it is non-directive.

waterbed (frame F–G). In frame H–I he interacts with the staff.

Snøezelen is a non-directive practice and much of the interaction happens on the children's terms. As a design team, we must therefore accept how the children will not always be interested or interacting with the prototypes. These cases of non-use can be valuable nonetheless, as they also add to the palette of ambiguous perceptions of the prototypes.

NON-DIRECTIVE EXPERIENCE DESIGN

Hassenzahl (2011) outlines a simple conceptual model that includes three different levels in experience design: The *Why*, *What*, and *How* (Table 1). Hassenzahl (ibid) defines experience design as designing the post-materialistic and he adopts a view on experiences as something detached from the material. He argues that the experience must be designed first; then the product.

However, Hallnäs and Redström (2002) present a material view on computers where expressional and aesthetic qualities can be explored within materials. Moreover, Wright et al. (2008) state how experiences are situationally constituted by the relation between the user and the artefact. Experiences are therefore to be understood holistically and the experience cannot be separated from the material. However, Hassenzahl's model provides a way of articulating elements to be considered when designing for experiences.

THE WHY

It is important for the designed artefacts to offer sensory experiences to the children. As the children in Snøezelen are not demanded to engage with the world in certain ways, the artefacts must offer a multiplicity in interaction possibilities. In order to be able to embrace this and to get an understanding of what is central to the children's sensory experiences, it has been necessary to have an understanding and emphatic attitude towards the children. We have not only considered what the children can do or cannot do, but also, through the initial ethnographic observations and the staff, tried to understand the children's motivations and reasoning for engaging with world. Through questions like "*What sensory experiences does each individual child enjoy?*" or "*Why would he rather use his tongue than his fingers to interact with the world?*" we have been able to articulate a design space for designing for sensory experiences.

Of course we will never be able to fully comprehend the children's experiences and emotions, but at least trying have kept an on-going ambiguity and focus on the children in the design process. These understanding of the children have been essential to the actual form-giving process, as it has given us a basis for giving physical form to designs that have a relevant and sufficient temporal form through interaction gestalts that enable the children to engage in the designs on their terms.

Table 1 Hassenzahl's three levels in Experience Design

WHY	<i>The experience, the emotions, the motivation the design is promoting</i>
WHAT	<i>What you can do with the design. The functions of the artefact</i>
HOW	<i>The way materials are used to form the artefacts</i>

Focusing on the *Why* level (the experience itself) will influence our design choices for functionality and form, which will, in the end, lead to design gestalts that are more sensitive towards people's experiences, senses, and emotions (ibid).

THE HOW

Hassenzahl suggests working with the functionality (the *What*) of the designs after defining the experiences we are designing for (ibid). As we are not designing for specific uses, but non-directive experiences, the *What* becomes much more undefined and ambiguous. Therefore, we argue, that it is more giving to explore the form and qualities of certain materials and computational technology (the *How*), prior to defining the functionality, when designing for non-directive practices, such as Snøezelen.

We argue how material explorations and focus on the expression of digital artefacts allow us to embrace the need to work with a range of the children's interaction forms in mind and allow us to approach the design work with ambiguity and variety. Through our material explorations and prototyping sessions we derived possible functionalities from the aesthetic experience of interacting with both textiles and computational materials, like a capacitive sensor or buttons. Or as Hallnäs and Redström (2002) state with their leitmotif: "*function resides in the expression of things*".

Working with the form and expression allow us to suggest ways of interacting with the designs, without imposing certain functions or ways to engage with them; thus, supporting the non-directive values in Snøezelen. This is especially relevant in the form-giving of the interaction gestalt. With the knowledge of the multiplicity of ways the children engage in the world, we have kept an openness in exploring how different performances on the designs would work with the physical as well as temporal form. For instance, how the physical form of the tulle and the temporal form of the lights could be experienced through different interaction gestalts.

Our different material experiments gave insights to our design programme and made it possible to convert of understanding of the children and the Snøezelen practice into the three form-elements. In other words, some experiments aimed at examining the intersection between physical form and interaction gestalt, while other experiments explored the intersection between

interaction gestalt and temporal form and so forth. In this way, explorations in the various intersections (Figure 1, page 2) was a way to constantly explore aspects of the design programme, which in the end was combined and embodied in the final prototypes.

THE WHAT

Our two textile-based designs did not try to convey one single function or purpose. What the children can do with the design depends largely, on how they wish to approach it, be it with their hands, their face, or their feet. This, however, does not mean that we have not focused on the cause-and-effect relation between the user and the prototypes. As interaction designers, we will always have to consider the causality of the interactive designs we are creating. Our scope has been to explore how multiple inputs can result in various interaction modes that are not pointing towards one gathered functionality, but instead inviting the user to ambiguous and engaging experiences.

Gaver et al. (2003) define three types of ambiguity in terms of (1) information, (2) context, and (3) relationship. Ambiguity in information arises in the way a system's information is presented (ibid). With the two pillow prototypes that connection between the LED lights and the textiles (tulle and yarn) was not obvious, and the children responded to this behaviour in different ways: Some intensified their interaction to make the light changes happen more often while others would slowly investigate the light and the tactile feeling of the textiles.

Ambiguity in the context suggests how users may use and perceive the prototypes differently according to the way the prototype is staged in the specific situation. In Snoezelen, the staffs are adjusting the rooms to each child. Sometimes the staff and child would make up a small game with the pillows, while other times the child would sit alone with the pillow to explore it by him or herself. This multiplicity in ways of using the pillow prototypes in the context exploits the ambiguous quality within them.

As the children are all cognitively disabled, it is not possible to assess their reflections and perception of the interaction with the prototypes. However, based on their different interactions it has been evident that their ways of ascribing meaning to the pillows has been different. For example, one of the girls was deeply engaged in interaction with both pillows and the possible interconnection between them, which is something we have not seen any of the other children explore.

By embracing the ambiguity as a premise for our design process and through articulations and explorations of the possible experiences and connection to material qualities, we created two non-directive designs for the Snoezelen practice.

CONCLUSION

Designing for Snoezelen as a non-directive practice has allowed us to design for ambiguous use, and not specific functionality. Although, designing for multiplicity, everything is not good design, or as Sengers and Gaver (2006, p. 107) phrase it: Ambiguous design "*does not have to lead to an anything-goes mentality*". Instead, through empathic insights and understandings of the children and the Snoezelen practice we have explored, developed and iterated on our design programme through various design experiments and by evaluating the prototypes with the children and staff.

Material explorations and investigations of possible expressions and designs with textiles and computational technology were the basis for discovering ambiguous and multiple functions and interaction possibilities. The designs did not strive for one specific function, but allowed the children and staff to interact, stage and perceive the designs in open-ended and co-existing ways.

This design approach can be summarised through a simple three-step model based on the works of Hassenzahl (2011): Firstly, based on empathic understanding of the users, the supported experience is defined by reasoning *why* the design is motivating and engaging for the users. Secondly, material expressions and aesthetics are explored to investigate *how* the desired experiences are available for the user through giving form to the physical and temporal aspects of the design, as well as the interaction gestalt (Vallgård (in press)). Thirdly, *what* the design can do and its functionalities are derived from these afforded material expressions found in the material explorations.

Giving form to non-directive design will not be suitable for all design contexts. In this article, it has been used on the specific practice of Snoezelen. However, I believe that design for other contexts that focuses on functionality and purpose, as secondary to emotional and aesthetical pleasures will benefit from the proposed design approach, as it will put empathy and aesthetics to the centre of the design process.

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METHOD-MAKING AS A METHOD OF DESIGNING

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ABSTRACT

The design research community has recently been very active in developing new types of methods, often called *innovative methods*, through experimentation and action research projects. The stream of innovative methods incorporates visual and creative components that are closer to a designer's genuine practices, aiming to support projection of users' own felt-experiences and their creativity. Innovative methods are in principle designed and re-designed in each project, while conventional methods aim to be easily reproducible and portable across situations. In this paper, we illustrate what learning is going on in the making process of the methods, rather than data collected by the methods. Our aim is to foreground the tangible benefits of innovative methods by discussing how the making process of innovative methods actually helps designers build contextual knowledge important for the design situation.

INTRODUCTION

In the historical development of human-centered design, the main agenda has been how to collect user information in a valid and reliable manner. A key response to this has been the proliferation of *methods*. A number of methods have been borrowed and adapted from more established human research disciplines, such as marketing, psychology, or anthropology (Hanington 2003). Methods have played a key role in describing how a human-centered design team works, systematizing the process, and educating designers

(Matthews 2009). In the design research community, introducing and writing about methods is a popular way to generalize knowledge from designers' work (Keinonen 2009).

In the past decade, the design research community has especially made substantial effort to develop new types of methods that are often called *innovative methods* (Hanington 2003). The development of innovative methods was driven by dissatisfaction with existing ones being incapable of incorporating the felt-experiences of humans and design imagination. Examples include cultural probes (Gaver et al. 1999) and their variants, a range of co-design workshop practices with various visual, storytelling, and generative tools (e.g., Sanders 2000; Sleeswijk Visser et al. 2005) and design games (e.g. Brandt & Messeter 2004; Vaajakallio 2012), to name a few. The Nordes community has played a very active role in developing and experimenting with innovative methods. (e.g. Binder et al. 2011; Mattelmäki 2006; Westerlund 2011; Sanders & Westerlund 2011; Eriksen 2009; Vajaakallio 2012).

Distinguished from conventional methods, innovative methods are constructed upon designers' genuine practices, and support design-intrinsic qualities rather than conventional scientific qualities. They are designed and re-designed specifically for each project context. Instead of rigid method instructions, designers' reflective sense-making process (Schön 1983) and contextual knowledge grounded in actions (Akama & Prendiville 2013) play a great role in making their methods work in a particular situation.

Despite this, the design research community has not paid consistent attention to the *making process* of innovative methods, i.e., what designers actually do and feel when making their methods work. Rather, the analytic focus and interests still remain in *data* that comes out of innovative methods. This is due to field's conventional conception on how methods are supposed to work in design, i.e. methods should be easily reproducible and portable, and guarantee satisfying results under correct operation, as diagnosed by Boehner et al. (2007), Woolrych et al. (2011), and Akama & Prendiville (2013). Sympathetic to these

studies, we argue that for those who are preoccupied with the conventional method perspective, a designer's situated actions (Suchman 1987) on making methods work is considered as an uninteresting phenomenon as such work might seem too practical or situation-dependent to become scientific knowledge.

In several years of experiences with innovative methods, we however have observed that designers' situated work on making methods is not simply extra efforts that are inevitable, but a knowledge-construction process that is important for design. Driven by this interest, in this paper we pay our analytic attention to the making process of innovative methods - *what is happening when designers make their methods and what learning is going in that process*. In so doing, we aim to foreground the actual roles, meanings, and benefits of innovative methods for designers and design work, which should differ from conventional methods.

In this paper, we illustrate this by analyzing design students' learning diaries, which were written while they were learning to use the innovative methods. Before doing so, we first discuss what has hindered designers and design researchers from recognizing how innovative methods actually work, by diagnosing current methodological misinterpretations in the field.

MISINTERPRETATIONS OF INNOVATIVE METHODS

Innovative methods allow designers and researchers' creative exploration and contextual sense-making while they configure and reconfigure the methods in interaction with local circumstances. This situated approach is at the heart of innovative methods (Lee 2012). Innovative methods often have an open-ended structure (Mattelmäki et al. 2011; Gaver et al. 2004) and do not involve a clear-cut formula: the list of innovative methods will never be complete (Koskinen 2011).

There is, however, a tendency observed in the field in which designers and researchers attempt to take innovative methods as, or transform them again into, an easily reproducible and readily portable set of tools. Sympathetic to Boehner et al. (2007)'s diagnosis on uses of probes in human-computer interaction, we argue that this tendency is observed when designers and researchers deal with innovative methods with the mode of conventional ones, without a proper understanding of how innovative methods actually work for design. In following texts, we diagnose such misinterpretations with regard to four aspects, by mapping them with what original writings about innovative methods say.

TURNING INNOVATIVE METHODS INTO REPRODUCIBLE TECHNIQUES?

In your codesign lab, are the methods and toolkits generalizable enough to be applied to other projects? (A question from the audience after the presentation of CoDesign Lab by Binder et al. 2011)

Often misinterpretation is observed around how designers and researchers feel about the situated, context-specific approach of innovative methods. Taking probes as an example, the original authors of the probes emphasized the real strength of the method was that they had "designed and produced the materials specifically for [that] project, for those people, and for their environments" (Gaver et al., 1999). Despite this, for those who are preoccupied with the view that methods offer generalized instructions and a structured process, probes' description and existing practices appear as another off-the-shelf method for design-based research. Boehner et al. (2007) reviewed almost 90 papers on various approaches to probes and found that many of the studies take a *probes-as-recipe* approach. They argue that "the outward forms of the original cultural probes, namely the technique of providing a probe packet with a camera, postcards, a diary, maps, and sets of instructions or questions as a base set are often enough for a researcher to cite cultural probes as the method of research" (Boehner et al. 2007).

In many method papers, we often see a sentence such as the following as a concluding remark or future work: "the next step would be to validate the cross-cultural applicability of this form of cultural probes" (Chavan & Munshi 2004). Chavan and Munshi (2004) introduced a modified design for the cultural probes in the form of "emotion tickets" for Indian participants. As seen in the quote above, they concluded the paper by suggesting further work for validating cross-cultural applicability of the method. This way of concluding a study stems from a desire that a method, when suggested as new knowledge from an experiment, should be generalizable enough so that it can be applied in other settings in a valid manner, as the outcome from scientific experiment strives for generalizability.

This view focuses on a method as an indivisible whole (Woolrych et al. 2011) that is capable of getting work done in itself, but neglects designer's situated actions and contextual knowledge that in fact make the method work in the setting. A method like cultural probes precisely aimed to escape such view of method-recipe because it glosses over crucial contextuality and designer's competence for design.

SEEKING SCIENTIFIC VALIDITY?

In terms of the attempts to codify innovative methods as a generic process, the situated approach of innovative methods still sometimes appears scientifically immature. Improving the scientific validity and generalizability of innovative methods is, thus, regarded as an imperative task for the design research community. For example, the open and inspiration-oriented approach of cultural probes might have made design researchers feel insecure about whether the probes' returns are legitimate enough to inform their design. This insecurity prompts design researchers to "back-up" the probes' returns with interviews or focus groups so as to either validate the materials that have

been gathered or supplement fragmentary pictures (e.g., Moser et al. 2011; van Leeuwen et al. 2011; Kuiper-Hoying & Beusmans 2004).

This tendency appears more prominently in terms of how the materials collected from the probes are interpreted and analyzed. Some studies that seek to find users' true meanings and a holistic picture of the users' world behind their responses to the probes introduce analytical rigor into their interpretative methods by employing statistical methods, such as graphing or numerical analysis (e.g., Murphy et al. 2005) or a cross-validation of the results (e.g., Howard et al. 2005; Volda & Mynatt 2005).

This way of gathering user information for design is exactly what the original cultural probes attempted to disrupt. The cultural probes were their alternative proposition for enlivening design inspiration in dialogic interaction with users (Gaver et al. 1999; Gaver et al. 2004). While most studies on the probes that we mentioned above acknowledged and valued the provocative, exploratory and participatory approach of the probes, the very awareness that the probes are provocative and ambiguous was unfamiliar to design researchers with a more conventional view of methods. This is why they attempt to impose scientific validity on the work of carrying out the probes as well as dealing with the materials gathered by them.

It should not however be read that we intend to say the above-mentioned studies are necessarily erroneous. Our concern, instead, is that the different adaptations of probes should be underpinned by a proper recognition of a nature and a role of probes, not by misinterpreting its flexibility and purposefully ambiguous approach.

For example, when using probes to explain the current state of affairs, the probes approach should not be downgraded due to the fragmentary user information that it creates or the challenges for scientific analysis. Instead, when using probes to explain the current state, designers and researchers should explain what aspects of probes they find useful and effective for achieving a comprehensive understanding of users' current practices and how they modified their approaches to the probes to serve that particular purpose.

DESIGNER'S STANCE: OBJECTIVE OR INTERVENING?

In carrying out innovative methods with other participants such as users, whether to maintain a designer's stance as an objective observer or an intervener in the situation is often not in question. For example, in co-design workshops, should a designer who facilitates the co-design workshop be objective without influencing the participants' activity or could he or she intervene what is ongoing? For methods that are considered to be generic and formal approaches to conducting a workshop, such as focus groups and structured interviews, a facilitator usually introduces carefully chosen topics and follows a thoughtfully written discussion guide (Kuniavsky 2003). For co-

design workshops, while it is often said that positioning a designer as a facilitator, an observer, or a co-creator should depend on different goals of projects, tensions in practice are also reported.

Some recent writings on conducting co-design workshops, including design games (Vaajakallio 2012; Kankainen et al. 2012) or video prototyping workshops (Westerlund 2009), argue for the importance of the designer's role in making sense of an ongoing co-design situation, capturing what is relevant for the design aim and orienting co-design activity towards that direction. In their study of the Storytelling Group method for service design, Kankainen et al. (2012) emphasize the designer's role as a *creative secretary* who observes the hidden possibilities in the "story world", intervenes in the way in which the group organizes the story events, and guides the group towards design opportunities. They report that the layer of knowledge in the storytelling group without a creative secretary remains at a rather superficial level. In a similar vein, in his doctoral dissertation on a video prototyping workshop and design space, "Design Space Exploration", Westerlund (2009) emphasizes the designer-conductor's responsibility for framing the design space as a prototype in the co-design session with users.

These writings discuss two reasons for this stance. The first reason is about designers' professional competence: Designers can identify what could be designed from the situation as a reflective practitioner (Schön 1983). The second reason is more contextual: designers can capture what is relevant in the situation and envision what can be designed because they have been already sensitized to the project context and design possibilities while designing the co-design sessions. The authors report that such knowledge developed before the co-design sessions nurtures designers' sensitivity and confidence.

WHERE IS DATA LEGITIMATE FOR ANALYSIS?

We have tried the make tools... but the prototypes created by users were something that we had already thought of or did not seem relevant. (Personal communication with a profession in human-computer interaction)

In the traditional view on methods, data are usually artefacts produced as end results from methods, be they interview transcriptions, survey statistics, or observation notes or photos taken in the field. Designers and researchers then use a structured analytic method to *mine* true meanings from the data artefacts.

In the quote above, the design team expected to mine innovative ideas and design inspirations from the artefacts, typically physical 3D models, constructed by the participants in the make tools session. If a design team only looks at what is produced after carrying out the method as final outcomes, similar to waiting for data to be produced and analyzed after conducting surveys or usability tests, such outcomes from a co-design

workshop may appear confusing for information mining.

Although there are slightly different views on how to handle the outcomes from innovative methods, what many recent writings still have in common is the idea that knowledge can be constructed not only through an analysis of *artefact data*, which is produced as end results, for example collage results or 3D models, but also from the *process* in which the method is carried out, especially when the conduct of the method unfolds in interaction with the participants in the study. For example, Sleeswijk Visser (2009) emphasizes researchers' annotations made during the generative workshop session as important data, alongside the artefacts made by participants. The role of a *creative secretary* in a design game setting (Kankainen et al. 2012) is also in line with this perspective.

WHY MISINTERPRETATIONS?

Historically human-centered design has a strong tradition in the scientific disciplines for technical systems design. A large part of the assumptions, theories and practices stem from such disciplinary traditions, although the field of human-centered design is more and more inter- and trans-disciplinary. The misinterpretations occur when knowledge and methods are adopted across boundaries without reflexive understanding, i.e. understanding *others* based on recognition of one's own assumptions and standpoints (Denzin & Lincoln 2000). The misinterpretations of innovative methods occur due to the sticky stance of the conventional method-recipe view in human-centered design as designers and researchers do not reflect upon different assumptions between conventional methods and innovative methods. Suchman (2002) explains that this sticky stance is closely tied to a culture in design that constructs technical systems as commodities so they can be "cut loose from the sites of their production and exported en masse to the site of their use." In a similar light, Dourish (2006) diagnosed the symptom of "implications for design" in many academic writings in human-centered design and human-computer interaction, which attempts to abstract findings of ethnographic research as bullet-point specifications for design resources. He argues this tendency is due to the field's unfamiliarity with, and thus neglect of, contextual knowledge constructed, grounded, and embodied in actors' situated actions, which are in fact crucial for design (Dourish 2006).

Sympathetic to Dourish (2006), we argue that what we currently need in the field of design research is alternative analytic focus that helps recognize the actual benefits of innovative methods, as well as alternative language with which to talk about them.

SEEKING ALTERNATIVES: HOW METHODS ARE MADE TO WORK IN REALITY

As one attempt to explore alternative accounts of innovative methods, we pay our analytic attention to

how innovative methods are made to work in reality, in a specific design setting, instead of how they ought to work in theory, in a controlled environment. In doing so, we reveal the back or "behind" stories, rather than aiming to develop method instructions or templates. We call them behind stories in the sense that these stories have not been communicated enough in existing method papers or method descriptions. In this section, we reveal the behind stories of cases where design students learn and use innovative methods for their term projects. We illustrate these through the analysis of their learning diaries.

DESIGN STUDENTS' LEARNING DIARIES

In a master's course called User-Inspired Design (UID), in Aalto University in Finland, students learn designerly and novel approaches to exploring future design opportunities by involving users in the design process. The students' backgrounds vary, from industrial design, design management, textile design, spatial design, and also computer science or psychology. Each year the course accepts approximately 25 students and the students are formed into five groups in the beginning of the course. The instructors group the students by considering their disciplinary backgrounds, nationalities, and gender. More than half of the students are in their first year of master's study.

The course encourages the students to explore innovative approaches to concept design beyond the scope of traditional user-centered design approaches. During the nine-week course, the students proceed with the comprehensive concept design process from framing design opportunities, working with users, interpreting qualitative user study materials, to generating and evaluating design concepts (for more about the UID course, see Mattelmäki & Keinonen 2001).

In the UID course, individual students should write personal learning diaries and submit them to the course instructors every week. The purpose of the learning diary is to help the students reflect on their own learning process. The learning diary includes:

- What has been done and what is ongoing during the students' project, including challenges and reflections;
- Reflections on the literature and other sources about the topic, including expectations, questions and interpretation;
- Problems in understanding the course objectives or in the group work;
- How the students deal with the problems.

The diaries thus contain lively stories about the situations the students encounter during the design project, how they organize their actions interacting with the local contingencies, and, in that, how they use design methods and what they do and experience when applying methods. Each week the students wrote, on average, one page in their dairies and the diaries

included sketches, diagrams, or pictures in addition to text (see Figure 1).

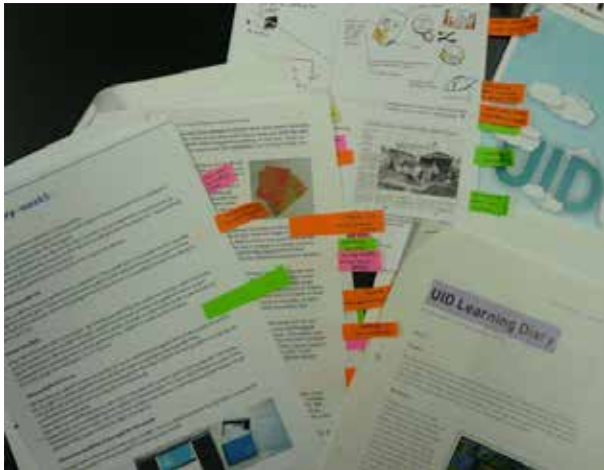


Figure 1. Students' learning diaries in the User-Inspired Design course

For this reason, the students' learning diaries make suitable materials for analysts to examine what they actually do, feel and experience while designing their own innovative methods. However, as these stories are reported by students who are not yet (professional) designers, the stories analyzed in this paper are rather about students' work and experiences while they *learn* to use innovative methods than competent designers' established practices with innovative methods. Thus we do not intend to generalize students' work, experiences, and learning when applying innovative methods as designers' work, as such work and learning might not go on in experienced design practice. Regardless of this limitation, the students' diaries still provide rich and original materials for researchers with interest in understanding the actual benefits of innovative methods for following reasons:

- First of all, because the students are not yet experienced, they present very practical work, situated actions, contextual challenges, and emotional concerns in a salient and detailed manner. Such practical work and contextual challenges could be taken for granted by experienced designers and remain implicit rather than explicit:
- Secondly, students' experiences with contextual challenges, emotional concerns and *ad hoc* actions construct a type of learning enabled precisely when working with innovative methods and highlighted as a benefit for designers (which we will explain in later part of this paper):
- In addition, because of the open and situated nature of innovative methods, those who are unfamiliar with and inexperienced in the use of these methods may face uncertainty or even disappointment when using them. In this sense, unveiling the hotspots of such challenges, as reported in the students' diaries, is exactly what we need to construct as knowledge

on how designers actually make innovative methods work.

The author was the tutor of the UID course from 2007 to 2009 and analyzed the diaries for the years 2008 and 2009. Each year there are 25 students who submit weekly diaries for nine weeks. The author had followed the students' design projects as the tutor for those two years, and thus had a contextual understanding of the written text. The loci of analysis was as follows:

- What expectation and first image of innovative methods do the students have?
- How do students choose and make methods in their project context?
- What challenges do they face when making methods and how do they deal with the challenges?
- How do they evaluate the methods during and after using the methods?

When going through the students' diaries, these questions were the initial foci of interests but did not constrain the analysis: when new, interesting findings arose, new themes also emerged. The first analysis was done by the author, and the first analysis results were validated and elaborated with two other course tutors. The analysis results were also verified by interviewing some of the students who took part in the course. In following texts, we present the analysis focusing on what the students actually did, felt and experienced when making their methods and what meanings such process unfolds in a larger design activity.

DESIGN LEARNING IN THE PROCESS OF MAKING METHODS

STEPPING INTO THE USERS' WORLD

In dealing with innovative methods for their design project, one of the biggest challenges for the students was *how to design the method*. While the students appreciated that they could utilize their design skills in research, they were not sure how to design the method so that it could be efficacious for their project and engaging enough for participating users. In particular, it was all the more challenging because their target users were often of different ages (for example, elderly people, teenagers or children), from different countries (for example, expats or tourists in Finland) than the students, or had different habitual practices (for example, smokers).

One of the student groups from 2009 aimed to design a service that could support safer and more meaningful peer-group hangout places for teenagers in the city of Helsinki. After doing the preliminary field observation in shopping malls where groups of teenagers often gather, the students wanted to apply probes to tackle the issues of the teenagers' emotional attachment to or detachment from public places. It was, however, difficult for the students to predict how the teenagers would respond to their probes. Hence, before designing

the probes, the students set the mood by recalling their own teenage memories.

I have tried to set the mood. I have tried to remember how it was like when I was in my teenage [years] more than ten years ago. Today I listened to Nirvana. It is not the music that teenagers nowadays listen to but I think it is classical teenage music anyway: it is wild, angry and arises [sic] feelings. To me it worked as some sort of mirror of my feelings and energy, a way to escape, although I did not have that hard time at teenage [sic]. I felt strong and confident and I thought I knew almost everything that is essential in life.

The group then went on reviewing recent newspaper and magazine stories about teenagers and compared them with their own teenage experiences.

In today's Helsingin Sanomat (major newspaper in Finland) there was an article of a 23-year-old woman who has slit her wrists [sic] since she was 12 years. In another article this week teenaged girls explain that the important places in their lives are home, school, shopping mall and McDonalds. What can I say about the mall and McDonalds? At this point so called empathic design demands a lot from me.

Designing the relevant tasks for the probes study was of course a major concern for the students. However, besides this, the students also invested huge efforts into how the probes should look. The look of the probes was considered important as a "marketing point" to attract the teenagers and, more practically, to encourage them to read, understand, and respond to the probes.

We really have to consider how to do this. At the moment it seems that it is not easy to make teenagers enthusiastic about the research. I guess we have to make really exciting probes and show them to those who we want to study and co-design with, in order to make even few of them interested in our topic.

We designed buttons that they can attach to the bag, which is not related to the research directly but we made it for motivating teenagers by jolly-looking kit. We also put candies in the bag for the same reason ... We discussed color, too. The teenage boys don't like pink and girls like vivid color and so on. It was interesting to hold such heated debates imagining the teenagers' feelings and preferences

As the students reflected in their diary writing, the actions of designing their method materials, such as having group discussions on what colors the teenagers would like or crafting bags and badges as part of the probes, kept the discussion within the group oriented towards the topics of what the teenagers would prefer and what they would be like. The students also discussed what time of day the teenagers would keep the probe diary, how they would carry the probe kits with them, and so on. We found that the students' practical work organized towards making the method enabled them to become gradually engaged with the user's situation by talking about users, putting

themselves in the users' situation to simulate what it would be like to answer the probe questions, and acting with method materials.

First of all, I realized how important it is to concern our target users over the whole process of user research. Of course it sounds so self-evident, but it also means that we should carefully consider them when we make the materials such as diary or social map for design probes. For example, which color would our users prefer? Or which font size is enough for our user to read? So, we should really consider characteristics of our users to get right results [by one female student whose target group was elderly people].

Considering which font size or color would be suitable for users may be a very peripheral issue, as the main concern of method-making is to design contents that are relevant and efficacious to the design topic. What is crucial here, however, is that by orienting their actions towards such peripheral, physical details, the students became sensitive to the users and their context and learned to build emotional engagement with them.

KNOWING DESIGNERS' OWN BACKGROUND AND ASSUMPTIONS

We found from the students' diaries that they gained sensitivity to the users and their context also by realizing their own background and preoccupation. In the student's example above, during the process of designing the probe tasks and materials, the students were able to re-enact their past teenage experiences. By doing so, they realized and explicated differences between their own teenage experiences and those of teenagers nowadays.

As another example of a student's story, one of the groups from 2009 aimed to design a service for elderly people in the outskirts of Helsinki, which could support them being more active and visible within the community. The students wanted to apply probes for the elderly people to elicit their past memories, emotional experiences, daily activities, and wishes, inspired by empathy probes (Mattelmäki & Battarbee 2002). This student group had the initial idea to deliver a daily probe task to the elderly each day for five days. This was the tactic they had developed to keep the whole process exciting and fun for the elderly people.

To recruit participants for their probes, the students visited one community facility where elderly people gather and spend time together. There, the students realized that their plan to deliver a task on a daily basis would not work. By meeting and talking with the elderly people, the students realized that the elderly people there actually had a very busy schedule.

"In our own study, we had already thought a lot about the probes tasks before we met our users for the first time. From the observations in the first meeting it became obvious that we needed to adjust the tasks we had planned for the probe kit to better suit their preferences. First of all, the elderly ladies were afraid

of having to use much of their time for the probes. Contradicting to our stereotypic thinking, they were extremely busy!"

This group had needed to modify their plan. In the end, they designed a probe package that contained the daily tasks in different sealed envelopes so that the elderly people could open one every day. We found that the students' realization of "busy elderly people" (see Figure 2) not only led them to redesign their probe package, but also to reframe their solution space for design. After noticing the elderly people's busy schedules, the students turned their design space to the elderly people's "collaborative productivity". Later, this student group reframed their design space, from "how to activate the elderly people's life" to "how to foster this active group of elderly people to spread their spirit to society."



Figure 2. Student's sketch on their new image of the elderly people as target users

These examples imply that the students began to engage with the users' context, not only by getting to know more about the users, but also by getting to know more about the students themselves – their prior assumptions and their own backgrounds. This dual learning is part of an intertwined process in which the students' prior assumptions and backgrounds become recognizable through the embodiment of innovative methods: Working with the method embodied the physical and visual dimensions of such assumptions. As ethnographers conduct autoethnography (Ellis 2004) to make their own assumptions explicit for writing about others, visual and physical creation of innovative methods allows designers to make their assumptions explicit. How designers externalize their inner knowing and construct knowledge through visualization in research part has been also discussed in Segelström and Holmlid (2011).

BUILDING MOTIVATIONAL ENGAGEMENT THROUGH UNOFFICIAL INTERACTIONS

In the diaries, the students often described many unofficial, practical activities they organized with their users during the project, such as making appointments

over the phone, visiting them to deliver the method materials or having tea with them to introduce the methods. These activities are "not officially" defined as methods or included in the method descriptions, but essential to implement the method at users' sites. The students' diaries showed that these unstructured, informal meetings with users helped them learn local relevance, as well as ensured a commitment from both the students and the users to the design project. Because such activities are informal, some students had a chance for more personal access to the users, for example getting invited for dinner at users' homes.

I was really happy with [the] elderly people who live in Loppukiri [the local name of the seniors' house]. First of all, they were much kinder than we had expected and we got four volunteers who are willing to participate in our project. Also, we were able to understand their context while having dinner together and had an opportunity to look around the elderly people's apartment.

These informal interactions and dialogic relationship with the users also made the students emotionally engaged with the users and their sites. Many students expressed their commitment to the users:

This week I am writing only about the contacts with teenagers and youth workers because they fill my mind right now! To meet them is generally one of the most exciting phases in design work, I think... Once you get their time to have a chat it is a pleasure to hear their points of view. I have always got surprised in some way.

After the final meeting with the users, it felt like we took so much away from them (the participants) then it was an anti-climax to end the project with no form of real implementation or improvement for them. The idea about building a relationship with the users was also obvious, as we felt rather sad to see them for the last time. Even though Sam and I were usually passive at the sessions due to the language barrier, just observing them and striving to come up with something for them or from them really made the process very empathic and committed.

DISCUSSION

METHOD-MAKING AS DESIGNER'S METHOD FOR EXPLORING USERS AND SOLUTION SPACES

As their behind stories of using methods presented, the students needed to gain knowledge about the local circumstances so they could make the methods relevant and engaging to users' local context. In this sense, the actions that were part of method-making, such as contacting users, considering users' preferences and abilities to handle the methods, or having informal meetings and chats with users so as to deliver the methods to them, not only helped improve the relevance and efficacy of the method, but also helped the students know about what actually matters for users and their context. The local sensitivity and contextual knowledge

built through situating the method is precisely that which plays a role in framing a design space, as we tried to illustrate in the case in which the students changed their design direction from activating passive elderly people to facilitating active elderly people in influencing the community.

This finding leads us to consider the method-making process as the externalization of a designer's initial interpretation of users and possible solution spaces. Heikkinen (2011) presented similar findings on how designers externalize their inner design hypothesis by designing their own design tools, thus construct knowledge already from the tool-design process.

In this sense, method-making can be understood as a form of articulated introspection into what the designer already knows, through iterative externalizations of what the designer wants to know in relationship to an instrumental goal. Method-making here can be interpreted as a method in itself for understanding users, and use context and speculating on possible solution spaces.

Indeed, it is still a question in practice whether designers pay careful attention and sensitivity to method-making so that the process of method-making can help the constructive learning about users as we discussed above. This is, however, precisely why this paper aims to turn designers' attentions to the phase of method-design by showing evidence of what designers can gain from that activity prior to method-in-action. Once designers understand how designing the method actually benefits their knowing the user's context and framing a relevant solution space by intervening it through the method, they could pay more attention to the method-making phase.

NURTURING SENSITIVITY THROUGH METHOD STORIES

When it comes to methods in human-centered design, the field has traditionally aimed to improve the applicability of methods through comparative experiments and abstracting generic rules for method adaptation. However, we believe that a research direction on design methods, especially on innovative methods, should be re-specified from developing new tools or pinning-down practices into recipe, towards *how to support designers to be more sensitive and comfortable with different types of learning from design-led and situated approaches of innovative methods*.

As one attempt to achieve this, we suggest presenting the story as it is – *how it actually gets done by designers (design students in the case of this paper) within particular circumstances*. We believe that "method stories" will help designers and design researchers to more effectively reflect upon their selection and use of methods because such stories do not strip away the rich contextuality of their actual use, their application in, and adaption to specific context.

The method stories from the students' learning diaries in this paper revealed to us that the students gradually develop their sensitivity to the local context and frame and re-frame possible solution spaces through organizing their practical actions of physically crafting the methods and socially making decisions. If designers become more aware of and comfortable with the fact that they can enhance learning about users and design sensitivity even before analyzing data produced from methods, their sensitivity to what they are doing and learning while making the methods can be better nurtured.

In addition, the practice of writing method stories itself can serve as a method for designers to become sensitized to and make sense of what learning is going on in the method-making process. The students' learning diaries expressed how they themselves understood the externalizations they make. Diary writing in this sense worked as a translatory process of persons reporting on their externalization of how to approach and understand users.

CONCLUDING REMARKS

As designers and design researchers more and more recognize context-specific intervention to explore what is possible, generic methods with a neutral position of designers do not nevertheless provide constructive directions (Binder et al. 2011). We think that methods in design and design research are still useful means to communicate and teach a design practice. Our aim in this paper is to highlight how we may need to then *respecify* our existing conception and practice with design methods: rethinking how design methods, especially innovative methods which are the main focus of this paper, produce knowledge for designers. If method stories, as evidence of such an alternative perspective, are collected and disperse, designers and design researchers can feel more comfortable with this alternative thinking, which differs from conventional belief on scientific, neutral methods.

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DISCURSIVE STRUCTURES OF INFORMAL CRITIQUE IN AN HCI DESIGN STUDIO

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ABSTRACT

Critique has long been considered a benchmark of design education and practice, both as a way to elicit feedback about design artifacts in the process of production and as a high-stakes assessment tool in academia. In this study, I investigate a specific form of critique between peers that emerges organically in the design studio apart from coursework or guidance of a professor. Based on intensive interviews and observations, this informal peer critique appears to elicit the design judgment of the individual designer in explicit ways, encouraging peers to follow new paths in their design process, while also verbalizing often-implicit design decisions that have already been made. Implications for future research in academic and professional practice are considered.

INTRODUCTION

Critique is considered to be at the centre of design practice, both in the education of a designer and in formal design practice (Anthony 1991; Schön 1985; Schön 1987). Informal methods and communities for facilitating critique have arisen in recent years (Xu & Bailey 2012; Xu & Bailey 2011) to support a more dynamic, on-demand critique culture, although latent features of critique culture are already a part of many professional design organizations, often driven by clients or stakeholders (Morton & O'Brien 2006). Insofar as education in the design studio and professional practice share a common set of cultural

practices in a given discipline (Brandt et al. 2011), understanding the role of critique in the studio is critical to recognizing the place of critique-like behaviours in professional design practice.

Despite the current recognition of critique as an important method for evaluating the progress of an individual design student or interrogating a design artefact more deeply, the behaviours and discourse surrounding this critique process is not well understood. Heretofore, study of these phenomena have focused on common implementations of critique as features of the pedagogy (Anthony 1991; Shaffer 2003), but has not focused on the effect of these pedagogical features on the development of design thinking of the individual design student. Design educators have long recognized the importance of engaging design students in realistic practice, with the ultimate goal of moving them towards patterns of expert design thinking and judgment (Cross 2007; Dannels et al. 2008; Harrison et al. 2006; Lawson & Dorst 2009). In activating this educative process, Holt (1997) notes the importance of early practice in engaging in interaction with objects of design precedent, and in understanding the relationships of those artefacts to the design task at hand. Quoting Vickers, Holt notes "judgement is made with a sense of obligation to discover the rules of rightness that apply in a particular situation" (Holt, 1997, p.114).

In this paper, I argue that a richer understanding of critique is necessary to develop alignment between the pedagogy and practice of design, by first understanding the role of explicit critique in the education of design practitioners. While critique has been reasonably well documented in formal, evaluative settings (Anthony 1991; Boling & Smith 2010; Percy 2004; Shaffer 2003), critique in informal settings is not well understood. Once the trappings of traditional, high-stakes, professor-led critique are removed, what is left when students engage in critique on a self-directed basis with their peers? Using design artefacts to promote discussion of tacit knowledge has been helpful in related contexts (Akama et al. 2007), but it is unclear whether the

experiences of practitioners in this study are directly mirrored in the design education context.

I will focus on the role of informal, peer critique in encouraging verbalization, and thus, some level of conscious awareness, of tacit design decisions, as well the guiding role of critique in considering new design directions. While previous research has addressed issues of form and function, centred around individual *desk crits* between professor and design student (Boling & Smith 2010; Hokanson 2012), or *design juries* between a design student and multiple design professors (Anthony 1991; Parnell, et al. 2012), I have chosen to focus on critique that arises organically between peers in an informal studio space. This exploratory study employs rich analysis of relatively few participants to uncover discursive elements of this form of critique that may inform future research.

The primary contribution of this exploratory study is to work toward understanding the discursive features of peer, informal critique and how these features inform verbalization of tacit design decisions. I am not evaluating the effectiveness of this critique, but rather am exploring an apparently functional element of the design studio that contributes in some way to the development of expert design practice and knowledge. To discuss the role of critique in this peer, informal sense, I will outline the primary elements of the design studio, conceptual representations of design thinking, and forms of critique that inform discussion of results from this study.

BASIC CONCEPTS OF THE STUDIO

The studio is a way for design students to “participate in the cultural practices of a discipline” in a way that “prepares students for the complexities of professional practice” (Brandt et al. 2011). The studio serves as a critical link between the education of the student and the expectations and habits of a practitioner, thereby placing the studio at the centre of educational and professional practice (Schön 1985; Shaffer 2003). Shaffer (2003) discusses a range of pedagogical and surface features that define a studio environment in the norm, concluding that it is a combination of these features that create the studio experience. Pedagogical features are aspects of the studio that are implemented as part of the course requirements and evaluation, including: reviews, desk crits, extended design problems, generative feedback, and assignments focused on different aspects of design. The studio includes a number of surface features, which are elements that support the overarching pedagogy of the studio. These include flexible hours to access the studio space, the presence of experts, provision of permanent space for individual work, availability of external reviewers, and use of variable media (Shaffer 2003). Efforts have been made in the past decade to translate the studio pedagogy from fields where it has traditionally been held as a signature pedagogy (Shulman 2005) to fields that have not traditionally been taught in the studio mode, like

human-computer interaction (HCI) (Blevins et al. 2007; Brandt et al. 2008; Hundhausen et al. 2011; Reimer & Douglas 2003).

The studio where data was collected for this study operates under many of the principles of a studio as Schön and Shaffer described (Callison 2011), but exists primarily as a workspace and hub of activity for the HCI Master’s program, rather than a centre of classroom instruction. No explicit individual space is afforded to the students, but because the pedagogy indicates primarily group projects, the studio space serves as a natural meeting location with numerous resources for collaboration and sketching.

Based on this conception of the studio, Schön makes use of several concepts to discuss how the judgment of an individual design student can be understood, including largely tacit patterns of reasoning, decision making, and explicit reflection. Each of these concepts will be discussed in turn.

KNOWING-IN-ACTION

Schön (1983) points to the concept of *knowing-in-action* as a critical part of design judgment, as employed by design practitioners. *Knowing-in-action* can be seen as “consisting of strategies of action, understanding of phenomena, ways of framing the problematic situations encountered in day-to-day experience,” an outcome of which is “a process of continual adjustment in the service of maintaining a sense of constancy” (Schön 1985). The process of knowing-in-action reveals tacit knowledge and assumptions in the act of designing. This conception of tacit knowledge draws extensively from the work of Polanyi (1966), and describes judgments that are made without explicit verbalization.

REFLECTION-IN-ACTION

Reflection-in-action is one of the primary forms of reflection encouraged in the design studio while a problem is being actively addressed. This reflection may be somewhat conscious, especially to beginning designers, moving more and more to the tacit dimension as expertise is gained (Lawson & Dorst 2009), with the designer engaging in a “reflective conversation with the materials of the situation” (Schön 1985). This conversation elicits, often in only a pre-emergent sense, the patterns of design thinking and judgment underlying a single decision. This includes a multitude of issues that may conflict—directly or indirectly—when considering a specific, situated design, including issues of “uncertainty, uniqueness, and value-conflict” (Schön 1985).

The concept of *knowing-in-action*—a manifestation of tacit knowledge—in tandem with the implicit design judgment explained by *reflection-in-action*, functions in the studio as a method for design exploration. These conceptual frameworks for understanding the way designers think allows the pedagogy to directly support these activities, ultimately resulting in more efficient and appropriate patterns of design judgment that

characterize an expert practitioner (Lawson & Dorst 2009).

FORMS OF CRITIQUE

Based on these guiding concepts of how a designer thinks, engages with tacit knowledge, and reflects on their design decisions, it is important to see these concepts activated in some external, observable form. Critique—often manifested in *desk crits* or *pinups*—is a core part of the design studio pedagogy, and provides some form of externalized reflection and justification of design decisions (Barrett 1988; Boling & Smith 2010). These pedagogical opportunities for critique allow either individual or small-group interaction around a student's design, including conversations that encourage the kind of reflective behaviours discussed previously. Left uninspected, these forms of critique have become laden with implications of power and often function as a high-stakes assessment in the design classroom (or at least feel to design students as high-stakes). This is especially true of the formal *design jury*, where a design is presented in front of multiple design professors or experts in a process that includes a presentation and intensive questioning (Anthony 1991; Parnell et al. 2000).

PURPOSE OF STUDY

The purpose of this study is to more fully understand the pedagogical impact of peer informal critique, how it may differ from more formal methods of critique, and in what ways this form of critique results in verbalization of design thinking and judgment in a specific HCI design pedagogy.

METHODS

The methods used in this study are informed by naturalistic inquiry (Lincoln & Guba 1985) and critical theory perspectives (Carspecken 1996). I used a combination of intensive interview and observation techniques in the process of data collection. Intensive interviews were used to target beliefs and behaviours related to critique that were largely tacit in nature, while an observation of critique between study participants allowed for a more naturalistic view into the behaviours and strategies *in situ*.

Table 1. Study participants.

Participant Pseudonym	Gender	M.S. Year	Country of Origin	Critique Dyad
Paul	M	2 nd	USA	A
Emily	F	2 nd	USA	A
Lisa	F	1 st	USA	B
Jiao	F	1 st	China	B

STUDY PARTICIPANTS

Participants were solicited through a departmental listserv and a student social media group. The invitation

requested that they be a current HCI Master's student, that they feel comfortable critiquing a student within their program, and that they provide a project they have previously designed (or were in the process of designing) to be critiqued. The final pool of study participants included four students, including three females and one male. The participants were evenly split between the two years of the Master's program (see Table 1).

THE RESEARCHER

Because qualitative methods were used in the data collection and analysis of this study, the role of the researcher in the chosen context is important to consider (Lincoln & Guba 1985). The researcher has performed multiple studies in this design studio, and was well known by most of the students in the Master's program at the time of data collection.

DATA COLLECTION

A series of two interviews were performed with each participant, as well as one observation of each critique dyad (see Table 1 for assignees to each dyad). Each session was approximately one hour in duration, and audio and video recordings were taken to allow for transcription and further analysis. The first interview served as an initiation to each participant's beliefs about critique, the way they used critique in their design process, and their feelings about critique activated in an auto critique of their chosen design artefact. In a separate session, an observation was performed using a constructed critique dyad of two participants of the same academic year. Each participant was asked to critique his or her partner's design artefact in turn, with no interruption from the researcher. A debrief at the end of the observation allowed the participants to share any immediate thoughts about their experience. Finally, following initial analysis of the first interview and critique dyad, a stimulated recall session was scheduled with each participant individually. This session allowed for member checking of collected data, review of initial coding schemes, and in-depth conversation about 5-6 video segments. These segments were used as either exemplars of primary themes, or where the intent or motivation of the individual was unclear. Clarifying questions were asked to triangulate meaning and ensure that the analysis of the data by the researcher matched the perceived intent of the participant.

ANALYSIS

The initial interview about the participant's belief about and practice of critique was transcribed and coded using an open coding scheme based on emergent themes. Separately, the observation of critique dyads was transcribed and coded using a one open coding scheme for the participant critiquing and another for the participant being critiqued. These two coding schemes were used consistently across all four critiques included in the two critique dyads. The resulting coding was used to develop a sequence analysis of the conversation flow

during each critique. This sequence analysis informed analysis of turn-taking behaviours, settings and sub-settings within each sequence (Carspecken 1996), and underlying discursive structures that inform these behaviours.

A fuller discussion of the behaviours, settings, and sub-settings identified during this analysis process will be provided in the following section, including important break points or setting shifts in the conversation, themes that elicited *knowing-in-action*, and instances of explicit *reflection-in-action* that revealed aspects of the design student's individual process.

FINDINGS

Based on the thematic analysis of the critique dyads, codes were created and applied. These codes were independently created from emergent data by analysing each side of the conversation—themes for the participant critiquing the artefact (the critic) and themes for the participant whose artefact was being critiqued (the recipient). These themes are provided in Table 2, with codes of similar content across each grouping placed in rows to show either a shared thematic relationship, or a “trigger” effect—where the critic code triggers another code from the recipient. Codes were applied non-exclusively to conversational units or turns.

Table 2. Codes applied to the person critiquing (critic) and the person being critiqued (the recipient).

Codes Applied to Critic	Codes Applied to Recipient
Association with User or Problem Space	Identification of Problem Space
Alternative Problem Space/Solution	
Limitations of Prototype	
Analysing Potential User Reactions	Setting New Scenario (Based on Critique)
	Support with Research
	Referencing Former Critique
Replay Prototype	Showing Off Prototype/Artefact
Worst Case Scenario	Response to Worst Case Scenario
	Potential User Scenario
Constructed Scenario	Internalizing New Perspective
Clarification (Interface)	Request for Clarification
Clarification (Idea)	
Unsure/Confused	Caught Off Guard/Explanation
	Conflicted/Personal
Drawing Parallels	Parallels to Other Projects

Codes Applied to Critic	Codes Applied to Recipient
How to Proceed/Next Steps	Next Steps/Self Critique
Positive/Affirming	Thanks
Humour	

The critiques under analysis include four separate primary sequences—two from each critique dyad. Critique duration ranged from 16 to 25 minutes, with no substantial difference in duration between the two critique dyads. Conversational units ranged more widely, from 42 to 87 conversational “turns” during the course of the critique.

Several of the most interesting of these discursive structures, including relationships between critic and recipient codes will be further illustrated.

BEGINNING THE CRITIQUE

Each critique began with the recipient leading the conversation, moving first to a conceptual grounding of their project. While they each had a copy of their design artefact on the table in front of them, they instead chose to identify the problem space they were addressing, explaining what constraints they had set in the process, and in rough terms, how their design came to be in its current form. The recipient drew not only on a conceptual framing of the problem space, but also relied heavily on shared history with the critic, referring to projects they had completed in the past, or referencing how that project had evolved since the critic may have seen it previously in class or in the studio. Examples include:

- *Jiao: Um, this is a workbook one, definitely on the topic of um—death*
- *Emily: OK, alright. So, this is a—well you've already seen this in class, but I'll OK—this is a prototype that I made for my capstone project. Um, I am focusing on newly diagnosed HIV+ individuals and um through a lot of research, I've kind of gotten into the topic of identity development, um kind of just accepting the fact that they are HIV+...*
- *Lisa: You probably know a lot about Anchor already. Um it is a tablet application that links sailors and their loved ones um during deployment. So during deployment when there are times when there's little communication, um it pulls media from a locked box—things they have prepared for deployment, um synthesizes a new message, even if there's no data connection.*
- *Paul: Nice, um cool. So, this project um was basically a project that we were trying to um find a way to help soldiers returning from Iraq and Afghanistan cope with instances of moral injury that they had suffered while deployed...*

After introducing and explaining the problem space, the recipients moved more directly and physically to their prototype. The prototype was used to ground a discussion of the potential user, common task flows, or primary features of the artefact. These explanations of the prototype tended to continue until the critic inserted himself or herself into the critique, most frequently with a clarification of the prototype or user/problem space. This constitutes the most stable setting shift—from design explanation by the recipient to a critique of the design artefact by both participants.

MAJOR SETTING SHIFTS

Settings are an agreed upon direction of conversation, shared implicitly and tacitly consented to between the conversation participants (Carspecken 1996). A setting includes “a tacit specification of the basic purposes of the interaction, its rhythm, and the tacit agreement on associated values, norms, and/or beliefs.” (Carspecken 1996, 116). Within this discursive context, settings can shift over time if both participants agree, again implicitly, to this shift. Setting bids are the actions by either participant to change the direction of the conversation, and these bids can be either accepted or rejected based on how the opposing participant responds, either verbally or using paralinguistic signals (Carspecken 1996).

These settings and bids are especially important to consider in an active discursive setting like critique, where bids continually reframe the conversation around areas of critique that are perceived to be mutually beneficial or profitable. In the analysis of these four critiques, all of the themes listed under each section could potentially serve as setting bids, but three in particular seem to change the direction of the conversation most significantly. The “limitations of prototype” and “worst case scenario” codes from the critic, and the “internalizing new perspective” from the critique recipient seemed most indicative of a major setting shift, frequently chaining together, requiring deep introspection on the part of the recipient either in verbalizing past design judgments, or in imagining new design possibilities.

LIMITATIONS OF PROTOTYPE

When limitations of the prototype under discussion emerged in the critique, almost invariably it prompted a deeper explication of assumptions and design decisions. In this example, Jiao is critiquing Lisa’s artefact, and brings up a potential American bias to their design. Lisa is prompted to explain their rationale, revealing a richer explanation of their (yet unstated) target user group, and other options they considered early in the design process.

Jiao: But I’m not sure, and uh I was curious where you guys are only designing for American [inaudible]?

Lisa: Um, well we designed this thinking about um, well—we—we made our target user people on

deployment in the Navy or people on ships. Um and so this—I think this could be expanded to other military branches.

Lisa: It doesn’t have to be the US, and also like people like migrant workers, where one of the first people who like popped into our head for ways to expand this. Um, so I don’t think it—it’s tied to an American population. I mean, that’s what we chose to be our—our starting point. But you can definitely—

WORST CASE SCENARIO

Playing the “devil’s advocate” in the context of critique frequently surfaced important design considerations, either through a change of perspective (often coupled with potential user reactions or a new scenario) or a question regarding technical functionality. In the conversation segment related below, Paul is probing Emily’s project on HIV/AIDS disclosure for potentially damaging use cases:

Paul: It might be a newer maybe newly diagnosed, it might be kind of jarring to like hear these stories of like, of people who’ve been having troubles as opposed to stories of people who have been living with it for a long time or people who’ve had like successful shared stories—

Emily: Yeah

Paul: Versus like, oh crap, that was awful or something.

Emily: Yeah, well, you know, that’s definitely one of the, I think one of the biggest problems with this is that it has potential to have really negative outcomes, too, because you know, if I am a African American gay male and I see the story of another African American gay male who was disclosing his status to his mother, and his mother you know called him a fag or something, and like you know, and—and he’s like, you know, is this going to happen to me? So I—that’s definitely something— [laughs]

These instances of “worst case scenarios” often resulted in limitations of the prototype being surfaced, or the re-evaluation of the problem space or target user. Thus, the worst case scenario activated evaluation and support through research, or a projected change in the prototype to address this new scenario.

INTERNALIZING NEW PERSPECTIVES

Three out of four critique recipients invoked this code, which describes some outward sign that they are considering a new scenario, user type, issue with their prototype, or other perspective. This consideration is often coupled with active listening or a sense that the recipient is proactively testing this new information against their design concept. In the following segment, Paul is advocating that an online community for

supporting individuals disclosing their HIV/AIDS status has similarities to support groups:

Paul: It feels like communicating the idea is kind of the same thing.

Emily: Yeah, and this is kind of more like if you need support you have to ask for it rather than like—

Paul: Yeah

Emily: What you said with like going there and seeing like, this support is being offered.

Emily seems to take this potential perspective and incorporate it into her design “conversation,” considering what effect it may have on her prototype. Following this brief consideration, Emily more explicitly referenced research as it related to her problem space, externalizing design decisions that had been unclear to this point.

ENDING THE CRITIQUE

While the recipient readily began each critique, the features of the discourse that ended the critique were less decisive. The critic had the last conversational turn in each critique, but the content of this turn varied—ranging from reiteration of the next steps in the design process, externalized thoughts of whether they had anything else to add, or bland positive encouragement to the recipient. Examples included:

- *Lisa: And you could cremate the person and put them in their real tree! [laughs] They would grow in it. Oh. Somebody posted on Facebook this thing where like you get cremated and then it's essentially like, I don't know, like a Chia pet for creation, and like you can—you can grow out of a tree or something.*
- *Jiao: Out of the tree [laughs]. How could it? We almost done—*
- *Paul: Not really, I mean—anxious to see where it goes.*
- *Emily: Me too! [laughs] Awesome, thank you.*

Because the participants in the critique dyad had some form of prior relationship through their coursework and interaction in the studio space, this seemed to bring more humanity to the end of the critique. While the central portion of all four critiques was quite focused and professional, each critique ended with more absurd notions (e.g., a memory tree for terminally ill patients being a real tree) or anticipation and support for the next steps in the design process. The central portion of the critique seemed in character with a professor-led *desk crit*, both in content and style of inquiry (often serving to externalize *reflection-on-action*), but the character of each critique by the end was more directly supportive of the informal, peer nature of the critique.

FLOW OF CONVERSATION

The critique sessions generally began with longer conversational turns, as the problem space was identified and the prototype was introduced. The discursive space appeared to become more informal over time, resulting in shorter conversational turns, and a rapid-fire approach emerged where it was unclear which participant was the original designer and which was the critic of the design. In this way, the design conversation turned to collaboration in a couple of instances, which seemed to be supported by the participants' recalled past experiences of informal critique in the studio.

DISCUSSION

The settings and shifts that were observed to structure the discourse of these peer, informal critiques fit within Polyani's (1966) assumptions about tacit knowledge and Schön's (1987) conceptualization of how this tacit knowledge may be externalized in the design process. While these generalizations about externalizing design thinking are helpful in framing the conversation, each design discipline brings with it different mechanisms, methods, and tools to actually verbalize important information.

In this set of critiques carried out within the HCI discipline, the critic encouraged verbalization from the recipient by using several key frameworks germane to features of designed artefacts in this field. These included: framing the problem space, projecting user reactions, constructing potential use scenarios, and “playing through” prototypes. Each of these tactics or strategies seemed to bridge the explicit critique context with underlying realities of designing interactions or experiences, recognizing the role of user groups, defining the problem, supporting research, and use patterns of the final design artefact. Each of these frameworks is discussed further, with additional detail around how *knowing-in-action* and *reflection-in-action* were activated in a productive way.

FRAMING THE PROBLEM SPACE

By defining the problem space early in the discussion—which is encouraged by the pedagogy of this specific Master's program as an epistemological feature of the studio (Shaffer 2003)—alignment is achieved between the critique participants early on in the conversation. This problem space serves to contextualize the prototype walkthrough, potential user concerns, or other clarifying comments. In addition, problem framing was used throughout the critiques by both the critic and recipient as a device or structure for changing perspectives or imagining different design possibilities. Making explicit alterations to the design landscape like re-framing the problem required active *knowing-in-action* to understand the change and translate existing design decisions into new design judgments. In the first example, the problem space is framed in isolation, while in the second example, the problem space serves as an

opportunity to discuss supporting research that advised the recipient on past design decisions.

- *Jiao: Yeah, and you know the topic then um we sort of call—have three or four two interviews with our participant who are [name redacted] and—and [name redacted]. They all lost their um relatives, especially for [name redacted]. [name redacted] lost her father um two years ago and it's really painful for her, but that's sort of a journey that we kind of—we don't know much, because um of course we lost our um relatives or our friends, um so our topic was um how to—how to help people who lost their loved one in terms of terminal illness.*
- *Paul: ...and especially um, I feel like a support group uh along the lines of Alcoholics Anonymous or something like that. Like the one thing that kind of charac—characterizes it is the like regularity of the meetings, but also accountability?*

PROJECTING USER REACTIONS

Participants often invoked a persona or generic identity to investigate the experience of the design artefact they were critiquing. In many cases, this sense of what a user *might* do or think was a way to find holes in the design, or explore segments of the design rationale that had not been fully considered or explored. This tactic was also used to actively support *reflection-in-action* on the part of the recipient—almost forcing verbalization of design decisions, which may have been tacit up to that point. In this example, Lisa asks a series of clarifying questions about the prototype to understand what the user experience would be like. In doing so, she improves her understanding of the design artefact, while encouraging explicit *reflection-in-action* on the part of Jiao—forcing Jiao to make these critical decisions, even if they had not been made heretofore.

Lisa: OK, can the family members see what the terminally ill person is saying, or?

Jiao: Yes, they can, but also, everyone who are going to post, they can select whether it is private or public.

Lisa: Whenever it's private, does that become public after you die?

Jiao: Um, I don't think so.

POTENTIAL SCENARIOS OF USE

Scenarios, or imagined walkthroughs of the use of an artefact, were used quite frequently as a device for visualizing the user experience. This method was highly effective for exploring tacit knowledge through *knowing-in-action*—framing new situations, contexts, and users in ways that were productive in generative ways to the overall design conversation. This technique was often linked with a re-framing of the problem space or projecting user reactions, but in a more explicit, tangible explanation of how a scenario might play out.

In this first segment, Paul is discussing how training about post-traumatic stress disorder (PTSD) during troop re-integration may allow them closer access to resources that can help them cope. Emily has already set this conversation in motion, and is supportive as Paul works through the details of whether this scenario is important to the overall design problem he is attempting to address.

Paul: You are, this is an emotional subject—[joking] but I think that might be the thing that—that it would offer is not necessarily like the end all be all solution of like getting these soldiers to tell their stories. Sometimes it might just be that knowledge that there's something out there that people are coping with this.

Emily: Yeah

Paul: Um, whereas for other people it would be that sense of I—I need to like get assistance with this, and I need to tell somebody, because maybe I can't tell it to anybody here. So what's—

Emily: Right

Paul: I just need to put it out there.

Emily: Yeah. So it does kind of—the motivation does have to be kind of (.) self made—

Paul: Yeah, yeah

In this second segment, Lisa is discussing how her concept could conceivably be used on more devices than just an iPad. This conversation began when Jiao asked about an alternative problem space beyond the iPad, prompting additional reflection from Lisa on how this might work.

Lisa: I think it would be easy to make this something that could go across multiple platforms. And like, that's a good idea, because I mean especially the people at home, like I think it's more logical for it to be on a tablet for somebody on the plane—

Jiao: Right

Lisa: On a ship, but at home. But I don't know, I think you're more likely to have your phone taking pictures of things—

Jiao: Right

Lisa: You want to send back or like using a laptop, so yeah, we could—I think having it go across multiple platforms wouldn't be that difficult. Like—

LIMITATIONS OF THIS STUDY

This study is based on relatively small sample of students within a specific design discipline. Results from this study cannot be generalized to students in other design disciplines, or even future cohorts of this specific design program. Future studies are necessary to evaluate the applicability of these discursive structures

in other educational contexts, especially in design disciplines where a culture of formal critique is more substantially implemented in the pedagogy.

The nature of the researcher-paired dyads and self-selection of design artefacts also limits the applicability of results in a studio environment. While dyads were selected within a single design program and the critiques were carried out in a portion of the design studio space, a fully naturalistic view of interactions without researcher involvement was not captured in this study. Additional research is needed to determine how students interact and critique in a studio environment without formal structures imposed by a researcher. Critique embedded in interactions between peers while collaborating on a shared design project may also indicate different discursive structures than those found in this study.

IMPLICATIONS FOR FUTURE RESEARCH

Based on the findings in this study, future research is needed to solidify the mechanisms of informal critique—both in design education and practice. In viewing critique outside of the lens of formal academic evaluation, the importance of documenting design conversations and the way these conversations affect the on-going iteration and development of artefacts can be seen as a significant issue in education and practice.

Within education—particularly in the context of HCI design—greater attention to the informal structures of critique could serve as a less high-stakes form of evaluation, while also fostering a sense of practice community on which the studio is based. The strategies and frameworks used to critique are also vitally important, as they seem to draw equally on foundational design methods/techniques (e.g., scenarios, personas, prototype walkthroughs) and major concepts in design thinking (e.g., problem space, user research). Additional research is needed in each of these areas to understand the space of critique in education, as well as the tools and frameworks needed to explore this space in the act of critique.

There are also significant research implications for the practice of interaction design, as professional practice is judged on the ability to communicate the purpose and use of a design (Morton & O'Brien 2006). Based on this exploratory research on informal critique in a design studio, parallels can be drawn between the cultural practices of the studio and professional practice in the communication of design ideas. Research is needed within practice communities to understand how design knowledge is communicated, critiqued, and changed, and how the tacit knowledge invoked in these situations is activated and made explicit.

CONCLUSION

I propose that this study into informal, peer critique is an avenue to understanding the communication of tacit design knowledge in a broader sense. Lawson & Dorst

(2009) note that as higher levels of expertise are attained as a designer, many design decisions move from the explicit to tacit dimension—from externalized to internalized. As such, studying design students closer to the level of beginning designer, or students in transitional stages of design expertise may provide valuable insights on design thinking, and greater access to tacit design knowledge (Lawson & Dorst 2009).

One of the most important contributions from this study is a more explicit understanding of how designers—or practitioners in training—talk through their design decisions and consider or investigate potential avenues for change. As Schön envisioned design thinking as a conversation with the design artefact—*reflection-in-action*—understanding the explicit dimensions of design thinking, and externalizing more tacit knowledge and decisions may serve to improve current and future design practice. A more complete investigation of *knowing-in-action*, and how the externalization of tacit knowledge can be encouraged, is an important line of research, and this study proposes some beginning frameworks for observing and understanding how this externalization may occur.

This study also implies a need for more research on how critique can reveal patterns of implicit design judgment. Because there is a strong divide in academia between formal critique (which has been studied extensively) and informal critique (which has not been studied explicitly), recognition of what constitutes this divide in terms of content and outcomes is an important next step. In addition, this study suggests parallels to design practice. Informal critique may be closely matched by water cooler talk or organic conversations in the design space, while formal critique could include high-stakes client or stakeholder pitches.

Ultimately, greater awareness of how tacit knowledge is productively externalized and shared with others will result in more efficient communication between designers. This awareness also leads to a greater reflective quality around communication of design issues, increasing the verbalization of key issues at stake for designers and non-designers alike.

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ENSTASY: IMMERSIVE DRAWING AS A DESIGN PROCESS

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Figure 1. Enstasic drawing of the decay of tidal flats.

ABSTRACT

This paper considers the means by which the short film *Munted* (Ings 2011) was drawn into being. It discusses drawing and interior dwelling as enstasic methodological practices. In so doing, it suggests that such approaches to the design of filmic narratives might enable the designer to reach *into* ideation and *outwards* into the communicative appearance of the text.



Figure 2. *Munted* is an unusual film about a false accusation of paedophilia and its terrible consequences. Set in 1961 in a remote rural New Zealand community, it tells the story of a ten-year old girl (Katrina) and her friendship with a brain damaged artist (Don). It offers a lyrical and brutal account of the cost of rumour and prejudice.

INTRODUCTION

Film is created in many ways but generally, the worlds we watch are conceived as written scripts that are later translated into images by directors, production designers and actors. However, if film may be understood as ‘talking pictures’ it might also be conceived and developed inside the domain of images. This alternative method reaches far beyond the didactic storyboard. By using it, the designer¹ ‘draws’ a world into being. By forsaking the script (scriptum), he might engage the Greek idea of *skariphasthai* (to scratch an outline, sketch) as a mode for dwelling within an enstasic space where thought is pursued, encountered and drawn into tangibility. Using drawing as an ideational tool, the designer processes ideas that words can’t reach; he touches the nuanced, draws into what withdraws, and retrieves from a protean world, a complex story that thinks... and speaks in pictures.

Using the recent short film *Munted*² (Ings 2011) and reflecting upon considerations of thought (Eliade, Heidegger, Rosenberg and Polanyi) this paper traces a trajectory of practice-led design research through the creation of the film’s story and treatment.

AIM

The aim of this approach was to find a way of bridging the space between visual ideation and visual communication (in the development of a film text). In other words, I was seeking a method through which I might transfer something of the intangibility of image-led thought into a film that dealt with a very interiorised man and his relationship with a child who wanted to

¹ Although traditionally the role of the director is a discrete, interpretive one, in films like *Munted* the roles of ideator, writer, director, production designer, illustrator, typographer and editor are fused. In cases like this, I position myself as the *designer* of the text. By design I refer to a conscious and critical orchestration of graphic elements/thinking into coherent, communicative texts.

² A trailer for *Munted* can be viewed at:
<http://www.youtube.com/watch?v=f81lk6gwnlw>

become an artist. I was interested to see if enstasic drawing might enable me to access processes (and ideas) that words couldn't reach. In so doing, I was attempting to open up the process of film design to higher levels of discovery.

LITERATURE AND THEORY

While a significant number of publications continue to reinforce conventional approaches to scriptwriting (Landau 2012; McBride 2012; McKee 2010; Turner 2011), a body of recent writing has surfaced that draws into question screenplays as an appropriate model for designing and developing film.

Millard (2010) has discussed how, in an era where images and sound play increasingly significant roles, traditional formatting conventions may restrict innovation in screenwriting. Murphy (2010) has considered alternative approaches to the screenplay including improvisation, psychodrama and visual storytelling. Their work builds on Wells' (2007) argument that the role of film ideation and development needs to be broadened to embrace alternative narrative forms, concepts, images, sounds and music. He notes, "many innovative screenwriters and film-makers have long favoured audio and visual expressivity over plot and narrative drive" (p.13) Wells' ideas have been prefigured by diverse examples of directorial practice. Jean-Luc Godard used images for inspiration "that for some reason meant something to him; obsessed him; a landscape, the face of an actor, a photograph from a newspaper" (Geuens 2000: 89). Similarly, the graphic designer Wong Kar Wai who in 1995 created *Fallen Angels*, insisted on the role of images, sound, and music in the scripting and production process. Like the films of Antonioni, Wong's work is developed from the idea that "abstract lines, and forms, and shapes, and colours can give emotional meaning and expression just as much as narrative lines, dialogue and characters" (Brunette 2005: 119). He believes, "You can't write all your images on paper, and there are so many things – the sound, the music, the ambience, and also the actors – when you're writing all these details in the script, the script has no tempo, it's not readable... It's not a good idea (to write out a complete script beforehand) and I just wrote down the scenes, some essential details, and the dialogue" (Brunette 2005: 126).

THE SCRIPTED NARRATIVE

However, unlike these films Munted was *entirely* constructed and refined through a process of drawing, poetic notation and painting.

Traditionally it is a requirement that the spectrum of visualised material in the writer/director's head must be translated into the comparatively limited parameters of written language before investors or funding agencies will consider the work. In other words, the merits of an imagined film are assessed on the act of translation into the interim medium of the written word.

The assumption that the narrative potential of film can only work if imagery is translated into written language may be in part inherited from the traditions of theatre where written scripts have historically driven performed narratives. However film is not theatre on celluloid. It tells its stories in unique, pictorial ways.

It is useful in this regard to consider for a moment the etymology of the term 'script'. The Latin word *scriptum* means a written text. It refers to the nature of recording in written language and relates to conventions of presenting ideas in a cohesive manner through the construct of writing. However, there is a potentially richer term akin to this word that is of comparable interest. In Greek *skariphasthai* also means to inscribe but it may be defined as scratching an outline, or sketch.

Skariphasthai suggests that meaning might be drawn into being in realms that transcend the limitations of the written word. It supposes an approach to communication that still records, but provides a broader dimension for thinking and construction of narrative. It prescribes an environment where a world imagined in pictures might be processed in pictures and eventually communicated in pictures, without the unnecessary impingement of literal translation. Within this construct, the hand and pencil as realising agents in the act of drawing, may serve as translatative tools that operate in a purely iconic mode (closest to the mode in which a film might be imagined). Pallasmaa (2009: 17) suggests "the pencil... is a bridge between the imagining mind and the image that appears on the sheet of paper. In the ecstasy of work, the draftsman forgets both his hand and the pencil, and the image emerges as if it were an automatic projection of the imagining mind." This kind of drawing is a process of pursuit rather than capture.



Figure 3. Immersive location drawing. Painted in coffee, ink and muddied water, drawings like this formed thinking spaces where I read the narrative potential of the site. These paintings offered up to four hours of contemplation and suggestion. The scribbled notes reflect on sounds, smells, and motion as poetic thought.

If the imagining mind creates in images and we accept that film uses pictures to communicate meaning, it is useful to consider the potential of methods of ideation and development that operate purely within iconic modes. If one considers the scripting of a film as *skariphasthai*, one might create and refine through a

process of drawing. In this approach, the designer might engage with levels of indwelling inside the film's emerging diegesis and this process may lend itself to a deeper contemplation of the visual potentials of a proposed narrative.

ENSTASIS AND DRAWING

Sketching as a method of processing and communicating design ideas has been discussed by a number of writers, (Goel 1995; Hare 2002; Pipes 1990; Rodgers, Green, and McGown 2000; Scrivener, Ball, and Tseng, 2000; Verstijnen, van Leeuwen, Goldschmidt, Hamel, & Hennessey 1998). However, much of the emphasis of research in the area has focused on what Rogers (2000) considers three primary uses of design drawing. These are concept sketching, presentation drawing, and drawing for manufacture.

However, through a process of immersion the designer might also engage in a drawing method I would describe as enstasic drawing. The term enstasic suggests a standing within. It surfaces from the Indo-Greek roots '*en*' (into) and '*histanai*' (to stand). It may be contrasted with dis-stasis (non-standing) and ecstasy or ec-stasis (standing outside of). The word has been used in certain esoteric/philosophical writing (Dooyeweerd 1931; Eliade 1958; Von Baader 1987; Friesen 2011). However, its origins predate this use.³ Although these writers use enstasis in slightly different ways it may be broadly understood as a state of indwelling, interior consciousness or inner reflection. Eliade (1958: 193) describes it as a state and knowledge where the "consciousness is saturated with a direct and total intuition of being".

In design research I would suggest enstasis might refer to an induced interior state of self hood where one dwells in the creative potential of what is not yet formed. This process may involve the deployment of drawing in a slow, reflective process that allows the designer to become immersed in the world of the emerging image and story. In this approach, thinking becomes contemplative; the designer converses with drawing and the drawing talks back to him. This talking is generally more nebulous than literal. One talks in tone and weight, emphasis and potential. Ideas are coloured and lit and their parameters are nuanced. Thinking is not prescribed by the territorial limitations of words. Images

³ The word enstasis as it appears in early Greek thought referred to an objection to a premise in a logical argument, or to finding an example that countered an argument. See Aristotle: "enstasis d' esti protasis protasei enantia" (Aristotle: Anal. prior. II, pp. 26-28). However, Friesen (2011) notes the Greeks also used enstasis to refer to a 'way of life' (enstasis biou). He records the first reference to contrasting 'enstasis' with ecstasy in the writing of Heinrich Paulus (1800, vol. 1, p.15).

operate with a more flexible grammar and one is able to connect possibilities in comparatively abstract and intangible ways.

Rosenberg (2008: 109) refers to this process as a state "where one thinks with, and through drawing to make discoveries, to find new possibilities that give course to ideas and to help fashion their eventual form". Here he says "the represented object does not function as a sign but rather as a trope; a vector, a directional motion that moves from the singularity of the image to turn the mind out towards something that suggests itself in the hubbub of connections" (Rosenberg 2008: 114).

Thus, in a state of enstasis one is not outside of one's self, drawing to create a picture, but inside one's self, drawing to explore the potentials of a thought. As such drawing is a process. Rosenberg suggests this form of drawing, "is thinking and acting between the not yet formed and the formed" (ibid.).

THE POST-THINKING DRAWING

These drawings are significantly changed when they are read post-process. Although residues of enstasic thinking were used in Munted as a way of making explicit the interior mind of a man, this was not their original purpose. Drawings on Don's walls (and acting as transitions between his world and that of the child) only acquired this function when one night as I was drawing I pinned some of his thinking up the wall in front of me. I was trying to clear my worktable of material, and when I looked up he felt comforted. It was the comfort of a fictional man. From that point the residues of some of these enstasic drawings contributed to a physical world that explained his interior nature.



Figure 4. Interior of Don's cabin with enstasic drawings used in the development of his character covering the walls



Figure 5. One of over 150 botanical drawings created 'as' Don in the development of his character and story.

Across the surface of these images we see evidence of an almost obsessive need to find meaning. Don's notes weave through his drawings in a tiny scrawled hand that bursts into unpredictable volume. His thoughts are poetic, meandering and introspective. They are also broken. This is a consequence of a condition of many brain injuries such that ideas cannot be held together in a cohesive manner for any extended period of time.

Although some of these drawings became artefacts, enstasic drawing is only what it is during ideation. Rosenberg (2008: 123) notes, "When the process has a clear outcome, a *telos*, it is in a sense no longer an ideational drawing.... Once the idea is in a sense realised, the drawing is merely a record, a feature in a history of the process, and no longer part of the process proper". In this regard I am reminded of Byron in his 1822 letter to Thomas Moore, who said, "...like all imaginative men, I, of course, embody myself with the character while I draw it, but not a moment after the pen is lifted off the paper" (Byron 1835: 623).

This approach to drawing surfaced characters, contexts and narratives. They developed and refined inside a visual world and eventually emerged as constructed beings. Thus, enstasic drawing became a method of immersing the designer in both the visual feel and the narrative genesis of the film (as thought).

DRAWING AS INDWELLING

This is not a new idea. The sixteenth century the Italian painter Titian reportedly "touched the surface of his paper in order to investigate an elusive world just beyond his reach" (Taylor 2008: 11). In so doing he was reaching into the domain of thought. He was drawn into the world of the mark. Heidegger suggests that what is thought provoking has not yet been thought. He notes that thought turns away from us, and calls us through the draft of its withdrawal (Heidegger 1968: 3-18). Schön, (1983: 159) argues that when drawing, we construct a "virtual world" where "the pace of action can be varied at will. The designer can slow down and think about what he is doing." This process of "thinking about" aligns somewhat with Polyani's concept of "indwelling" (1967: 17). In this state the thinker is dwelling inside an environment of the self where meanings and connections might surface.

Douglass and Moustakas (1985: 47) suggest that this process is marked by "vague and formless wanderings" but eventually there develops "a growing sense of direction and meaning emerge[s] as the perceptions and understandings of the researcher grow and the parameters of the problem are recognised."

In this space, Rosenberg (2008: 109) suggests one thinks as "a process and always in process". He notes that in this state the process of drawing is simultaneously mental and physical. It is both thinking and thought. Thus, he suggests, "we are drawn into making drawing and the drawing draws us into further thinking" (Rosenberg 2008: 110). In this regard, "the known and the un-known are drawn to and through each other" (Rosenberg 2008: 112).



Figure 6. Painting of drains. This was a four-hour contemplation on water running through the darkness of an abandoned culvert. I was interested in how such a sound might translate into the idea of loss through drowning. This painting appears in the film as a tracking shot accompanying the child's monologue on the death of Don's family.

ENSTASY IN APPLICATION

In developing the diegesis of the film *Munted* I travelled to a remote, farming settlement. I sketched the brittleness of bracken fern, the corrosion of old tank stands, and the smell of summer mud. Later, in the same region (where we eventually filmed *Munted*), I discovered the remnants of an old house and began to sketch the wild plants and forgotten gardens that marked the enigmatic residues of lives that had unfolded there.

Upon returning home each night, I unloaded piles of wilted plants onto my table. Then I began to draw in the character of a damaged man. I was not drawing as myself (indeed my painterly style is very different from

the works that appear in this film); instead, I dwelt inside and sought out, a fictional character. I moved into an enstasic space. Here the rhythm and sound of a pencil, the smell of wilting leaves and the quiet beating of my heart formed a kind of *denkraum*. This contemplation removed me from a known world and from an awareness of myself. In an enstasic space the unknown had room to dwell and find tentative form. Although Eliade (1958) considers this space one of static consciousness, no longer related to any temporal duration or functions, I would argue that it is not static, although time may feel suspended. Time and action function, but in less familiar ways. One is aware of fatigue and of the drying of paint, but not of the linear progression of time. Stasis is not a suspension of thought but a stillness inside which thought might surface as a form of contemplation.

Using a process of indwelling I slowly drew into existence the nature and story of another being. The man who surfaced from the interior space into which I was drawn was a botanical artist. I discovered that he was intelligent and had a scientist's penchant for detail. However, some years before the film begins, he suffered a brain injury as the result of a car accident that killed his wife and children. Accordingly, his work wrestles with grief over the incident.

As I drew, I dwelt inside this man. Eventually I replaced the light bulbs in my studio with a kerosene lamp so he might feel more comfortable with the luminosity, scents and sounds that were in the slowly forming world he occupied.

The state of immersion became increasingly sensory to the point that, as the film sought higher levels of refinement, changes were made to the story only after driving out to the world where the narrative would be shot and spending hours drawing inside the rooms of the cottage where he would be living.



Figure 7. Don's paintings were created using only materials available to an isolated man in a remote New Zealand farming district in the early 1960s. Accordingly, his drawings appeared on sheets of light, unbleached paper in Indian ink, graphite, coloured pencils, watercolours, grass stains, coffee washes, and rust. When completed, these works were glued roughly onto card so the paper he had stretched in the process of painting, blistered, creased and marked.

Through this process of immersion the character of the botanical artist (Don) began to speak. He was strange company because unlike other characters I create, he did not speak with words... (in the film he has largely lost the ability). Instead somewhere between drawing and the scribbled, fragmented, poetry of his observations, his story began to surface and connect through a language of nuance and suggestion.

I discovered he was very vulnerable. He was afraid of conflict because he could not hold ideas together long enough to protect himself. Drawing had become his retreat into a simple but beautiful world that could not hurt him. His friendship with the child in the film was based on this same quest for the safety of innocence.



Figure 8. Drawing of Don's house one evening when I was working on location at dusk. This image was later embedded into the film, and the flickering light of his kerosene lamp was animated in the window.

STANDING WITHIN THE SELF

The process of drawing into being is difficult to describe but Miller (1993: 74) comes close when he observes, "creativity is linked to a state of consciousness where images appear. This is usually a passive state where we are not trying to be creative but are receptive to experience and ideas". In this regard I was not indwelling so I could find describable, narrative episodes, instead I was receptively 'listening' inside the drawing of a fictional man's thinking. I was standing within the self and dimensions of the self were speaking in languages that transcended words. Drawing in this realm was not didactic. I was not trying to record thought. Rather drawing was contemplative. Each mark induced another and collectively the weight, colour and texture created worlds and ways of seeing became the dimensions of a fictional character and his story.

Enstasis in this regard may be likened to Keats concept of negative capability, "when a man is capable of being in uncertainties, Mysteries, doubts, without any irritable reaching after fact or reason" (Keats 1958, I: 193). In this uncertain state one receives and reflects on thoughts rather than actively pursuing them. Thought is cumulative. The dimensions of characters, worlds and their collective stories gather like tentative fragments drawn to a magnetic field. These fragments are brought to the fore through rhythms of drawing objects and

environments.⁴ Where a character murmurs words in this state, I record the fragments I ‘hear’. These fragments do not become the dialogues of the film, but act as further insights into consciousness. They are the lyrical thoughts of dimensions of the self that have adopted fictional personas.



Figure 9. Drawing of a wild lily showing a fusion of Don’s botanical training and the fragmented nature of his grief.

COMMUNICATING PAINTERLY INNOCENCE

Because the process of drawing was so organic I realised while I was working that the idiosyncratic and unpredictable mark of the artist’s hand might also be employed as a means of emphasising the painterly innocence of the story. In contemporary short film, special effects are generally manufactured inside the convenience of digital environments. These environments carry in their architecture the cognitive blueprint of their software designers. What is promoted, as a plethora of options is in fact just that; a set of options. They are not approaches driven from the source of the work but somebody else’s styling agents that may be applied to its surface.

Munted is a film that bears the marks of its thinking and its making. The danger of water permeates it on many levels. It is the medium of thought (ink, watercolour, coffee and tea stains), it corrodes old cars, stains surfaces, and ties the death of Don’s family to him. Accordingly, the aesthetic of the film is marked with water. Sometimes its stains drift across the surface of his paintings and sometimes they bruise the filmed world around him.

The technique of narrative staining was not achieved via the application of a special effect. Instead it was created from portions of Don’s paintings that we separated and individually animated as discrete elements.

⁴ Some of these fragments establish homologies and resonances; they ‘relate’ to each other. Others surface and then fall away. This may be likened to Simmel’s discussion on method (1908: 1) where he notes, “out of complex phenomena, the homogeneous will be extracted... and the dissimilar paralyzed”.

These stains were the *skariphasthai*, the marks of making, pulled forward from the creation of a story and embedded in the film’s final treatment. They were the texture of thinking, the unreliable and unstable products of an alternative method of designing film; they were the leakage of method into the surface of a visual story.

INSIGHTS AND CONSEQUENCES

As a research method, enstasic drawing enabled me to think slowly and immersively. By being able to develop a film via images rather than through written description, instruction, and dialogue, I was able to develop a diegesis based on weight, tone, colour, texture and sound. This is not unlike Wong’s approach to filmmaking that utilises abstract forms, shapes, and colours to create distinctive levels of emotional resonance. However, the process of enstasic drawing is more immersive. One dwells *inside* a world and through this indwelling that world gravitates towards the tangible.

Because as a director I had lived inside these characters and their physical worlds, I knew the ethos of what I eventually filmed on very sensory levels. This meant that approaches to lighting, grading, movement, sound and texture were internally cohesive because they were developed inside the same ideational process.

Significantly, the outcomes of this approach also influenced the manner in which the film was directed. When Munted was shot we did not have a script. I showed actors drawings, introduced them to the physical world they would inhabit, and explained the event that would occur in each scene. This meant that their performances were essentially responsive. This technique is not unique. Films like Wright’s *Shaun of the Dead* (2004), Kubrick’s *Full Metal Jacket* (1987), and Scorsese’s *Taxi Driver* (1976), all contain significant, non-scripted scenes. However, with Munted the entire film was directed through immersion and guidelines.

Both Katrina and Don spent long periods, prior to shooting in their respective houses and the environments that surrounded them. They learned to ride bikes through long summer afternoons, they picked wild blackberries together and drew pictures of each other. The scenes of Katrina’s near drowning and the assault on Don were shot without rehearsal. The actors knew what would happen in the scene but I asked them to feel their way through (dwell within) the episode and respond accordingly.

CONCLUSION

In trying to describe the design process that brought this film into being I am aware of the difficult nature of the discussion.

First, enstasic consciousness (as discourse) has a somewhat discordant history through theological philosophy. In considering the term I have largely stripped it of its spiritual/esoteric associations and

considered it as a concept that may be used to describe a state and process used for developing creative thought.

Second, enstasic drawing is not a form of communication. Its purpose is not didactic (diagrams), nor a form of shorthand (sketches). Instead, it is used to *generate* thinking.

Third, enstasic drawing is by its nature, nebulous. It validates the sensory, the immersive and the tacit. It elevates standing *within* the subjective self to draw thought into being. As such its processes are neither stable, predictable nor explicit.

Finally, enstasic drawing is useful only *in* action. What we read post-process is not the thinking, but at best, a disconnected residue. In *Munted*, these drawings *did* bleed into the film. Because of this, it has been necessary in this article to differentiate between the drawings as enstasic thinking and their nature and use as post-ideational artefacts.

IN CLOSING...

Munted premiered in the 2011 Montreal World Film Festival. It went on to official selections in a number of international festivals including the 53rd Bilbao International Film Festival, the 29th Brussels International Film Festival, the 27th Berlin-Interfilm Film Festival, the 18th Regensburg Short film Week, the 2011 Vladivostok International Film Festival, and the 2011 Lucerne International Film Festival. The film won numerous awards including: Best Short Film at the Lucerne International Film Festival, Finalist in the 2011 New Zealand Design Awards, the Jury Award: Special Honour at the 18th Regensburg Short Film Week, and the Audience Award at Zubiak Gexto (Spain).

But these awards are only the aftermath of making. *Munted* was a film generated inside an enstasic space that eventually bled into a short film text. The film was conceived through painting, drawing, touch and sound, in a world beyond words. Through this highly sensitised process, two men reached out to each other. One was the designer and the other, a fictional man. These men were inextricably linked, although one functioned as the creator of the other. The drawings constitute the territories and residues of their thinking.



Figure 9. Opposite- Drawing of digitalis. Although drawings like this served to develop the intricacies of the film's diegesis, they did not lose their potential for generating thought as the film moved into production. However, their role changed from the enstasic to the explicit. In this new form they permitted new types of ideational conversation to occur between actors, crew and myself.

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BALANCING FOOD VALUES: MAKING SUSTAINABLE CHOICES WITHIN COOKING PRACTICES

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ABSTRACT

Within user-centred design and topics such as persuasive design, pleasurable products, and design for sustainable behaviour, there is a danger of over-determining, pacifying or reducing people's diversity. Taking the case of sustainable food, we have looked into the social aspects of cooking at home, in specific related to the type of food that is purchased. This paper describes what it means for people to make more sustainable choices in food shopping and how that can be mediated while taking different 'food values' that household members have into account. In a design experiment, we developed a service for selecting daily dinner meals while supporting choices of sustainable food which reported on environmental impact, health and nutrition values, and purchase data. Through visualizations of alternative food choices, the experiment provided a space for households to negotiate food values, while opening up possibilities for changing cooking practices.

INTRODUCTION

Society is facing grand challenges through global environmental change, economic instability and social inclusion. Issues underpinning these challenges are manifold but household consumption, defined by the OECD (2002:2) as "the selection, purchase, use,

maintenance and repair of any product or service by members of a household" is increasingly being highlighted as a key area requiring attention. Furthermore, increased efficiency of production and products has been countered by increased consumption, and volume effects resulting from behavioural, social and demographic factors (Keyfitz 1998, Stø et al. 2006). For example, 'rebound effects' have spurred consumer research which challenges previous assumptions of rational choice, planned behaviour and consumer sovereignty which tended to 'black box' consumption as an economic and material category (Stø et al. 2006, Welfens et al. 2010). Broadening focus from the individual consumer to consumption as part of socially shared practices (Spaargaren et al. 2006) holds potential for a better understanding of the role of these in the complex reality of daily life, and to find leverage points for change on the scale required for reaching a more sustainable society (de Jong and Mazé 2010).

In this paper we describe a project where we had an existing online food shopping service in Sweden as starting point. People increasingly use services like these, for various reasons such as efficiency, and some appeal to people's interest in shopping for more 'eco-friendly' products. Our initial aim was to provide customers with their personal historical purchase data as a way for them to have more control of their consumption behavior. However, this also offered the unique potential for us to intervene and influence customer's choices in order to shift towards choosing products with less environmental impact and to raise the issue of producing less food waste at home. A study conducted by the Consumer Society in Stockholm (Ungert 2008) shows that the Swedes, on average, discard about 28% of the purchased home, where 18% is unnecessary waste (food that does not consist of inedible parts). By making alternative food choices the daily diet would cause only a quarter of energy output (13MJ) compared with a more energy-intensive diet (52 MJ) (Stockholms Stad 2008). In relation to these 'good' food choices, there is also a great potential to reduce environmental impact by using locally produced food, a

change that also generates cost savings. However, there are several unresolved questions in this matter, which we cannot all address in this paper since it is a complex discussion very much dependent on the system boundaries chosen, and also driven by political agendas. For instance, the question if local production, such as beef produced and consumed in Sweden is environmentally better in terms of less transportation versus potential large-scale benefits of production of beef elsewhere in the world.

The questions that we are addressing in this paper are how people make food choices for everyday home cooking practices, and how to engage and support household members in making sustainable food choices.

BACKGROUND

DESIGNING CHANGE

Approaches for raising awareness and changing people's consumption behavior often focus on designing interactive systems, for instance by presenting information on resource uptake in a visually attractive and easily accessible way. For example, for reducing direct energy use in households, the goal is to make people reduce their energy uptake by making energy uptake itself both more visible and understandable as to what and when it is used for (Broms et al. 2010). However, some domestic energy-consuming practices, such as washing clothes are non-negotiable (Pierce 2010), where people simply are not willing to make a change. Interactive services and products are also available for shopping 'eco-friendly' food products, such as bar code scanners and applications revealing the 'eco-footprint' of food products or ingredients when standing in the store. However, choices of food are driven by other than rational goals as well. They are not only economically and culturally driven, but set and embedded within a social context (De Borja, 2010).

In our previous work we have investigated the concept of social practices (Author 2012) in order to study the role of design for shaping alternatives to current water and energy consuming household practices. We have adopted the definition of a practice by (Reckwitz 2002), since it explicitly mentions 'things' which we find useful in relation to product design:

"a routinized type of behavior which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge"

A basic characteristic of practices is that they consist of a constellation of interconnected elements, of which 'things' and their use, mental activities and emotional states, and bodily activities and background knowledge are part (Shove and Walker 2010). While designers are trained to design products, Shove and Pantzar argue that "products ('things') alone have no value. They do so

only when integrated into practice and allied to requisite forms of competence and meaning" (2005, 57).

Taking practices as a unit of design (Kuijter and de Jong 2012) means not only to focus on the design of new things but to think about novel constellations of skills and images as well. However, this is still not all of it. Again in the words of Shove and Pantzar, "new practices consist of new configurations of existing elements or of new elements in conjunction with those that already exist. From this point of view, innovations in practice are not simply determined by the generation of new products, images or skills. What really matters is the way in which constituent elements fit together" (2005, 61). In practice-oriented design, the focus expands from things to images and skills, but not without consideration of how these fit together. For example, practices of washing, cooking, travelling and gardening (De Borja et al. 2010, Hielscher et al. 2008, de Jong and Mazé 2010; Spaargaren et al. 2006) are understood as a historically and constantly changing assemblage of designed artifacts, skills and images. Taking practices as unit of analysis offers sustainable design the systemic perspective necessary to address the scale of change required in moving towards a more sustainable society (Scott et al. 2012).

In this project we adopted cooking as main unit of analysis. Although people in Sweden are believed to have a limited number of eight to ten dishes that they prepare for about 80% of the time, there is a large variety of lifestyles between participants from different backgrounds even in similar environments. While for some this is inherently a fun and family matter where taste and variety of dishes and ingredients are on the top list, for others the hassle of this everyday recurring activity but also lack of knowledge and skills, lack of inspiration and the actual planning of meals requires much effort (Spengemann 2011). People have very different personal goals when it comes to what food they choose, varying from balancing quality and price, to health issues, as well as social values.

The increased use of different technological devices and convenience of ready-made food has brought about a new set of skills than in traditional cooking (Truninger, 2001). Processed and pre-prepared food can be combined into tasty dishes and this way of cooking might fit better to the way in which food is sold in supermarkets. In that perspective, it is not enough to simply bring back traditional skills and knowledge to the current cooking practices if the aim is to have a fit with people's modern values. Re-introducing traditional knowledge is seen to have potential but is believed to not hold all the skills needed for the modern context of food practices. This means that new skills and products have to be developed that fit to the context instead of having to re-learn 'traditional skills'.

PRACTICE-BASED DESIGN PROCESS

We adopted an explorative design approach to explore and open up cooking and shopping practices. It was

carefully guided by the research team for developing design examples in which issues of awareness and social interaction in relation to food shopping choices could be explored, see for example our previous work for such an approach [Mazé and Redström 2008]. Rather than ends in themselves, designed artifacts can be instrumental in futures studies for approaching the social complexities and controversies inherent in dealing with sustainable futures. For example, visualizations may frame perspectives on otherwise intangible and complex phenomena, conceptual or critical designs may broaden the collective imagination by depicting alternative futures or viewpoints, and scenarios may illustrate transition pathways (Mazé and Önal 2010, Quist 2007).

The project was set up around a design team, consisting of service designers and user researchers with a design background, and managers from an online grocery store, joining together in monthly meetings as well as in the participatory design workshop. In these working sessions, quantitative survey data as well as qualitative ethnographical material from the user research was presented as building blocks for the design process, resulting in several design proposals for an online shopping service. One of which was elaborated as prototype for explorative evaluation with users. The project started in February 2011 and lasted one year.

EXPLORATIVE RESEARCH

Our starting point was to get more insight into what food values people have, and how people actually make choices what to eat, what these choices are based on and how this is embedded in a socio-cultural context. We started off with explorative research by inviting ourselves to accompany people into both physical and online stores. Afterwards, we joined into their homes while documenting the entire sequence of unpacking and storing by video and/or photos. Such documenting was done throughout the project, including evaluation of the final prototype, and data was fed into the design process shaped as stories, pictures and quotes of participants' practices.

ONLINE SURVEY

As a first indicator, we conducted an internet survey on what people think about 'ecological' brands, and what they need in order for them to make more sustainable choices in their food shopping. The survey contained questions ranging from the amount of ecological products people buy to amount of food that is thrown, as well as the reasons for making (non) environmental food choices. The internet survey was set out amongst personal networks of the design team members, and was eventually filled out by 42 persons. The results were analyzed by quantitatively assessing the results and were regarded as indicative. Results suggested that people suffered from a lack of trustworthy information on food products to make sustainable food choices.

ETHNOGRAPHIC STUDIES

In response to the need for diversity and inclusion of people with different 'food lifestyles', we set up our explorative observations and interviews with people whom we expected to have different personal goals: a person with an interest in eco-products, an online shopper with small kids, a food expert, and a person *uninterested* in food waste. Furthermore, one person, the 'food expert', agreed to be part of the project during all research iterations, see also Figure 1.

We found it particularly important to observe people directly at the store where they usually would go for shopping food or groceries, and at their homes. If possible, we invited them to be interviewed with family members. For various food choices, it is difficult for people to verbalize their thoughts about things they do in the store and why they choose certain products or brands. Similarly, it will provide more direct and evidence based information when people show things in their kitchen or at the store. For example, to see what type of ecological products they buy and why, how they go about with information on products, where and how they store things at home, and whether they are aware of the food they have in their cupboards and fridge. Meanwhile, we asked questions about special occasions, such as dinner parties and birthdays, and how they used to think about food products and shopping in the past.

The explorative research included two moments in time for the observations and interviews: (1) at the start we performed explorative observation with 4 people during shopping at the physical store or online at home (each roughly 1.5 hours), and (2) half way during the project, we organized interviews with 7 people, of which the one person as 'food expert' had been part of the first observation round, to evaluate and prioritize three design proposals (each roughly 1.5 hours).

METHOD OF ANALYSIS

We analyzed and transcribed all collected material from the observations and interviews, resulting in a total of about 20 hours of video and audio recordings. The questionnaire, observations and interviews were mainly used to inspire the design process, not to form an accurate overview of different food values and people. These were reported in user profiles reflecting personal information as well as ambitions and problems, see Figure 1.



Figure 1. User profile with picture, quotes, drivers/ambitions, opportunities, problems and thresholds.

FOOD CHOICES

The food values of participants that we found in the research showed a high variety between people. They ranged from a high demand for taste and quality from food experts, who are experimenting with food, and the eco-interested person who uses social media for exchanging recipes with other similar minded people. Others values coming from the online shopper with kids and the food expert, are related to issues on health and nutrition, for instance from people with children or people with specific diets. Also, a lack of inspiration and knowledge reported as a 'daily hassle of balancing quality and price' is a recurring issue among all participants.

How people make food choices and what it is based on, has been divided in two themes: firstly, trustworthiness of information and secondly, balancing food values.

TRUSTWORTHINESS OF INFORMATION

Participants indicated in the first explorative interviews and in the internet survey that they had a need for knowledge on the environmental impact of their food consumption. They indicated that they did not trust the eco-brands, or that they did not know how to interpret the information and understand differences between the 'eco-products'. Also, unverified stories going around about 'good' and 'bad' products, and proper ways of preparation were a source of frustration. Here, participants are searching for answers online and in their personal networks, but do not know where to look for trustworthy information.

From the observations in the store, it became clear that participants had various ways of determining quality of specific fresh products, for instance the food expert was touching and smelling fruit and vegetables, and looking at the product's color, texture, as well as due dates of fresh products. The eco interested person and the food expert were keen on getting raw ingredients or locally produced food, as opposed to the ready made dishes, pre-cooked and processed food to avoid artificial food supplements. However, the online shopper also indicated not to know how to relate to environmental

impact and was especially unsure about other impacts, such as packaging and transportation and how that worked out as a whole.

BALANCING FOOD VALUES

Participants take the everyday returning choices of 'what to eat' very differently. For the food expert with teenaged child who is also deciding on the daily dinner meals, there is more discussion and negotiation on sustainable choices. But for the online shopper with small kids it is more important to have a healthy and balanced diet, combined with a good quality/price index.

Although for the eco-interested person the environmental impact of food products was an important part of the decision process, other participants find it difficult or not important and rather relate to taste and health/nutrition. Some participants use a home delivery service, or have used it earlier. These services take care of deciding what to eat, and deliver the ingredients for dinner meals, for instance. Some of these services are geared towards providing fresh and locally produced ingredients and 'eco-products'. Again the participants mention trust and that it is important to believe in the quality of the service, the products they deliver, and what it stands for.

An important value, that is already touched upon, that all participants mentioned is health and nutrition. Even though the importance of this has changed continuously during their life, with getting children as the major instigator for taking this more seriously, most participants mentioned that they still have to balance the quality of products with their finances. Evenmore, in households where not all members prefer the same food, for instance those with specific health or vegetarian wishes, participants indicated that this adds to their daily struggle of finding harmony in everyday cooking.

In terms of food waste, participants often mentioned not to know what items were lying around in the fridge and cupboards, nor did they know about their due dates. They also talked about dinner left overs, which were made into lunch boxes for the next day or, what also happened, that left overs were being placed in the back of the fridge or freezer and forgotten over time and eventually were thrown. This is something that people said they were actually feeling unhappy about and would like to avoid.

DESIGN EXPERIMENTS

Given these food values and choices, we were looking for points of intervention for our design example. We sought to find those instances where people are open for discussion and interested in hearing more, or where they are already looking for alternative ways, or even trying out new ways of cooking to see how those fit in their everyday lives.



Figure 2. Participatory design workshop with a futures approach.

By taking a futures perspective, as explained in the background section, which was set in a participatory design workshop format, we aimed to open up potential scenarios without the present political and social power structures, see Figure 2. For instance, what it would be like if there was a high food tax on specific products or if more types of food waste than compost could be recycled in ways similar to recycling of paper and plastics. Even so, it is extremely difficult to imagine how that would work out, and more specific, what the consequences of those ‘future conditions’ are for people’s everyday life. However, it opened up a way of thinking and reflecting on food values and cooking practices that are not restrained by, for example, industries’ sales objectives or accessibility of locally produced food.

As a result, we formulated four directions that worked for us as a way of framing ‘design spaces’ in which we could start formulating our design examples:

1. Informative, which support individual customers during actual shopping with information,
2. Collaborative & Social, focusing on the potential of social media to engage people in networks for getting inspiration, or gaining skills and knowledge,
3. Coaching, which is based on open access of purchase data and linking those to user profiles.
4. ‘Futuristic’, involving more interactive modes of coaching where questions can go back and forth on a more personal level, such as stress levels.

Within these directions, we sketched and, in the end, defined three design examples. They were different types of services and we chose one for each direction, apart from the Futuristic direction: (1) A shopping service with an extra layer for local producers and food experts to exchange knowledge and ideas, (2) A recipe service for sharing tips and recipes, and (3) A planning

service with factual data on food and guidance for changing food patterns.

DESIGN EXAMPLE

To be able to reflect on the questions we posed in the research, we developed one design example called ‘Food Planner’ further. It is based on the third design direction, and was prototyped as an application for an iPad, see Figure 3, only for the purpose of the research. This gave us the opportunity to study the type of feedback and information that people actually supports in their decision making and possibly in changing their cooking practices.

We chose the Food Planner, because we were looking for ways to support and engage household members in cooking practices, with meals as the center of attention for people’s inspiration, negotiations, and choices. By offering several options for dishes, including healthy alternatives and showing their environmental impact, it aims to create discourse around food preferences as a way of reflecting on people’s cooking practices. This would mean, for instance, that if one person in a family thoroughly enjoys beef (with high environmental impact), and another person prefers vegetarian dishes (with low environmental impact), it can be made ‘acceptable’ for both to have some beef dishes since it will be balanced out by vegetarian dishes.



Figure 3. Family planning of weekly dinners in the interview setting.

We will briefly present the design example here.

The final design has several features that allowed people to plan their dinner on a weekly basis by choosing ready available meals and recipes. The selection of meals made it possible to create a point system of meals’ environmental climate impact. Such a point system is preferable since impacts are defined in intervals and making the points correspond to these intervals. Similar to the point system of Weight Watchers (2013) for nutritional information, the system creates an intuitive model matched to different goals (for instance a goal could be 10 points/day). Furthermore, it is only necessary to calculate products in common recipes and the impact of many products converge to zero in small quantities.

These calculations were based on Life Cycle Assessment (LCA) calculations of indirect energy caused by producing, transporting, packaging, etcetera, of food products. The calculations were estimates, based on environmental impact databases made available through our previous project 'Reclaim your data' in which data was developed by Swedish defence research through the use of an energy analysis program, which is a simplified LCA method. The LCA calculations were made for a small number of example dishes by calculating the type and amount of ingredients, and add their relative impact in terms of CO2 emissions, see Figure 4 for an example.

To set the CO2-score we multiplied the total amount of CO2 with a factor and put the result in different intervals. To set this factor we experimented with the numbers and found a reasonable balance between having low numbers, which are easier to remember and more accurate in terms of letting errors into the intervals- and still expressing variations between most dishes. Thus, most recipes wouldn't be in one or a few intervals.

In the prototype we set a goal of a maximum of 40 CO2 points per person and week based on dinners. This was mostly an experimental number but it was based on a 25 % decrease in CO2 consumption from the current consumption. This was up to people themselves to set based on their current consumption, and then to gradually lower it so as to make it feasible for people to reach the goal.

The nutrition and health information was based on the content and balance of ingredients of the meals, such as fibres, fruit/vegetables, sugar, salt and oil-based products, where we used customized preferred daily intake overviews for visualizing the data.

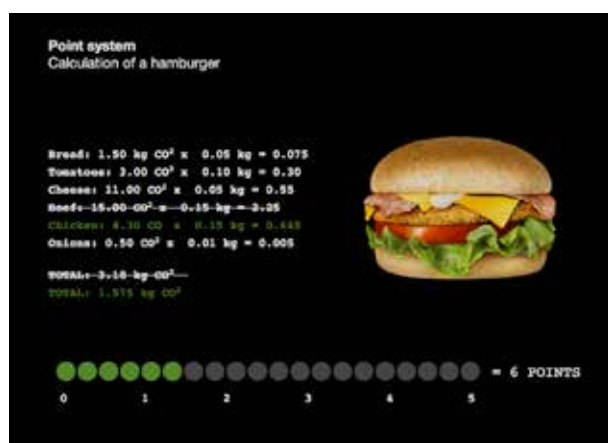


Figure 4. Example of LCA calculation of hamburger, including a meat alternative, in CO2 values and related point system.

The calculations and information were gathered purely for prototyping purposes. They did not reflect accurate numbers, which was also pointed out to participants in the user tests. Our intention here was to describe

possibilities and boundaries with a possible system of CO2-feedback rather than develop it.

Another feature is the democratization of data. As people use services in their daily lives, such as shopping with loyalty cards, large amounts of data about their behavior is generated and analyzed to empower organizations in their decision-making. Therefore it provides people with the opportunity to access their own purchase data, which could give 'power back to customers'. Apart from historical data on quantities of products, the service also generates a shopping list based on the chosen meals, with which people could check their stocks and take away those items they don't need, hence reducing food waste.

In Figure 5, the design example is shown. Here, it reflects the main screen with pictures of dishes, as well as their ingredients and recipe. For each meal, an indication of environmental impact of all the ingredients is provided by a number reflecting environmental impact. Those are added up in a bar depicted underneath the chosen recipes which is visually filling up from the left in green, but turning orange and red as soon as a, self-chosen, goal of maximum total number of points per week was exceeded. Also, accumulated overviews of environmental impact, including so-called 'top five ingredients' and personalized suggestions are provided in follow-up screens. Other overviews, not depicted here, include the health and nutrition graphs, and financial overviews.



Figure 5. The first prototype of the design example Food Planner on an iPad with the suggestion of daily meals, including direct environmental feedback.

EXPLORATIVE EVALUATION

The prototyped design example was explored by 6 participants, including other household members, at their homes in an 1-2 hour interview. The participant that had taken part from the beginning was included in the evaluation as well. For the purpose of the research, about 20 dishes were taken up in the service, as well as their calculated environmental impact, and the nutrition

and health data. The prototype functioned in terms of the visual layout of the screens, possibility of manipulating images of meals, the shopping list functionality, graphs and overviews, but did not resemble reality in terms of actual store content and exact data.

The interviews were themed by taking out quotes and reporting those within our questions of food choices and changing practices: (1) Making sustainable food choices and (2) Changing everyday cooking practices.

1. Making sustainable food choices

In the service we included three types of information feedback that people indicated they needed: an environmental impact point system, health and nutritional graphs and financial overview. For choosing dishes, visualizations were provided in clear and bright pictures of the dishes. People mentioned this as an important feature since food is all about texture and colour and this is a good way of referring to those values, albeit in a different way. However, they also clearly indicated that they wanted detailed overviews to compare their data with others and also for setting their personal goals. On a more practical level, people expressed preferences on the way the environmental impact was depicted. For instance, they felt they were punished by visualizations indicating high impact numbers in a red color.

Credibility and accessibility of information are two important notions within the service for people to actually make changes in their routines, which they feel are worth the effort. Several participants indicated afterwards in the phone interviews that they became much more aware of the products they choose and to be more active in finding information and alternatives. Apart from providing purely information about the background of products, there is also a need for more personalized, humorous and visually attractive stimuli and remarks that are aimed towards making people reflect on their consumption patterns, for instance a remark on environmental impact that says “Oops, too much beef here”.

2. Changing everyday cooking practices.

Participants indicated that even though the environmental impact was simplified within a point system, it is a notion that is often unfamiliar to participants and that they cannot relate to their everyday life. In order to become useful for them, they need a way of comparing the impact value with other things that they can relate to, such as the impact of traveling or energy use, or with other people. In terms of nutrition and health, graphs are difficult to interpret for some people, but in general this was seen as an important feature of a total service. Similar viewpoints arose on the graphs reflecting historical purchases and financial overviews.

During the evaluation, some participants actually had to change their shopping practices since we interviewed

them sitting together as families, which they normally would not do, as they said. Here, teenaged children got very involved in the selection of dishes, see also Figure 3, and it provoked discussions on food choices among family members, of which they said that they had not known about other members' thoughts before. During the interview negotiations on the planning of dishes in one week were going on between family members, such as “but you have already had your steak and now I would like to have the beetroot soup”. It facilitated a meaningful interaction amongst family members in a playful way, contrary to the notions of ‘hassle’ and ‘efficiency’ that we encountered in the earlier user research.

DISCUSSION

Our goals in the project were to understand how people make food choices and to explore how to engage and support household members in making their food choices more sustainable.

We found two important themes related to people's food choices: (1) Trustworthiness of information, and (2) Balancing food values. We have been experimenting with these themes by designing several design examples of which we have prototyped and evaluated one, the Food Planner, a service for weekly planning dishes presenting reliable information on environmental impact, nutrition and health information, and financial overviews based on purchase data. The environmental impact feedback was visualized in a point system, based on LCA calculations of food products in Sweden, albeit with a limited size of the database. The nutrition and health information was based on the content and balance of ingredients within estimated preferred daily intake overviews.

CHANGING PRACTICES

While issues on presenting and visualizing data on resource uptake are not new, we have begun to explore ways to present the information of environmental impact of food to people in an easy, yet rich way. Still, many issues remain open for questioning, such as the point system for environmental impact of food products and the relation of such a system to other resource uptake indicators.

We have also intervened on a social level, by facilitating negotiation and decision making within families. However, we discussed changing routines only in the interviews and we have to question whether this comes near to the level of forming and stabilizing ‘new’ practices that we feel is necessary. In order to understand how cooking practices can be shaped, we may need to step away from current modes of interaction and devices that come on top of the current information load that people handle in everyday life.

EXPERIMENTAL DESIGN APPROACH

The experimental design approach taken in the project as well as the continuous iteration of the user research

into the design process has led to design iterations that were made on the basis of the aim of the team members to understand how to relate to people's food values. Team members were eager and anticipating on implementing insights and evaluations of the prototyping phase into the final design example. However, they had to get used to the way the project was framed, without the existence and formulation of a 'design problem', and instead searching for design examples as a way to study a phenomenon rather than designing a 'solution' for a certain 'need'. Our design team, although varied in terms of expertise, did not represent customers, nor did it include people from other socio-cultural backgrounds than our own. As a concluding remark on participatory design, we need to be careful when thinking in terms of who we are designing for, and who we relate to as 'the others' (Keshavarz and Mazé 2013), or as they put it "The role of the designer and researcher simply cannot be pre-constituted, nor its terms of participation. Design must be queried at the 'political frontier', in which other, situated forms of knowledge are embodied in social- and change-oriented practices".

Future research is underway and will take up the precise calculation of meals and how people can relate that to other (in)direct use of resources. Also, the mode of the current design example has been used merely as an example and possibilities of other modes, not necessarily online shopping, but more directly related to food, such as in a physical grocery store will also be investigated. Maybe most importantly, we need to take a step back from this experiment, and, perhaps guided by principles of backcasting and future studies (Wallgren and Höjer 2009), find alternative scenarios that do not introduce yet another interactive technology.

CONCLUSION

In this paper we have presented how we explored issues around making sustainable food choices in everyday home cooking practices. Important themes that we found in our search are: (1) Trustworthiness of information, and (2) Balancing food values.

We have prototyped and evaluated one design example, the Food Planner, a service for daily planning of dishes which presents reliable information on environmental impact, nutrition and health and financial overviews, which proved to be a viable means for exploring and negotiating people's food values. However, we will still need to verify by means of long-term studies, for instance, to what extent people will actually make more sustainable food choices and change their cooking practices.

Future research will take up the development of the suggested point system for environmental feedback, to assess whether and how this will actually succeed to become an effective means to create discourse in households on food values and accordingly, to develop new cooking practices.

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CHARACTERISTICS AND INTERFERENCES OF EXPERIMENTS IN SCIENCE, THE ARTS AND IN DESIGN RESEARCH

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ABSTRACT

Commonly the term “experiment” is in the first place associated with science, systematic methods and strict principles for the sake of knowledge creation. Nonetheless, the term is widely used across the boundaries of science. The arts attribute artworks likewise as experimental – a usage that is often claimed to be metaphorical, since experiments in the arts (including design) lack the essential attributes that define a scientific experiment.

Currently, research in the fields of science studies and literary science has revised these established conceptions as well as the primacy of the scientific experiment. The philosophical approach of New Experimentalism relativizes the deductive conception of hypothesis-testing experiments and argues for a broader view. Studies in literary science and cross-disciplinary comparison between the arts reveal an age-long experimental tradition and also common characteristics of experimental work in these fields. Design researchers should be aware of these developments in order to position, theorize and argue for design experiments accordingly.

INTRODUCTION

The term ‘experiment’ is closely connected with scientific research in the natural sciences, psychology social sciences and also archaeology. Physics, a prototypical science, can look back to a long history of successful experimentation that reaches back as far as to the scientific revolution in the course of the 17th century. However, experimentalism is also rooted in the arts: Artistic experiments can be found in literature, theatre, film, music, fine arts, and design. Clearly, the “two cultures” (Snow 1964) claim likewise that they conduct experiments, proceed in an experimental manner or produce experimental artefacts. Nonetheless a comparison between the experimental practices and results of the “two cultures” show profound differences. At first glance, there might even be more differences than there are communalities.

Differences and blurred borders can also be found when we examine experiments in design practice and in practice-led design research. In both fields the term “experiment” was and still is often used but poorly defined or interpreted. The multiple uses of the term and its different meanings and connotations in the various fields bear closer examination.

In order to shed light on this subject this paper chooses an approach from the science studies and literary science. During the last decades these disciplines have compiled an extensive body of knowledge about experiments, the interplay between experimental practice, construction of theory and instrument making, characteristics and validity of experiments in the various fields and, last but not least, the social and material contexts of experiments (Kuhn 1976; Schmidt 1978; Gombrich 1980; Hacking 1983; Rheinberger 1997; Berg 2009; Gamper, Wernli and Zimmer 2009, 2010, 2011; Kreuzer 2012)

The paper first, examines the etymological origin of the term “experiment” and early experimental practices in

the Renaissance. Second, it describes characteristics and antagonistic conceptions of the experiment in science, i.e. the inductive approach and the deductive approach. Then, the so-called New Experimentalism will be introduced, a philosophical approach that reconciles and broadens these traditional concepts. Next, traits of experiments in the arts (including design) will be introduced and compared to the characteristics of scientific experiments. Finally, the different findings and lines of argument will be brought together and conclusions drawn.

ORIGINS OF THE “EXPERIMENT”

According to the Merriam-Webster Online Dictionary the English term “experiment” originates from the Latin word *experimentum*; the first known use goes back to the 14th century. It is defined as 1a: “test”, “trial”; 1b: “a tentative procedure of policy”; and 1c: “an operation or procedure carried out under controlled conditions in order to discover an unknown effect or law, to test or establish a hypothesis, or to illustrate a known law”. Further, the dictionary states that the terms; “essay”, “experimentation”, “test”, and “trial” are related to “experiment”.

The German digital etymological dictionary (Etymologisches Wörterbuch), edited by the Berlin-Brandenburg Academy of Sciences and the Humanities, lists the term ‘experiment’ in the following ways; “(scientific) trial”; “in the 16th century in medical records ‘approved medicine’ and ‘trial’, at the end of the 17th century ‘trial’ in the context of experimental physics”.

EARLY EXPERIMENTAL PRACTICES

In early usage, the meaning of the term experiment was somewhat vague and all embracing: “Test” and “trial” don’t address a specific field of research and application or a certain procedure. It seems that this usage corresponded to the state of science and the arts at that time. Philosophical, scientific and artistic aspects or approaches were not yet separated from each other, as the following prominent example will show.

THE POLYMATH LEONARDO DA VINCI

Without a doubt Leonardo da Vinci (1452-1519) was in Renaissance one of the first major experimenters, a man ahead of his time. He conducted countless scientific studies in various disciplines including anatomy, optics and mechanics. Kemp (1981) and Letze and Buchsteiner (1999) stressed that Leonardo placed great value on “impression”, “experience” and on experiments. For the documentation of the results of his empiric research Leonardo used the ‘artistic’ medium of drawing. (Fig.1,2)

Taking up a dispute between Kuhn (1969) and Hafner (1969) on the relationship between science and art in general and the role and importance of scientific and artistic pictures in particular, the question remains whether the new scientific insights and the drawings and writings generated by the researcher are equally

important in the judgement of posterity. Are the ‘scientific’ drawings from Leonardo works of art in their own right? Or is the new knowledge more important than the drawings? In the case of Leonardo the question is rather pointless. There is no reason for giving one or the other part of his work greater weight. The experimental practice resulted in scientific insight *and* in artwork. The drawings contributed to rational scientific insight as well as to the arts.



Figure 1-2: Leonardo da Vinci: The Vitruvian Man”, drawing, 1492. Study of the mechanism of the hand.

THE “TWO CULTURES”

Subsequently, in the course of the 17th century and beyond, philosophers and scientists as well as men of letters and artists started using the term “experiment” in the context of their studies. Unlike the Renaissance scientist-artists, their studies contributed either to natural philosophy or science on one hand or to the arts on the other – even if their ambitions might have been more universal.

By way of example, the painter John Constable (1776-1837) is well known for his cloud paintings (see fig. 3). In 1836, he argued in a lecture, held at the invitation of the Royal Institute, that painting is a science and should be undertaken in order to research the laws of nature: “Why isn’t it possible to consider landscape painting as a branch of natural philosophy and the paintings as corresponding experiments?” (Gombrich [1980] 1984: 212) He may have held the hope that his sky paintings would contribute to meteorological research and



Figure 3: John Constable: Cloud painting, oil on paper, 1821 (National Gallery of Victoria, Melbourne)

weather forecasting. But whereas in the Renaissance drawings of anatomy and central perspective added to the body of scientific knowledge, Constable's sky paintings failed to contribute by induction to meteorology (ibid.:227). The divide between the "two cultures" took place.

EXPERIMENTS IN SCIENCE

Generally, the term "experiment" is closely connected with the scientific endeavours that began at the end of the 16th century. Indeed, the exact sciences emerged in step with experimental procedures in the modern scholarly sense. The driving force was the desire to explore and reveal the fundamental laws of nature. Francis Bacon (1561-1626) was notably the first to argue that observation is not enough, but one must 'twist the lion's tail', i.e. intervene in nature, in order to learn its secrets. According to him knowledge of general principles and causal relationships results from unbiased observation, experimenting, accumulating data and setting up generalisations based on these data. His approach was known as inductive reasoning and the contemporary philosopher and physicist Galileo Galilei (1564-1642) strengthened this tradition as did the originator of classical mechanics Isaac Newton (1642-1726) and the philosopher John Stuart Mill (1806-1873). (Heidelberger 2007:159)

In the 19th and 20th century, various natural scientists, historians of science and philosophers such as Justus von Liebig (1803-1875), Pierre Duhem (1861-1916), Karl Popper (1902-1994), and Thomas Kuhn (1922-1996) vehemently refuted the English tradition of inductive reasoning. (Ibid. 160f) The chemist Liebig for instance claimed: "Experiment is only an aid to thought [...] the thought must always and necessarily precede it if it is to have any meaning. [...] An experiment not preceded by theory, i.e. by an idea, bears the same relation to scientific research as a child's rattle does to music." (Hacking 1983:153)

Referring to Newton's laws of universal mutual gravitation and Ampère's theory of electromagnetism, Duhem proved that these laws and theories, which claimed to be prime examples of induction, were by no means a derivation from observed facts. Instead of this, the raw facts of experimentation had to be reframed and shaped in a symbolic form by means of arbitrary hypotheses. According to him, observation has to be interpreted within a theoretical framework in order to be useable in physics. Thus, the necessity to express the experimental data in a symbolic manner disables the inductive method (Heidelberger 2007:160). During the ensuing period, his arguments were influential. Karl Popper, an "extreme anti-inductivist", continued this approach. From his point of view, theory based on hypotheses comes first and the central aim of conducting an experiment is to eliminate unfounded hypotheses (ibid.:162). Until the 1970s, the discourse on experiment was dominated by an overly theoretical

approach and the primacy of theory was taken for granted.

Apart from the controversy regarding inductive and deductive reasoning there is a consensus that the main objective of experiments is to gain new knowledge or to eliminate false hypotheses about fundamental laws of nature. For this purpose experiments might serve as exploration, verification, explanation, proof or demonstration of natural phenomena. This demands an objective, unbiased approach and repeatability of the experiment. The aim is to gain deep understanding of a phenomenon within a set of boundary conditions in order to be able to explain a phenomenon and to make predictions, which derive from the postulated hypotheses or laws.

NEW EXPERIMENTALISM

Ian Hacking deserves the credit for having redirected the discourse on the experiment by criticising the primacy of theory and emphasising the importance of the material dimension, experience and skill. Thus, his work "Representing and Intervening. Introductory Topics in the Philosophy of Natural Sciences" (Hacking 1983) is regarded as a "pioneer work of New Experimentalism" (Chalmers 2008). Choosing historical experiments from various natural sciences (chemistry, optics, thermodynamics etc.) as case studies, Hacking provided evidence that it is a mistake to view experiment as a simple controversy between advocates of the inductive and the deductive approaches. He revealed the relationship between experiment and theory to be manifold and claimed "any one-sided view of experiment is certainly wrong" (Hacking 1983:66). Suggesting that there are various approaches, he advances this classification: "Some profound experimental work is generated entirely by theory. Some great theories spring from pre-theoretical experiment. Some theories languish for lack of mesh with the real word, while some experimental phenomena sit idle for lack of theory" (ibid.:159).

Beside exploratory experiments, where observation or action is undertaken to find out what will happen, and hypothesis- or theory-testing experiments, where hypothesis or theory precede the experiment, Hacking also identified 'happy meetings', where experiment and construction of theory are undertaken independently of each other but meet in the end. Furthermore he even considers trial and error and invention to be preliminary stages of the experimental method as, in some cases, they are followed by theory. For instance, the science of thermodynamics or rather the thermodynamic cycle, established by Nicolas Sadi Carnot in 1823, arose from a profound analysis of the principles of high-pressure steam engines, which had their origins in the inventions of Watt, dating back to 1767-84, and Trevithick, dating back to 1798. This example shows that the time that elapsed between action or invention on the one hand and understanding of the phenomenon and construction of theory on the other might be many decades. Hacking

conceded: "I make no claim that experimental work could exist independently of theory. That would be the blind work of those whom Bacon mocked as 'mere empirics'. It remains the case, however, that much truly fundamental research precedes any relevant theory whatsoever." (Hacking 1983:158)

A further argument put forward by Hacking is remarkable. He claims, "a chief role for experiment is the creation of phenomena" (ibid.:220) that "did not hitherto exist in a pure state in the universe" (ibid. xiii). Herewith he opposes the traditional opinion that "the phenomena revealed in the laboratory are part of God's handiwork, waiting to be discovered" (ibid.:225) by the observer and the experimenter. Taking the Hall effect¹ as an example, Hacking pointed out that the apparatus needed to produce the effect was man-made and the inventions were created. Thus, even though the effect is based on a fundamental law of nature, "the effect does not exist outside of certain kinds of apparatus" (ibid.:226).

EXPERIMENTS IN THE ARTS: USING THE EXAMPLE OF LITERATURE

Artistic artefacts and performances – whether from the field of literature, theatre, film, music, fine arts, or design – are often described as being "experimental". In the context of these genres, the term "experiment" connotes that the artwork shows traits such as being "novel/ innovative", "courageous" and "non-compliant", that it "opens new dimensions and insights" or that the artist "works with an uncertain outcome" (Schmidt 1978:9). A dictionary on arts, architecture, fine arts, applied arts, design, and art theory pointed to "practical implementation and testing of new procedures", "novel, daring expressions, forms and compositions", "neglecting the risk of failure" and furthermore "development of numerous new media, materials, techniques, social visions, iconographical motifs and forms" (Olbrich 1989:404). And a dictionary on German literary studies states: "Generally, in literature the term 'experimental' connotes an explorative, testing, unusual approach." (Jäger, quoted by Berg 2009:53)

Consequently it has been argued, that in the field of the arts the term is mostly used metaphorically, since the artistic experiment can be characterized by absence of all the essential attributes that define a scientific experiment. For instance, artistic experiments lack a theoretical framework, a systematic method or methodological approach and the possibility of verification through repetition. Furthermore, the artistic experiment does not aim at new knowledge that is accessible to everybody or at dominance over nature. (Berg 2009: 54)

¹ The Hall effect, discovered by the American physicist Edwin Hall in 1879, is the production of a voltage difference across an electrical conductor, transverse to an electric current in the conductor and a magnetic field perpendicular to the current. See http://en.wikipedia.org/wiki/Hall_effect

For this reason, the linguistic usage draws criticism from its own ranks. In the 1960s, the author, poet and editor Hans Magnus Enzensberger and the novelist and poet Helmut Heißenbüttel resolutely denied the appropriateness of the term in this field. Enzensberger disclaimed any relation between experiment and literature as "nonsense" and "simple bluff" (Enzensberger 1962:309f) while Heißenbüttel found that the term "experimental" replaces the term "revolutionary" (Heißenbüttel 1972:133). However, he argued for using the term "trial", if the author does not know beforehand what he is doing. He refused to call a probing, enquiring linguistic exploration an experiment, since "an experiment proves what one already knows" (Schwerte 1968:401). Obviously, this criticism was based on a narrow transfer of the deductive hypothesis-testing concept of experiments in science, which was dominant at that time.

Thus, the question arises, whether experimentalism in the arts is nothing more than a late and dubious successor to experimentalism in science. Is the term "experiment" in the context of the arts nothing other than a badly chosen metaphorical expression? (Schwerte 1968:388) The literary scholar Hans Schwerte negated this question by referring to the age-old linguistic tradition in literature: He brought to mind that Novalis (i.e. Georg Philipp Friedrich Freiherr von Hardenberg) (1772-1801), a poet, author and philosopher of early German Romanticism, was one of the first to transfer the term from natural philosophy into the realm of the arts. At the end of the 18th century, in the context of the evolution and differentiation of the so-called two cultures, the early romantics strove for a reunion. Novalis advocated "to experiment with images and terms in the imagination in a similar manner as physical experimenting" (quoted from Gamper 2012:20).

Furthermore, Schwerte referred to the French writer Émile Zola, who wrote his novel "Le roman expérimental" in 1879. Zola put forward for discussion that a novel might be an experimental composition in order to gain socio-scientific and psychological insights. The experimental aspect was meant to be bound to the content of the artwork, not to its form. However, later on, the focus shifted from the content to the form of the work; poetic language became the material of experimentation. This was the sense in which Nobel laureate Thomas Mann used the term in a letter, not to mention renowned authors such as Gottfried Benn, Berthold Brecht ("experimental theatre"), Friedrich Dürrenmatt and Max Bense ("experimental writing") (Schwerte 1968).

Congruent with this line of argument is also the before mentioned fact that the terms "experiment" and "essay" are historically related. The essay and the experimental method emerged simultaneously. Experimental research and reflection in essay form seems to be the result of a philosophy that is based in practice, argued Gunhild Berg (2009:55). Indeed in the 17th century natural philosopher, chemist, physicist and inventor Robert

Boyle described his air pump experiments in the form of an essay (Hentschel 2000:15).

While the discourse on experimentalism in the arts reached a first peak in the 1960s and 70s (Schwerte 1968; Heißenbüttel 1972; Gombrich 1980), scholarly research on this subject has recently entered a new chapter. Michael Gamper conducted a tri-annual research project, which resulted in a profound appraisal of the experiment in literature from 1580 to 2010 (Gamper, Wernli and Zimmer 2010; 2011; 2012) – a body of knowledge that will presumably strengthen the confidence of the discipline to be a true field of experimentalism in its own right.

Also worth mentioning is recent cross-disciplinary research carried out by Stefanie Kreuzer that compares experimental practice in literature, theatre, film, music, and fine arts. She concluded that in the various art fields experimental approaches take place on three levels: First, on the level of form (test, combination or new contextualisation of text, material, media, or sound); second, on the level of processes and methods (as for example the invention and application of random techniques); and third, on the level of addressing the audience (foiling or irritating the attitude and expectations of the audience; enabling new ways of reception). (Kreuzer 2012:14)

However, this characterisation might provoke the question whether these features do not characterize the modern arts as such. The traits described above might be characteristic of the creative fields as such – but perhaps to a particular high degree in experimental approaches? Indeed, Schmidt stated that the ability to extend the canon is a measure of the quality of experimental artwork. (Schmidt 1978:12)

EXPERIMENTS IN DESIGN PRACTICE

Apart from the experiments of renowned Renaissance artists and artists-researchers, experimentalism in design was livened up by the attitudes of the Modernist Movement. Walter Gropius ([1935] 1956), the founder of Bauhaus, to name but one, used the term “experiment” frequently. He called the school, its programme and projects an “experiment”, and the Bauhaus workshops “laboratories”. Indeed, modernist architects and designers left traditions behind and put innovative and unusual shapes, new materials, construction methods, and so on to the test.

At least from the 1950s onwards the term “experiment” has become widespread in the design community, as a literature review in the German design magazine “form, Zeitschrift für Gestaltung” indicates. A query in the online-archive (www.form.de) shows 350 hits for the term “experiment” and its inflections during the period 1957-2007. A closer examination of the articles and reports reveals that the focus of the design journalists, designers and companies is placed on innovative outstanding products that attract particular attention from both the media and the marketplace. By

“experimental designs” they mean products that stand out from accustomed shapes, established product categories, and familiar use, and products that challenge the borders of technical feasibility or cultural acceptability.

Further evidence for this can be found in recent design literature. Gareth Williams curator at the Victoria & Albert Museum presented under the title “Material Experiments”, prototypes and products from the museum’s collection that derive “from experiments with materials or technical advances, ranging from the diverse ways plastic and wood can be handled, to high-tech materials such as carbon fibre and the possibilities presented by digital technologies” (Williams 2006:90). (See fig. 4-7)



Fig. 4-7 Examples for “material experiments” from the collection of the Victoria & Albert Museum: Above: “Cinderella table”, designed by Joroen Verhoeven, 2006. Below left: Chair, made out of recycled post-consumer plastic packaging by Bär & Knell, 1996. Below right: “Gel Chair”, designed by Werner Aisslinger, 2002.

In order to address the reasons for conducting experiments in design practice, Williams points out that “it is important to note that individual designers and large-scale manufacturers experiment in these ways for very different reasons. For the designers, experiments are part of their personal line of enquiry, but most industrialists will only innovate if they are assured of a more cost- or time-efficient production process as an outcome” (ibid.:90).

Repeatedly experiments in design draw criticism that they are not based on hypotheses let alone reflection or contextualisation within a theoretical framework (Gros 1987:85; Bürdek 2010:32). This critique greatly resembles the arguments brought forward against experimentalism in literature by Enzensberger and Heißenbüttel. Indeed, experiments in design practice show – at best – few of the essential attributes that define scientific experiments. Rather, the term “experiment” indicates “novel, daring expressions, forms and compositions” and, in the words of Bürdek (2010:33), “pushing the boundaries of traditional design

methods". In this respect, design experiments show commonalities with experiments in literature.

Last but not least it could be argued that experiments in art and design create alike scientific experiments certain phenomena. But whereas scientists create the phenomena in order to analyse them with respect to laws of nature, artists and designers create phenomena since they are interested in the psychological effects and the aesthetic impact triggered by the artefacts.

EXPERIMENTS IN PRACTICE-LED DESIGN RESEARCH

Whilst experimentalism in design practice is almost a century old, it has only just begun in terms of academic design research. Many scholars involved in practice-led design research use the term frequently when describing their research projects, and in dissertations the role and contribution of experimental practice is reflected upon (Rust, Whiteley and Wilson 2000; Niedderer 2004; Sokoler 2004). Meanwhile, there are few generic reflections on experimentalism in design, design research and its relation to other disciplines (Eisele 2000; Koskinen, Binder and Redström 2008; Redström 2011; Hall 2011; Steffen 2012 a,b).

However, the difference between experimentalism in the context of design practice and design research is distinct. "It is the theoretical scaffolding that makes the difference", argued Koskinen, Binder and Redström (2008:47). They position design experiments right from the outset in an academic research context: "By 'design experiment', we refer to pieces of design carried out as a part of a research effort." (Ibd.) In fact in practice-led design research, experimental designs are undertaken in order to gain new knowledge and to advance understanding, for example to identify causal relations between various factors or to improve insight into cultural, social or psychological issues.

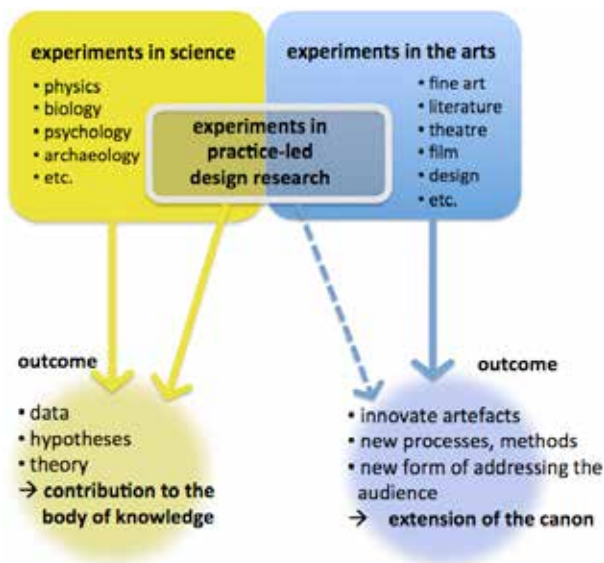


Fig. 8 Outcome of experiments in science, in the arts and in practice-led design research.

Clearly in the research context, knowledge creation is more important than the experimental artefact, which takes an instrumental role. Thus, the contribution of the artefacts in practice-led design research to the extension of the canon might be weak. (Fig. 8) Accordingly, Niedderer admits after completion of her practice-led research: "What the project did not provide, and was not meant to provide, was a body of creative work that would stand for itself. [...] Furthermore, not having to produce a body of 'artistic work' that would stand for itself was a liberation, which allowed for a much freer experimentation." (Niedderer 2008: 208)

DISCUSSION AND CONCLUSION

As has been pointed out, experiments in the sciences show certain characteristics: Their main objective is knowledge creation; they demand an objective, unbiased approach; they refer to a hypothesis or theory etc. When we interpret the term "experiment" in the narrow sense of science (as for example the authors and poets Enzenberger and Heißenbüttel did as well as the design theoreticians Gros and Bürdek) than we accept the primacy of science as regards to experiment and we have to infer that the arts – including creative design practice – use the term in a biased manner: A friendly interpretation is the "metaphorical use" of the term; a more harsh interpretation is that it is misused or abused by the arts, motivated by the aim to participate in the prestige of the sciences. Such a narrow usage of the term "experiment" facilitates communication, judgement, and inclusion in or exclusion of the community of practice-led designer-researchers, who experiment in a scholarly manner. Somewhere else I supported this position (Steffen 2012b).

However, when we take into account the common origin of scientific and artistic experiments in the Renaissance, the current reconstruction of the history and tradition of experimentalism in the arts, and interferences between experiments in science and in the arts, this judgement would seem to be ignorant or premature. Frequently, it serves the protection of vested interests.

Instead of drawing clear boundaries and making distinct judgements on what "is" or "is not" an experiment we might take a position that accepts that experimentalism has many faces. The characteristics of a design experiment – whether it pushes the aesthetic boundaries and extends the canon or whether it contributes to knowledge creation – depend on the field in which it is conducted. Thus, a designer who experiments in the studio should deliver artefacts that are truly novel in some aspect, but he/ she is not obliged to deliver a concise hypothesis or theory. Thus, from a designer-researcher we can and must expect that he/ she is able to place his/ her experimental approach within a theoretical framework and to contribute to knowledge and understanding.

We should bear in mind Hacking's warning that "any one-sided view of experiment is certainly wrong" (1983:66). This argument of New Experimentalism, brought forward in order to avoid a narrow inductive or deductive view of experimentalism, also appears to be true with respect to the usage of the term "experiment" in science and in the arts. An exclusive appropriation of experimentalism on the part of the scholarly research culture in opposition to creative practices in the arts should be avoided. Taking a broader historical perspective the sole claim of scientific research to experimentalism seems to be untenable.

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MULTIMODAL EXPERIMENTS IN THE DESIGN OF A LIVING ARCHIVE

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ABSTRACT

Designing a ‘living archive’ that will enable new forms of circus performance to be realised is a complex and dynamic challenge. This paper discusses the methods and approaches used by the research team in the design of the Circus Oz Living Archive. Essential to this project has been the design of a responsive methodology that could embrace the diverse areas of knowledge and practice that have led to a design outcome that integrates the affordances of the circus with those of digital technologies.

The term ‘living archive’ has been adopted as a means to articulate the dynamic nature of the archive. This is an archive that will always be evolving, not only because of the on going collection of content, but more importantly because the performance of the archive users will themselves become part of the archive collection.

INTRODUCTION

This paper presents a discussion of two foundational propositions that have informed a three-year investigation into the design and development of a

‘living archive’ for the performing arts. The live performing arts are an important part of our shared cultural heritage and it is vital that their histories be documented and preserved. Performing arts, particularly circus performance, are recognised as transitory art forms that lack formal systems of documentation and notation (such as music and dance for instance). As such film and video documentation are paramount to the preservation of histories of performance, the development of new repertoire, and the teaching of performance skills. Since the advent of video technologies in the late 1960s, it has been increasingly feasible for performing arts organizations to record their performances and rehearsals. However, until now such video collections, which are maintained by the companies themselves, have been largely inaccessible and inevitably prone to deterioration. The invaluable Circus Oz collection consisting of over 300 videos, which documents in detail the company’s performance history since 1978, is an exemplar, and provides an excellent context in which to experiment with the design of a ‘living archive’ prototype.

By proposing innovative solutions to the question of how to meaningfully utilise the video documentation of a specific performing arts company, this research has sought to explore new modes for engaging with archives and archival documentation in a manner that has relevance for both audiences and performers alike. In this way the project opens the way for a paradigm shift in thinking about the relation of performance to knowing, and the ways in which the tacit knowledge of circus performance can be enhanced through the sharing of these videos via social media protocols and practices. The ‘living archive’ also challenges us to think of new ways to design not only systems but also interfaces that enable tacit and ephemeral knowing to be documented, discovered, and shared.

Apart from physical person-to-person transmission, audio-visual recordings are the main format in which

knowledge of particular circus acts or performances have been recorded and passed between circus performers. The dynamic and subtle nature of the performance skills and tricks, cannot be adequately conveyed through still photographic images, or reviews in newspapers. Video provides the plastic information of a whole sequence of movements, which is essential to this mode of practice and expertise (Polanyi 1966). The language of performance development is one of oral and kinaesthetic knowledge exchange (Sennett 2008); consequently, contemporary circus artists have commonly drawn upon ad hoc private video collections to aid in the development of new repertoire. One of the significant innovations inherent in this project's research was to explore how video can be used to extend the parameters of participants in such events, by allowing performers, as well as expert and lay publics, to view, comment upon, annotate and discuss specific circus acts and routines. The aim is for this vernacular knowledge to be shared, discussed and built upon both within Circus Oz and in dialogue with its 'knowledge community' of peers, scholars and fans.

The concept of the 'living archive' is novel, situated between the relatively fixed standards of description and control employed through the metadata standards and taxonomies of the traditional archive and the supposedly open, porous, informal and carnivalesque world of user generated content and Web 2.0 systems. This project has investigated methods for the integration of these two approaches to archival practice. Wandering between the institutional formality and demands of the traditional archive - where to some extent the artefact as thing is the privileged term - and the rise of personal and vernacular forms of personal curation and archiving that have arisen as a consequence of low cost digital media used for the creation, storage, and dissemination of digital artefacts. In this project this has been achieved by the development of a more or less traditional video archive, derived from the existing audio visual material that Circus Oz has collected, and then experimenting with a variety of social media layers and protocols not only 'over' the video archive, but also 'through' it. This dynamic and functional social media layer allows individuals to 'write into' (in various media forms) as well as 'read' (or view) the videos and user contributed material. The communities of users of the archive vary in their interests, as some may coalesce around specific styles of act (for instance juggling), others around perhaps an individual (a noted performer and the recorded history of their work), while others may simply note and comment upon shows and acts that they have seen as members of the audience. In all cases the project has sought to develop both an interface and a user experience that allows others to record and contribute their own presence to the archive, so that what is typically individual and solitary can become collective and shared. The ability to collate a diversity of contributions, and to computationally curate them via such simple mechanisms as tags and self-descriptions, we hope will make tacit to both the company, and the

performers, what otherwise remains scattered, atomistic and implicit.

LITERATURE AND THEORY

Understanding the context of the organisation, its evolution and the historic and contemporary practices of performance and video was essential for the design of the 'living archive'. The following text outlines some of the key theoretical and practical frameworks that have informed the design research in this project.

Circus is a visual, aural and kinaesthetic artform written on the body of its performers. Circus performances do not generally follow a written script — in Circus Oz, for example, a brief list of act-names based on apparatus (e.g.: 'Tightwire, Hoop-diving, Juggle') will be the only text defining the 'running order' of the show. Furthermore, circus, in contrast to other physical performing art forms such as dance, has not developed a language of written notation defining specific physical gestures and movements that can generate a choreographic 'score' and record for posterity the specific form of a particular performance work. One reason for this is that a coherent language of written notation is more difficult for an artform such as circus which is inherently hybrid and multi-disciplinary in form. Dancers, barring instances of avant-garde experimentation, use a single common apparatus: the floor. The circus, by contrast, is profligate and promiscuous: it uses all manner of apparatus: aerial, manipulative and floor-based. And it is a magpie artform, "eternally opportunistic" (Stoddard 2000, p.1), capable of continually and rapidly absorbing new cultural influences into the forms of its performance.

Historically, circus knowledge was passed on within circus families, and to outsiders who were accepted into families, either through marriage or other means such as extended apprenticeships. Circus was a family business, and is still seen as such in the traditional circus sector (Syred 2011, Cannon 1997). As Mullett has commented: 'The form of teaching was experiential and practical. Families became known for specialising in particular skills, which were built on and improved as they passed from generation to generation' (2005, p 123).

For the international new wave of circuses founded in the 1970s and 80s, among which Circus Oz was an early leading exemplar, circus knowledge could not be gleaned through formal institutional means. Some Circus Oz founders joined traditional circuses (Mullett 2005, pp. 128-131), for the express purpose of learning experientially from the established circus families — not only performance skills but also the tacit knowledge of how to run a circus on the road (put up the Big Top and so on). In other cases, they discovered circus tricks through ad hoc visual means, such as by studying photographs in books, following up by experimenting in rehearsals to find the physical means to build the end-point pictured. The photograph showed the 'what' of

the trick, but only through physical trial and error could the 'how' be arrived at. Cinema, particularly the slapstick performers of the silent movies, as well as television's popular variety shows provided another rich field of inspiration connecting the new circuses to the traditions of vaudeville entertainment. However, in the days before videos, DVDs and Youtube, there was limited capacity to examine such moving images in detail: for example, to view repeatedly, slow down or freeze the image.

Circuses have always been early adopters of technology, and it is not surprising that circus troupes such as Circus Oz immediately saw, in the 1970s, the potential of video as a technology to record, analyse and disseminate their work. Circus Oz have attempted to capture on video complete recordings of as many performances each year as feasible, and have amassed a collection of some 900 tapes in a variety of formats. The Circus Oz video collection has for many years, functioned as a larger version of the private circus performance collections stored and shared by individual performers in the circus community. Its cataloguing and usage has been ad hoc. Performers and directors in Circus Oz would commonly view videos of their current show to analyse and improve their acts as the season or tour progressed. When developing new acts, they would also refer from time to time to videos of older Circus Oz shows for inspiration, or to recycle or combine in a new way previous show ideas. In recent years, as non-linear video editing technologies have become affordable and, indeed, ubiquitous, Circus Oz directors have used video in a more systematic way to shape new performances, digitally recording acts and experimenting on screen with varieties of show running orders, musical and other choices. In this context, the concept of the 'living archive' emerges as a logical progression of these techniques and practices: as a flexible and adaptive way to produce new knowledge from and around this video collection.

The video of a Circus Oz performance is a representation capturing more or less well, the tacit knowledge embedded in the creation of that particular performance. All the elements of circus — the skills, the gear, the physical relationships, the gestures and movements, the dialogue, the music, costumes, rigging, the interactions between performers and with the audience — may be there seen and heard. However, each individual viewer of the video, is able in isolation, to interpret and understand the knowledge represented in the video only through the prism of their own prior experience. The 'living archive' concept, in proposing the development of a shared interactive knowledge space around the web of videos, allows for a growing community of users to build upon each other's knowledge. For instance: The performer featured in the video adds notes about how the act developed; the rigger adds an anecdote about a safety incident that occurred 'behind the scenes' while the act was taking place in the ring; a former member of Circus Oz

comments on the resonances between this act and one the company performed a decade earlier (we can view that clip too, of course); an audience member describes memories of their response to the show that night; a circus scholar places the act in a broader cultural context; a circus fan from a different culture situates the Circus Oz act within his or her frame of reference ... and so on.

Across the fields of performance studies and digital technologies, there is a growing number of publications and debates regarding what makes a performance 'live' and the relationship between act, the digital space and documentation (Salter 2010, Dixon 2007). What makes something 'live' is being challenged. Being present in body, does not ensure 'presence' in terms of attention or engagement with what is being performed (Dixon, 2007, 130). Digital technologies challenged notions of time, space and reality; roles and contexts such as performer, performance and original or mediated are challenged through the mediation of cameras and screens (Salter 2010, 116). Is the recording of a performance for the present (an experience or locale for performance) or documentation the future? There is a "strong contradictory thread running through the live arts" (Reason, 2003, 82), a tension between the inherent (and highly valued) ephemerality of live performance, and the desire for a durable, archival record of said performance. Any record of performance, due to its ephemeral nature, can never be the 'authentic' record. The archive is only a memory, a reminder of performances past. The 'real' performance exists in the relationship between the audience and the experience. There can be no completeness, accuracy, or true authority in a performance archive: the video has only 'surface authenticity' the archive has only 'claimed authority' (p87). While much of the archival research regarding digital archives has focussed on the act of capturing 'authentic' records in digital forms, the fact remains that 'acts of contextualization, representation, or use of digital archives receive scant attention' (Hedstrom, 2002, 23). Yet it is in the act of interpreting the knowledge represented in the video through the prism of their own experience — the acts of use and contextualisation — that the record of performance could be said to exist.

The 'living archive' concept responds to and indeed emerges from the particular aesthetic processes and culture of Circus Oz. Circus Oz, across its thirty plus years, despite numerous changes in personnel, has retained a strong and distinctive performance culture. The show is considered to be jointly created by all of those involved: acrobatics, musicians, directors, designers, and technicians. Each has a distinct role to play but has freedom to contribute; in particular the performers are not assigned roles or acts by the directors, nor assigned costumes or props by the designers. On the contrary these decisions are negotiated, contingent and subject to evolution, just as each show meets its audience and evolves in response to

that interaction with the audience. The Circus Oz show, although highly polished and constructed, is in fact always unfinished, in so far as its form is both open to spontaneity and improvisation on any particular night, and also constantly being adjusted. Therefore it seems appropriate that the documented records, the archive for such a cultural organisation, likewise take on these qualities, made possible, like Wikipedia, in the Web2.0 environment where the online presence of the archive is both a location for community access, and a method for archives to define relationships with patrons (Samouelian, 2008, 42). It has been further argued that the future performing arts archive should actively encourage multiple representations and perspectives, and allow for 'creative reuse and reinterpretation to keep the spirit of the performance alive' (Jones et al., 2009, p165).

DATA AND METHODS

There are two important components to this project. The first is an existing video archive that documents thirty-five years of performance history. The second is a desire to rethink existing paradigms of contemporary performance particularly in relation to time, authorship and place, and how this can be transformed through technology. The 'living archive' project emerged from Circus Oz's desire to explore these two aspects, with the proposition being that it would be through the design of a new way of engaging with an archive that new conceptions and experiences of circus performance could emerge. This simple proposition raises many questions and challenges and these have been used to frame the project objectives, the design of the team and the various types of expertise that are required to realise it. It has also required the team to adopt a multi modal research methodology, integrating various approaches as the complexity of the project have evolved.

One of the core ambitions of this project was to explore possible new forms of circus performance. These new forms of performance include the potential use of contemporary digital documentation combined with the archive as a means to create new performances by circus practitioners. It also creates the possibility for users of the archive to create new digital performances by drawing on the contents of the archive and the current thirty-three years of video documentation. Exploring these possibilities has required a critique of what the current practices are and to position these within these potential future forms of performance creation. This aspect of the research has integrated theory, observation and proposition; and has underpinned the design explorations in the various other aspects of the project.

With new models of performance come the possibilities of new types of circus performers; a realisation that lead the research team to question who the performers will and could be within this new context for circus. They could be the audience, the researcher, the person in the

centre of the ring or the circus enthusiast who has never been. As such issues of expertise, history, authority, temporality entertainment or scholarship start to emerge, especially when we frame these possibilities within the context of an archive (Fig.1).



Figure 1 – the intersections between video documentation, repertoire and engagement by all potential constituents

As a consequence of these research ambitions, the project team is comprised of a dynamic mix of expertise. There are circus performers and managers and ringmasters, creative directors, archivists, computer programmers, digital storytellers, interaction designers, historians and cultural theorists. It is a weighty mix of practitioners and academics, from science, humanities, business and the arts working together to think about, to think through, and to hypothesise what a 'living archive' might be and how it might be realised to address the broader concerns about future possibilities for circus performance.

The exploratory nature of the project has required the project team to adopt an iterative and exploratory approach to discovery. At times the methods for realising the research were founded in the cyclic nature of design and develop, and at others they are participatory, with the research team working with members of the greater Circus Oz community to identify potential scenarios for use in practice. Additionally there is the meaning making that emerges through critique and reflection. All of this has been done within an informed framework of innovation and contribution to the various fields that are invested in and essential to the project.

The performative nature of the research context and the research partner has engendered a culture of performance within the research and an acknowledgement of the embodied nature of discovery and exploration. In this way, the phenomenon of multimodal and performed knowledge production (Merleau-Ponty 1996) has guided the design of the series of workshops and prototype developments throughout the project.

Early workshops were focussed on active engagement with the circus community and involved an

experimental performance strategy on the part of the researchers. For example – a series of workshops were held in a relaxed ‘event’ context, with researchers wearing white lab coats, we introduced the project and early prototypes to the circus community in an environment closely connected with their experience of the shared history embedded in the archive content. The aim of this strategy was to encourage shared experience of the larger cultural context of the archive, as well as to collect data and to assist us in the early development of the archive prototypes (Fig. 2).



Figure 2 – Early workshops were ‘performative’ in nature

Later workshops involved deeper and more prolonged engagement with select ‘champions’ who provided invaluable data regarding current and future use of the archive (Fig 3). The workshop participants either feature in the archive (either on screen in the videos, or closely involved in the performance production). As such, they have a deep knowledge of the various contexts surrounding the video content, and should begin to ‘seed’ the archive with both objective and subjective information drawn from their experiences.



Figure 3 – Later workshops involved deeper engagement with ‘champions’ in the community.

Acknowledging the various conceptions of research and rigour or relevance to each of the fields in this project; whilst also communicating the progress in ways that are relevant to the various research partners and funding agencies has been important to the project. In an attempt

to build bridges across points of difference and assist the team to be transparent and respectful, social media and other associated digital collaboration and communication devices were used to make all information open to the team and where appropriate to the public (Vaughan 2011). Additionally a series of digital prototype services were implemented to facilitate access to the videos. Using a technique of embedded, exploratory prototypes (Heyer et al., 2010), we have continually iterated on the design and development of the ‘living archive’ in close collaboration with research partners. The prototype application has been constantly accessible by project members, to provide ongoing feedback. We have continued to iterate on the prototype as new ideas and design directions are developed, and the dynamic nature of the prototype encourages ongoing experimentation and discovery. The prototypes were designed to enable a variety of forms of user generated content to be ‘attached’ to individual episodes and sequences to facilitate the collection and collation of a variety of formal and informal knowledge, in order to investigate what happens, and what emerges, when such performance specific practices are enabled.

This mix of methods, approaches and participants creates a complex space of potential confusion and confrontation. Conscious of this the team adopted an open and diverse approach to the project methodology and methods. The research process is documented in a project wiki and blog that all project stakeholders have access to (<http://www.circusarchive.net/>).

Table 1 summaries the diversity of methods used within the project often synchronously over the life of the project in the design and development of the ‘living archive’.

Issue	Method	Application
Current theory in circus performance and digital technologies	Literature review, professional networks within the field	Critique of living archive development and discussions for future use by other companies
Evolving understanding of digital archives	Literature review, project reviews	Design of archive and critique of developments
Database management and big data challenges	Literature review and trial and error	Design of database infrastructure
Interface design and the creation of digital screen based performance	Literature review, project reviews, scenario and prototype development	Design of interface and user experiences of the living archives
Engagement strategies with Circus Oz company	Workshops and presentation with members of	Design and development of the prototype through numerous

members	community Workshop 1 – introducing idea of project Workshop 2 – release of alpha prototype for trial and use Workshop 3 – release of beta prototype and community data collection	iterations
Integrating the 'living archive' into the life of the company	On going informal workshops and meetings with key people within the organisation	Design of on going use, hand over of prototype and scenarios of use issues

Table 1 – a diversity of methods used in designing the 'living archive'

DISCUSSION

Burdick et al (2012) argue that it is essential that we rethink the static nature of archives as knowledge entities. Stating that '(a)ccumulation is no longer enough to ensure the survival of the cultural patrimony. Objects that sit in storage... disappear into the ever-expanding heap of cultural remains, entering a limbo that in no essential way differs from being lost' (p.48). For them animating the archive is essential for the future and that this requires a 'user centred approach to the construction of archives that implies a multiplicity of use-scenarios' (2012, p.48). In this research the project has adopted the term 'living archive' as a means for articulating and experimenting with how to animate the archive.

The 'living archive' project has provided an interesting and challenging context for us to explore both methods of, and the implications for, designing environments that enable multi-modal approaches for creating knowledge, and for experiencing information within a digital environment that is a collection or collation of documentation of a challenging kinaesthetic knowledge form. Across the design field, in theory and practice, there is an increasing awareness of the importance of designing *for* people and in relation to their particular needs and practices. Within this discourse terms such as situated knowing (Suchman 1987), tacit knowing, and practice are used as a means for articulating the messy and diverse nature of knowledge and practice in practice (Dourish 2001, Fallman 2008).

As argued by Boehner et al (2005) there is an increasing interest in and awareness of, the socially situated, culturally informed, affective nature of human interaction within digital contexts. For them, there is a lack of recognition and understanding within the human

computer interaction literature (and practice) of 'everyday action as situated in social and cultural contexts' (p. 59) and that it is these contexts that give them meaning. In response to this they propose that an 'interactional approach' to the design of affective digital systems and artefacts, and that affectivity is essential if we are to enable people to engage with the system and the content in a meaningful way. This interactional approach is contrasted with an "informational" one, where meaning resides within the technological system, and all communication is mediated through a rational model. In an interactional approach, meaning is constructed through interaction, and is subsequently closely bound with the situations and people involved in those interactions. In this way, the focus on affect emphasises that it is the whole person as a social, cultural and biological entity that informs the multiple ways that we engage with digital artefacts, and the multiple levels of meaning (Dourish 2001) that arise in those engagements

This increased focus on situated and emotive aspects of design as argued Suchman (1987), Dourish (2001) and Norman (2002) and then expanded on by Boehner et al (2005), has enabled an important shift in how we design digital artefacts and also how we understand their social role in everyday life. This realisation does in itself hark back to Schon's (1983) emphasis on the dialogic nature of designing, and the ongoing 'back talk' that exists between designer, material and the process of making. Yet it takes it further by elevating the iterative conversation from being between the maker and the made, to being one between the maker, the made and the subsequent user. In the 'living archive' project the ambition is to extend this cycle of dialogue into an ongoing process of cultural production through the archive. The 'madness' of the design outcome in this context is never complete, the dialogue of the 'living archive' is ongoing, with each new user adding to the archive and the potential narratives that the living archive allows and creates.

Designing for such a dynamic and generative engagement between the various elements of the archive has required the project to explore possibilities for the ways in which people will seek out information within the archive and create new narratives within it. This has included allowing for the various layers of expertise and familiarity that a user may have. From the knowledgeable researcher or performer, to the lay enthusiast or the novice, each will have varying familiarity and expertise in relation to the content and the technology of the digital archive. As Schon (1983) highlights, 'Knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing. It seems right to say that our knowing is in our action' (p.49). It is this mix between the tacit and the implicit that will enable people to engage with the archive and the patterns of use are both hypothetical in the pre-design of the system architecture

and in the patterns that subsequently emerge through the use of the architecture of the archive.

Design is often framed as being a propositional activity, one where designers must engage with the uncertainties of the unknown in order to 'shape a situation' (Schon 1983 p. 78). The notion of 'if' is one shaping possibilities and this can be framed by ideas such as:

- what can or might happen if, or
- what should or must happen if.

The move between can or might, and should or must, is a significant one is still open to the unknown the other embedded in certainty. In the design of a complex system such as a living archive both 'if' situations must be worked with – one frames an act of discovery in exploring the archive and creating the desired multifarious outcomes of engagement, the other refers to the technological infrastructure that makes the poetry of discovery possible.

TWO PROPOSITIONS

The following are two examples of the initial propositions that framed the research and have been developed by the research team in their attempt to start to scope some of the 'if' situations that frame the design of the archive.

ONE: ENABLING MULTIMODAL FORMS OF ANNOTATION ENCOURAGES DIALOGICAL KNOWLEDGE

The archival project proposed a research problem about how the multimodal collection and collation of information, from a diverse range of sources, might express, and form, knowledge. One of the ways we believed it would be investigated and achieved was through the ability to dissolve traditional hierarchies between artefacts, commentary and knowledge claims through the use of social media and Web 2 paradigms (O'Reilly, 2005).

Traditional approaches to knowledge construction, dissemination or documentation, particularly in creative practice, have wittingly or otherwise emphasised either the artefacts produced, or the accompanying 'explanatory' documentation. Similarly, from a traditional research perspective, the written text, usually essayist in form, has been privileged. In each model an epistemological economy is constructed where one or other of the terms is reified at the expense of the other, so that one is always secondary, subservient, and some sort of minor mirror to its master. This is a dichotomous model of the text *then* the artefact, or the artefact *then* the text.

The 'living archive', has experimented with the development of a dialogical model of performance *and* video *and* audio commentary *and* textual annotation *and*

photographic annotation of the available performances are present there is no privilege or priority between each mode (Fig. 4). As a consequence a plurality of knowledges are recognised and legitimated in the archive and the ambition of the system is for this rich mix of elements to live through use in the archive, thereby, enabling new knowledge about the circus, performance, audience, and experience to be manifest in the archive.

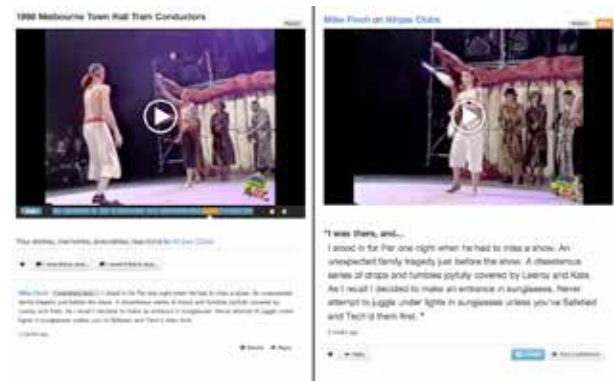


Figure 4 – Two interfaces to the same 'act': the 'living archive' attempts a dialogical model of annotation without privileging one mode over the other.

These experiments into various modes of annotation have taken place throughout the development of the various digital prototypes of the archive. The digital artefacts, and the responses to them, have served as reflective objects for the project team to further explore the limits of this proposition. By building the proposition directly into the prototypes, the project partners have come to their own understanding of the proposition through their *experience* of the archive. Embedding the proposition into the artefact has encouraged the appropriation of the archive by the Circus Oz community, acknowledging that "designing for appropriation requires recognizing that users *already* interact with technology [...] with an awareness of the larger social and cultural embeddedness of the activity" (Sengers et al., 2005, p.57)

TWO: TACIT KNOWLEDGE IS EXPRESSED BETWEEN, NOT IN, THINGS

Archives are, like libraries, repositories. Places where things reside for the primary purpose of allowing access. However, while libraries contain things that already have much to say and be (books), archives are in many ways, repositories for things that gain meaning through external contexts to. Archives may be a collection of things related to an institution (for instance the National Archives of Australia), an individual (the Eisenhower Archives), or are an array of objects that have in common their shared 'objectness', (a national film archive for example), but a key quality of the archive is the integrity of the objects that constitutes its collection quite apart from their interpretation. Indeed, this is one of the distinctions between an archive, and a museum, where the former emphasises the integrity of

the collection while the latter, clearly performs an interpretive role. This is a world of things. Yet there is a difference, portraying a certain tension between the intimate, inward looking and almost private nature of the archive and the shared, extroverted and public museum (after all, it is hard to imagine a museum that is never open to the public, but quite easy to imagine a closed archive) that is contested within the ‘living archive’ as the archive, which are recordings of circus performance, are ‘opened’ to not only public access and exhibition but are explicitly invited to be interpreted, interrogated, named, commented upon, holus-bolus by any who so choose. This invitation, which is both allowing the archive to look out, but also through its capacity to capture these annotations, comments, and viewings also looks in, as this material, in turn, builds the archive.

The ‘living archive’ in the context of performance is an explicit effort to solicit and then farm the informal knowledge that is distributed amongst those who wish to contribute to the archive via everyday social media practices of annotation and engagement. This knowledge, which includes knowing the ‘how’ of circus performance, is informal, anecdotal, oral and shared. It is an embodied knowing but also relational, as, for instance, knowing how to juggle lies in the relation between juggler and ball, and does not reside in one, or the other. So with the ‘living archive’ knowledge about performance does not ‘lie’ in the video recordings, but between these and all that will accrete around them, which includes relations to other similar acts, iterations of the same act, relations to other acts by the same performer (all relations internal to the records of performance), as well as the commentary and appropriation of this by other performers, for repertoire, learning, and as a record (relations external to the records of performance) (Fig. 5). Such activities make explicit what is implicit, and so help to make visible and tangible what is tacit and otherwise internal. In this way the ‘living archive’ is animated to be outside of the boundaries of one place and a limited selection of visitors at a particular place and time (Burdick et al 2012). Designing the components of a digital archive that allows for this desired rich layer of discourse and interconnections has been one of the key challenges. From the back-end file storage and access, to meta-data schemas, interface design, and modes for the creation of individual narratives within the archive have all been part of this rich process. The walls of the archive have become porous and the affordances of digital technologies have enabled the archive to perform in new ways, through a broader community of performers or users.

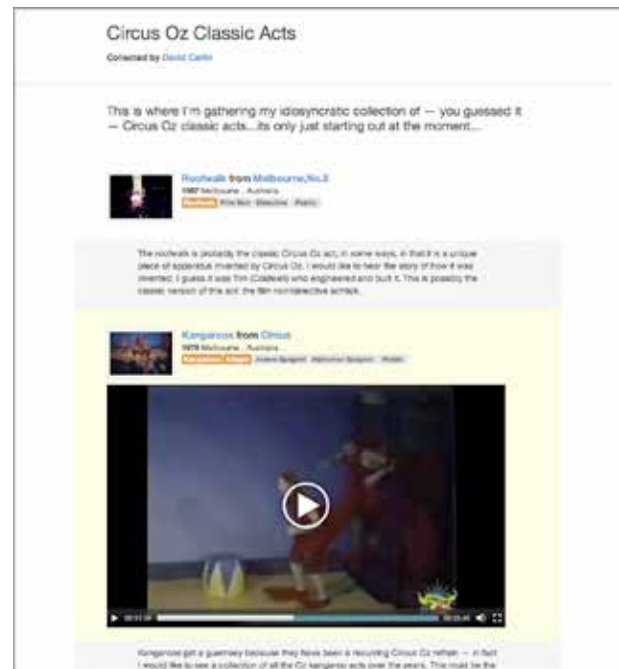


Figure 5 – The ability for users to build relational collections and add personal commentary through the archive makes tacit knowledge more tangible and allows for a rich layer of discourse.

This porosity would not have been possible without the team also designing means for designing with the circus community at the heart of the archive. For a team of designers the possibilities for rethinking the nature of an archive and the possibilities for new kinds of performance within it, is in many ways theoretical. For the performers and the company whose history and creative practice is at the heart of the substance of the archive it is personal and collective – my/our performance and our history. Having adopted a co-design approach to the project, the team have worked closely with members of Circus Oz community in designing an archive that has integrity for them, and which enables them to consider and explore new notions of performance from their perspective.

Doing this has involved undertaking numerous workshops at small scale, ongoing project meetings on a regular basis, and then three full-scale workshops with the broader Circus Oz community (Vaughan 2011). In each of these events the research team have experimented with designing experiences that both enable dissemination of project ideas and developments, whilst also being inclusive and participatory where the various members of the community have been able to contribute to the design in a manner that has relevance to them – be it technological, cultural or personal histories and identity.

CONCLUSION

It has been through this collaborative design approach that the research team have sought to transform a once storage bound video library into a dynamic resource that

is in a constant state of evolution and adaptability depending on the intention of each user. We have also aimed to create an archive that is a creative environment of knowledge creation and exchange, that is integrated into the greater life of the organisation on a day-to-day basis, beyond the limitations of place and time.

The term 'living archive' has been adopted as a means to articulate the dynamic nature of the archive. This is an archive that will always be evolving not only because of the on going collection of content, but more importantly because of the performance of the archive users will themselves become part of the archive collection. To experience this 'living archive' please venture to: <http://archive.circusoz.com>.

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TOWARDS A MANIFESTO FOR METHODOLOGICAL EXPERIMENTATION IN DESIGN RESEARCH

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ABSTRACT

This paper argues that design research may benefit from investigations, explorations and innovations in the means of conducting and of conveying design research from qualitative methods in the social sciences. The paper examines how inter-disciplinary and inter-methodological experimentation as a mode of knowledge building. At the end of the paper we draw out a manifesto that proposes potential actions concerning design research methods which ought to be applicable for designers and design researchers, but also for social scientists engaging with the changing nature of production-related inquiry and critique in which design increasingly features

INTRODUCTION: LOCATING THE ISSUES

EPISTEMOLOGICAL MATTERS

This paper offers an epistemological prompt to design researchers to consider a number of core issues concerning methodological experimentation. The prompt is to draw together design techniques from designing and innovations in research methods in qualitative social science research so as to expand and enrich innovation in methods in design research.

Much design research applies research methods from subject discipline domains from outside design without

much experimentation. The paper argues that design research may benefit from investigations, explorations and innovations in the means of conducting and of conveying design research from qualitative methods in the social sciences. However, what is seldom seen is mention of techniques used in designing (sketching, video prototyping etc.) that is central means to the generation of new products, interactions, services and experiences.

The paper offers a meta-level discussion concerning inter-disciplinary and inter-methodological experimentation as a mode of knowledge building. At a methodological level, we see a need to more fully consider the production of knowledge by designing and via the acts of constructing of design artefacts.

In addition we see a need to more fully unpack for design research the resources for methodological experimentation offered by developments in some social science disciplines in recent years. This includes fields such as sociology, anthropology, human geography, media and cultural studies. We argue for a methodological and dialogical mix of these differently situated and generated approaches. This mix itself needs to be seen as a mode of experimenting with knowledge production relating to design. There is considerable epistemological and methodological diversity as well as experimental variation within and between different disciplinary domains in the social sciences. Such a mix also offers the social sciences an additional design centred view and techniques that may serve to enrich experimental modes of constructing and communicating aspects already taken up in post-structuralist inquiry (presentation-mediation, voice-identity, indeterminacy-messiness etc.).

OUTLINE

In the next section we focus specifically on matters of method and methodology. Then we cover and illustrate constructive design techniques and qualitative research methods in the section data and methods. Thereafter follows a section that reflects on the hybrid mode of experimental methods we propose. The argument, illustrated with references to projects and publications in design research and in qualitative inquiry, leads towards a three-part manifesto for considering and realizing methodological experiments in design research. Finally, we discuss this manifesto with respect to potential actions concerning design research methods and their contextualisation in the complexity of today's world. We close by arguing that the assertions of the manifesto ought to be applicable for designers and design researchers, but also for social scientists engaging with the changing nature of production-related inquiry and its critique in which design increasingly features.

LITERATURE AND THEORY: FOCUSING ON METHODS

EXPERIMENTAL RESEARCH

The practices of thinking and doing that fall under the category of experimentation do not comprise a unified body of work and definitions of the experiment are still open to contestation. To date, definitions range from the more scientific interpretation of the experiment as a testing of theories through a carefully crafted and monitored environment, albeit with room for the unexpected, to the less formalised "experiment as a trial or a venture into the unknown" (Gross 2010: 4). However what most social and cultural researchers agree on is that experimentation should "push the limitations of current conventions of representation and knowledge-making. There is a desire to move away from what is considered 'safe', orderly and established, whether it is by searching for methods that meet the imperatives of new theories, existing complexities or desired accessibility." (Last, 2012: 708). This effort is connected to the desire to take knowledge of the social beyond the prescribed environments and to bring it into dialogue with new disciplines, spaces and audiences (Massey 2008; Pratt and Johnson 2009; cited in Last 2012). Experimental Research Network (<http://experimentalnetwork.org/>) make the argument that 'traditional research methods can be used creatively' and situate them within experimental research by including 'people who are using creative, innovative, novel or risky research practices in their work' (Gallagher and Prior 2010).

In other circles the idea of interdisciplinarity itself is thought of as a main form of experiment, as experimentation is often driven by the perception of discipline-specific methods as being limited (Davies, 2011). Some disciplines share significant theoretical and methodological overlaps with others, while others are

separated by significant difference in outlook. This makes different demands on the researcher in terms of producing analytical accounts. However, the negotiation of differences between fields continues to be regarded not only as a powerful means of generating novelty, but a useful way of seeing one's familiar approaches in a new light (Driver et al. 2002: 8)

Reflexivity is another key attribute that characterises most approaches to the experimental in social science research. Here there is recognition of the researcher's implication in the construction of spatio-temporal practices and interrelations as well as their amplifications and mobilization. Reflexivity involves understanding the assumptions, biases, and perspectives that constitute the basis of research. It includes epistemological questions and contextual conditions of understanding that are implicated rooted in practices of collaboration, and in the choice of perspectives.

Ian Kerr suggests that "'to act/research is to be involved in change – experimental change. We need to recognise that acts of knowing are forms of change'" (Kerr 2008, p. 65). Active, participatory experimentation is taking on manifold forms. Gail Davies observes that what is at stake is less 'what can be known through precisely controlled conditions, and more about creative forms of world-making' (Davies 2011). Last (2012) observes that active participation in this "world making" mirrors the desire by many researchers to move beyond "mere critique" and to affect the spaces and relations of concern through non-traditional means, with the hope of being more effective in reaching relevant audiences.

The search for alternative research practices or representation is often guided by the desire to align the dissemination of research findings more with the ethical and aesthetic imperatives of research subjects. Last (2012) outlines some questions that have been posed among researchers such as: How can researchers include the nonhuman in their practices and analyses (Hinchliffe et al. 2005)? How can we engage with the precognitive, with emotion (see Anderson and Harrison 2010)? Should concepts be followed formally in writing (Massey 1997) and certain impressions be rendered as poetry (Lorimer 2008)? Should writing on experimentation result in experimental writing? Such questions, Last argues, underline the intertwining of aesthetics, ethics and ways of knowing and representing. Such a line of reflection forces us to ask what aspects of the social world can be known or represented, and what kinds of options are available to be engaged with the potential for the unknowable and unrepresentable through experimentation.

THE EXPERIMENTAL IN DESIGN RESEARCH

Koskinen and his colleagues (2011) have identified three main modes through which design research in Europe at the doctoral level has approached experimentation. The first mode that they identify has historical foundations in the natural sciences, but

usually comes to design through psychology. The goal of such methodologies is to identify relationships that might serve as a basis for design. In such research we can find questions such as, for example, how the limits of human cognitive capabilities affect error rates in the use of tablet computers. If such relationships were found, they could be turned into mathematical formulas that would provide a solid ground for design. In such research, epitomes of analysis are artefacts such as a prototype. It crystallizes theoretical work, and becomes a hypothesis to be tested in the laboratory.

Other perspectives on design research build on interpretative social science, where the stress is on the need to study people in their everyday life settings, rather than in the laboratory. Interpretive methodologies have a long history in design and have been used by companies like IDEO and Xerox PARC. This methodological approach has also been widely used by design researchers especially in Helsinki Milan and Copenhagen. This research has addressed issues such as garbage collection, health practices in favelas, and housing services for seniors. This approach makes use of action research and builds on notions of co-design.

The third perspective builds on the relationship between design and art. A lot of this work was done at the London College of Art in the nineties where Anthony Dunne and Fiona Raby coined the notion of “critical design” (Dunne and Raby, 2001). The main aim of critical design was to question the dominant commercial ethos of design. They drew inspiration from cultural studies, critical theory, radical architecture, and Italian *controdesign*.

Another key figure that used this approach is Bill Gaver, the chief ideologue behind cultural probes (Gaver et al. 1999) that developed an art based methodology drawing on Guy Debord’s Situationist idea of *psychogeographie* and on Nicholas Bourriaud’s notion of “relational aesthetics”. Recently, critical design has focused on the politics of science by trying to make the implications of science an object of discussion by making them tangible long before true applications hit the market. Dunne’s (1998) ‘post-optimal’ object, for example, critiques product semantics and the human factors preoccupation with the ergonomic and psychological ‘fit’. Instead, he applies strategies of defamiliarization and estrangement from modernist aesthetics, as ‘user-unfriendliness’ and ‘para-functionality’ to discourage unthinking ideological assimilation and promote scepticism by increasing the poetic distance between people products.

In all these research programs and in more recent work on design research, the discourse of experimentation has been widely adopted. This has been seen in examples from contextual inquiry, co-design (Johansson & Linde, 2005); cultural probes; and design games (Brandt 2006). However in these contexts, experimentation is seen in terms of “design experiments”. In this case, the innovative thrust of experimentation takes place during

the during the design process and not in research. The focus is more on design methods rather than on research, and often with little theoretical grounding (Laurel 2003). In other cases the methodological reflection takes place mostly in the early stages of the design process.

Increasing social science is expanding the repertoire of materially innovative methods and addressing the limits of the phenomenal. Christena Nippert-Eng suggests that social sciences can offer design such disciplinary skills as a distinctive conceptual, analytic framework, ethnographic skills, writing skills, contextual information via substantive areas of interest including a way of looking at the relationship between people, objects and activities – especially the politics of design (Nippert-Eng 2002: 213).

These reflexive stances have been categorised as baseline, tool, location, and position (Marcus 1996). John Law and John Urry (2004) argue that the social sciences are relational or interactive. Social scientists *participate in, reflect upon, and enact* the social in a wide range of locations. They see research methods as *performative*. They mean by this that these methods have effects, make differences and enact realities. They can help to bring into being what they also discover.

Lucy Suchman (2002) suggests that one strategy for successful collaboration between designers and researchers in technology corporations is to establish new bases for technology integration, not on the basis of universal languages, but in what she calls *partial translations* (Suchman 2002: 101). Suchman also proposes that we value heterogeneity in these systems rather than “homogeneity and domination”. Critical perspectives from cultural studies, feminist theory, and post-colonial theory, social studies of science and technology (STS) might provide useful “tricks of the trade”, methodologically and theoretically, to think through problems of universal languages and standardized practices. They can offer detailed accounts of local practices, different understandings, and explore the relationships between marginal experiences and mainstream discourses.

DESIGN TECHNIQUES AND DESIGN RESEARCH

Numerous design textbooks exist on techniques for designing, whether connected to engineering, fashion, interaction and product design, to mention only a few domains of design. These books, and now websites, are usually written and illustrated to assist students of design to learn how to engage creatively and also productively with generating ideas, design works and processes of arriving at designs of their own, for specific interest groups, users and stakeholders. They have traditionally been developed for use in the studio of the design school but naturally they are also resources that designers in everyday professional practice also draw upon.

As Ilpo Koskinen and colleagues (2011) write, the contexts for designing, of inspiration and of making, of use and usage, have shifted from the studio to also include other locations, that in their terms now can be covered by the field and the showroom. This implies that the activity of designing is now also spread more widely, contextually, culturally and in practices of work and innovation, including ones that are emerging. Such design is implicated within work that takes place outside the studio setting, once remote from the grittiness and transformative power of the street and the demands of retail.

Today design is increasingly embedded within popular and commercial cultures, and contexts of personal and corporate use. It has extended more recently to diverse areas such as smartphone 'app' development and civic protests arranged by communication design strategies enabled by social media such as Twitter. Important too is the emergence of co-design as an alternative to the earlier romantic notions of the lone gifted (male) individual. Matters of gender, special needs, universal access and cultural sensitivity have become key issues to consider.

Important also in understanding how design works as an activity, not just the generation of products or indeed even services, is to acknowledge the needs for spaces for design. This extends to phases, iterations and the ways these are mapped, timed and cognitively articulated in teams and to clients. A great range of techniques often mixed and matched depending on need, in abductive relationships, as wranglings, tinkering and maverick moves, are also selected, put into play and applied. The techniques include amongst others conceptualising, sketching, paper and video prototyping, patterning, evidencing, mediating, probing, the use of props, gaming, scenarios, mock ups, mood boards, role allocation, temporal boundedness, user narratives, walk throughs, protocols, shadowing, cards, stakeholder maps, storyboards and demos.

In general, designers are expected to imagine new things and not just existing ones, to find new routes and means to shaping innovative products, experiences, services and interaction, and systems. Much energy, iterative work and often co-design endeavour goes into producing designs. Designers may find that as they engage in creative innovation on design, they might gain from drawing on other methodological insights and theoretical discourses some social science fields in order to better reflect over their processes, written accounts and on-going evaluations of their practices. This is not to say that this does not occur, not that is often only a matter of emphasis. Instead, it is to suggest this is a space (Sevaldson 2008) for richer design and related research activity where co-design may also be extended to means connecting design techniques with qualitative methods. In the next section we offer some examples of how this has been carried out and the types of resources they offer us all to realise such a synergy.

DATA AND METHODS: CONSTRUCTIVE DESIGN METHODS AND QUALITATIVE RESEARCH METHODS

CONNECTING ETHNOGRAPHY AND DESIGN

Drawing on an adaptation of modes of interdisciplinary research inspired by a study carried out by Andrew Barry, Georgina Born and Gisa Wieszkalnys (2008), Lucy Kimbell (2008) proposes three ways in which social science methods such as ethnography might connect to practices of design and research.

The first mode she identifies in which ethnography and design engage is what she calls the *service* mode. In this mode design craft is in the service of ethnographic research or ethnographic data is employed in the service of the design process. Ethnography might use design to style the tools of ethnographic research. So for example, communication design skills can help with the arrangement of text, photographs and diagrams, or the editing of video footage. Design serves a stylistic function in helping deliver the outcome of qualitative research. Seen from the other side, it is possible to think of ways that design makes use of ethnography in presenting its arguments, drawing from ethnographic research its data or analysis.

The second mode Kimbell identifies is *integrative* and *synthetic*. In this mode, ethnography might partner with design to develop artefacts that might persuade stakeholders. Design methods and processes are drawn upon to develop a critique of existing arrangements or conceive ideas for new ones, stimulated and complemented by ethnographic research. Examples are narrative devices such as scenarios or prototypes or mockups of product or service ideas. In this case design is central to the imaginative possibilities of research. Rather than just making research more visible and better understood, design synthesizes it in the creation of visual artefacts that suggest new ways of doing things, new products and new services.

The third mode is *agonistic-antagonistic*. This means that rather than coming together smoothly, disciplines engage in continual argument. In this mode design and ethnography forsake their disciplinary identities and merge into an unhappy union. Here design engages in a self-conscious dialogue with, criticism of, or opposition to, the intellectual, ethical or political limits of qualitative inquiry and vice versa. Kimbell argues that working in this way involves a kind of invention in the sense that the creative clash between design and ethnography generates knowledge in the form of methods and forms that may not make sense to either discipline.

POTENTIAL

It is this third mode that we wish to emphasize because we believe it holds the most potential for exploring the possibilities of methodological experimentation. The *agonistic-antagonistic* mode holds the most possibilities

because this mode, as Kimbell (2008: 320) describes it is “tricky, destabilizing, critical, hyper-reflexive, contingent, resistant— all virtues that are cherished in art and design and in ethnography. The third mode reassembles the social and material possibilities of disciplines.”

EVALUATION OF DATA: REFLECTING ON HYBRID EXPERIMENTAL MODES OF INQUIRY

EXPERIMENTS IN ACCOUNTS

Recently, there have been shifts in the forms of scholarly communication or at least in the ecology of the present expansion of digital possibilities and how these are affecting the different genres of research and writing.

Experiments have been widespread in genres such as the ethnographic narrative since the launch of debates about representation, voice, orality and the power and poetics of writing in the 1980s (Clifford and Marcus 1986). Some of this experimentation has taken forms such as autoethnography, layered accounts, and performance texts (Downey and Dumit 1997).

The writing of accounts of design research is one area where we believe there lies potential for experimentation and where insights can be drawn from the humanities and the social sciences. What does the book or its related productions (such as the journal article or the conference paper) out of the process of design research become with this ecology? We argue that less baroque forms of design research accounts might find their richness outside established traditions of design research accounts. Alternative forms of articulating thinking, ideas, and concepts in “third spaces,” archives, studios, labs, performative acts, “para-sites” and the like can provide rich avenues for exploration.

EXPERIMENTAL RHETORIC

Andrew Morrison (2011) has experimented with a series of design fiction narrative works as part of the *YOUrban* project at the Oslo School of Architecture and Design. In a paper presented at the *NORDES Conference* in 2011 he presented one of these fictional narratives where he described it as being aimed at motivating design research to expand styles of playful, reflective and interpretive modes and genres of research writing. He locates the first person narrative perspective used in the text in bio-cultural contexts of design fiction future use, referring to current Wi-Fi, RFID and GPS technologies. The text takes the form of an abductive design narrative that aims to escape from often “paddocked” research modes of writing about design. Instead, what is on offer is a playful, performative, reflective mode of design research writing that is allied to wider techno-societal concerns, drawing rhetorically on post-structuralist traditions in the humanities.

VISUAL DESIGN

Nina Wakeford (2003) describes how ethnographers and designers collaborate at the *INCITE* Lab in the exploration of the use of visual practices and design sessions as ways of doing cultural studies of technology. Through their work they are encouraged to think of the product of social and cultural studies of technology as going beyond textual output, or acting in conjunction with traditional fieldwork narratives and analysis. In some cases the product of their collaborative work is in the form of sketches of objects. They explore among other things the ways in which these sketches are linked to fieldwork, their analysis, the collaborative session, the culture of technology studies and the norms of design practice.

Wakeford suggests that by thinking through these issues collaboratively, they are stimulated to examine more closely their relationship to different aspects of the cultures of production of new technologies. From a design perspective such reflection might focus, for example, on what kind of reasoning sketching might represent in design practice. From a sociological viewpoint it might mean reflecting on what kind of reasoning this kind of collaborative process and output sketching might signify.

Similarly, Christine Wasson (2000) describes how in collaborative work between designers and field researchers at E-Lab ethnographic data were analysed from instances of data into patterns. These patterns were further transformed into a model that interpreted ethnographic materials and envisioned a solution for the client. As she explains:

The model offered a coherent narrative about the world of user-product interactions: how a product was incorporated into consumers’ daily routines and what symbolic meanings it held for them. These insights, in turn, were framed to have clear implications for the clients’ product development and marketing efforts (Wasson, 2000: 383-384).

RECOUNTING EXPERIENCE

Recent work in human geography has emphasized personal experience and, through the parallel running of different genres of narrative tracks, played with theories, and (non) disciplinary practices (Last 2012). Some of this work merges poetry, story telling and academic writing to relay the authors’ walking journey. Shiloh Krupar’s narrative stresses the conflict of author investment/emotion and academic enquiry. Her ‘ethno fable’ runs alongside what she calls an ‘academic and personal subsurface guide’, a guide that takes on the form of excessive footnotes (2007, p. 194). Krupar explains her reasons for using what she calls a ‘performative representational strategy’ as follows:

(1) to produce a certain affect of curiosity,

concern, and outrage at the staging of nature spectacle on militarized sites by organizations that continue to produce and profit from deadly wastes; (2) to show the various discourses and representations, figures, material practices, institutions, and personal experiences of the author that have constellated in and around this site-based study; (3) to display two texts; one being the performance script that displays some of the rhetorical contrivances of the Rocky Mountain Wildlife Refuge nature spectacle, and the other, a supplementary text that attempts to contaminate the clean surface of the site and its staged unchanging wilderness, interjecting academic substrata and dumping a personal landfill of mythic histories, alternative landscape taxonomy, documentary photography, and animal avatars, or, subsurface tour guides (2007, p. 195).

Pelle Ehn and Dan Sjögren (1991) have explored the use of games as mediating tools in participatory design processes. The games are used to create imaginary situations that complement reflective understanding of practice. The games induce a playfulness that follows from non-constraining use of language. They argue against the correctness of descriptions and stress how linguistic artefacts are used rather than what they state to be true. In such a context, meaning arises not in how exactly a statement is formulated, but rather by the intertwining of different voices that shape language in the specific situation.

ENRICHING REPRESENTATION

In human geography, for example, authors have contested the content and means of production of representational modes of research in the form of visualizations such as photography, film, sketches and maps (Rogoff 2000). 'Critical cartographers' for example, have turned to artistic or participatory experiments in map-making that emphasize the subjective, the provisional, the excluded and the unforeseen (Crampton 2009; Crampton and Krygier 2006; Kitchin et al. 2009). Others have experimented with innovative methods for 'animating' the archive. These research practices in many ways try

to bring the material and documentary properties of archives into play, through an emphasis on bodily performance, the mobility of materials and the interplay between generating accounts and ongoing processes of interpretation. Such work engages directly with the contradictory processes of archiving, of giving form to the identities and capacities of past communities, spaces and landscapes, while simultaneously erasing that which cannot be so easily captured. (Dwyer and Davies 2009: 89).

In her work Kathryn Yusoff explores how the Antarctic landscape is rendered through expeditionary photography and embodied practice (Yusoff, 2007). Mixing writing techniques and photo essays, she stages an encounter between the 1970s 'Antarctic Action Man' and historic photographs and written accounts of the embodied endeavours of Antarctic exploration. The stories found here of pain, snow-blindness, exhaustion and exposure puncture the heroic play of exploration. She moves beyond the historic visual record to ask how such representations were achieved – a collision between technologies and possibilities of photographic exposure and bodily exposure to the landscape. Her artful interventions and a critical engagement with visual methodologies provide opportunities for producing 'archives of the feeling body'. Incorporating the body into the landscape and the landscape into the body introduces a different sensibility to the narratives, materialities and images of these extreme environments.

ON MATERIALITY

Another area of fruitful experimental work is that of materiality. Common to both design and parts of social sciences is a shared interest in objects. At a seminar series at Goldsmiths University held between 2009-2010 titled *The Objects of Design and Social Science*, the organizers argue that a focus on material, empirical, and conceptual objects open up possibilities for overlaps and disjuncture between the two disciplines and a rich space for dialogue.

Design is concerned with making and interpreting objects including finished products, experimental design aids (e.g. prototypes and probes), and projective representations (e.g. scenarios). Design has also recently begun to re-engage with more speculative objects whose ambiguous functionality makes it possible to explore the social and the material, the political and the aesthetic.

Some social science disciplines also work with objects as well, including categorical objects such as race, gender, and class. They have also explored empirical objects ranging from the mundane to the exotic, and conceptual objects such as the notions social scientists use to theorize the social. 'Materiality' and 'material culture' have, of course, long been key preoccupations in anthropology (e.g. Miller, 1987), an emphasis on the role of settings, instruments and devices in the production of scientific facts is the banner of science studies (e.g. Latour & Woolgar, 1986).

Using Nippert-Eng's work as an example, Wakeford (2003) suggests that objects can serve as a useful medium for reflective exchange between social researchers and designers. In researching the book *Home and work* (1996) Nippert-Eng discovered that the ways in which people manage their keys are linked to a series of their other daily activities around people and objects. She noticed that people who had all their keys together in one key chain tended to have an integrated

life, where the boundary between home and work is blurred, while separate key users tend to have a strong division between these worlds. Nippert-Eng writes:

I found that one's key chain is linked to numerous other behaviours that we frequently don't even notice like commuting behaviour, appearance management, the way we talk at home and work, office and home decor, and eating and drinking habits. But key chains also are linked to trajectories as diverse as the domestic division of labour, occupational norms, the history of industrialization, family composition, and position within the organizational hierarchy, just to name a few. If we add to this links to more physical factors such as the production of metals and doors, the norms of access to building and car interiors, or even the popular culture of key chains as collectibles, you can see how easy it is to think of the key chain as a very interprofessional manifestation or hyperlink. (Nippert-Eng 2002: 214).

Drawing from this Wakeford (2003) argues that objects such as key rings can serve as a good data elicitation technique for qualitative inquiry on the boundaries between home and work. A qualitative narrative can be offered where key chains are positioned as objects through which to talk to designers about sociological concepts that might otherwise be difficult to introduce in other ways. She describes the idea of working with an artefact or an idea as an "interprofessional hyperlink".

Martin Johansson and Per Linde (2005) use the concept of playful collaborative exploration as ways of interacting with material from fieldwork that do not constrain analysis only to the search for objectified knowledge. Instead the ambiguous nature of such exploration nourishes a dialogue between different actors in the design process. This playful exploration can be used in the design process to create fantasy worlds (worlds of hypotheses) where designers experiment with ideas and concepts.

DESIGN BOARDS

In other collaborative work carried out in the *INCITE* project Wakeford (2003) and here colleagues used "grey boards" or large foam panels which can be used to pin or stick photos or text into a story of a project. These boards were used to pin up cuttings from magazines, segments of interview transcript, theoretical ideas, and stills from video interviews. They used coloured shapes to indicate categories of ideas or the development of a line of thought. Wakeford observes that these boards were useful not only as a way of physically sorting and re-ordering ideas, but also because they became part of performative stories about the research. The grey boards became "boundary objects" used to ease dialogue between researchers used to conventional ways of

working with text and analysis, and designers, many of whom are used to working visually. In workshops with computer scientists, engineers, and designers, these boards were successfully used by social scientists to describe on-going fieldwork.

Wakeford argues that these boards were not just about display. They were also a physical manifestation of a way of working. Unlike a report handed to a designer as a set of specifications, the active and embodied process of translation of the data was crucial to the collaboration. It involved explicitly producing an active and engaged anthropological interpretation for an interdisciplinary audience.

As Koskinen and colleagues (2011) point out, "design things" such as mood boards and prototypes are a prominent feature in the spaces in which designers work. They suggest that:

They are an effective way to bring people to the same table to imagine futures together. Most important, they make it possible to probe and discuss those sensuous, embodied and social things that are central to design – like colors, how materials feel on skin and the shapes of objects. Few people have a reliable vocabulary to talk about them. Inventive methods have a place in design for this reason alone. (Koskinen et al., 2011: 139).

Charlotte Lee (2007) introduces the notion of "boundary negotiation artefacts", where she suggests that negotiating boundaries might be considered a special form of cooperative work, where actors discover, test and push boundaries. This implies that we may perceive these emerging design artefacts as challenging boundaries and notions, inviting participants to negotiate and redefine those boundaries.

CULTURAL PROBES

One device that has been discussed among designers and social researchers is the cultural probe. Originally conceived by Bill Gaver and his colleagues (1999) at the Royal College of Art in London, the cultural probe was a design method that was used to help with inspiration, and to enable the authors to create a way of thinking about a new research area. Gaver and his colleagues (Gaver et al., 2004) have commented on the way that their original idea has been adopted and adapted by other researchers, in a manner that disrupts their original intention to create room for uncertainty. The probe is now part of the toolkit of some designers, used not just for inspiration but also for data gathering and to open up conversations with stakeholders (Loi, 2007).

As Boehner and colleagues (2012) point out, probes were not originally intended to support a process of deducting definite truths and target communities in a manner more familiar with for example social scientists,

nor the problem solving process familiar to many designers. Probes were developed in and for a design process that disregards utilitarian values in favour of playfulness and exploration. Because probes are motivated by the desire to inspire new ideas rather than understand existing practices, they need not to be accountable to values such as replicability, representativeness and comprehensiveness.

Instead, it is important that they are able to help provoke new design ideas and move both designers and participants out of their comfort zones. For probe artefacts this implies emphasizing their ability to uncover surprising details while still giving a sense of familiarity with certain settings. The idea is that, in this way, they will reveal previously unexplored possibilities for design that more standard methods would mask. In order to avoid surface engagements and support empathetic interpretation, for example, probes such as the Listening Glass inspire participants to take a fresh look or a new perspective on familiar surroundings and practices. Other examples such as the Telephone Jotter Pad and the Camera provide prompts for people to produce images and text unlikely to emerge in the context of more expectable research prompts.

Seen from the perspective of Barry and colleagues' three possible modes of social science-design collaboration outlined above, it is not mode one: design used to style a data gathering method. Neither is it an example of mode two: design integrating with ethnography to create a new method. Kimbell (2008) suggests that probes can be viewed as an example of mode three: an agonistic-antagonistic intervention into discussions about what constitutes data and data gathering by doing inventive inquiry.

Kimbell argues that researchers designing and using probe packs are "reassembling the social" through paying particular attention to visual data. They are involved in constituting messy realities in which they, stakeholders, and the objects in the packs, are all intertwined. They offer an intriguing way for this community to reconceive its disciplinary boundaries.

RESULTS

REFLECTION

In considering the section above on a range of approaches to methodological experimentation, we have developed a Manifesto as a means of trying to take one more step forward the need for such experimentation into a more programme driven direction that can be realised in detail over time.

We see this Manifesto as the outcome of a process of work and reflection. It may also be approached as a way of identifying potential challenges for design research to consider.

MANIFESTO

The Manifesto is not intended to be all encompassing; rather it is offered to design research as a prompt to methodological action. Methodological experimentation in design research can be developed through three main interconnected components and activities a) as knowledge building, b) by way of modes of experimental inquiry, and c) through acts of methodological innovation.

A MANIFESTO FOR METHODOLOGICAL EXPERIMENTATION IN DESIGN RESEARCH

a) Knowledge building

- 1. Methodological experimentation is needed as a continual feature of design research in the wider project of reflexive knowledge building.*
- 2. A diversity of design techniques drawn from design practice can usefully inform ways design research is conducted experimentally.*
- 3. Methods from qualitative inquiry may be drawn into design research more fully so as to enrich understanding and analysis developed through construction.*

b) Modes of experimental inquiry

- 4. The mixing of design techniques and qualitative approaches can help support the dynamic production of an expanded and creatively extended mode of methodological experimentation.*
- 5. The innovative making of design artefacts, interactions, systems and services together with the critical articulation of qualitative accounts provides a reflexive and combinatorial means to getting at the processes of methodological creativity.*
- 6. The creative and abductive character and processes of designing can enhance critical and reflexive ways of presenting the social in qualitative inquiry in design research.*
- 7. Focus on non-positivistic methodological matters accentuated in qualitative inquiry - concerning representation, voice, positionality multi-sitedness, embodied knowing, multimodality, interpretative communities, blurred boundaries, partial accounts, situatedness – allows design research to extend its methodological repertoire.*

c) Acts of methodological innovation

- 7. Position and perspective in qualitative methods can be integrated with design techniques to enhance construction-based inquiry involving interdisciplinary teams in dialogue.*
- 8. Working with modes of representation and technologies of mediation, productively in design and reflectively in research practice can advance and enrich*

methodological action and critique that is design centred.

9. When design work is well situated, practised and understood - through culture, in its political character, by way of its social implications and force, and in contexts of embodied use - it may be effectively paired with methodological views and insights on building knowledge on design innovation.

10. Design increasingly negotiates and takes up shifts between material and intangible properties and experiences so that these transformations and the hybrid character of design products, processes and uses ask we actively develop methods to meet these states and changes.

DISCUSSION & CONCLUSION

As this paper is of a meta character, in this section we briefly point to a number of key matters we have identified and their methodological potentials and limitations.

In *Design Research through Practice*, Koskinen and colleagues (2011) write that what is particular to design inquiry is the need to understand how knowledge is built in the different locations of making, use and reflection. They archetypically term these 'lab, field and showroom'. These locations - metaphorical, conceptual, literal and pragmatic - ask us to rethink how and where design research is being constructed and the ways in which this is epistemologically framed and enacted, especially in and as practice. As design moves into increasingly complex contexts, there is a need for the nature of that complexity to also be investigated and presented reflexively. Their work points to a need to see design research as being more than research in, on and through design. What is possible to extend methodologically, in design experiments and experimental reflection, is to engage with acts of designing and critiquing that are constructions. These are acts that integrate and enrich one another through their inter-relations. These writers also argue that *practice* may be explicated more fully in design research, and that we continue to examine the connections between making and researching with reference to projects, innovations and settings of use.

The Manifesto offers ways of looking into the experimental complexity and messiness of both qualitative and creative design methods to develop richer understanding of design and design research. By no means has qualitative social science inquiry always been able to achieve this itself! Also, design and design research need to strengthen ways of tackling complex real world challenges and the messiness of understanding and engaging in actual settings. Self-reflection here needs to be connected to wider pressing political and cultural concerns so that experimentation and the application of methods are geared towards contemporary social challenges; this is to go beyond

functional and instrumental notions and practices of design.

In this paper we have mentioned the importance of methodological innovation and the need for continued experimentation that allows design research to look into its practices, academically, productively and through situated application. We have offered a Manifesto to try to encapsulate some of these developments as principles for further investigation, but done so with close reference to research methods in qualitative inquiry. We have done this by referring also to design techniques that the social sciences and humanities could also include their own on-going moves into practice-based knowledge building that is already methodologically a very dynamic domain within design research.

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DESIGNING FOR SELF-LEADERSHIP

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ABSTRACT

This paper argues generative tools can be used not only as ‘a language for co-creation aimed at the collective creativity’ as stated by pioneer E.B. Sanders (2000), but as ‘a visual making-language for self-dialogue and value clarification’, paving the way to self-leadership.

In a Danish bank this ‘making-language’, was offered banking customers, who wanted to change their ‘money-behaviour’. They created visual ‘hand-made’ strategies which proved to be strongly self-persuasive: six weeks later the participants had changed their behaviour - and in accordance with their new strategies.

Additionally they stated they felt increasingly empowered by taking action and leadership.

Designing for self-leadership meet with an increasing need for identifying our values and ‘voices’ and becoming self-leading (Covey, 2005, Drucker, 2000). This need aligns with the recent discovery within cognition and neuroscience, that we actually can change inappropriate thinking patterns and habitual ways of acting (Manz & Neck, 1992, 1999, Seligman, 1998, Damasio, 1999, Pinker, 1999).

Designing is paving the way.

FROM VALUE CO-CREATION TO VALUE CLARIFICATION AND SELF-DIALOGUE

Despite most of us are focused on achieving a successful life, we seldom reflect on our dominant values. Instead most of us quietly ‘accept’ our daily ‘habits’, like constantly working too much, eating too much or using too much money.

In the wake of the economical crisis plenty of people are struggling with their private economy and also struggling with authorities that are ‘dictating’ them how to live and use their money, - but who is to blame when people are constantly overspending? - and how should future banking services look like?

In this research generative tools are used as a language for value clarification and self-dialogue. Generative tools are central in co-creation, a popular method for innovation (Sanders & Stappers, 2008, Pralahad & Ramaswamy, 2004). Generative tools are known as ‘thinking tools’ (Sanders, 2000). Pioneer within the field of co-creation, E.B. Sanders, calls generative tools ‘a language for co-creation’, aimed at the collective creativity. Sanders argues, that this language is characterised by two things: First of all the language is predominantly *visual* and the *ambiguity* that often characterises visuals does indeed affect the participants’ way of thinking. Second, a key concept in the language of co-creation is ‘*making*’ and the fact that participants are ‘creating’, makes the use of the language a kind of creative and reflective process, a design process (Sanders, 2000).

In one of my preliminary co-creation sessions in a medium sized Danish bank I met a young girl, AM who was constantly overspending. The process performing the creative tasks in the co-creation workshop made AM reflect, and finally she ended up being more aware of her specific needs and wishes. She was capable of telling exactly, what she wanted and how she wanted it. She expressed that she wanted to gain control over her finances by shifting to another bank where she imagined she would not “feel like a number” (AM), but be welcomed by an empathic and

friendly financial advisor who had plenty of time to care about her and her overspending.

Such types of insight are typically gained in co-creation sessions and used in business development. Like the sleeping region retail bank in the US, Umpqua Bank, who did design driven innovation and found out that people in general, just like AM, felt disenfranchised and disconnected from the large financial institutions. This made Umpqua Bank change their concept into a bank with the strong selling point in turbulent times: a slow, local, trusted bank doing 'slow banking'. With this concept they highlighted 'personal services and relationships', 'social connections', 'activities' and 'localness' (Berger, 2009). Co-creation sessions definitively can lead to brilliant innovations in business and society.

Despite these presumably interesting insights from my co-creation session, among others with AM, I was keen on exploring whether the creative workshop had had any effect on AM, and whether she actually did change bank. In other words my interest moved from the 'common' understanding of the outcome of co-creation session – which can be used for co-creation of values, like the example of Umpqua Bank - to an investigation of a potential outcome and effect *on* the participant.

In an after-interview AM argued she had not changed bank. But surprisingly, she had made budgets herself and adhered to these budgets – thus she had changed her behavior. She expressed she was proud of herself and felt empowered: "I have become much more aware that I cannot be a big spender while being a student, so I have started saving"... AM had changed her perception of herself from 'being a big spender' and 'not being in control' to 'taking action' and 'being in control'.

This discovery first of all made me question co-creation sessions, as AM changed her perception and 'wishes' *after* participation in the workshop. Secondly, it changed my research focus into how the generative tools can be used not only as a language for co-creation (Sanders, 2000) but as 'a language for self-dialogue and value clarification' (Sørensen, 2011).

In the current research in a Danish bank participants were offered generative tools as a language for self-dialogue and value clarification. While doing different creative assignments participants reflected on their deep and dominant values and created visual and hand-made strategies for the future. On behalf of these strongly self-persuasive strategies, they developed new cognitive strategies in accordance with Manz & Neck's theory about "Though-Self-Leadership" (1992, 1999). A theory that relates to a relatively new finding within cognitive science – that human beings can change inappropriate beliefs and assumptions and thus change thinking patterns and behaviour (Seligman, 1998).

The current research highlights the human power of the design activities, 'framing', 'reframing' and 'design-as-doing', using generative tools as a visual making-language for value clarification and self-dialogue. The paper demonstrates, how this making-language can be used when creating new personal strategies and pave the way for self-leadership.

In the following sections I will present my MoneyWorkshop, followed by an explanation of the workings of the creative sessions and finally I will discuss the topicality and the future possibilities of this visual making-language for self-dialogue and self-leadership.

DESIGN EXPERIMENTS

The research on which this paper is based includes altogether 43 participants. My Ph.D. thesis and this paper include material representing 20 participants (10 customers and 10 potential customers).

When designing the creative workshop, later called The MoneyWorkshop, the intention was to make a private 'room' for the individual to respond in. I designed a box as a private 'room', leaving space for reflection, memories and ideas when responding to the questions, and also for the provocative statements and the creative tasks. This 'reflective room' was designed with a happy, artificial, long green grass carpet in the bottom, topped by the materials: pictures, pieces of paper, scissor, glue, and coloured pencils. The box had an appealing and accommodating look, almost like a gift, with long green ribbons attached to small notes, telling people what to do.



Figure 1: The box with all the creative tasks – developed for this specific research (Bonde Sørensen, 2011)

Later, participants were asked to make collages about their perception and relationship to money and to banks within different 'time-framings': the present, the past and the future. These are generative assignments that include a narrative perspective and playing different roles. Finally, participants were asked to make a personal statement in case they wanted to change their perception and relationship to

money. After approximately six weeks, when participants came back for a follow-up interview, the majority had *changed their perception and behaviour* in relation to money.

The following paragraphs are extracts from the creative session. This participant, 'The Flying Lady', is a banking customer. She presents her collages, which represent different time framings: the present, the past, the desired future, the personal statement followed by the participant's reflections on her participation in the workshop. The latter represents the situation approximately six weeks after participation in the workshop.

AN EXAMPLE FROM THE MONEYWORKSHOP: 'THE FLYING LADY'

The Flying Lady is a customer in the bank. She is around 50 years old. Here are her descriptions:

A: The interviewer

B: The Flying Lady

C: Another participant



Figure 2: Collage made by the Flying Lady describing her present situation

DESCRIPTION OF PRESENT SITUATION

B: *This is me, and this is my financial advisor. I think the place where we meet is kind of dull, but modern. It gives an impression of security, guarantee, of balance, there are certain fees... but they have to have their salaries, too, right? Things are quiet and uneventful. But in five years (she changes the collage)*

... then things are more exciting. This is me and this is my financial advisor. I think we need to draw in nature somehow. Why cannot we sit in the park and talk about money? But...lots of words. It doesn't mean that I am overpowering my financial advisor with words. It means that I want more time to write. And I am a methodical person. That's why there are many words and not so many pictures. I need to take a flight of fancy, I need to realize some things, do you get it?

That's where I am going.

A: Yes, I get it, and how do you get from A to B?

B: *Well, that's just it. I really hope I can do it. Here I am (laughing) stuck at the river crossing, right at the water's edge. I am making a 5-year plan.*



Figure 3: Collage made by the Flying Lady describing her past situation

DESCRIPTION OF PAST SITUATION

B: *My childhood, briefly. My mother always had to take the calls from the Credit Union, because we needed a postponement of our payments; my father went out and started digging at his little farmhouse garden. That's where all the extra money went. I wore second-hand clothes, we never went on vacation, I never had pocket money. That's the baggage you carry through life.*



Figure 4: Collage made by the Flying Lady describing her desired situation

DESCRIPTION OF DESIRED FUTURE SITUATION

So, this is where I would like to go, because, as I said earlier on, I need freedom and space and I want to be close to nature, be in contact with my senses, with my thoughts and the space around me, so that I can get new ideas, can move on and write what I want. I thought the images of children with money say something: It's fun, but they don't take it very seriously. There are no pictures of grownups, they are far too serious and insisting, I believe you should be able to let go. I think money should be circulating for

it to be fun. You don't benefit much if it's lying under the pillow. Money must work, so that you can buy freedom to do the fun stuff. Invest it in something that benefits other people. I want freedom and reserves of energy, which means that I need savings, so I can manage if something collapses, but I don't have...

A: So what you are saying is that people should have a more relaxed attitude to money, is that it?

B: *I think I have come a long way...it was my mother who had to deal with all the unpleasant situations. I guess I realized it was necessary to take things into your own hands, also when it was not much fun. And I believe that I have done that to a large extent. But I would like to be able to view things from a more fun perspective. I am still very focused and want things to be in order. Maybe I need to let go and say, "It'll be OK". I have worked so I am now out of debt and I have two children who are doing well on their own. I could start relaxing a bit and open the dam over there a little. But I don't have the courage yet, I need to be somewhere else.*

A: But now you have the chance to make a personal statement, if you want...

DEVELOPING A PERSONAL STATEMENT

Developing a personal statement is an assignment that follows up on the previous assignments and 'time framings'. It is a generative assignment that offers participants the opportunity to define or redefine their role and personal goal.

In the first assignment, participants had already reflected upon ways in which they would like the future to be. In the second assignment, they might see patterns from the past, but now they are offered the possibility of taking action and becoming 'the agent', they wish to be – 'agent' in the understanding, acting, being in control, taking leadership.

In general people do not seem to reflect about their dominant values in relation to money, instead people often are quietly accepting their habitual ways of thinking and acting. The MoneyWorkshop ends by offering participants the possibility of making a personal statement, which is a representation of the imagined future ideal situation, that act as a basis for the development of new mental strategies.

PARTICIPANTS REFLECTIONS ON THE WORKSHOP

A: Well, it's been a couple of weeks since we last met. What did you do in the MoneyWorkshop?

B: *I managed to transform my father's last, defensive, sad words 'Maybe I should have taken more chances in my life' to the forward-looking, positive: "So fly, goddammit" and that expression has been VERY important for me the last few weeks.*

A: How?

B: *...this workshop four weeks ago made me take action, I have to do something, I cannot just sit passive and wait for someone to do something to ME'. So I took three sick days and thought about my situation. Then I went to Copenhagen where I had an hour and a half sparring with an advisor in my union about what I want my future job to be like...*

B: *I spent the three days off writing a 10-page spread sheet outlining what I really wanted to do the rest of my life. That was quite something...*

A: That's great to hear.

Like 'The Flying Lady' other participants also made deeper reflections not only on their private economy, but also on their life in general. However the majority of the other participants (all in all 20 persons) were more focused on changing only their perception and money-behaviour – like this '50-a-day guy', who expressed his collage in this way: *That's what I would like to be, a "Money-Man-JAZZ" – be more in charge.*

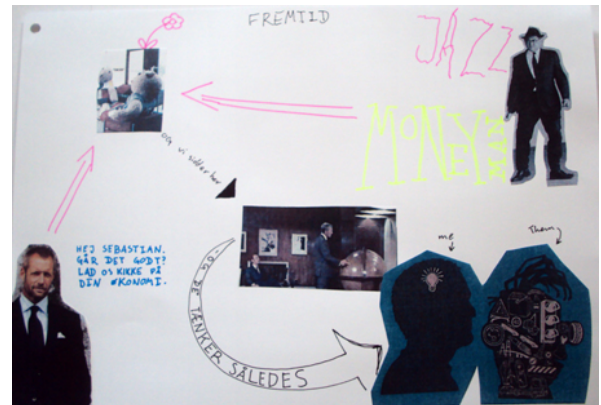


Figure 4: The-50-a-day-guy's illustration of his desired future situation (Bonde Sørensen, 2011)

AN EXPLANATION OF THE DESIGN PROCESS IN THE MONEYWORKSHOP

The pioneer of the concept of generative tools, Elizabeth Sanders, argues: "We interpret what is happening around us with reference to our past experiences" (Sanders, 2001, 2), which can also be referred to as mental mappings and/or metaphors. More precisely, our beliefs and values *shape* the stories we add to situations.

By changing core beliefs and altering the stories we make up, we can slowly affect the deeper beliefs and values we hold about ourselves, the world around us, and our habitual ways of thinking and behaving. In Paton & Dorst's understanding of framing, 'reframing' refers to "building a new frame for oneself, based on changing one's view due to briefing interactions – although it is acknowledged that reframing can also occur as a result of reflection", as Paton & Dorst explain (2010, 318). In line with Paton

& Dorst, Schön argues that the designer “understands a situation by trying to change it, and considers the resulting changes not as a defect of the experimental method but as the essence of its success” (Schön, 1983, 151).

In the current research *framing* is one way of seeing a situation; you can do several framings, finding new ways of seeing a situation. *Reframing* is changing your perception, which can include deeper self-reflection about unreflective, or maybe underlying and subconscious mental mappings and/or dominant metaphors, and seeing the situation anew, just like the participants in the MoneyWorkshop are urged to *reframe* their current money situations into preferred ones. They reframe themselves and/or their money situations *by doing design*.

In the following section I will elaborate on design-as-doing, representations, graphics as cognitive tools and the generative metaphor.

DESIGN-AS-DOING AND REPRESENTATIONS

When ‘doing’ design representations are essential. Representation of problems, solutions or situations is important because it allows the designers to develop their ideas in conversation with these representations, in a *reflective conversation with materials* (Bamberger & Schön, 1983). Designers externalise their thoughts in all types of drawings, doodles, sketches etc.; they talk with their sketches and have conversations with representations. The sketches act not only as outputs, but as important inputs to the thought process and stimulate the act of framing and reframing a design problem or situation.

This reflective conversation combined with the ambiguity in the visuals is pivotal in the MoneyWorkshop as it encourages framing and reframing. Moreover these framings and reframings are meant to question the underlying assumptions which are rooted in mental models and/or metaphors and this again seems to persuade participants to change their habitual ways of thinking and behaving.

In her “say-do-make-approach” (2001) Sanders gives an account for how different methods appeal to different types of knowledge. She claims generative sessions provides “tacit knowledge” and can reveal “latent needs”. The say-do-make-approach is elaborated in this way:

Listening to what people say tells us what they are able to express in words (i.e., explicit knowledge). But it only gives us what they want us to hear. Watching what people do and seeing what they use provides us with observable information (or observed experience). But knowing what people say/think, do and use is not enough (Sanders, 1992). Discovering what people know helps us to communicate with them. Understanding what they feel gives us the ability to

empathize with them. This way of knowing provides tacit knowledge, i.e., knowledge that can't readily be expressed in words (Polanyi, 1983). Evoking people's dreams will show us how their future could change for the better. It can reveal latent needs, i.e., needs not recognizable until the future. (Sanders, E.B., 2001, 3).

Later Visser (2005) made an illustration (fig. 6), which gives an overview of how different techniques influence different types of knowledge in people. The say-do-make approach includes the generative sessions, which Sanders calls ‘a guided discovery process’. Here the ‘make’ method enables creative expression “by giving people ambiguous visual stimuli to work with”. As Sanders claims: “*When we bring them through guided discovery and give them the participatory make tools, we have set the stage for them to express their own creative ideas*” (Sanders).

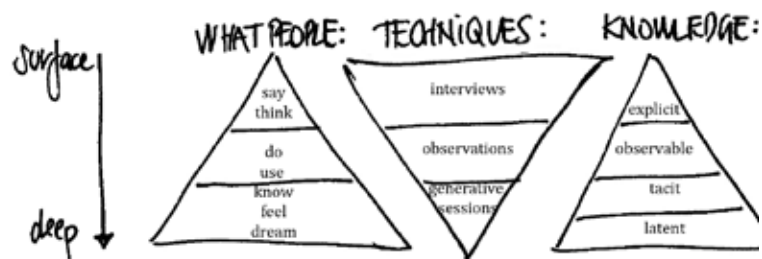


Figure 6: Different levels of knowledge are accessed by different methods. (Sleeswijk Visser 2005)

This method of designing becomes a crucial component in Thought-Self-Leadership that highly stimulates the development of new personal strategies. Below is an extract from an interview about the participants’s reflections on the process:

...performing the tasks in the box was one long process, where I got deeper and deeper into the concept of ‘money’ and ‘finances’, first filling out the postcards, choosing statements etc. I think these tasks were necessary in order to make the final collages. In these collages I felt I was able to express my reflections and final statement; I found an outlet for my frustration about my personal finances.

A: What happens when you look at those pictures? Would it have been the same if I had interviewed you and asked you to tell me about your relationship to money also in your childhood?

C: *It would have been very different, because we did not create it. We really created this by cutting out the pictures, by choosing the things that meant something to US.*

B: *They somehow open some other doors in your consciousness, than if you just had to answer a question – you explore your own mind, I think.*

Can you describe what you meant when you said earlier on that those pictures triggered something?

B: ...it was a challenge to sit with those pictures and try to find the best fit. It also went well with my idea of putting more emphasis on play and my conclusion that it has to be fun – let's try and get something positive out of it, what is it I want?... So it has been an interesting journey, which has just started, and I don't know where it will take me.

C: That's funny, when I went back to my childhood and what had influenced me, I suddenly saw some connections – I could see images and hear some words. Well, your childhood really affects you a lot, more than you think.

As the participants express, the visuals are crucial elements. Graphics as cognitive tools play a central role as described below.

GRAPHICS AS COGNITIVE TOOLS

Graphics can be considered cognitive tools, enhancing and extending our brains and mental imaging. In his book *Visual Thinking in Design* Colin Ware (2008) provides guidance for designers on how to present information, which aids the thinking process of their audience. He refers to new scientific knowledge from the discipline of human visual perception and transforms this into concrete ideas. Ware explains that we should understand perception as a dynamic process, implied by the term "Active vision." He explains, "...we should think about graphic designs as cognitive tools, enhancing and extending our brains. Although we can to some extent form mental images in our heads, we do much better when those images are out in the world, on paper or computer...etc., which all help us to solve problems through the process of visual thinking". Ware claims, "we are cognitive cyborgs in the Internet age in the sense that we rely heavily on cognitive tools to amplify our mental abilities" (Ware, 2008, ix). Neuroscientists support the claim that humans think in images and often in visual images rather than in words (Pinker, 1998, Damasio, 1999). Similarly Kazmierczak claims "visual representations as revealing mental models, rather than depicting what we see" (Kazmierczak, 2002,1).

The brain is most effective, Ware claims, when visual and language modalities are combined, and he continues his argument that the science of perception must take design into account because the designed world is changing people's thinking patterns. He says: "Designed tools can change how people think" (2008,181). Mental images are internalized active processes; much as our inner dialogue is internalized, visual imagery is based on the internalized activities of seeing. Ware explains:

Everyone uses internalized speech as a thinking tool

but the constructive internalization of mental imagery is a skill that is more specialized. Experienced designers will internalize the dialogue with paper, others who do not use sketching as a design tool, will not (2008,152).

Thus the visual images help participants in the MoneyWorkshop to generate mental images or even, as Kazmierczak claims, *reveal* mental models. Similarly Ronald A. Finke, Thomas B. Ward and Steven M. Smith in their books *Creative Cognition* and *Creativity and the Mind* (1992, 1995) attempt to identify the specific cognitive processes and structures that contribute to creative acts and products. In their model: 'The Geneplore Model' mental imagery is a core concept that enhances creativity. Mental imagery is linked to different cognitive notions.

Another central element related to visuals is metaphors and generative metaphors that are paramount in this way of working with the collages.

THE GENERATIVE METAPHOR

In his theory about the generative metaphor Schön (1993) distinguishes between two different traditions associated with the notion of a metaphor. The first one "treats metaphors as central to the task of accounting for our perspectives on the world: how we think about things, make sense of reality, and set the problems we later try to solve". In this sense "metaphor" refers both to a certain kind of product – a perspective *or frame*, a way of looking at things – and to a certain kind of *process* by which new perspectives on the world come into existence. In this tradition metaphorical expressions like "Man is a wolf" are significant only as symptoms of a particular kind of seeing, such as the "meta-pherien" or "carrying over" of the frames or perspectives from one domain of experience to another. This is the process Schön calls "generative metaphor" (Schön, 1993, 137).

Both meanings of metaphor are present in the collages. Both AM and 'The Flying Lady' and other participants often use metaphors in their description of their situations. They use metaphors in order to describe their situations, "money flying out the window", "burying my head in the sand" etc.

Another participant used this expression to his collage (figure 4): *That's what I would like to be, a "Money-Man-JAZZ" – be more in charge...* Here "the Money-Man-Jazz" clearly is a *generative metaphor*, meaning 'being in control'. The generative metaphors move the frame into a new one and thus the use of metaphor acts as a *reframing* of the participant's relationship to money (Schön, 1993).

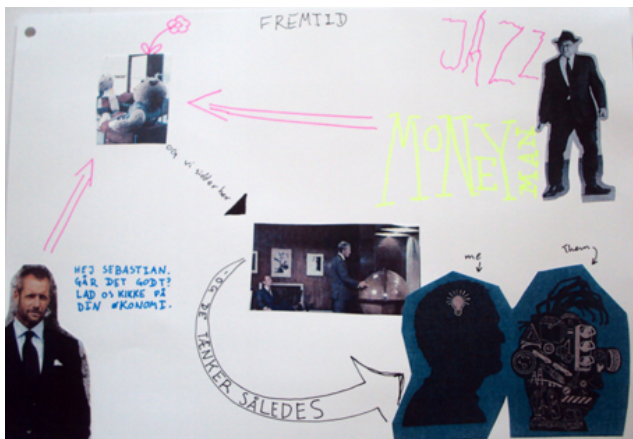


Figure 4: The-50-a-day-guy's illustration of his desired future situation (Bonde Sørensen, 2011)

Thus the design process and mechanisms of the MoneyWorkshop relate to the design activities 'framing', 'reframing' and 'design as doing'. There is, however, a significant factor, the personal statement, which contributes to the act of designing for personal mental strategies in line with the ideas expressed in *Thought Self-Leadership*.

DESIGNING FOR NEW PERSONAL STRATEGIES AND SELF-LEADERSHIP

The process of the MoneyWorkshop described above echoes Manz & Neck's idea about Thought Self-Leadership. Self-Leadership was originally applied to *organisations*, developed with the purpose of improving *employees'* performance. Self-leadership seeks to appeal to an individual's inner motivation, as Neck & Houghton explain: "Self-leadership is a self-influence process through which people achieve the self-direction and self-motivation necessary to perform" (Neck & Houghton, 2006).

Thought Self-Leadership consists of specific behavioural and cognitive strategies designed "to positively influence personal effectiveness". The underlying premise is that people can influence or control their own thoughts through the application of specific, cognitive strategies and ultimately impact individual and organisational performance (Manz and Neck, 1991).

Neck and Manz's theory about Thought Self-Leadership addresses the effect of self-talk and mental imagery on performance and claims that people can influence or lead themselves "by controlling their own thought through the application of specific cognitive strategies which focus on self-verbalisations and mental imagery" (Neck & Manz, 1992, 696).

In their article "Thought Self-Leadership: The Influence of Self-Talk and Mental Imagery on Performance" Manz and Neck (1992) give an outline of how cognitive strategies can change dysfunctional beliefs and assumptions and thus improve thinking

patterns and performance. Mental imagery and self-talk are key concepts in these strategies, the authors argue. Whenever we imagine ourselves performing an action in the absence of physical practice, we use 'imagery', the formation of mental images defined as "The mental invention or recreation of an experience which, in at least some respects, resembles the experience of actually perceiving an object or an event, either in conjunction with, or, in the absence of, direct sensory stimulation" (Finke, 1989 in Neck and Manz, 1992, 684). Similarly Manz explains mental imagery as follows: "We can create and, in essence, symbolically experience imagined results of our behaviour before we actually perform" (Manz, 1992, 75). From these views, mental imagery refers to imagining a successful performance of the task before it is actually completed. Weick's concept of 'future perfect thinking' provides a parallel argument when he states "...If an event is projected and thought of as already accomplished, it can be more easily analysed" (Weick, 1979, 199).

Self-talk and mental imagery have been examined and tested in various disciplines including sports psychology, counselling psychology, clinical psychology, communication, and education (Manz & Neck, 1992, 682) and refer to Seligman's statement:

One of the most significant findings in psychology in the last twenty years is that individuals can choose the way they think (Seligman, 1991).

According to Godwin, Neck and Houghton (1999) TSL cognitive strategies include the self-management of:

- Beliefs and assumptions (the elimination or alteration of distorted individual beliefs that form the basis of dysfunctional thought processes)
- Self-dialogue (what we covertly tell ourselves)
- Mental imagery (the creation and, in essence, symbolic experience of imagined results of our behaviour before we actually perform) (Manz, 1992)

The figure below illustrates, in simple form, the relationship between what Manz calls 'self-leadership components' and goal performance. As outlined in the former paragraphs visuals stimulate and even reveal mental models (Kasmierzczak), and metaphors can make participants reframe their situation (Schön). *Doing* design includes reflections with materials – all activities that have the capability to challenge and even change mental imagery, beliefs and assumptions. Thus, the MoneyWorkshop is an example of Thought-Self-Leadership stimulated by both the ambiguity of the visuals and the 'making' process. Hence this method of designing becomes a crucial component in Thought-Self-Leadership that stimulates the

development of new personal inner strategies.

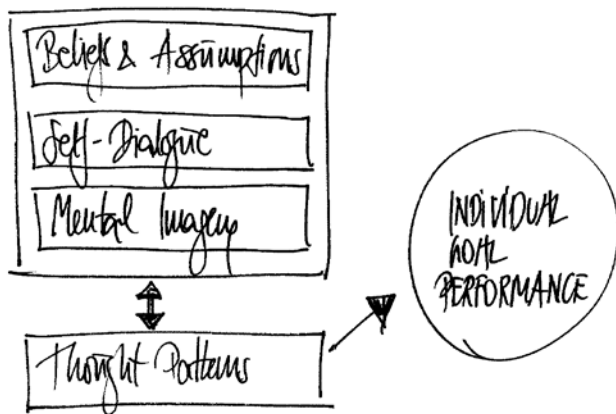


Figure 6: Simplistic rendering of the relationship between Thought-Self-Leadership components and individual goal performance (Manz, 1999)

TOPICALITY AND FUTURE POSSIBILITIES

In this final section my intention is to bring a discussion and a conclusion on topicality and future possibilities in relation to designing for self-leadership. The discussion is merging different perspectives: 1) a rhetorical perspective, which discusses the effect of co-creation. 2) an ethical perspective on taking responsibility and 3) an ideological perspective on designers role and responsibility when designing. Finally, I will bring a conclusion on how this current design project is moving generative tools into a radical new direction. This research is *not* about co-creation and empowerment. This is about designing for self-leadership and about how humans can become self-leading in accordance with the current change in the human conditions.

Co-creation reminds us of the changing roles among customers from being part of 'the market' to becoming increasingly active and part of the value creation process in organisations (Norman, 2001) (Prahalad & Ramaswamy, 2004).

Adding a rhetorical perspective, the effect of co-creation can be considered an art 'constitutive rhetoric' (Charland, 1987). The central point in constitutive rhetoric is the audience being constituted in new subject positions, here as 'co-creators', 'drivers of innovation', 'creative people', 'experts' etc.

According to Charland (1987) the crucial point in constitutive rhetoric is the audience 'claiming its rights' on behalf of this constitution. This raises the question: Will customers claim their rights as 'creative' 'co-creators', 'empowered' people? An additional question is: What kind of customers, users or in particular *citizens* are we 'producing' through our practices within participatory design, user-driven innovation, co-creation, and 'the people, we are

serving'? (Sanders, 2006). I am aware that Sanders has found inspiration in Illich and his theory about "*The Convivial Tools*" (1973), in which he claims people need *convivial tools* rather than *industrial tools*. According to Illich the convivial tools allow users to "invest with their meaning", whereas the industrial tools "destroy" people's creativity.

In that sense I agree that we need design that 'serves', or rather 'appeals to' the creativity in people and also to some degree comply with the needs of users. But in general I wonder if the enormous focus on customers as 'experts', 'drivers of innovation', 'co-creators' e.g. together with an understanding of design as something that 'serves' people, leaves customers in a complex 'expert-and-being-served' role, focused on own needs. How do these approaches affect people as citizens? Are we as citizens becoming increasingly demanding rather than self-leading and responsible?

In terms of banking service, some crucial questions are emerging, such as: Who is in charge of your finances? and Who is to blame if you are overspending? The focus of this research has been to demonstrate how problems or situations can always be approached in different ways and viewed from different framings. In the case of AM, the question arises: Who is to blame for AM's overspending? In the first co-creation session AM herself (indirectly) blamed her financial advisor for her overspending; she was dissatisfied with her financial advisor, as he had not helped her set up a budget, she felt ignored and 'just like a number' in the bank.

Ann Heberlein, professor of ethics argues in her book *It was not my fault – the art of taking responsibility* (2008) that there is a massive shirking of responsibility taking place these days. She argues:

They are all over, people who refuse to take responsibility. People who always succeed in finding someone or something to blame, if not society, the boss, the parents, then McDonalds, the tobacco industry or the bank. (2008)

Instead Heberlein advocates a message about having respect for oneself and taking on responsibility for oneself. She gives the example: Alcoholics Anonymous (AA) never talk about 'having' a recurrence. Instead they say: You 'take' a recurrence. The difference between the two words can seem small, but it is actually enormous, Heberlein argues. The guy who 'has' a recurrence, is hit, he is innocent, helpless, a victim and thus without responsibility. The guy who 'takes' a recurrence is active, he chooses, he acts, he does. The guy who 'takes' a recurrence is responsible and capable of choosing, although this time he has made a bad choice.

Reverting to the banking service, the different framings and different roles and the question of who is to blame for AM's overspending, what would an appropriate 'service' for AM look like? There

generally are two possibilities:

One in which the bank or financial advisor ‘take over’. The financial advisor will presumably act as an authority and confiscate your credit card or he/she will examine and calculate all your expenses and purchases, make budgets etc. (like the famous Danish TV series: *The Luxury Trap*). The other solution treats you as a responsible human being and has the underlying assumption that you are capable of managing your own affairs. Of course you can ask for help or learn how to do things, and of course the business is focused on making the products and services transparent and accessible. But the final responsibility rests with you.

Being asked to describe your money situations in the MoneyWorkshop particularly the young participants often referred to their bank or financial advisor as ‘a co-agent’, which means they didn’t feel like agents (the person in charge) themselves, which I found quite astonishing! If these people were to co-create new banking services, what would they look like? The starting point would most likely be the situation as it is now, the *current context*, (like AM and other participants, who in the first workshop asked for ‘quick and easy’ solutions, like changing bank e.g.) and they would ask for ‘services’ that would make it ‘easier to manage their money’, but probably without them having to take responsibility, without becoming ‘agents’? Or would they ask for self-leadership in banking service?

In an introductory conference call to the conference “Who designs design? Practice, theory and history of participatory design” (DGTF, 2011) in Gmünd, the issues of interest were presented:

...the participatory design approach is confronted with the accusation of being based on an idealized, occasionally unreflective understanding of democracy and social participation...

Professor Ove Korsgaard (2010) argues the media these days is worshipping the individual, who steps forward on the scene reaching for his or her own success, whereas we seldom hear about those who take a step back for our common good (-which reminds of the 20 January 1961 when President John F. Kennedy made the famous statement “...ask not what your country can do for you; ask what you can do for your country.”)

With these thought I would like to put emphasize on the crucial power when designing services, for example financial services. We need to create designs that make people act as agents, as Buchanan argues on the Emergence conference 2007 on service design:

...give them [people] in some way the capability of acting. To become agents, and not passive. That in some way, service activates people. In some way it gives them power...It may be an ideal of service design to give up control and let other people

act... (Buchanan, 2007)

In the field of participatory design and co-creation, a new need for value clarification *prior* to co-creation may arise. In the example from this research a young girl stated that she wanted to change to another bank and have a financial advisor who could help her set up a budget and help her gain control over her money; However, after the workshop, she changed her behaviour and the wish she had stated in the workshop changed accordingly. Therefore *value clarification* might be an interesting activity *prior* to the co-creation of values.

In the current research, I moreover argue that generative tools can be a language for self-dialogue and value clarification aimed at the creativity of the individual – that means this research moves generative tools into a radical new direction.

I have proved the hypothesis that people actually can change their thinking patterns including ‘inappropriate’ beliefs and assumptions by design and designing. In the “MoneyWorkshop” customers and potential customers are offered generative tools, designed to guide people through different time framings. In this process unconscious and dominant metaphors are often revealed, which makes it possible for people to ‘reframe’ themselves and their understanding here of money and private economy. The workings of the MoneyWorkshop is explained as “Thought-Self-Leadership” (Manz & Neck, 1992).

The majority of the participants *changed their perception and behaviour*. They reported feeling empowered as they were now agents in their own lives and acting *in accordance* with their values. In the workshop they appreciated nobody was talking to them, but instead they were stimulated to talk to themselves and reflect upon deeper values.

The MoneyWorkshop represents a new type of service in which the central idea is the “Self-Leading Customer” (Bonde Sørensen, 2011) – a new customer type who is interested in taking control and becoming ‘a conscious customer’. As we become more and more aware of the possibility of changing our thinking patterns, an increasing interest and demand for methods and languages for personal reflection and value clarification is likely to arise.

Designing for self-leadership meet with an increasing need for identifying our personal values and ‘voices’ and becoming self-leading (Covey, 2005, Druckert, 2000). This aligns with the recent discovery within cognition and neuroscience, that we actually can change inappropriate thinking patterns and habitual ways of acting (Manz & Neck, (1992, 1999), Seligman, (1998), Damasio (1999) (Pinker, 1999).

In a broader perspective, the human conditions are changing radically these days which is why leadership and in particular self-leadership is topical as Peter Drucker (2000) argues the biggest changes right now

are within the human conditions

"...For the first time - literally - substantial and rapidly growing numbers of people have choices. For the first time, they will have to manage themselves..."

Similarly Stephen Covey (2005) argues the human conditions are changing and that humans must find their inner "voices", inner values and lead themselves. In the perspective of these changing conditions, I consider this making-language can be applied in various domains and lead to the "self-leading patient", "the self-leading entrepreneur", "the self-leading citizen". Designing is finally becoming a liberal art.

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DEMONSTRATING COLOR TRANSITIONS OF LEUCO DYE-BASED THERMOCHROMIC INKS AS A TEACHING APPROACH IN TEXTILE AND FASHION DESIGN

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ABSTRACT

Although there are a lot of interest concerning the use of leuco dye-based thermochromic inks in Textile and Fashion Design, there is still a lack of teaching approach to help students arrive at a better understanding of the color transitions of leuco dye thermochromic inks. This paper aims to share a systematic approach for teaching the behavior of leuco dye-based thermochromic inks to students in Textile and Fashion Design. Printed color-swatches and exercises were used as the central part of the approach. Through the approach it was described what printed color-swatches were and how to use them effectively to make color transitions understandable. The approach has been applied in several workshops at both Bachelor and Master level. The samples made by the students in the exercises clearly revealed that the approach created opportunities for students to craft an understanding of using leuco dye thermochromic inks through experimentation and individual exploration. Ultimately, this approach plays a

fundamental role in the design process, the creation and the development of dynamic patterns.

INTRODUCTION

Nowadays by entering leuco dye-based thermochromic inks into the textile and fashion design area, new type of challenges appear in order to use thermochromic inks effectively in design process. Albers (1975) proposes an approach to studying color and of teaching color based on learning by direct perception, and not by theories or color systems. Collis and Wilson (2012) discuss an investigation in how to deal with color accuracy in digital-printed textiles while there is dearth information about how textile digital printing is being used in textile. However, the approaches provides profound insight about how to use colors in different contexts, and how to match color and media but they are not adequate to apply to studying and of teaching Leuco dye-based thermochromic inks that are dynamic colors, and not static. Studying leuco dye-based thermochromic inks is mainly about color transition, so when I was asked to hold the thermochromic workshop I decided to plan my workshop based on notion of learning by doing (Drew, 2004), motivational framework (Wlodkowaski, 1999), and adopt it to my own way of thinking about planning (Ginsberg & Wlodkowski, 2009) to help students achieve a better understanding of the behavior of leuco dye-based thermochromic inks at various temperatures. This paper aims to share a systematic approach for teaching the behavior of leuco dye-based thermochromic inks to students in Textile and Fashion Design. It has focus on demonstrating the color changing process to facilitate the understanding and designing of dynamic surface-patterns at different temperatures. The approach introduces printed color swatches, explains what printed color-swatches are, and

discusses how they can be used in a workshop on Leuco dye-based thermochromic inks. It also describes how to use printed color-swatches to effectively demonstrate the color transition of the ink.

THERMOCHROMIC INK

Thermochromic inks constitute one of the major groups of color-changing inks. Developed in the 1970's, these inks are temperature sensitive compounds that temporarily change color with exposure to heat.

Bamfield and Hutchings (2010) describe thermochromic ink as consisting of two major types of thermochromic inks: liquid crystals and leuco dyes. Because liquid crystals are more sensitive to temperature changes than leuco dyes and require highly specialized printing techniques, they are considered difficult to work with. Leuco dyes are more easily handled and are used more frequently in screen-printing. They can be found in a variety of products, such as textile applications, color changing T-shirts (which were in high demand at the beginning of the 1990s), interactive plastic baby-safety feeding-spoons, coffee mugs, and toys. They are suitable for use in general indicators that display approximate temperatures such as cool, warm and hot.

LEUCO DYE-BASED THERMOCHROMIC INKS

Bamfield and Hutchings (2010) define leuco dye-based thermochromic inks as colored in a non-heated state (below their activation temperature) and become clear or slightly colored in a heated state (above their activation temperature). Also, they are usually blended with other pigments (non-heat sensitive pigments), allowing them to change from one color to another.

STRUCTURE OF LEUCO DYES

Structure of leuco dye based thermochromic ink is described by Bamfield and Hutchings (2010) as consisting of a color-former and a color-developer dissolved in a solvent, together making up the thermochromic composite. The composite is then microencapsulated in a protective coating to protect the content from undesired effects caused by the environment. In a non-heated state, the composite remains in solid form and the color-former adopts its colored form. When in a heated state, the solvent melts and the interaction between the solvent and the color-former destroys the composite, thus causing the color-former to adopt its colorless form. The activation temperature is defined by the temperature at which the solvent changes from solid to liquid state.

AVAILABLE TEMPERATURE OF LEUCO DYE

Leuco dye-based thermochromic inks are formulated to change color at temperatures ranging from -15°C to 60°C. The temperature at which the ink changes color can be chosen when it is ordered (Chromazone, accessed April. 2013).

PROPERTIES OF LEUCO DYES

Leuco dye-based thermochromic inks are produced to be reversible or irreversible. Reversible inks change from a colored state to a clear or slightly colored state as a result of increasing the temperature to above the activation temperature of the ink. The color returns upon cooling. This procedure may be repeated over a long period of time. Irreversible inks are invisible until they are exposed to high temperatures, at which time they change from a clear state to a colored state. This change in color is permanent, which means that once the change from clear to colored state has occurred, it will not revert. Kulcar states that irreversible inks normally begin color transition at 65°C and complete the transition at 90°C.

In addition, a wide range of leuco dye-based thermochromic inks are available, such as solvent-based, water-based, UV cured, epoxy, etc., and are used for printing on textiles, plastic, paper and metal (Kulcar et al 2012).

COLOR BACKGROUND

Leuco dye-based thermochromic inks must be printed over a light background. If they are printed on a background color other than white, the background color will influence the color of the ink in both the non-heated and heated state: e.g. a blue ink printed over a yellow background will change from green to yellow when heated.

COLOR OF THE INK

Leuco dye-based thermochromic inks can be produced in most colors, except for white. The most common colors are magenta, black, blue, turquoise and orange with good intensity.

STRUCTURE OF THE METHOD

Before starting work with leuco dye-based thermochromic inks, it is essential to be aware about the following factors: the ambient temperature (non-heated state of e.g. the printing lab), temperature sensitivity of the inks, and the properties of the inks. The ambient temperature at the printing lab at the Swedish School of Textiles at the University of Borås, where this study was carried out, was 20°C. The temperature sensitivity of the

chosen inks was 27°C¹ and 15°C². The inks were reversible and water-based. The most desirable printing effect would be achieved on cellulosic fabric. White plain cotton-weaved fabric was used as a background. The size of the silk-screen mesh was 43 threads per centimeter. In addition, the thermochromic inks had to be mixed with binder in order to attach the ink to the fabric. In addition, binder is defined as “the chemicals, which have the ability of forming a three-dimensional film used to hold the pigment particles in place on the surface of a textile substrate” (China Tianyu Nickel Screen CO., accessed April. 2013). In this paper, binder name is acrylic-based extender.

Leuco dye-based thermochromic inks, like other pigment printing pastes, require certain equipment, such as a textile lab with high-tech temperature testing capacity. I did not have a proper chamber, so I made color-samples with the chosen leuco dye-based thermochromic inks. The samples were then measured with a spectrophotometer at three different temperatures: at the ambient temperature (20°C), after heating (up to 30°C or above), and after cooling (down to 5°C or below). These measurements were then followed by creating printed color-swatches with the produced databases, using the textile pigment printing pastes. As a result, the color-swatches I produced made it possible for me to demonstrate the color changing of leuco dye-based thermochromic inks at different temperatures (see Figure 1). In addition, scanned images of printed color-swatches were used to support the figures.



Figure 1. shows color-swatches made with textile pigment pastes to demonstrate the varying colors of leuco dye-based thermochromic inks at different temperatures.

HOW TO TEACH ACCORDING TO THE APPROCH

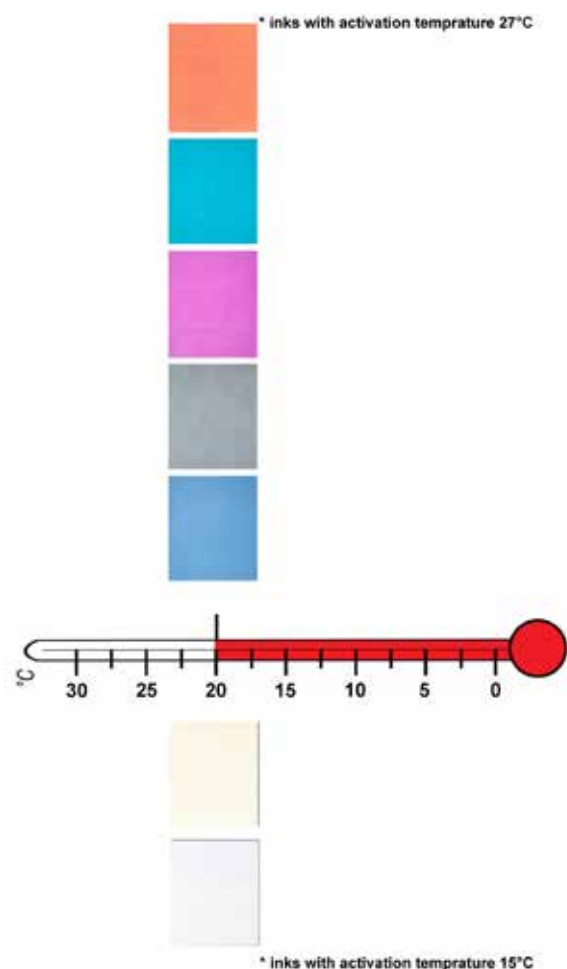
A printed thermometer was placed on the table of the printing lab in order to illustrate the ambient temperature. The ambient temperature was showing 20°C. Three grams of blue ink with activation temperature 27°C was mixed with 97 grams of acrylic-

¹ Zenit company in Sweden

² B&H Colour Changing Company in England.

based extender, hand screen-printed on the chosen fabric, and then placed on the right side of thermometer. The same recipe was used for the black, magenta, turquoise and orange inks. The prints displayed the following colors at ambient temperature (20°C): light blue (14-4214 TCX)³, light black (17-0613 TCX), magenta (17-2520 TCX), blue green (14-4811 TCX) and light orange (15-1435 TCX). Colors' name and color-coding were used to convey information quickly for reader, as well as to facilities understanding of visual display (cf. Green, 2010).

The blue and red inks with activation temperature 15°C were screen-printed on the chosen fabric with the same recipe and method, and then placed on the left side of thermometer. The prints displayed the following colors at ambient temperature (20°C): white with a blue tint (11-4604 TCX) for the blue ink and white with a pink tint (11-1005 TCX) for the red ink (see in Figure2).



³ Although, there are more accurate color systems such as lab, L*a*b*, this paper has chosen PANTONA due to the accurate color is not important in this approach, and textile designers use more PANTONA or NSS in design process rather than color measurement. Printed colour-swatches were compared with PANTONE in order to give the reader a better picture of the colors achieved.

Figure 2. shows how the effect of printed fabrics produced by the mixture of 3gr of ink with activation temperatures 15°C and 27°C with 97gr of extender look like at ambient temperature (20°). From bottom to top: the effect of mixing 3 grams of the blue and the red inks with activation temperature 15°C and 97 grams of extender and the effect of mixing 3 grams of the blue, black, magenta, turquoise and orange inks with activation temperature 27°C and 97 grams of extender at ambient temperature (20°)

The temperature was then increased to 30°C or above. The effect of heating the fabrics printed with blue, black, magenta, turquoise and orange inks with activation temperature 27°C was, for both blue and black ink, white with a yellow tint (11-4301 TCX), white with a pink tint (11-2409 TCX) for the magenta ink, for the turquoise ink it was white with a yellow tint (12-1009 TCX), and for the orange ink it was white with a yellow tint (11-0603 TCX).

The effect of heating the fabrics printed with blue and red inks with activation temperature 15°C were white with a yellow tint (11-4604 TCX) for the blue ink and for the red ink it was white with a pink tint (11-2309 TCX) (see Figure 3).

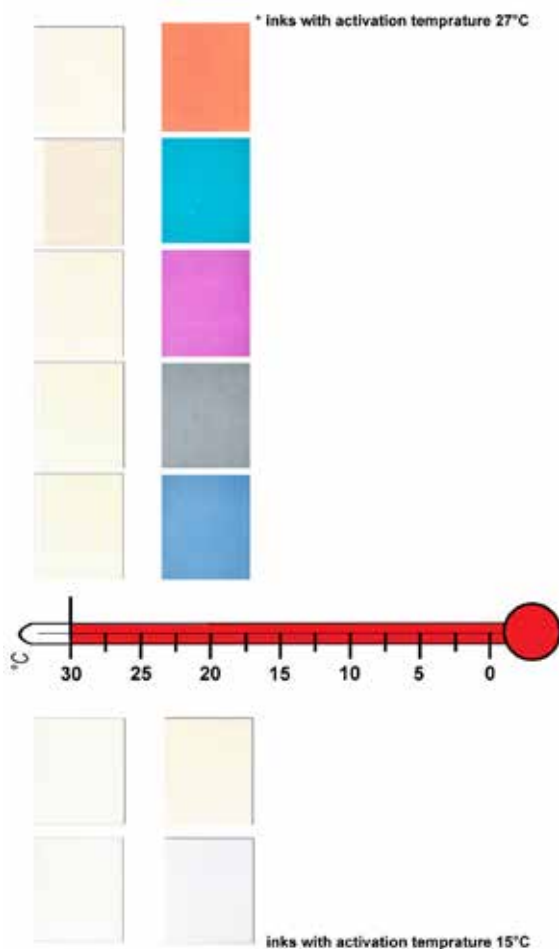


Figure 3. shows (from bottom to top) how the effect of heating the printed fabric produced by the blue and red inks with activation temperature 15°C and the blue, black, magenta, turquoise and orange inks with activation temperature 27°C look like at 30°C compared with the one at 20°C.

The first result is that by increasing the temperature to a level equal to or above the activation temperature of the ink, the reversible leuco dye-based thermochromic ink always changes from a colored state to a clear or slightly colored state.

Four grams of yellow textile pigment printing paste (14-0756 TCX) was mixed with each of the leuco dye-based inks (blue, black, magenta, turquoise and orange) with activation temperature 27°C, screen-printed on the chosen fabric, and then placed on the right side of thermometer. At the ambient temperature (20°C), the prints made with the mixture of inks and yellow pigment paste displayed the following colors: green-ochre (16-0540 TCX), gray-ochre (16-0540 TCX), reddish-brown (16-1350 TCX), greenish-yellow (15-0343 TCX) and orange (15-1157 TCX).

The same recipe and method was used to mix the blue and red inks with activation temperature of 15°C with the yellow textile pigment paste, and then placed on the left side of thermometer. The colors displayed by the prints at the ambient temperature (20°C) were a light greenish-yellow (11-0620 TCX) for the blue ink and for the red ink it was a light pinkish-yellow (12-0721 TCX) (see Figure 4).

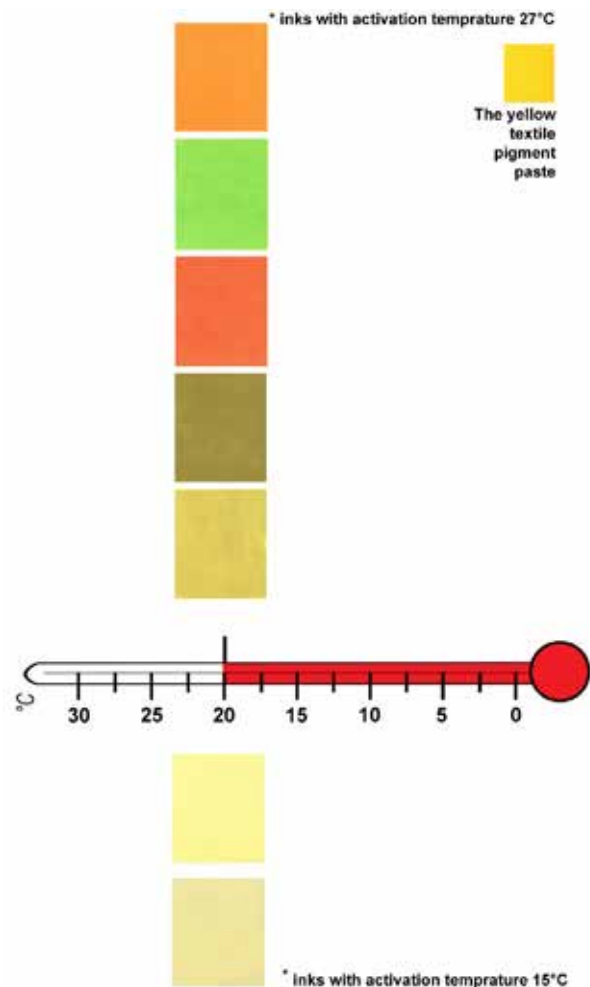


Figure 4. shows how the effect of printed fabrics produced by the mixture of ink with activation temperatures 15°C and 27°C with yellow textile pigment paste look like at ambient temperature (20°). From bottom to top: the result of mixing the blue and red inks with activation temperature 15°C and blue, black, magenta, turquoise and orange inks with activation temperature 27°C and the yellow textile pigment paste at ambient temperature (20°).

The temperature was then increased to 30°C or above. The result of heating the fabric printed with the inks with activation temperatures 27°C and 15°C were colors identical to the mixed yellow pigment paste, only slightly lighter (12-0752 TCX) (see Figure 5).

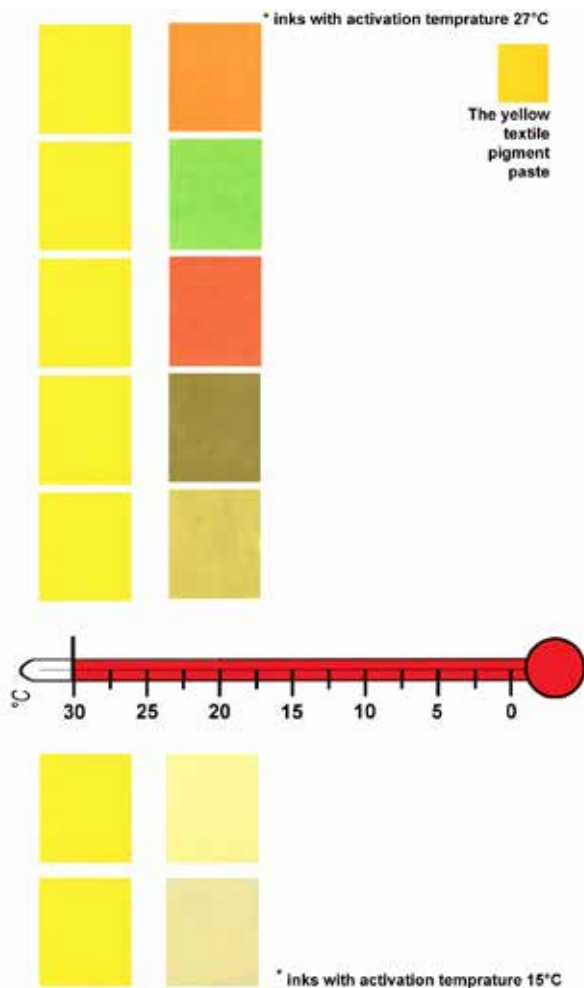


Figure 5. shows how the effect of heating the printed fabric produced by the inks with activation temperatures 15°C and 27°C look like compared with the one at 20°C. The effect of heating (at 30°C) the fabrics printed with the mixture of the inks with activation temperatures 27°C and 15°C with yellow textile pigment paste was identical to the mixed yellow pigment paste, just slightly lighter.

The second result is that by increasing the temperature to a level equal to or above the activation temperature of the ink, the color of the mixture of reversible leuco dye-based thermochromic ink and textile pigment paste always changes to the color of the mixed pigment paste, only slightly lighter.

When the activation temperature of the ink is lower than the ambient temperature, we may produce an additional

color transition by cooling the printed fabric. Both groups of printed fabrics (produced by the inks alone and also by the mixture of inks and yellow textile pigment paste) were shown at 5°C. The result of cooling the fabrics printed with the inks with activation temperature 27°C was colors identical to those displayed at ambient temperature (20°C). However, cooling the fabrics printed with the blue and red inks with activation temperature 15°C produced the colors dark blue (18-4045 TCX) and dark red (15-1920 TCX) (see Figure 6).

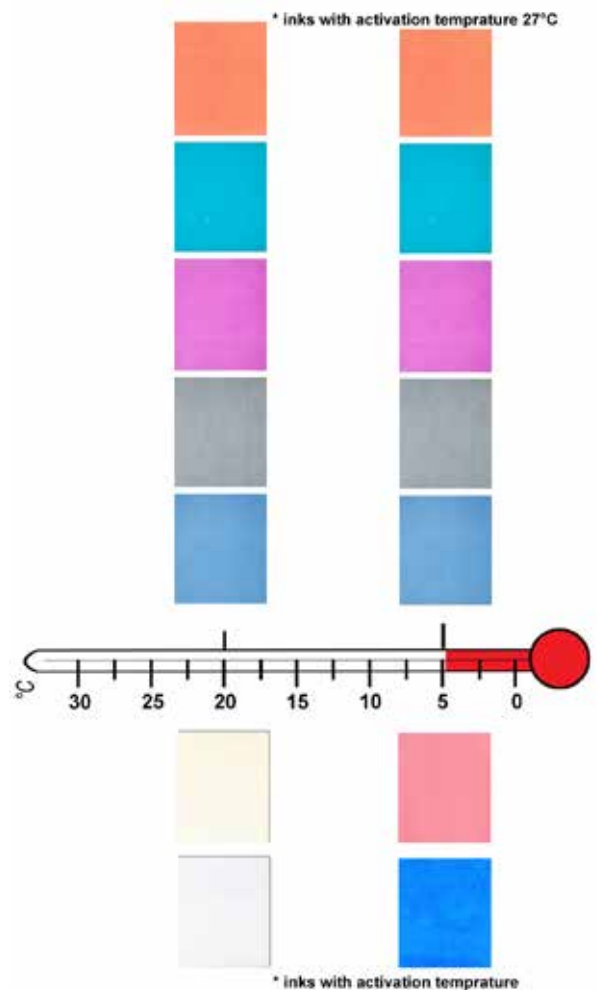


Figure 6. shows how the effect of cooling the printed fabrics produced by the inks with activation temperatures 15°C and 27°C look like compared with the one at 20°C. The effect of cooling the fabrics printed with the inks with activation temperature 27°C was identical to those displayed at ambient temperature (20°C). However, cooling the fabrics printed with the blue and red inks with activation temperature 15°C produced the dark blue and dark red.

The third result is that by decreasing the temperature to a level equal to or lower than the activation temperature of the ink, the ink will display its actual color.

Following, the colors displayed when cooling the fabrics printed with the mixture of inks with activation

temperature 27°C and the yellow textile pigment paste were identical to those displayed at the ambient temperature (20°C). However, the fabrics printed with the blue and red inks with activation temperature 15°C became dark bluish-green (17-5111 TCX) and light reddish-yellow (16-1632 TCX) (see Figure 7).

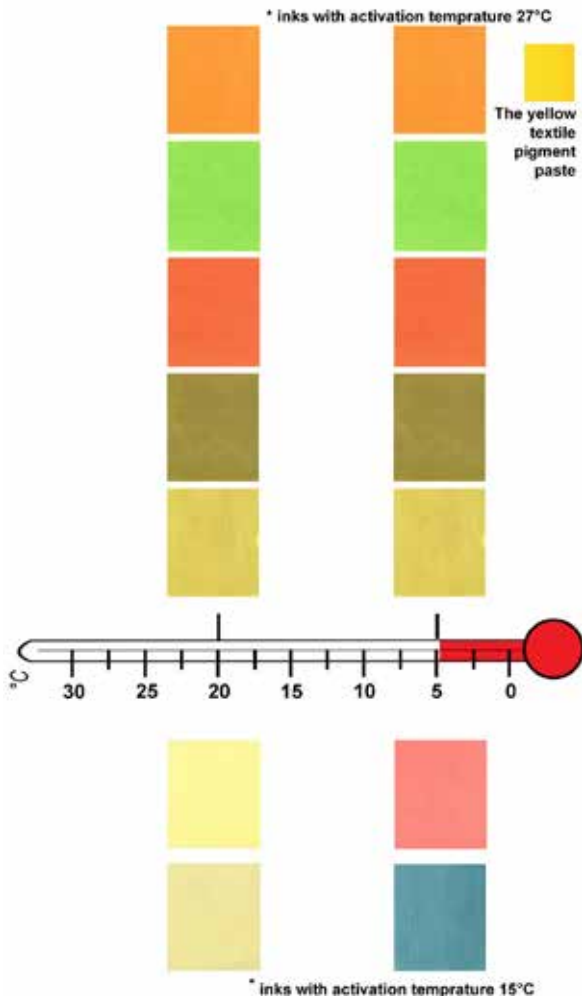


Figure 7. shows how the effect of cooling the printed fabrics produced by the inks with activation temperatures 15°C and 27°C look like compered with the one at 20°C. The effect of cooling the fabrics printed with the mixture of inks with activation temperatures of 27°C and 15°C and the yellow textile pigment paste. The effect of cooling the fabrics printed by the inks with activation temperature 27°C and yellow pigment was identical to those displayed at ambient temperature (20°C). However, cooling the fabrics printed with the blue and red inks with activation temperature 15°C and yellow pigment produced another color which is the actual color of the mixture.

The forth result is that by decreasing the temperature to a level equal to or lower than the activation temperature of the ink, the mixture of reversible leuco dye-based thermochromic ink and textile pigment printing paste always changes color to the actual color of the mixture.

Exercises

Deep learning was the central part of this approach. Therefore, a good strategy for creating and managing a high quality workshop environment was essential (Ginsberg, M.B. & Wlodkowski, 2009). My strategy was to give students exercises in order to experience the content. The exercises engaged the students in their design process. I started them off with easy exercises and followed up with increasingly challenging ones.

At the Swedish School of Textiles, University of Borås, thermochromic workshops are one part of the dyeing and printing course. The students were asked to bring two silk-screen frames (frame No.1 and frame No.2) on which the patterns were already exposed.

The first exercise was to work with leuco dye-based thermochromic inks with activation temperature 27°C. The white plain cotton-weaved fabric was given to the students. The students were then instructed to choose one warm color and one cold color from among the inks of an activation temperature of 27°C and then mix 3 grams of the chosen inks with 97 grams of the extender. They overprinted one of the patterns (frame No.1) with the chosen cold color and the other one (frame No.2) with the chosen warm color. In addition, in all exercises, they were required to wait until the printed fabrics were dry. Afterward, they heated up their printed fabrics to 30°C using a hair dryer or a heating pad in order to examine and observe the first result at the previous section (see Figure 8).



Figure 8. From top to bottom: sample of prints made with the turquoise and magenta inks with activation temperature 27°C at ambient temperature (20°C) and the effect of heating the printed fabric. Work by Bachelor Student Cecilia Krook, thermochromic workshop, 2012.

The second exercise was to work with the inks with activation temperature 15°C. The students were instructed to choose only one color of ink, either warm or cold. Two different recipes were given to them. One recipe was to mix 3 grams of the chosen ink with 97 grams of the extender (the first recipe) and the other one was to mix 1 gram of the chosen ink with 99 grams of the extender (the second recipe). After mixing the two recipes, they overprinted one of the patterns (frame No.1) with the first recipe and the other one (frame No.2) with the second recipe. At first, they heated up the printed fabrics to 30°C using a hair dryer or a heating pad to test the first result at the previous section. Then, they cooled the printed fabrics down to 8°C using a freezer, testing the third result at the previous section (see Figure 9).

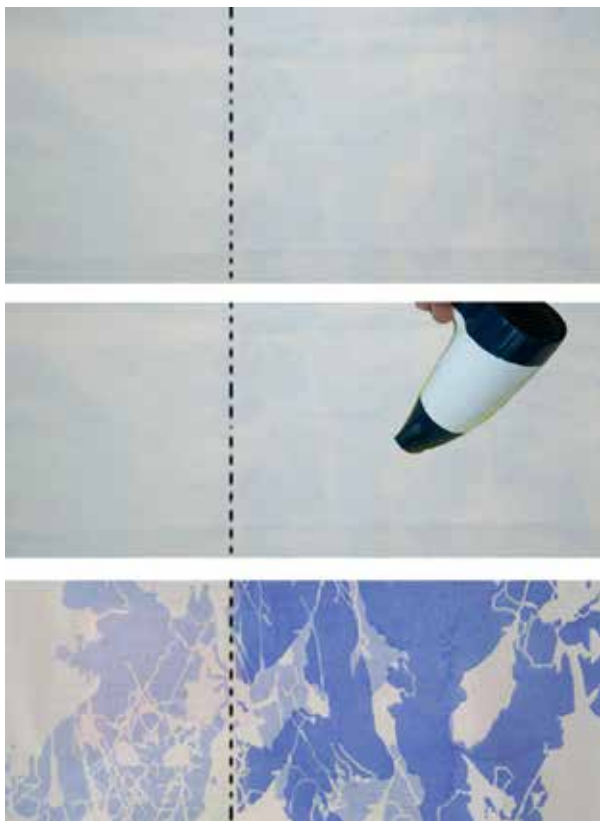


Figure 9. From top to bottom: sample of prints made with the blue ink with activation temperature 15°C at ambient temperature (20°C) and the effect of heating and cooling the printed fabric. Left to right: 1 gram of ink and 3 grams of ink, both with activation temperature 15°C. Work by Bachelor Student Therese Amus Gidlöf, thermochromic workshop, 2012.

The third exercise was to mix the inks with activation temperature 27°C with the textile pigment paste. The students were instructed to use a textile pigment printing paste of their own choosing and to mix it with the inks chosen in the first exercise. They then overprinted one of the patterns (frame No.1) with the mixture of the ink

of a cold color and the pigment paste and the other one (frame No.2) with the mixture of the ink with a warm color and the pigment paste. After doing this, they heated up the printed fabrics to explore the result of the second exercise at the previous section (see Figure 10).

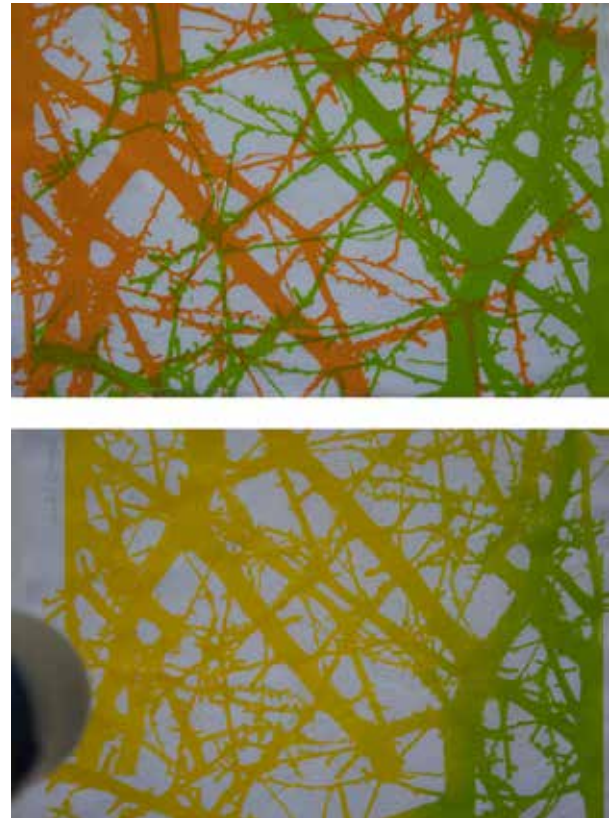


Figure 10. From top to bottom: sample of prints made with the mixture of yellow pigment and orange and blue inks with activation temperature 27°C at ambient temperature (20°C), and the effect of heating the printed fabric. Work by Master Student Justien De Bus, thermochromic workshop, 2012.

The fourth exercise was to mix the inks with activation temperature 15°C with the textile pigment paste. The students were instructed to use a textile pigment color of their own choosing and mix it with both recipes from the second exercise. They overprinted one of the patterns (frame No.1) with a mixture of the first recipe and the chosen pigment paste and the other one (frame No.2) with a mixture of the second recipe and the chosen pigment paste. They heated up the printed fabrics to observe the second result at the previous section. Afterward, they cooled the printed fabrics to examine and analyze the fourth result at the previous section (see Figure 11).

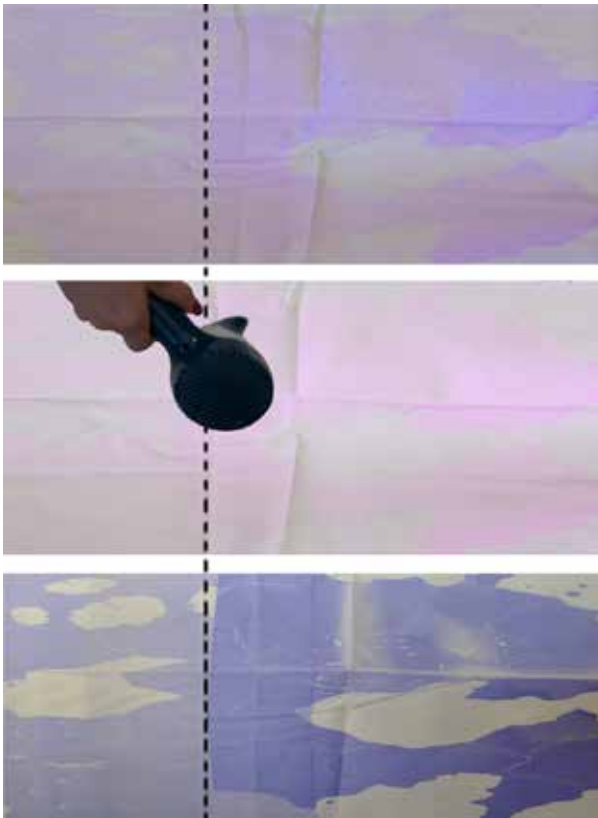


Figure 11. From top to bottom: sample of prints made with the blue ink with activation temperature 15°C and magenta pigment paste at ambient temperature (20°C), the effect of heating and cooling the printed fabric. Left to right: 1 gram of ink and 3 grams of ink, both with activation temperature of 15°C. Work by Bachelor Student Annika Björk, thermochromic workshop, 2012.

At this point, the students had had enough experience working with the inks with activation temperatures 27°C and 15°C. They were in a situation that challenged their previous conceptions about color. The situation created a forum for open discussion of the exercises and so they were instructed to bring all samples of printed fabrics for discussion. Afterward, I showed them some examples of dynamic patterns used in textile applications.

The last exercise was an assessment exercise based on the process (what they had learned so far). The exercise was to design a dynamic surface pattern that would give the audience different information or produce different expressions at different temperatures. Textile dynamic pattern is described by Worbin (2010) as “a textile pattern that reacts to environmental stimuli and always returns to a given initial expression”. The point of this exercise was to give the students a chance to construct their own meaning (Biggs, 2003) & (Wlodkowski, 2008), when learning the properties of thermochromic inks (see Figure 12 & 13).

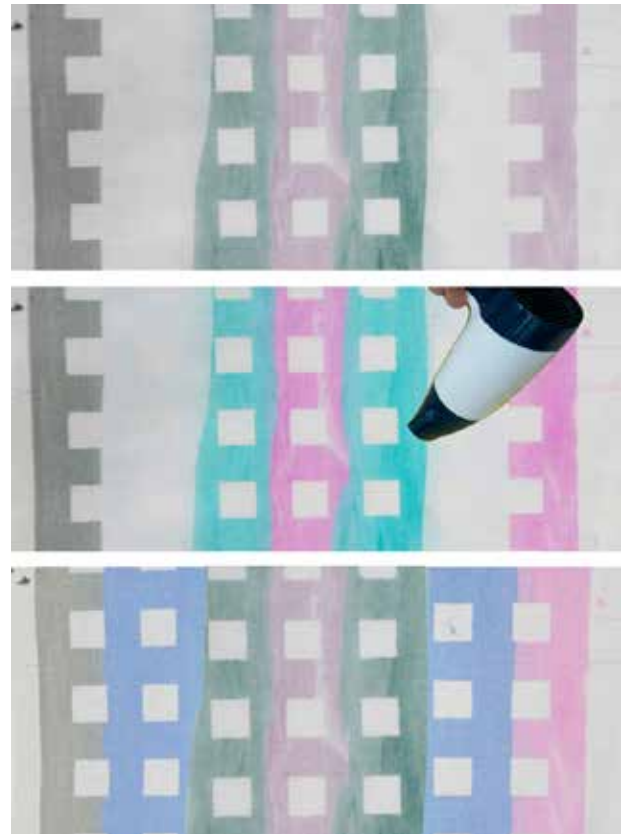


Figure 12. From top to bottom: sample of prints made with the inks with activation temperatures 15°C and 27°C and pigment paste at ambient temperature (20°C) and the effect of heating and cooling the printed fabric. Work by Master Student Matilda Andersson, thermochromic workshop, 2011.

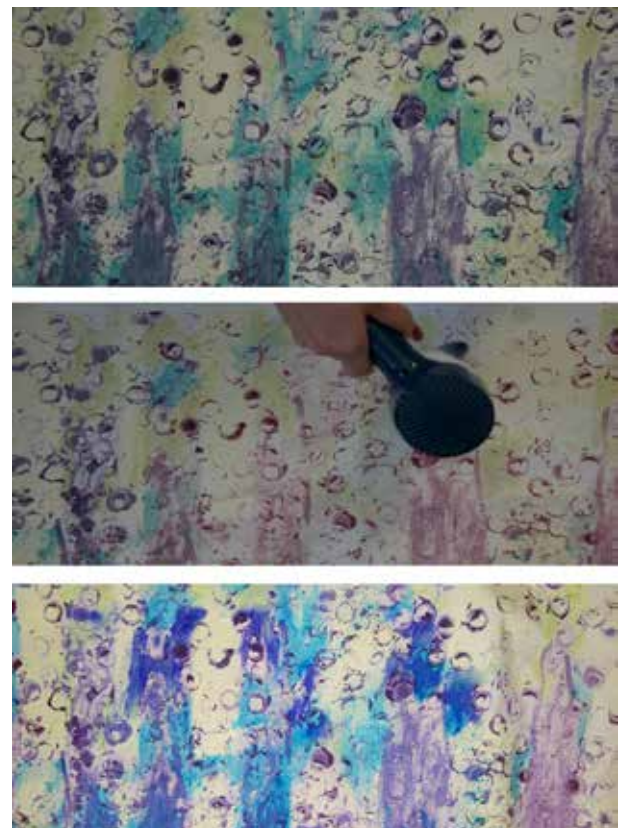


Figure 13. From top to bottom: sample of prints made with the inks with activation temperatures 15°C and 27°C and pigment paste at ambient temperature (20°C) and the effect of heating and cooling the printed fabric. Work by Bachelor Student Johanna Samuelsson, thermochromic workshop, 2012.

DISCUSSION/ CONCLUSION

The aim of this paper has been to share a systematic approach of teaching the behavior of leuco dye-based thermochromic inks in Textile and Fashion Design. It has focused on demonstrating the color transition of the thermochromic inks to facilitate the understanding and designing of dynamic surface-patterns at three different temperatures: the ambient temperature (non-heated state of e.g. the printing lab); a heated state, i.e. a temperature above the activation temperature of the ink; and a cold state, i.e. a temperature below the activation temperature of the ink.

Printed color-swatches made with the textile pigment printing pastes and exercises made up the core of the approach. The printed color-swatches effectively demonstrated the color transitions of leuco dye-based thermochromic inks at different temperatures. The exercises created opportunities for students to craft an understanding of the design potential of using leuco dye thermochromic inks through experimentation and individual exploration.

This approach has been applied as a three days workshop at both Bachelor and Master level, as well as textile designers. The length of workshop and plan designed created active learning environments where students had hands on practice with high degree of learning (Sork, 1997).

The samples made by the students in the final exercise has indicated that the approach creates a new way for me as a lecturer to convey thermochromic knowledge to the students and also creates a unique set of fundamental skills for students to learn color transition principles in a more quick and easy way for designing dynamic patterns through the experimental workshop. The approach seems to be an efficient approach allowing students to develop their ideas through pushing the properties of thermochromic inks supported by design skill and predicting color transition while they are designing dynamic surface-patterns (Drew, 2004) & (Ginsberg & Wlodkowski, 2009).

Previous approaches Albers (1975) and Collis and Wilson (2012) reveal that essential knowledge regarding color within a particular context can be achieved through experiential learning, materiality and experimental processes. By entering smart colors such as leuco dye-based thermochromic ink into textile and fashion area, the design process has been directed towards a new face of design, which needs new approaches. One suggestion for further studies would be more investigation on how to use the leuco dye-based thermochromic ink in textile digital printing, and how to describe color transition of leuco dye-based thermochromic ink in a proper color systems.

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EXPERIMENTATION AS MAKING KNOWLEDGE: TWO MODELS OF RESEARCH IN THE DESIGN STUDIO

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ABSTRACT

Two propositions underpin the paper. The first is that studio-based research contributes to architectural knowledge in a manner no less vital or effective than more traditional research methods. The second proposition is that experimentation undertaken in the design studio at its most effective blurs distinctions between the activities of the practicing architect, academic theoretician, and the historian. An analysis of two approaches to the architecture design studio in the university setting will lead to a preliminary response to these propositions. The introduction provides an overview of the guiding questions, approach, and data sources. In the second part I analyse two exemplary design studios, those undertaken under John Hejduk at Cooper Union, and Colin Rowe's urban design studio at Cornell University. In the third part I return to the opening propositions and suggest some generalizable findings.

The paper aligns with the Conference themes of "Experiments in design education", and "Methods of experiments in design research".

INTRODUCTION

The underlying argument of this paper is that the various activities of the university design studio constitute a form of experimentation and that these activities contribute to advancing disciplinary knowledge in architecture. In order to test this idea, two general propositions organize the paper, one conceptual, one methodological. The first is that composition or form-based research in the architecture design studio contributes to thinking and form research in a manner no less vital or effective than more traditional archival, historical, and/or text-based academic methods. The second proposition is that the brief or studio program, design problems, and conduct of the design studio at its most effective blurs differences between the activities and outcomes of the practitioner, historian, and academic theorist. An analysis of two exemplary approaches to the design studio will be used to develop a preliminary response to these propositions. The examples are John Hejduk's didactic and exemplary suite of studio problems unrolled at Cooper Union, and the extended multi-decade effort of Colin Rowe's Cornell University graduate urban design studio. An analysis of the two provides a dense range of highly charged and differentiated approaches to architectural research in the design studio. Each is distinguished by specific kinds of design problems, programs, and a range of form and space responses. An emphasis is made in both on how to structure and run the design studio as a form of open-ended research.

As will be shown, in each the life of the studio project is a contained, finite phase in a larger, continuous pursuit with findings to be generalized as a provisional outcome awaiting further refinement. Differences in studio character, approach, design problem, and device are bracketed through a limited set of compositional and formal moves. Student work is used to illustrate key points and differences and general observations provided as a form of conclusion.

SCHOLARLY CONTEXT – LITERATURES AND APPROACH

Analytical and historical work on the architectural design studio as a kind of experimentation on the key elements of architecture (form, space, structure and the art of composition) is limited. Where such effort has been made, the point of view has been generally descriptive or anecdotal and documentation of the work of the studio, especially over multiple years, not of immediate access.

For the projects resulting from Hejduk's Cooper Union studios, there has been, exceptionally, a reasonable amount of primary and secondary documentation sufficient to warrant a survey of the results. In addition, the existence of the Architecture Archive of The Cooper Union provides a resource on student projects for scholars and researchers. Key secondary essays include those of Moneo 1980, Pérez-Gómez 1999, and Slutzky 1980.

Regarding the design work undertaken at Cornell University within the context of Colin Rowe's urban design studio, a small but sufficiently representative series of publications from academic staff and former students, as well as the publication of a high number of student projects, provide a profile of that program's approach and the resulting studio findings.

Key secondary writings on Rowe's studio, and summary descriptions as well as some documentation of student work, can be found in Rowe 1996a, Rowe 1996b, Hurtt 1983, Cooper 1983, Middleton 1980.

Different from other research into the Cooper Union and Cornell studios, my approach focuses on the work of the studio itself, in particular on studio programs and student material produced, and less on the historical, intellectual or political contexts in which the studio was undertaken.

DATA

The research data was assembled from published sources and university archives. The material on Hejduk's studio teaching at Cooper Union has been taken from a number of key sources. These include *On the Education of an Architect: A Point of View* (1999), *Education of an Architect* (1988), Moneo 1980, Slutzky 1980, and Hejduk 2011. Extensive use was made of the The Irwin S. Chanin School of Architecture Archive of The Cooper Union. Important additional material on Hejduk's parallel design investigations was sourced from the John Hejduk fonds Collection Centre Canadien d'Architecture / Canadian Centre for Architecture, Montréal.

The primary data and images related to the Cornell program were sourced from academic publications. Key primary sources were Rowe 1996b, Middleton 1983, Hurtt 1983, Cooper 1983.

In terms of evaluating the quality or quantity of the data, in relation to these two studio groups, the data surveyed is fairly comprehensive and representative of the work from the respective multi-decade studios.

These two studios provide a particularly apt beginning to a larger study of the architecture design studio due not only to the depth of data and image documentation available over a multi-year period, but importantly because they represent a range of scale and education level. Hejduk's studio, to generalize, focuses on the tectonic scale, Rowe's on the urban scale. The Cooper Union program, during the period under exam, is dedicated to undergraduate teaching; the Cornell program on post graduate.

It would be beneficial in subsequent research to source where possible additional university programs and to obtain program descriptions in addition to final studio projects. Potential candidate programs include Peter Eisenman's multi-year Venice Studio unrolled at the Yale School of Architecture between 2009 and 2012 and certain of the multi-year studios at the Architectural Association.

ANALYSIS, FINDINGS

In the following section, I examine the major thematic structure, key topics, and general approach to Hejduk and Rowe's design studio sequence. Student projects are used to illustrate typical responses.

STUDIO WORK AT COOPER UNION

In his notes to accompany the publication of *Fabrications*, Hejduk recalls the role of the school of architecture specifically and the pedagogical emphasis in the teaching of fine arts generally.

The work of the school is one which exemplifies a "tradition of commitment to search for new relationships of forms—in our opinion the only possible, as well as necessary role of a school of architecture." (Hejduk 1974, s.p.)

This is a useful starting point: 'to search for new relationships of forms' can be taken as one ambition behind the development of a sequence of studio problems refined over several decades by Hejduk and his colleagues at Cooper Union. An analysis of the architecture design studios reveal a commitment to abstract problems, to 'a belief in paradigmatic creation, that is, in the pedagogical use of exemplary or abstract problems, which however removed from real implementation or function, develops a heightened sense of consistency, a framework for inventiveness'. (Slutzky 1980, p. 86) The approach thus also aims to work the student's imagination.

Hejduk's approach and specific studio sequence has been well documented. The 1971 monograph,

Education of an Architect, provides a useful index of how studio problems were conceived, worked, and what was produced. (Franzen, Pérez-Gomez and Shkapich 1999) Three studios formed the core of studio teaching under Hejduk and are named according to the primary pedagogical tool they address: the Nine Square, Cube, and Juan Gris Problems.

Hejduk also put in place a fourth studio, the Analysis Problem. It examined exemplary buildings or project from the history of the discipline. (See Franzen, Pérez-Gomez and Shkapich 1999, pp. 245-262). This fourth studio is not examined below. In the following I survey the three core studios and exemplary student work from each.

In notes from 1965, Hejduk describes the first of these studios as follows: ‘The Nine-Square problem is used as a didactic tool for the introduction of architecture... A[n] understanding of elements in their primary essences is revealed; the idea of fabrication emerges.’ (Hejduk 2011, s.p.)

The Nine Square Problem starts from the subdivision of a square into nine others. The student develops a plan, an isometric, and a model proceeding through a series of exercises. In so doing, according to Hejduk, elements (grid, frame, post, beam, panel), relations (center, periphery, field, edge, butt, interlock, compression, tension, extension) and conditions (measurement, number, black, white, grey) are revealed and tested. (See Hejduk, *The Nine Square Problem*, 2011 s.p., Franzen, Pérez-Gomez and Shkapich 1999, p. 23; Moneo, 1980, p. 65)

A resulting studio project (see Figure 1) provides a snapshot of certain of the architectural problems under investigation: post to partition relations, edge to field or frame to boundary – and the differences of these one to the other –, of implied direction whether of release or containment.

Refinements in the response to the problem reveal the potential of this apparently simple exercise. Questions of direction, energy and the act of drawing – including figure/ground oscillations emerge. For example, in Georgescu’s solution, the reversal of background and ‘figure’ can be claimed to highlight the spatial and structural forces that result from combinations of column/post, I, L and T elements. (See Figure 2)



Figure 1: Nine Square Problem (Architectonics, The Nine Square Grid Problem, Edwin Aviles, 1964-65, The Cooper Union).



Figure 2: The Nine Square Problem, Plan variation on a black field (Architectonics, The Nine Square Grid Problem, Diana Viorica Georgescu, 1970-71, The Cooper Union).

Closely related to the Nine Square problem, and introducing an appropriate level of complication, is the Cube problem. The design studio brief can be succinctly stated: given a cube thirty feet to a side, invent a proposal. The Cube Problem, or a form in search of a function. A logical extension of the elements and form relationships worked on in the previous studio, it now starts to engage three-dimensional conditions more overtly and with color. See for example Schiano’s early work from the studio (Figure 3). One also reveals here an engagement with the act and traditions of drawing itself as a legitimate field of inquiry. The cube’s frame, implied or real, also allows the studio member to test out new notions including carving or cutting, projection and extrusion, collapse and explosion.

Ceraldi’s thesis project (Figure 4) illustrates certain potential findings. Drawing style and representation are specifically in play (folded elevations). The on-edge or frontal unfolded axonometric and exploded drawing condition is another instance of what might result from the none-too-innocent brief.

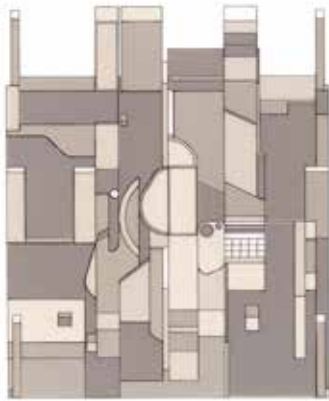


Figure 3. The Cube Problem (Thesis, Kenneth A. Schiano, 1969-70, The Cooper Union).



Figure 4: The Cube Problem – unfolded direction project elevation and plan (Thesis, An Experiment in Architecture, Theodore Michael Ceraldi, 1969-1970, The Cooper Union).

The third of the core Hejduk studios was the Juan Gris Studio. The brief asks students to design a building ‘in the intention of Juan Gris’. (Franzen, 1999, p. 193) Architectural states of transparency, of simultaneity, and of organic and technocratic or machined form are called up. If we look at examples of student projects, the nature of the findings, and their difference from the proceeding studios, is made clear.

The most striking difference is the increased complexity in the devices and instruments at work. In the House by Colamarino for example (Figure 5), ideas of circulation and simultaneity are clearly present. A sense of time or memory thus enters.

And in Dolinski’s project (Figure 6), engagement with site, thought of perhaps as entourage, emerges, even if a real place is still not part of the agenda. Whereas the Nine Square and Cube studios generally produced research on form relationships bound to an architectural object, the Gris studio now starts to engage and impact on a site, or at least an outside field, however virtual or implied it may be. What is also evident, now in this third studio, is a shared studio vocabulary, of shapes and relations: piano-form, line, linear, square, circle, circular post, free plan and free distribution.

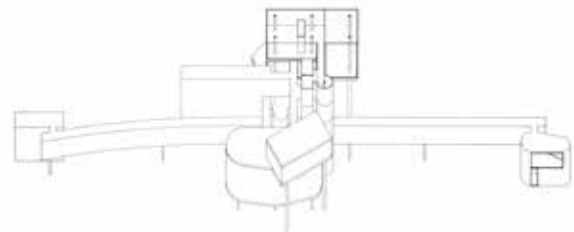


Figure 5: The Juan Gris Problem (Thesis, House, John Frederick Colamarino, 1968-69, The Cooper Union)

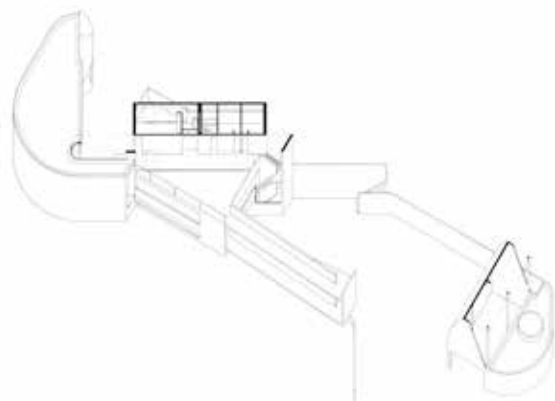


Figure 6: Juan Gris Problem (Thesis, Juan Gris House, Michael Dolinski, 1967-68, The Cooper Union).

URBAN DESIGN STUDIO WORK AT CORNELL UNIVERSITY

Under Colin Rowe, and over a roughly twenty-five-year period, the graduate urban design studio at Cornell University took urban scale elements as the site of invention and of intervention. The formal development of the city was its field of investigation.

A founding hypothesis informed at a basic level all of the studio work, that of the integration – dynamic, antagonistic, dialectical - of the traditional city and the modern city, the city of solids and that of voids. The design studio was distinguished by a series of relevant problems and an attitude ‘loosely defined as contextualism’. (Middleton 1980, p. 47)

As described by Middleton in his introduction to the student projects reproduced in *The Cornell Journal of Architecture*, a limited range of project types were explored. (Middleton 1983) Such project types included waterfront sites, impacted grid collisions, field/edge ambivalence, and produced responses that included linear buildings, towers, towers and podiums, and perimeter blocks. Open space shaped or otherwise given texture and figure became a response to the research problems in certain studios. A selection of projects follows which capture aspects of the studio character and a view of what was at stake. These include grid collisions, and the use of figure/ground as the predominant realm of representation and investigation

Key examples of project types illustrate the kinds of studio problems assigned by Rowe and the range of research outcomes considered. From a review of published projects, three kinds of design studio problems were undertaken:

- grid and fragment studies largely explored at the scale of the street and block plan
- infill or connection or completion problems, taken on at the scale of the composite building or group plan
- overall (field, city precinct) plans that may include open spaces of various kinds as a key ordering device such as water, park, plaza, garden

I will in what follows describe key elements and examples of each, recognizing that often the studio blurred the boundaries of these artificial categories.

Cooper's figure/ground plans summarize both an analytical tool and a representation/design approach. (Figure 7) It appears as a constant resource and beginning point over the decades. Two particularly clear examples of the limits and beauty that could result can be seen in Cooper's study of Dusseldorf and in the suite of drawings prepared around the Buffalo waterfront problem. (Figure 8)



Figure 7: Mapping and analysis study of Dusseldorf. Figure/Ground plan. Cooper, W. W. (1967, Cornell University, Department of Architecture)



Figure 8: Grid collisions: study of the Buffalo Waterfront, a group project: Baiter, R., Cardwell, R., Chan, D. W., Cooper, W. W., Forusz, H. N., Koetter, A. H., Miki, M., Olympio, E. F., Oswald, F. R. G. (1969, Cornell University, Department of Architecture)

The group plan and the composite buildings were prevalent for many years both as condition for analysis and as an ideal to work toward, reflecting in part the precedent based assumptions in some studio years. (Figures 9 and 10)

A review of published studio work as well as Rowe's academic publications reveals his unflagging return to this problem, and to the devices that were deployed to resolve – even provisionally – the assigned brief.

Infill and hinge or connection conditions are favourites of this studio study. In the Providence Capital District studio, for example, can be seen a full range of urban scale problems (loss of spatial definition, small to large scale, foreground to background). Fong's solution to the Marlybone studio (Figure 10) is a particularly elegant example of the both figure and ground aim.



Figure 9: Infill and completion: open space as figure and ground, Providence existing and proposed plans. Middleton, D. B., Providence: Capital District Development Strategy (1980, Cornell University, Department of Architecture)

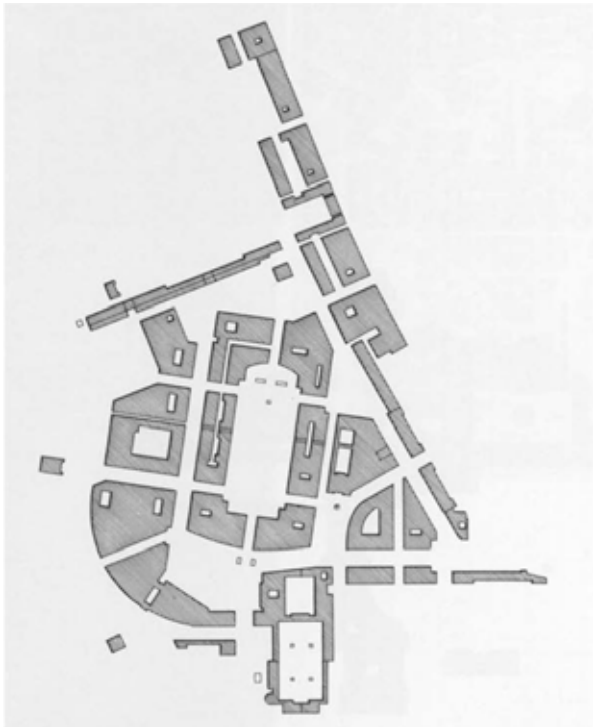


Figure 10: Composite building generated from field and edge study: Marlybone Rail Station, Regent's Park London, Figure/Ground Plan, Fong, S. (1979, Cornell University, Department of Architecture)

A larger field – whether of the city or of open space more generally – populate the studio work in later years. In the research toward a transition or transformation from figure/ground to Nolli-type drawings – and the

larger field more generally - one can discern a change in perspective.

The parallel publications by Rowe and Koetter of *Collage City* to a more subtle degree provide another formulation of the research intent and reach. (Rowe and Koetter 1978) Underlying the whole endeavor as noted at the beginning is the engagement with modern architecture and the traditional city. Can modern architectural types be used to solve traditional urban problems?

Berlin, Rome, Providence, Florence, London provided the material for much of the studio work in this period. And the group project was not uncommon. Infill may be the most easily legible term, but a close study of, say, the Florence plan of Lonman, reveals a now mature resolution of this fine-grained approach. (See Figures 11 and 12)

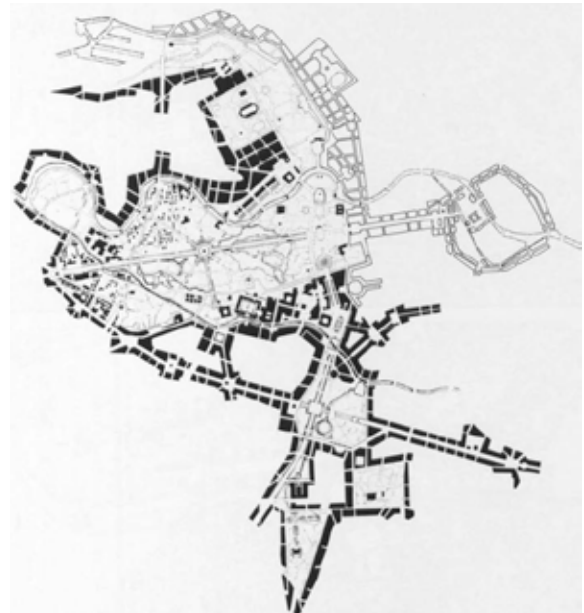


Figure 11: Field/edge research and proposed infill plan: Berlin Tiergarten. Carvalho, R., Frederick, D., Sennyey, E. (1981, Cornell University, Department of Architecture)



Figure 12: Completion/extension of an existing traditional city: proposed extension plan and conjectural view, Florence. Proposed plan, perspective view, Lonnman, B. (1980, Cornell University, Department of Architecture)

From the above too brief review, it can be claimed that the following constants distinguish Rowe's urban design studio:

- conceptualizing the city as a (single) gestalt
- engaging with a corpus of architectural/urban forms
- employing techniques of abstraction, thus a limited number of drawing styles, with figure/ground leading the way
- work and re-work from previous studio efforts
- a limited number of design problems: figure, field, pattern texture, edge, axis

There is a clear bias to be inclusive and to privilege conjecture. And it was all exemplified by a strategy of collage. Perhaps in the end, and as alluded to by one of Rowe's most inspired students, the question of beauty provides a provisional reflection on the eclectic manner and findings of the design studios, a search for a city with 'a beauty less stable, less perfect, more dynamic, more irresolute...' (Hurt 1983, p. 68)

CONCLUSIONS

Two approaches to teaching by research in the architectural design studio have been briefly surveyed. What, if anything, do they share? And what of the

opening hypothesis, of the relation of studio work on or toward a contribution to disciplinary knowledge?

Are there generalizable lessons on the workings and reach of the architectural design studio as a realm for research one could extend out to? And what are the important differences?

To start, Moneo provides a useful synthesis of the outcomes or intent of Hejduk's approach. He claims for it both close by and far-reaching stakes. The three Hejduk studios are 'exercises', a limbering of the hand and mind and eye. And they as a result together have a distinctly pedagogical function, one distinctly appropriate to an undergraduate studio. I think there is also an epistemological role.

Different from the studios of Rowe, Hejduk designed studio problems for undergraduates, thus the Nine Square problem was intended for first year students.

Moneo continues, now less about the studio's impact on the student but on the general context in both practice and theory in which the work should be interpreted: 'does the formal structure of architecture come as a result of making an abstract, modular division of space or does it, on the contrary, arise as an independent assertion making use of elementary images and figures?' (Moneo 1980, p. 65, 67) For Pérez-Gomez, it is the promotion and production of imagination that is the main thing. (Pérez-Gomez 1999, p. 16-17)

Both Rowe and Hejduk's efforts, to state the most basic, can be read as investigations of specific architectural problems, whether work on architectural imagination, the traditional/modern city dialectic, or the design process itself and more generally.

Looking more pointedly, five characteristics, at least, seem to be in common.

First, the functional brief or space program is down played or even absent. Hejduk assigns no functional brief and Rowe downplays function over a privileging of the gestalt, of eclectic and coherent shape or form.

Second there is an emphasis on precedent, or in the case of that first year undergraduate student in front of the Nine Square problem, the strict delimitation of specifically architectural elements.

Third is repetition: the studio problems are repeated over several years with subtle variations and refinements. In the case of Hejduk's Cooper Union studios, a framework is adopted and replacement terms (of concept couple, analytic component, site) introduced. So duration and the implicit studio culture.

Fourth, there is an explicit effort to remain open to the new, and to renewal generally. In the case of Hejduk, perhaps at the level of individual imagination. For Rowe, the force of the specific city to reshape our thinking and forms.

There is a fifth aspect, related to transmission and reflection: the findings or outcomes are documented. In the case of Hejduk, a public exhibition and major publication, along with the requirements of accreditation, in part spurred the systematic documentation of student projects. At Rowe's Cornell, a cluster of articles by graduates and colleagues framed critical discussions around the studio and the eventual publication of a high number of projects.

The differences are both evident and subtle. The scale of investigation is the most visible. From the post-beam joint at Cooper Union, to the city under Rowe.

An attitude toward context varies, as does the underlying assumption about autonomy. The studio projects that emerged out of Cooper Union are a work on the language of architecture, and the pedagogical intent through paradigmatic problems is to study the most normative of architectonic relations. At a different scale and in a different realm – that of the city – Rowe's deployment of figure/field relationships passes through a filter or is indexed against cubistic composition devices not only in plan but spatially, which endeavor to realize an 'and-and' (as different from an either or) condition. Rowe's field of inquiry can be seen to be simultaneously context based – whether Rome, Baltimore or Manhattan – and deeply engaged with architecture's future by a parallel confrontation with architecture's past (it's insides) and an openness to the potential in concepts and ideas from other realms

Another way to distinguish the difference of the two approaches, and to clarify their contribution to the topic of design research, is to endeavor to formulate the research problem each could be said to be treating. For Hejduk, he has given us the most succinct formulation: the design studio, in fact the pedagogical charge in the largest sense, is to 'search for new relationships of form.' The scale of form research in this suite is focused on the joint, post and beam relationships, frame to grid. It is a limbering up, an exercise. In this, Saltini's is the most extreme version. (See Figure 13)

For Rowe's ideal studio, perhaps the research problem is that of reconciling traditional city form and modern architecture. Here the form research is emphatically at an urban scale and conclusions, however provisional, do result. Think of the role of the linear building, or that of composite buildings, the discovery of the figure/ground drawing as tool, and its complication through Nolli. (See Figure 14)

Adding to work on form and thought in architecture, the two studios are exemplary efforts of thinking through architecture and its promise in the design studio.

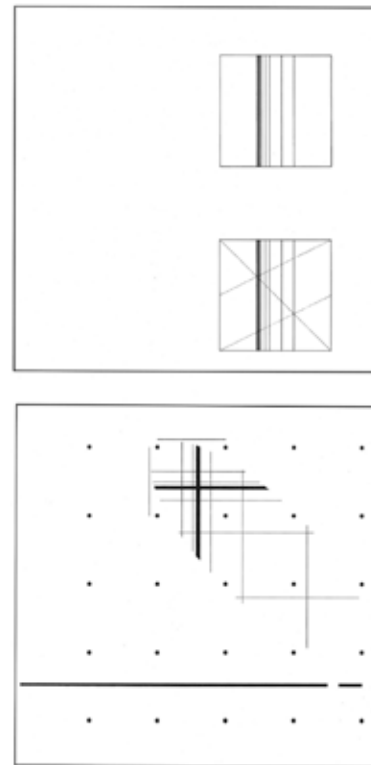


Figure 13: The most radical exploration of the cube problem, according to Hejduk. (Thesis, A Twenty-Seven Foot Cube, Peter Saltini, 1969-70, The Cooper Union)



Figure 14: Studies of alternate field and object readings of open space. Middleton, D. B., Providence: Capital District Development Strategy (1980, Cornell University, Department of Architecture)

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ILLUSTRATION CREDITS

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THE TRAVELLING TRANSECT: CAPTURING ISLAND DYNAMICS, RELATIONSHIPS AND ATMOSPHERES IN THE WATER LANDSCAPES OF THE CANARIES

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ABSTRACT

The practice of landscape architecture is most often a cultivation of open space alongside an open-ended dialogue with the presence and complexities of the cultural and natural features of places, usually resulting in projects generating site resolution rather than pure invention *ex nihilo*. However, when working with the more unpredictable qualities of sites as in water-made landscapes, designers often lack mapping and representational tools capable of capturing and expressing ephemeral qualities - *dynamics*, *relationships* and *atmospheres*. These abstract qualities, that exist over physical site conditions, correspond to the fields of natural sciences and to spatial aesthetics. The Travelling Transect method, inspired by Alexander von Humboldt's method of transareal travelling and transversal collecting of ephemeral information from site, informs our exploratory fieldwork in the water landscapes of the Canary Islands, adopting the working title Canarysect. Seeking altered expressions of the abstract qualities of places, we test three well-known tools: the *sketch*, the *photo* and the *model* in response to the site conditions that meet us along the journey. While acknowledging these tools' familiarity in everyday practice, the Canarysect project negotiates testing and capture of the dynamic, relational and atmospheric qualities encountered along lines of transect across island lands and waters. Individual sketching, photography and modelling gestures merge into a common archipelago of thinking around the water landscapes of the Canaries. Through the medium of the Nordes 2013 exhibition, coexisting tableaux of imagery and form produce another mapping of already-known island landscapes, brought to contemporary presence through a gaze informed by the layered histories of the landscapes and peoples, sites and programs.

INTRODUCTION: CAPTURING SITE QUALITIES

Site as entity, both object and as essential nature, is recognised by spatial designers as a paramount issue for their work, and over the last decade theorising about site has been a developing theme in design research. As researchers approaching site from a landscape architectural perspective, we identify the ways with which designers handle site qualities as a compelling area for contemporary design research. In current design practice, we observe that designers often address sites from a static and material point of view as empty play grounds to host new design inventions, overlooking much of that what exists, and especially the more ephemeral yet constitutive site properties such as relationships, dynamics, and atmospheres. This means that 21st century designers have not completely left behind the legacy of the modernistic era of the 20th century, which promoted design from scratch, complete with respective design methods to shape sites seen as *tabula rasa* – static, empty, bounded, functional units devoid of history or dynamism. Understandably, this legacy has led to a lack of appropriate design methods and work modes able to *transform* sites through taking on their mutable extant qualities rather than to design them anew according to a universal recipe. However, there is a tendency to increasingly acknowledge site specificity that is paralleled by an increased ecological awareness focusing on dynamic and relational site properties, such as flux and flow on the one hand, and on atmospheric site properties leading to an expanded understanding of aesthetics on the other.

This context motivates us to formulate the critical need to develop methods that enable designers to better capture the more intangible aspects of existing sites to

support *relational* transformation. We argue that contemporary design practitioners can expand their conceptual thinking and work modes through utilising design research to help elaborate these methods, which in turn can offer new site-specific driving forces to design practice. Our particular aim is to qualify the understanding of water landscapes as sites of relational, dynamic and atmospheric qualities in order to develop consciousness for their ephemeral and constitutive features. This understanding lays the foundation for improved landscape design and development. To achieve this objective we want to add to the landscape architectural 'toolbox' the first steps toward the development of an informed landscape analytical method that captures and represents the relational, the dynamic and the atmospheric qualities of water landscapes. As a means to focus around on-site qualities we investigate fieldwork travel as an immediate and mobile form of site exploration, complementary to the in-studio 'overlooking' site study of mediated site aspects in documents such as statistics, maps, Google searches and other diagrams. Our fieldwork method seeks to make the site an active participant to address the dynamic and changing qualities of places and their environmental contexts; a maker rather than simply bearer of meaning (Kahn 1996: 180). We explore the ways the more ephemeral relational, dynamic and atmospheric site qualities, often overlooked in current design practice, can be better captured through this method, and we set up a travelling experiment to test it. In this paper we report on the theoretical foundation that has helped us outlining the method, we explain what it consists of, how we have set up our experiment, what we have found on site during our experimental fieldwork, and how we evaluate our findings.

Taking the 18th and early 19th century traveller, writer and explorer Alexander von Humboldt as our methodological (and spiritual) guide we adopt a transareal approach, understood as exploring a particular geographical and cultural area from the perspective of another geographical and cultural area but on an equal footing and in order to generate new knowledge through relational thinking through an open-minded redefinition of local empirical studies. Our research team, composed of two Northern European and one Australian landscape academics, is armed with varying experiences and preconceptions according to our home landscapes, to explore test sites in the exotic - as in the sense of the other - Canary Islands landscapes. Our primary historical guide in this collaboration is Alexander von Humboldt, not the least because he first used the Canaries as a test site in preparation for his trips to the Americas, and we experiment with how the translation of his historic travelling fieldwork approach may be relevant to contemporary research practice. We base our experiment on a contemporary interpretation of Humboldtian science put forward by researchers of various fields around German scholar Ottmar Ette: 'Research subjects and objects are understood as

crossing individual areas of scientific inquiry. That is, they emerge from relations, circulation, and interactions beyond the local' (Kutzinski et al. 2012: 215). Our contemporary travelling fieldwork involves on-site fieldwork in a travel mode inspired by long-distance Australian road trips, travelled by car. It relies on the following method, nominated as 'transect' in previous educational programs. From existing knowledge we draw a transect line over the site for exploration, linking areas of interest so far identified to prepare the itinerary. On site, our knowledge expands with every kilometre travelled and every exploration made on a stop, and we correct or deviate from the itinerary to meet the needs of our immediate curiosity and questioning of the unfamiliar. Along the way, we adopt and test familiar tools that we assume to have the capacity to capture dynamic, relational and atmospheric site qualities: photographs, videos, sketches, models, writing and annotating, and ourselves as sensing, thinking and communicating subjects engaged in the multiple processes required by travelling - together.

In previous research, we have identified water landscapes as potent areas for investigation of sites understood as transient (Parodi 2010). We understand that the influence of water conditions on human settlements and the effects of human practices on aquatic systems over time can only be apprehended in the perspective of economic, climatic and social change. Generic solutions are particularly inappropriate to specific and dynamic water landscapes exposed to ongoing change, prompting our proposal for a new acknowledgment and representation of site particularities from which the design of water landscapes can shift from an imposition of universal solutions into a transformation of sites through apprehending their existing qualities.

THEORY: TRANSFORMATION, TRANSAREAL, SERENDIPITY, SITE

Our theoretical background includes contemporary post-modern and post-structuralist theories formulated in the arts, in landscape architecture, in urban design and planning, relating to concepts of transformation, the transareal, serendipity, and site. Our other source of inspiration lies in the reinterpretation of the historical figure Alexander von Humboldt who regarded science as a mobile, transareal enterprise that moves across disciplinary and geographical boundaries and territories. Humboldt practiced such mobility of thought and application accordingly in his fieldwork through mapping and writing as witnessed in his journals and recent scholarly reinterpretations. Noticing the current state of segregated knowledge, which is counterproductive to capturing water landscapes as physical phenomena to be measured and experienced in as manifold and interrelated, we draw on Humboldt's scholarship to exceed these limitations and explore the potentials of a more nuanced view.

PERCEPTIVE TRANSFORMATION

Designers have not completely left behind the legacy of the modernistic era of 20th century that promoted design from scratch while shaping sites regarded largely as *tabula rasa*. This leads us to sketch out perspectives for the redefinition of design methods as transformative approaches. Transformation is a situation when something is changed from one state to another – from ‘something’ to the new, or at least altered, ‘something else’ – a condition that recognises that neither before, nor after, is static (Braae, forthcoming). While the traditional design act is associated with originality in terms of ‘the new’, novelty in transformation is rather associated with the ability to create a dialogue for change with the existent. Such transformations depend upon site-related knowledge, ideally focused on enhancing relations between the nostalgic/place-bound and the not-nostalgic/nomadic, between the material and the immaterial, and between the past/present known and the future unknown (Kwon 2002). The design process is therefore influenced in terms of integrating and balancing the aesthetic reality found on site, gaining understanding of the broad notion of aesthetics (‘aisthesis’, Böhme 2006), and adopting an approach opposed to the traditional privileged, mediated and also distanced view.

Within transformation the existent reality becomes the main driver, and design thus becomes a hermeneutic agency privileging novelty through focus on creating new perceptions of the existing rather than an ex nihilo creation of new objects. If transformation does not necessarily imply that the future is subordinate to the present the sum of the dialogue between the existent and the intervention results in production without a predetermined relationship. Furthermore the outcome is always incomplete; it is a priori open for further design intervention due to its heterogeneous and compound character based upon a paradigm of complexity beyond one of harmony (Braae-Diedrich 2012). We see the interplay of immediate apprehension of and mediated intervention on sites as intrinsic to design understood as transformation, an approach we consider underestimated in current design research. That is why we propose to enhance immediate site apprehension through fieldwork, in order to grasp the qualities that are otherwise overlooked, namely the relational, the dynamic and the atmospheric, and to represent them as useful models to inform design practice.

TRANSAREAL TRAVELLING

Humboldt’s scientific approach is appropriated to assist us to re-envision the current epistemology. Dating back to the turn of the 18th to the 19th century, his work operated within an environment characterised by an intense movement of globalisation through seafaring and increased trade with the colonies. We now find similar, yet arguable more ephemeral conditions of

global movement driven by the globalised economy. The changing world then required a changing worldview, and in his time Humboldt advanced two ‘epistemological revolutions’, which we recognise as similar to the threshold situation now. These approaches were not fully exploited then and have subsequently been forgotten or misinterpreted over the development of science into segmented and specialised areas in the late 19th and in the 20th century. Yet, according to contemporary researchers, they promise to deliver a highly valuable foundation for the adaptation of today’s scientific model to better counteract the unstable conditions of the 21st century. For us they deliver the base for examining a new site understanding and an appropriate site exploration method, fostering design as transformation.

Humboldt’s first epistemological revolution consisted in the rejection of pure reflection at distance (epitomised by the encyclopaedic knowledge of the French philosophers of 18th century) and posited empirical exploration on site as the new authority for reliable knowledge generation. Humboldt’s two great travels to the Americas (1799-1804) and to Central Asia (1829) adeptly depict his work mode in practice through his reliance on fieldwork, on immediate observation by (his) subject observer and eventually relating his findings through critical thought to his context in an ever evolving process of knowledge generation. This is precisely his second epistemological revolution: Humboldt posited knowledge as an open work, continuously in motion just as he practiced as a researcher, crossing boundaries between areas of study, exploring their interrelatedness and relational dynamics, and seeing science as a transareal pursuit. He was a pioneer of this approach in opposition to the established intellectual boundaries between disciplines and territories of the day, many of which have evolved into the specialised disciplines and area studies we still know today.

Humboldt’s appreciation of the open-ended and the relational has generated his particular format of writing, communicating and publishing, namely through texts that feature multiple cross-references and side stories in a meandering footnote apparatus, through book series conceived along forthcoming editions and through comprehensive publication of images produced by artists utilising his sketches and notes. This particularity has also earned him disdain, and many of his thousands of pages have been published in falsifying shortcuts and misinterpreting translations. Many researchers today content that Humboldt’s time has come again and as a scientific figure his work embodies such merit as to be rediscovered and reinterpreted from primary sources (cf. Ette 2012 and 2009, Kutzinski 2012, Gebauer 2009, Humboldt 2004/1810-13 and 2004/ 1845).

From our readings and research perspective, Humboldt’s claim seems to be more up-to-date than

ever: everything in our world is interrelated, and only a science understood as mobile can help us generate appropriate knowledge for complex contemporary landscapes. Our transect experiment includes the translation of this historical approach to our contemporary enterprise: Humboldt submits site thinking as on-site thinking, and site knowledge as open-ended evolutionary knowledge. We intend to contribute to the transareal and trans-scalar understanding of Humboldt's scientific model by our gaze framed through the lens of contemporary landscape architecture in a problem-oriented research approach seeking to capture the relational, the dynamic and the atmospheric qualities of sites.

INTENTIONAL SERENDIPITY

The open-mindedness of Alexander von Humboldt's approach corresponds with a design research epistemology that today is articulated by French urban researcher François Ascher in his writings about serendipity (Ascher 2009). The concept of serendipity involves circumstances that allow for finding what you have not been searching for. Ascher highlights that in a context of uncertainty the capacity of researching alone is insufficient for tackling problems without the ability to deploy the unexpected. Our complex contemporary world is increasingly more calculated and reasoned, and less traditional, therefore less reliant on well-known patterns resulting in the "hypermodern" condition. The nature of research is impacted through the necessity to produce new profitable knowledge in relationship to multiple individual and collective actions and decisions, to mobilize more reflection and knowledge for every action and decision and consequently to produce an increasing array of choice often with resulting uncertainty. Ascher invites researchers to shift from casual, unintended serendipity to conscious, intentional serendipity. With uncertainty as a starting point such an invitation entices a considerable shift in epistemology and methodology and encourages findings produced through situational interaction and exchange. (Ascher 2009: 88). Our design research consciously approaches serendipity as an important mode of discovery; through the medium of the transect the organizing function is the line/itinerary of travel and serendipity is what crosses the line/itinerary and causes us to pause and record or map whatever situation is thrown up at us on site.

SENSING SITE

Concentrating on the relational, the dynamic and the atmospheric components of sites overlooked in current design practice, we find a theoretical foundation for their relevance in the contemporary writings of US scholars Burns and Kahn. Occupying a central position in the definition of what a site is from a design perspective is the relational construct. Burns and Kahn argue that even if designers are only attributed a site within the strict boundaries of the area given by a client as an area of intervention, they cannot conceive their design without transgressing these boundaries and relate

to other geographical areas, and to past, present and future time frames. They 'construe and construct' site from an exchange between what they see in front of them and what they wish to have there, between ideas from outside (the physical site) and inside (disciplinary norms, personal convictions, societal ideals), and between the real as observed and the real (Burns/Kahn 2005: xv).

The relational dynamic is the key notion from which the whole body of ecological knowledge evolves, especially in respect to water landscapes. Furthermore, contemporary authors found their definition of landscape on it. American writer J.B. Jackson addresses landscape as 'no more than a collection, a system of man-made spaces on the surface of the earth (...). It is where the slow, natural processes of growth and maturity and decay are deliberately set aside and history is substituted. (...) A landscape is where we speed up or retard or divert the cosmic program and impose our own' (Jackson 1984: 156). Shaping sites is therefore a continuously performative action and we need to understand the existing dynamics of sites in order to work with them. This thought is confirmed by US landscape architect and scholar James Corner who proposes shifting our attention from the formal characteristics of landscape - its simple appearance - to its formative effects over time - how it works and what it does - to 'the *activities* of design and the *effects* of constructed landscapes in time' (Corner 1999: 4). With Corner, we can acknowledge landscape as design activity, which is the human aspect of the constructed dynamism of sites.

The atmospheric is a central notion in phenomenology, defined as the interface of sites and our immediate sensing of them. According to German philosopher Gernot Böhme, atmospheres are produced by the site, by the observer and by the interplay of both (Böhme 2006). In post-phenomenology, atmospheres are defined as quantifiable ephemeral qualities, such as moisture, temperature and sound (Hillier 2005). These theories have so far only been exploited to a limited degree in designed landscapes.

DATA AND METHODS FOR A WATER LANDSCAPE TRANSECT

ON-SITE SENSING: RELATIONSHIPS, DYNAMICS, ATMOSPHERES

In our project to practice a transareal approach to water landscapes, we seek to refine how to unpack the three previously defined aspects of relationships, dynamics and atmospheres. The relational aspects of water landscapes can be understood spatially, functionally and across scale or territory. Firstly, spatial relationships can be detected from a study of the elements of a site and how they interact – this corresponds to a conventional architectural work analysis of the morphology and syntax of spaces. Secondly the functional aspects appear

through a comparison between program and site, between intended use and the site's current state of human-nature-interaction – less common in prevalent design culture that imposes programs on sites. Thirdly, the scalar/territorial aspects can be detected through scrutiny of the site and the various realms and geographical areas it is connected to on local, regional and global scales – also less common in the design disciplines that work predominantly within their own defined scale limitations.

The dynamic qualities of water landscapes and how the use of water changes over time become apparent when studying developments in the evolving relationships of program to site, alongside the larger systems of influence such as geology and climatic progression over time. In normative practice analysing the dynamics across these different fields is new to many. The atmospheric features characterising water landscapes can be studied in phenomenological and post-phenomenological ways, including qualitative and quantitative methods: the humidity, temperature, light, noise of a site can be sensed through the body and expressed in visual, textual and modelling descriptions, as they are equally measured through scientific means involving tools such as hygrometers and thermometers.

ON-SITE METHOD: THE DEVIANT TRANSECT

Our on-site method has been inspired by Humboldt's explorative travelling further informed by our previous experiences of an Australian-European educative and research collaboration on water landscapes, focusing on the bodily experience of the subject landscape at extensive yet personal scale, called the Transects. They involved a short-term (2 weeks), intensive, long distance field trip (1000 km), nominally organized along a line drawn across territories exhibiting apparent or presumed water-land conflicts, investigating the various design projects encountered along the way. The Transects are inspired by Australian road trips for landscape architecture students and academics, modelled on The Big Transect, undertaken by RMIT University in 1997. Three subsequent Transects as academic student and research collaborations have been undertaken over the past three years in southern Australia (Queensland University of Technology, 2009), Northwest Europe (Karlsruhe Institute of Technology, 2010) and Scandinavia (University of Copenhagen, 2011). They engage with site and design through both experiential and intellectual approaches framed by an educational focus informed by fieldwork leading to the production of research questions. They arise from consciously serendipitous deviation from the itinerary while travelling, halting, observing something unexpected, further questioning it, identifying it as an issue (Diedrich/ Lee/ Raxworthy forthcoming).

The Canary Islands project, the Canarysect, is now conceived as the first solely research focused transect by three of the researchers who have been part of the

previous transects; Ellen Braae (University of Copenhagen), Lisa Diedrich (Swedish University of Agricultural Sciences), and Gini Lee, (University of Melbourne).

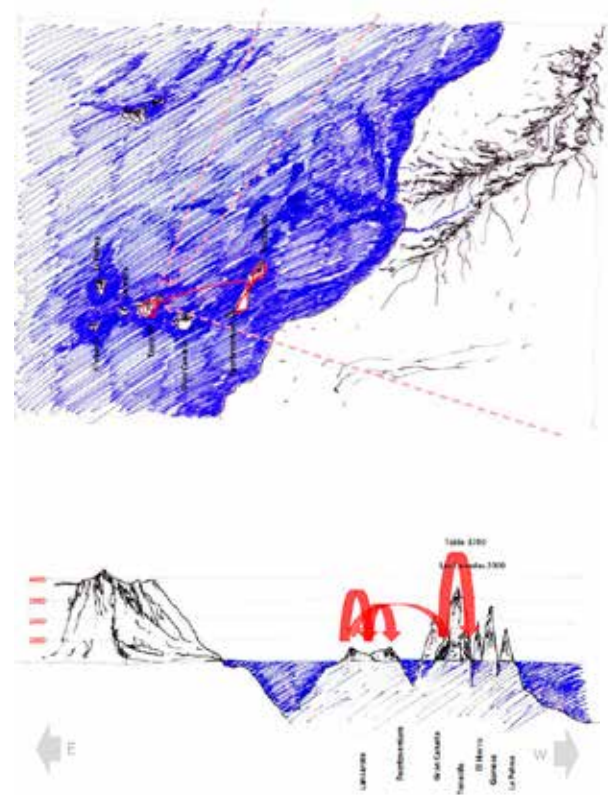


Figure 1-2: pre-travel sketches of the Canarysect itinerary

A research transect comprises three phases; pre-travel preparation based upon the experience of the host or experienced guide, on-site travelling with companions, and post-travel evaluation and communication to others. Before departure, we define our itinerary just as we did for the educational transects. We use our pre-knowledge to draw a line across the site of study along the points of landscape that promise to help us capture relationships, dynamics and atmospheres. On site, we travel along the line, always receptive for deviation, and we take with us a set of tools allowing for capturing conditions and activities. On site, we often work in an analogous way, using our tools separately and then coming together to share our observations and collections.

Photographing and filming enables us to acknowledge atmospheres through framing, in capturing a moment and making it last, for contemplating details, colours, structures, scales and capturing small sequences of a dynamic site, including sound. Sketching and hand-drawing permits open and flexible depiction of details in a semi-automatic reflection mode, it allows superimposition of various observations of forms, structures, objects and their associations brought to clarity through annotation. Conceptual modelling seeks

to capture scales, spatial properties and relationships, while abstracting landscape complexity on the one hand, and expressing materiality on the other. Our modelling kit is composed of 'as found' small materials; timber pieces of various lengths, thickness, colour, metal geometries and plexiglass elements that can be used to quickly 'build' a model on site, on an appropriate ground. On-site abstract models are photographed and the elements removed back to their kit leaving only the indents and shadows of their fleeting appearance.

Sampling techniques such as collecting materials under our feet, allow us to gather 'findings' in a very immediate way, effective for collecting small and light weight on-site materials; rocks, soil, plants but also the detritus of found crafted objects and relics. Brought together, samples allow for comparison and can detect relationships, such as between rock textures, sand colours and plant types. Plants when pressed further reveal their abstract shapes, also producing imprints on the paper of the press book, as ghosting atmospheres of plants transformed through desiccation to become the collection of site elements in miniature. Conversations with locals, designers and professionals involved in landscape development help with gathering information and insight into current discourses and practices about the dynamics and relationships of local conditions – often along the way collaborations and associations arise towards a community of practice around the site.

After the trip, the findings consist of a collection of raw material: photos and small films, sketches and annotations, model photos, earth and plant samples, interview notes. This material is sorted, evaluated, combined, interpreted, synthesised and elaborated into a communicable representation of our findings. In this phase, the tools we used on site open various options of interaction, and also of evolution into digital media.

TEST SITE: THE CANARYSECT

In April 2013, the particular water landscapes of the archipelago of the Canary Islands were chosen as a test site, to explore methods for transformation through transareal travel. Calling ourselves the travelling transect gels ('gels' being Australian slang for 'women') we saw these islands presenting a perfect on-site laboratory as they are commonly acknowledged as a tourist destination, providing beaches, sun and general merriment as generic qualities, indistinguishable from any other mass tourism site. We sensed that most of their particularities are overlooked as the Canaries host a maximal variety of topographical and water conditions over a compact geographical expanse, able to be explored in the context of our transect experiment. Furthermore, the Canaries are a microcosm of the globalising world, subject to economic, environmental and social change affecting the predominant Canarian economy that relies on the universal recipe of mass tourism and fossil energy.

We sought to commence at Humboldt's test site, his first extra-European halt before sailing to the Americas on the island of Tenerife, where he ascended the Teide volcano. The island represented to him an 'Inselwelt' of scientific endeavour – in German a duality of meaning – designating the island so complex that it both contains the whole world, but with the island as also part of the world that is composed of smaller and larger islands and sometimes whole continents, within the waters of the planet (Ette 2009). When Humboldt sailed from Spain to the Canaries, his team set foot on ground at La Graciosa, the small satellite island of Lanzarote in the North of the archipelago, thinking it was Tenerife. They continued to Tenerife, having a week to study the island, especially the Northern slope and the crater of the Teide Volcano. After his American travel, he elaborated on vegetation storeys on the slope of the Teide and its related microclimates, on the settlement and agriculture of the Orotava valley, on the effects of the Spanish colonisation (cf. Gebauer 2009).

The Canaries are composed of seven islands of which the easternmost, Lanzarote and Fuerteventura, are arid and the western (Gran Canaria, Tenerife, La Palma, Gomera, El Hierro) are subtropical. This is due to the high volcanoes on the western islands, which capture the clouds of trade winds and receive rain to support vegetation which can thrive as their volcanic activity has since long ceased.

On the mountainous islands, and especially on Tenerife, with the Teide as the highest peak in Spain (almost 4000 m), the local population has always lived on the cooler, wetter and more fertile Northern slopes of the volcanoes, however recent mass tourism settlements and industries have developed on the dryer, sun-exposed Southern slopes (precipitation index for the Orotava valley on the Northern slope of Tenerife 370mm/y; for Santa Cruz on the Southern slope 250mm/y). The eastern islands feature lower lands where significant vegetation cover was exacerbated by volcanic activity enduring over longer time periods, especially visible in the lava lands of Lanzarote (precipitation index 150mm/y) and the wind-eroded slopes of Fuerteventura. The small island La Graciosa, where Humboldt first went ashore, is part of this volcanic regime while featuring no fresh water resources at all. Acknowledging these water conditions, we sketched out our Canarysect itinerary to traverse the islands from wet to bone-dry, across the weather and lee sides, over six days, using a car on the islands and the airplane or ferry between the islands: Tenerife North, Tenerife from North to South across the Teide, Tenerife South, Lanzarote, and La Graciosa.

The sun-exposed Canaries have been exploited by mass tourism since the 1970s, beneficial for the local economy but a threat to the existing landscapes of the Islands through a generic mono-cultural and imported approach affecting the fabric of Canaries' ecological,

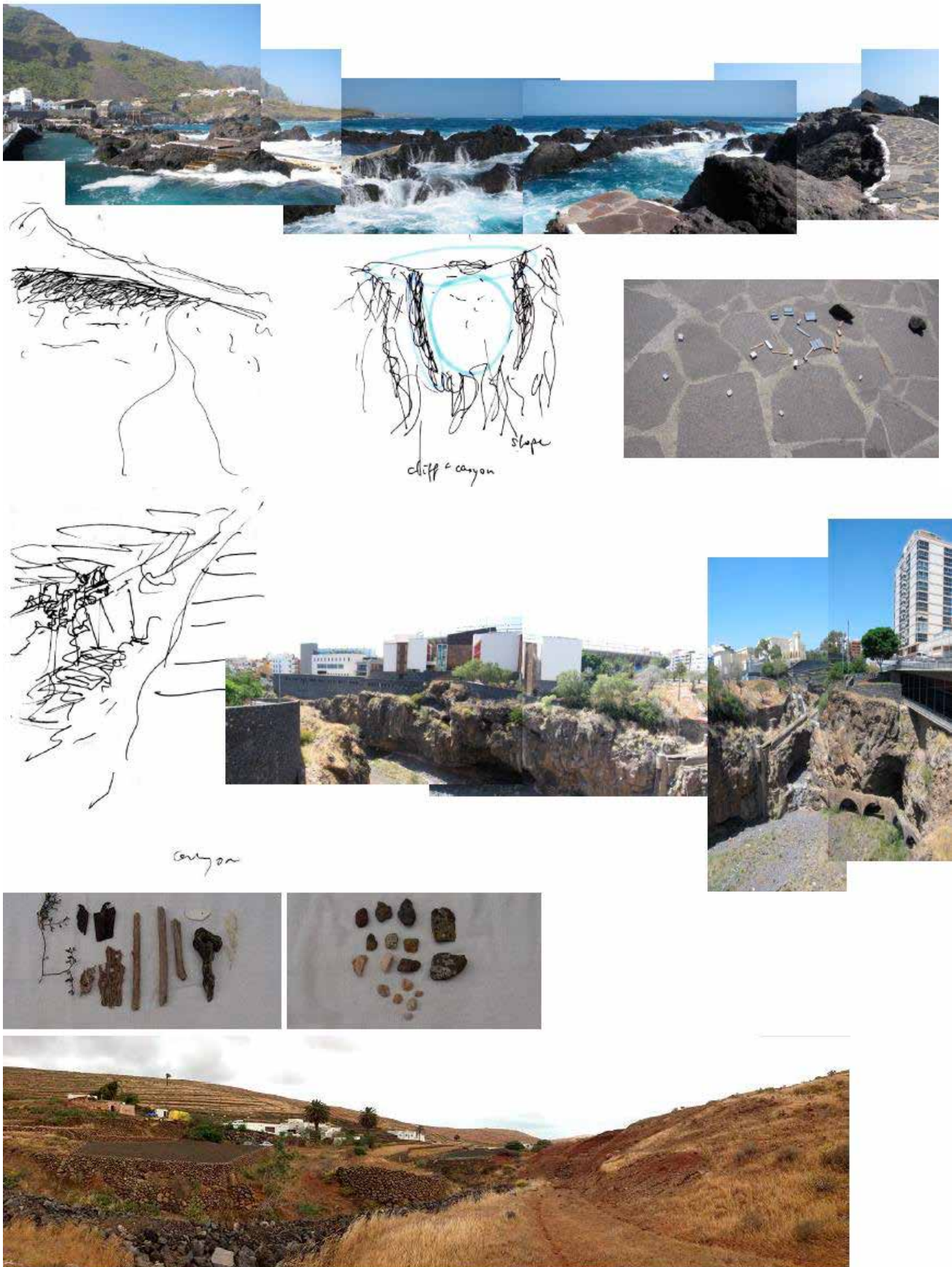


Figure 3-4: photocollage of Garachico rock pools, context sketches, model photo of Garachico coastal spaces, Tenerife; synthetic sketch of a cultivated barranco, photocollage of the urbanised Barranco de Santos in Santa Cruz de Tenerife; photos of samples from the rural barranco Los Valles, panorama photo of the Los Valles agricultural terraces, Lanzarote

social, and economical existence. Critical voices have been raised against this monoculture since the 1970s, namely in the person of Lanzarote-born artist and architect César Manrique who investigated vernacular building forms and settlements and commenced exploration of the volcanic landscape site typology, specifically in his architectural projects. He also fought for the controlled development of tourism. Since Manrique's death in 1992, Fernando Gómez Aguilera, his road companion and today director of the César Manrique Foundation, promotes local claims through his cultural institution based in Manrique's old house and from him we learnt of Manrique's great projects to preserve and exploit the unique aesthetic landscape of his island home. Also on Lanzarote, architect Caroline Bos, partner of the Dutch office UN Studio, has made her sometimes home at the end of a local valley, among tended fields and terraced hill slopes, and with her we made a journey along the local valley experiencing the age-old practices of water farming in the dry gullies.

La Graciosa introduced us to a local ethnographer in her adopted home who guided us on a transect across the island from coast to coast and from water story to small constructions and unmarked sites of interest. And on Tenerife, the local architects' chamber has initiated public activities to raise interest in local landscapes, through a Biennial for art, architecture and landscape. The director Juan Manuel Palerm, also partner of a Tenerife based architecture practice, has created the Canaries Landscape Observatory along with the Biennial, promoting research and aiming at implementing the policy of the European Landscape Convention. In our conversations with Palerm we found an enthusiastic audience for the transect idea as a revealing method for the Canaries territory alongside our exploration of his own water landscape infrastructure project for the Barranco de Santos in Santa Cruz.

FINDINGS: MORE THAN COASTLINES, MORE THAN RAVINES

Our days of travelling transects had provided us with more than enough material - from wet to dry, from volcano to coast, across impassable rock plains to black sand beaches, from sub-tropical density to bare aridity – even thought we had originally planned to travel further.

We were particularly interested to complete our findings on cultivated ravines, discovered in a very urban typology in Tenerife and serendipitously discovering a rural form of such a ravine and its terraced agricultural landscape on Lanzarote where we invited to stay in a farmland valley. In exploring these landscape features we also came to express our different languages derived from our various home country knowledge – the ravine could also be a gully, a gorge, a canyon or a barranco in Spanish. The realisation that transect travelling requires both fast and slow travel is a temporal aspect of

landscape expression that is impossible to convey on maps far from site – this is the benefit of fieldwork.

Arising from our travel across the rocky coasts of Tenerife, Lanzarote and La Graciosa is the design research condition where landscape elements become prompts for recording and conversation. Our field notes and images reveal atmospheres of exposure and enclosure, danger and protection, the wet and fresh, the salty, the dark and the bright, dynamics of erosion in the long time frame. Our samples reveal rock textures and support the atmospheric and relationships to where the materials originate. Our films reveal water dynamics over short sequences. Our models reveal relationships of morphological elements on the architectural scale. Our sketches reveal relationships of landscape entities such as coast, ravines, cliffs and slopes at scale beyond detail.

Together, these prompts relate to: geology, topography, wind and the water regime of the Canaries, the Canaries as part of the African tectonic plateau that drifts eastwards whereas the Americas drift westwards creating volcanic activity, the volcanoes that ejected the lava that ran down the slopes forming the rocky coasts, the trade winds coming in and the northern coasts exposed to them, wind and water erosion, the closeness of the Sahara, winds in former times having deposited yellow sand at particular spots of the Canaries that now come to surface through wind erosion creating the bright land masses of La Graciosa, and finally the shallow waters between the eastern Canaries and the African coast on the African shelf thus creating the rich Canarian Saharan fishing bank and the shellfish rocks of La Graciosa.

In all the cases the coast appears to constitute both a separation line between land and water and an area of exchange – a water landscape in itself opening up for examination of the dynamic and relational interactions between site and program. By travelling in a deviated manner to literally thicken the line, we accessed an important part of the islands' water landscapes in terms of their dynamics, relations to other parts of the water landscape system, and their atmospheres as explored by visitors and fisher(wo)men.

Visiting the ravines, the lofty Barranco de Santos in Santa Cruz in Tenerife, and the gently sloping Los Valles valley in Lanzarote we were impressed by the manner of cultivation of the ravine and its terraces and infrastructures. Either for public spaces and facilities or for agriculture, and insofar as how the relationships between topography and human practices also reveal atmospheres of breath-taking spaces, tamed danger, courageous building culture (Santa Cruz), or atmospheres of paradise, the fertilised desert land, courageous earth work and terracing (Los Valles). And in our travel towards the volcanoes in the centre of the islands, our samples of geologic and botanic valley

materials support the atmospheres of the wilder desert and of the fertile and managed areas closer to the coast.

Prompts most often were found to relate to regimes of cultivation predicated on water availability and landscape management which to our gradually knowing eyes was all revealed in the patterned, constructed and piped water infrastructure embedded across the island landscapes. And it was possible to regard the migration of the forms of agricultural landscape management; the use of stone to form extensive terraces to provide enough ground to farm and to live on, and the water management tanks, aqueducts and channels into the designed landscapes of the city and its public infrastructures. These shifts in use as transareal transformations make use of the former structures, materials, and other site aspects traced directly in the genesis of the new. We sought to record these dynamic and relational characters through abstract models and drawings supplemented by photographs as a means to capture phenomena that caught our attention; elements which later appeared to play a role in the water landscape site-program of design exchange.

DISCUSSION: THE TRAVELLING TRANSECT AS METHOD

As we transected island after island we were able to identify a pattern of approach that we seemed to repeat in each place. By means of travelling we slowly determined an idea of the regional water landscape structure, reading the ridges and valleys and at the same time studying local projects. The local projects both informed our understanding over the overall conditions, at the same time providing us with sensorial inputs. The locally situated projects opened up a direct understanding of the regional conditions and their translation into a site while at the same time they constituted a network of projects. This trans-scalar approach relating project to project and project to the overall spatial and climatic entities could only be captured by means of movement. As this understanding is gradually built up we sought to capture these relations and dynamics through making on-site models and sketches aided by structuring the photographs in a sequence of travel to record the material presence under foot in collaboration with the middle and distant landscape as contextual prompt.

Application of the various tools while transecting, in order to capture the relational, the dynamic, and the atmospheric of water landscapes, confirmed some of our research and methodological expectations and tested others. We had to distinguish between firstly the relational being spatial - the relations between objects - and second, trans-scalar - the relation between overall structures, functions and forces, site and program. In the first case the model was an excellent tool, while trans-scalar relationships could partly be represented by sketches and models. Dynamic change over time - cycles and flows - is traced on site, through the camera

and the sketch. Atmospheres as spatial, haptic and temporal conditions typically were the most difficult to record through experiments with modeling and photography, both sequential freeze frame and video capture. However, we find that much knowledge is produced 'in between' the tools or in their intersection.

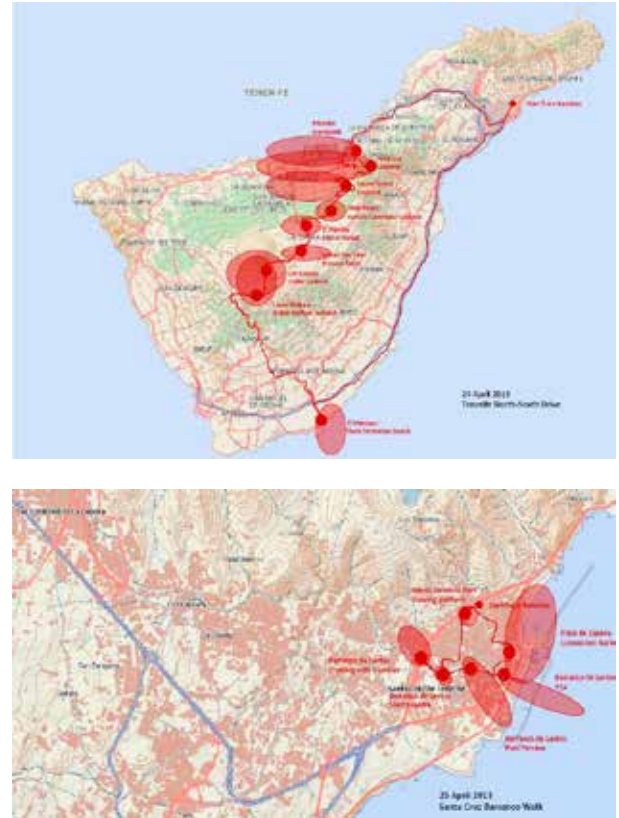


Figure 5-6: sample Canarysect itineraries, actually travelled, for the North-South transect of Tenerife, and for the urban Barranco de Santos in Santa Cruz de Tenerife

We set out with the idea of the transect knowing that pre-knowledge enabled us to define the itinerary, and that we would intentionally allow serendipity to change our itinerary on site if our attention was captured by something that deviated us. On this experimental transect research trip, it became clear that the deviation is what generates new knowledge. Future transects drawn from our fieldwork knowledge, would again be enticed to deviate, confirming our method as open-ended, producing evolutionary, never complete knowledge.

This is the source of the method defined as the deviant transect. As in Humboldt's 'tropic(al) constructions' (Ette 2012), the shift between the plan and the on-site experience enables us to discover. No shift means no discovery but only confirmation of pre-knowledge. The shift, or the trope, in Ette's words, is border crossing, leaping forward. The shift depends on the researchers' knowledge and interests, their moves, motion and emotion. It depends on WHO travels, as the knowledge generated each time and by each person will never be

the same. And if it is a team that travels, evolving from the pre-knowledge every research collaborator brings, in an iterative combination of many interpretations of experiences found while travelling towards a new common archipelago of knowing and thinking.

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CAN DESIGN GO BEYOND CRITIQUE? (TRYING TO COMPOSE TOGETHER IN OPENING PRODUCTION)

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ABSTRACT

This paper aims at contributing to the emerging field of design for social innovation (D4SI) discussing the insights from the author's long-term involvement as a design researcher in a social innovation project. In order to discuss this experience a particular perspective is introduced, according to which D4SI can be considered an attempt of design to go beyond critique, and, specifically, of *composing together* (Latour 2010). In this understanding D4SI can be considered as a collective effort towards the construction and exploration of alternative ways of living and working.

In deepening how D4SI can be understood as *composing together*, some reflections are made on the author's involvement in the maker-space STPLN, a platform where production processes are opened and attempts of composing new ways of making things and delivering services are carried out.

By highlighting some of the challenges emerged from being a designer in STPLN, the paper develops two reflections. The first one is related to *togetherness* and it argues that, in dealing with collective compositionist processes, designers need

to acquire skills and look for a possible role that is different from the one of the enabler. The second reflection deals with how to assess *composing together*. From the experience with STPLN, it emerges how compositions need to be accountable in diverse discourses in order to travel further and, hopefully, generate future *prospects*.

INTRODUCTION

I belong to a generation of designers fully aware that "*There are professions more harmful than industrial design, but only a few of them.*" (Papenek 1971). Climate change and environmental problems may have lost their priority on the political agenda, but this does not mean that pollution levels have reduced or global temperature stopped to rise.

We are also aware that "*there is no alternative*" (Tatcher 1980) to neoliberalism, but we are increasingly realizing that in the irresistible march of progress, fewer and fewer are invited to participate.

As designers it seems that we have two possibilities: either hold it strong to progress (Latour 2010), embracing the conviction that "*We have designed systems, cities, and commodities. We have addressed the world's problems. Now design is not about solving problems, but about a rigorous beautification*" (Rashid 2012); or try to address the challenges that our times are posing to design.

Facing these challenges is not an easy task. If taken seriously, they are basically questioning the scope of design itself as the creative engine of mass-consumption and progress. Is it possible to be a designer and embrace environmental and social issues beyond developing environmentally efficient dishwashers?

A provisional possibility to respond to these dilemmas is coming from design for social innovation (D4SI) that is suggesting how design could contribute to the

development of environmentally and socially sustainable ways of living, working and producing things; giving the chance to stop designing for *progress* and rather cautiously experiment with *progression*, by engaging in the tentatively *composition* of possible future *prospects* (Latour 2010).

This paper aims at contributing to the understanding of the possibilities and limits of D4SI by reflecting on a three year involvement as a design researcher in a social innovation experiment, the setting up and running of the maker-space STPLN. The paper builds on an analogy between D4SI and the idea of Compositionism as presented by Latour (2010). By looking at D4SI as an attempt of *composing together*, two contributions are made: the first one is how D4SI can be considered as a way for design to move beyond critique; the second contribution highlights issues and criticalities that can emerge when trying to design as *composing together*.

The paper develops in three parts: first, D4SI is related to Compositionism and how it can be considered to be an attempt of going beyond critique. In the second part, the design experiment is presented: the ongoing participation in the setting up and running of STPLN, a maker-space in Malmö, Sweden. This experience has given the author the opportunity to work with D4SI focusing on production processes. Finally, by reflecting on the involvement in STPLN, the paper reflects on challenges in working with D4SI as *composing together*. The focus is on how to deal with togetherness and on how to assess compositions, that is trying to understand if alternative *prospects* are generated, or if the composition is rather *tinkering* with future-as-usual.

DESIGN FOR SOCIAL INNOVATION AS COMPOSING TOGETHER: IS IT POSSIBLE FOR DESIGN TO GO BEYOND CRITIQUE?

D4SI represents a growing and heterogeneous field with diverse approaches. This paper accounts for a specific development of D4SI that originated in Europe and that entails the possibility for design to play a central role in tackling both environmental and social issues, specifically, by engaging and fostering collaborative processes for the development of new practices and ways of living.

In 2003, Jegou et al. presented a collection of everyday sustainable scenarios, showing how design could help in the transition towards more sustainable lifestyles besides developing energy- and material efficient products. Few years later, the work with creative communities (Meroni 2007) and collaborative services (Jegou et al. 2008) contributed to further develop the idea of design as a key player for the development of a more sustainable society and as an enabler of grass-root initiatives.

In the same years (2004-2006), the work of the RED group in UK represented one of the first attempts of

using design to tackle complex social and economic issues (Design Council 2008, 2010). Focusing on diverse themes (health, ageing, democracy), the work of RED proved how design could be used for developing new services and solutions to respond to complex issues. From these experiences, the idea of *transformative design* (Burns et al. 2006) emerged, defining some key features of D4SI: the centrality of participatory processes involving stakeholders from diverse sectors, the importance of prototyping, and the need of transferring design skills to process participants. Counting on a strong political support, transformative design has been further developed with the DOTT programs (Design Council 2012), a project where entire communities are involved in prototyping solutions for sustainable local living, and Public Service by Design (Design Council 2010), a program where designers have been involved in redesigning services in the public sector.

The vision provided by Manzini and his group in Italy and the practical work promoted by Design Council in UK had a strong impact, fostering the idea that design can shape not only products but also lifestyles and systems for more sustainable societies. In this sense, D4SI differs from previous experiences of “social and politically engaged design” since it aims to *change* rather than *critique*. Moreover, it addresses and involves a wider public than the design community itself.

In his book on design activism, Fuad-Luke (2008) offers a compendium of diverse design experiences, which have aimed at “*generating (...) positive social, institutional, environmental and/or economic change*” (Fuad-Luke 2008:28). From Bauhaus to Critical Design, Fuad-Luke maps design practices involved in and with change. He also notices how “*the target audience for many of the design movements, groups and individuals were predominantly aimed at designers, with a view to change the way they think, approach their work and deliver their form-giving, rather than at specific targets external to the world of design.*” (Fuad-Luke 2008:48). D4SI distinguishes itself from these experiences in its ambitious goal of involving not only the design community, but also other stakeholders: from civil servants to NGOs, from citizens to companies.

This focus on collective processes has brought D4SI close to Participatory Design (PD) (Björgvinsson et al. 2010, 2012, Hillgren et al. 2011, Manzini et al. 2011) and its long-standing experience with collaborative processes (Simonsen et al. 2012). Starting from the belief that users should have a say in the development of technology (Kyng and Ehn 1987), PD strived (and strives) for establishing collaborative design processes involving diverse stakeholders, developing tools, techniques and theories to support users cooperation with professional designers (Kyng 1998). More recently, the PD community started to address social issues by getting involved in public arenas (Björgvinsson et al. 2010, Halse et al. 2010); and D4SI has recognized how PD knowledge about collaborative

processes could be valuable in fostering social innovation (Manzini et al. 2010).

Involving diverse stakeholders can play a role when it comes to the impact of the design process. As underlined by Fuad-Luke (2008), design activism has historically had a significant influence on the design world, but a negligible influence on a broader social level. In this sense, D4SI, similarly to PD, sees in participation in design processes the possibility of moving beyond traditional critique towards a notion of critique based on the construction of possible alternatives. Involving diverse stakeholders in collective design processes and empowering grass-root initiatives are looked upon as possibilities to scale and diffuse promising initiatives promoting change on a large scale (Jegou et al. 2008, Meroni 2007).

D4SI is also opening the possibility to redefine the role of design and to emancipate it from mass production and consumption. Historically, design activism practices (Fuad-Luke 2008) represented isolated and fortuitous occasions where individuals or small groups of practitioners had the chance of being a designer outside the mass-production realm, often, retiring themselves in academia or arts from where they have done a great job in revealing issues and controversies in the design field. The program of D4SI is more ambitious: it proposes to establish a new role for the designer as a catalyst of collective design actions aimed at exploring alternative futures, opening for a new way of practising and understanding the profession of being a designer.

In order to discuss what this practice could be about, the paper introduces an analogy between D4SI and Compositionism (Latour 2010), arguing that D4SI can be considered an attempt of *composing together*.

Latour's (2010) *An Attempt at a "Compositionist Manifesto"* was written after the 2009 climate meeting in Copenhagen when, once again, the limits of traditional politics in facing climate change emerged. In suggesting how to deal with environmental issues, Latour (2010) proposes to move beyond traditional critique through Compositionism. Particularly, he is formulating an approach that is not too much concerned with revealing cracks and limits, but rather it focuses on the construction of alternative practices and discourses.

Latour recognizes how, historically, "*critique did a wonderful job of debunking prejudices, enlightening nations, and prodding minds, (...) generating an immense source of productive energy that in a few centuries reshaped the face of the Earth*" (Latour 2010: 474). However, eventually, *critique ran out of steam* (Latour 2004) because in distancing itself from the world to get an objective perspective on facts, it missed to notice that "*Reality is not defined by matters of fact. Matters of fact are not all that is given in experience. Matters of fact are only very partial and, I would argue, very polemical, very political renderings of matters of concern*" (Latour 2004:232).

In the present situation, in the light of an environmental, economic and political crisis (Castells et al. 2012), to exert critique could sound as a call to nihilism (Latour 2010). In being at the end of history with no alternatives, the emerging malfunctions of neoliberalism are dramatically revealing that we might have no future. In this scenario, critique is unable to generate the necessary energy to provoke change, and it ends up *poking holes in delusion* (Latour 2010).

The *An Attempt at a "Compositionist Manifesto"* refers explicitly to Marx' work. Particularly, it seems to build on the conviction that "*the philosophers have only interpreted the world, in various ways; the point is to change it.*" (Marx 1848). Latour's argument is that reaching change implies involvement in the construction of alternatives. Compositionism is a way of tentatively explore and prototype diverse activities, practices and discourses and understand how they could become *prospects*, challenging future-as-usual and open for new possibilities.

What Latour proposes is to shift from *progress* to *progression*: from an inexorable unidirectional march towards future-as-usual to an exploratory and suggestive progression where different future *prospects* are tried out: "*While critics still believe that there is too much belief and too many things standing in the way of reality, compositionists believe that there are enough ruins and that everything has to be reassembled piece by piece*" (Latour 2010: 475).

Instead of explaining away the world, Latour calls for engagement with humans, objects and technologies (actants) to compose, construct, compromise and even compost future *prospects*. An engagement that acknowledges how each actant, being human or non-human, carries its own agendas and has an active role in shaping the present situation but also possible future *prospects*. *Composing together* aims at generating *things* (Latour 2004), socio-materials gatherings where human and non-human actors are brought together. "*A thing is, in one sense, an object out there and, in another sense, an issue very much in there, at any rate, a gathering. To use the term I introduced earlier now more precisely, the same word thing designates matters of fact and matters of concern*" (Latour 2004:233).

Compositionism should not be mistaken for being acritical, but is an attempt of moving beyond critique that still requires the ability of having a critical mind and carefully understand how *things* are composed and how they flick between being facts and being issues. Working with *things* requires you to recognize and be aware of the connections and tensions that hold reality together, trying to understand how they could be effected. In composing, the focus is not on the construction per se, but on how the process does or does not affect actants' relationships and agendas. On the contrary, if the focus is more on having a functional composition, the risk is to end up in *tinkering*;

assembling not towards alternative *prospects* but rather towards future-as-usual.

What Compositionism is proposing for critique resembles what D4SI is trying to do with socially and politically engaged design: an attempt of moving beyond exert critique to rather work collectively towards the experimentation of alternative practices of living and working. As mentioned above, D4SI is exploring how design approaches could support collective efforts to compose future *prospects* for sustainable living, involving diverse stakeholders in the society. It is moving from raising awareness about specific issues to rather support collective prototypes about possible sustainable futures.

Latour underlines how composing is a matter of togetherness “*it is time to compose—in all the meanings of the word, including to compose with, that is to compromise, to care, to move slowly, with caution and precaution*” (Latour 2010:478). Togetherness plays a central role in D4SI: it often requires the creation of new alliances and relationships between stakeholders from diverse sectors (Jegou et al 2008), but it is also a matter of empowering bottom-up initiatives, developing ways to support other stakeholders’ design activities (Björgvinsson et al. 2012, Jegou et al. 2008, Meroni 2007).

Considering D4SI as a way of *composing together* sheds new light on this emerging field. It values prototyping as a key approach to explore alternative possibilities; it underlines how making things (together) – being artefacts, services, scenarios – allows to experiment with new alliances that can move us away from future-as-usual. However, some shades are also emerging from being practically engaged in *composing together*, such as designers’ inability of dealing with togetherness, as well as their lack of implementation and management skills. Another issue is related to the role of designer in *composing together*. Finally, the dilemma of understanding if we are *composing* or *tinkering*: are we really building *things*, or are we just playing safe with future-as-usual? These issues are further discussed using some insights from the author’s involvement as a design researcher in the setting up and running of STPLN, a maker-space for opening production.

STPLN, A SPACE FOR OPENING PRODUCTION

It is a usual Thursday evening in the STPLN basement: the laser-cutter is running at full speed, cutting out a wood shell for the arcade game that Marcus and Niklas are building. Sitting at the table, Davey is building a wood wristwatch and discussing with a guy who needs help to develop a software. On the sofa, some guys are coding, or maybe they are drawing something to cut out with the laser-cutter? In the Textile Department, two women are knitting, having biscuits and tea. A lot of bicycles are stacked in one corner of the room: they are projects from the Bicycle Kitchen, an open workshop

where people can fix their bikes with the help of volunteers. In the room beside, Carin is fixing the last things before tomorrow’s workshop with a primary school: she is the founder of Återskapa, an atelier where cast-over materials from industrial production are used to explore with children their creativity and teach them about sustainability. In the opposite corner of the same room, behind a curtain, some guys are setting up the textile printing workshop, bringing in materials and paints, checking out the frames for screen printing. Upstairs everything is quiet now, but few hours ago the co-working facility was busy as usual and in the kitchen a catering company was cleaning after the conference in the concert room.

STPLN is a 2000 sqm venue owned by the city of Malmö. It was opened in April 2011, becoming an arena where people can experiment with diverse kinds of production: from repairing bikes to staging new formats for music concerts, from building robots to trying out new educational formats.

The space is managed by the NGO STPLN that has a long experience in working with culture production in a broad sense. The role of the research centre I belong to was to set up and manage the workshop in the basement in collaboration with the NGO. When it comes to my role, I have been involved in diverse activities: from setting up events and workshops about making to experimenting with urban gardening, from using prototyping as a tool for coaching to being actively involved in the development of the cast-over materials bank. These activities have been often carried out as a collaborative effort between several stakeholders and with a long-term perspective.

STPLN is a maker-space, a platform where people and individuals can access tools and share resources to engage in production processes, trying out how to move from being a consumer to becoming a producer. In STPLN, diverse practices and activities are interweaving: from amateur do-it-yourself, to professional educational services; from small-scale production with commercial aims, to artistic explorations of materials and technologies.

Maker-spaces, together with other physical infrastructures such as FabLabs and Hacker-spaces, represent a growing phenomenon that is offering to small companies, freelancers, students, artists and amateurs the possibility of opening physical production processes.

The expression “opening production” accounts for all emerging practices that are experimenting with the way in which production is understood and organized, blurring the distinction between producers and consumers, focusing on social values rather than economical ones, reconstructing local supply chains. These practices are cutting across diverse realms: from software and ICT sector, with open-source and commons-based P2P production (Benkler 2006, Bauwens 2009), to the food sector, with civic

agriculture (Lyson 2004), from manufacturing, with the rise of crafts and do-it-yourself practices (Anderson 2012), to the media field, with platforms supporting collaborative production between users (Löwgren et al. forthcoming).

The opening of production is not a coherent movement. Nevertheless, there are shared traits that characterize these *opening production* practices, e.g., the challenging of the distinction between producer and consumer in creating new models in which the two roles overlap and sometimes merge. Moreover, if compared with capitalist and mass-production processes, these practices are often aiming at the generation of multiple values: use value, but also social and human capital. When it comes to social innovation, these practices are looked upon as promising attempts for the establishment of a local-based and on-demand production systems that, by valuing small-scale and artisan production, could become a more social and environmentally sustainable way of generating goods and services (Anderson 2012). Opening production gathers diverse practices that are experimenting with the possibility to compose processes outside (or on the side of) the capitalist and mass-production model.

STPLN represents a space to explore how production could be opened in the specific context of the city of Malmö. What practices can emerge? Which needs are fulfilled? Who is participating? Above all, how is it possible to *compose together prospects* about production, and how can design contribute?



Figure 1: Activities in STPLN basement workshop

REFLECTING ON COMPOSING TOGETHER STPLN

THE CHALLENGE OF TOGETHERNESS: FROM COMPOSITION TO COMPOSING

The expression *composing together* stresses the role of collective actions in generating *prospects*. Togetherness is considered a central element in social innovation, which often emerges from encounters between established organizations and grass-root initiatives (Murray et al. 2010) and entails the creation of new alliances and relationships between diverse sectors (Phills et al. 2008). D4SI has developed the idea of

designing networks, collectives where diverse stakeholders are brought together and entangled in co-design activities (Manzini et al. 2008). Similarly, *transformation design* underlines the importance of participatory approaches for developing social innovation (Burns et al. 2006). Togetherness also implies a shift in the role of the designer: from being the driver of the design action to becoming the enabler and supporter of others' composing activities (Burns et al. 2006, Manzini et al. 2008, Meroni 2007).

However, D4SI lacks hands-on insights discussing the difficulties and challenges of togetherness. What does it take to bring actors together? How is it possible to *compose together*? The work with STPLN has been rewarding, providing insights about how complex (but also surprising) togetherness can be (Seravalli 2012b, 2013). The experience with STPLN has generated two outcomes in terms of togetherness: the first one related to a particular understanding of the collective action in D4SI; the second one regarding the role of the designer in *composing together*.

In framing togetherness (and its difficulties), a great contribution comes from PD, which offers a wide range of approaches and frameworks to understand and deal with collective processes (Simonsen et al. 2012). This knowledge has been extremely helpful in making sense of and navigating what happened at STPLN (Seravalli 2012b, 2013). One of the main learnings that D4SI could embrace from PD is the one of design as a situated practice (Suchman 1987), where human specificities play a central role in shaping practices and results. In dealing with togetherness, it is important to remember that to support the collective design action, the focus should be neither "*the method (n) or the designer but the designer using the method(...)*" (Light, Akama 2012: 61). In this perspective the outcome of a design action depends on the interaction between the designer, the method and the specific actants involved (being both human or non-human). In *composing together*, a particular emphasis should be put in understanding the specificities of the collective that is brought together. Designers willing to work with social innovation should be able to embrace the specificities of the collective they are involved in (e.g. agendas, possible conflicts, personalities) and develop a particular sensibility in deciding which approaches can be used to foster and navigate togetherness. For example, in the initial phases of STPLN, traditional design strategies for togetherness (such as workshops) have been unable to foster a collective design action, while working on a tactical mode with prototyping, small-scale interventions, and long-term engagement encouraged the emergence of a specific form of togetherness based on making (Seravalli 2012a, 2012b, 2013).

When it comes to the designer's role in making together, D4SI proposes the idea of the designer as a facilitator or enabler of social innovation initiatives. The involvement in STPLN opens for a different

understanding, where the designer brings its competences in the composing but does not necessary lead it.

As a designer, embracing the idea that STPLN was collectively built has meant to leave the ownership of the design agenda, moving from a strategic to a tactical design mode. Rather than starting from specific ideas about which activities should happen in the space, I tried to be more open to support what was emerging: navigating the diverse initiatives and hooking up with the ones close to my agenda. This has been difficult but it has also revealed how *composing together* is often about compromising (Latour 2010) and how, as a designer, you have to stop designing and understand how to support others' design activities.

This requires gaining a different role. PD has developed knowledge about how to support others' design processes, but there is little discussion about what it takes to gain that role. In STPLN, it has been a matter of building trust and understanding what exactly I could offer to the other participants. In establishing a long-term collaboration with the cast-off material bank, it has been important to use my industrial design skills and knowledge about sustainability to make evident how I could contribute to the project. Time passing, mutual trust has grown, creating the possibility to extend the collaboration to other aspects of the project (such as possible business strategies, formats and content for the workshops).

However, trust is not enough, as it emerges from the collaboration with the NGO running STPLN. I always wanted to work with service design aspects of the maker-space, such as how to organize access to the space and how to engage users in its everyday management. I had the chance to give suggestions about possible strategies and solutions regarding these topics; however, it has not been possible to get the same space for experimentation that I gained in Återskapa, the cast-off material bank. A possible reason is, that, while with Återskapa the collaboration is built on offering competences that are missing (e.g. industrial design), with the NGO what I would like to offer overlaps with competences that are already in place. Moreover, my involvement in the management of the space could lead to issues when it comes to defining ownership and roles.



Figure 2: Workshops with Återskapa

These experiences have also highlighted how being a facilitator could not be the most appropriate role for a designer involved in social innovation. In these three years, I had to face the frustration of lacking skills and competences for having that role: one thing is to facilitate a design workshop about visions and scenarios, a totally different one is to cope with issues related to implementation and everyday management of a maker-space. On the other hand, I could see how my skills related to making and "*not being afraid to try out things*" (as Carin from Återskapa framed once prototyping) are considered much more valuable. It is difficult to define exactly which role I have in the *composing together* at STPLN. It is not the one of the facilitator or enabler, but rather it seems to be more related to the ability of navigating the diverse agendas looking for possible connections and having the skills (and some material resources) for trying out activities together with others.

The experience of STPLN shows the need in D4SI to move the discourse from *compositions* to *composing*, from visions and hopes to actual insights from being involved in social innovation activities, to understand how composing is performed and what kind of competencies are needed to work with it. Similar issues have already been brought up in the field of D4SI. The former director of Young Foundation (a leading organization for social innovation) highlighted how designers are often lacking skills in the implementation phase, when it comes to organizing resources and people (Mulgan 2009). A similar critique has been raised by the design studio *Inwithfor* that has worked with D4SI for a long time. They underline the need to move from concepts and prototypes to developing and spreading robust theories of change (Schulman 2009).

COMPOSING OR TINKERING?

In understanding D4SI as *composing together*, a fundamental question relates to how to assess what we are doing, this to understand if we are *composing* or just *tinkering*, i.e., if we are creating *prospects* or just playing safe towards future-as-usual. This is a central issue in both conceptual and practical terms.

In conceptual terms, it is important to embrace how, going beyond critique does not imply to suspend critical mind, quite the contrary. D4SI has been criticised for not considering the political aspects of its actions (Tonkinwise 2010). This risk has emerged in a quite evident way in the discussion about designers' engagement in the implementation of Big Society policy in England, where the development of community-based public services seems to be not an attempt of composing but rather a progressive withdrawal of the State from delivering public services (Tonkinwise 2010). Similar discussions can also be found in the opening of production, for example, in open software and hardware fields, where it is discussed if open-source approaches represent a possible seed for alternative

production, or if they have already been totally co-opted by market forces (Bauwens 2009).

When it comes to practical terms, the line between *composing* and *tinkering* may be blurred. A possible way to navigate this is to consider how *things* travel, i.e., who and what is involved in the composition, as suggested by Latour (2010). *Composing together* aims at generating *things*, which are both matters of facts and matters of concern. In trying to understand if we are generating alternative *prospects*, or if we are just *tinkering* with future-as-usual, it is important to consider how *things* may or may not travel. This idea can be explained by looking at how STPLN worked both as matter of fact and a matter of concern in relation to economic growth.

My participation in STPLN was made possible through a research project financed by EU structural funds aimed at fostering economic growth and innovation. The project involved a consortium of diverse actors: a research centre (to which I belong to), a media cluster, and regional departments. In this constellation, the role of my organization was to set up three Living Labs that were supposed to work as pre-incubators from which new entrepreneurial activities, products and services should emerge (more information on format and aims of the Malmö Living Labs can be found in Björgvinsson et al. 2010).

One of these labs was the workshop in STPLN basement. Since its opening, the lab has been criticized from other project partners due to the fact that it was not delivering enough companies and jobs, which were two of the project evaluation parameters. This led to the decision, a few months after its opening, to re-allocate the remaining resources for the creation of a new prototyping lab that could contribute more directly to economic growth and innovation by engaging big players in the region.

This unfolding can be used to argue why it is difficult to judge if we are *composing* or *tinkering*, since *things* flick between *facts* and *concerns*.



Figure 3: Fixing bikes at STPLN

One of the reasons why the STPLN lab is considered a failure resides in its inability of delivering companies and jobs. At the same time, it is possible to see how the space is contributing to economic growth. Beside the fact that some companies have been actually developing in the space, other interesting “*facts*” emerged. Such as the participant that by starting tinkering around with electronics decided to take courses at university to improve his education; or the number of long-term unemployed people that is regularly coming to the space and eventually being enrolled for internships there. Other facts are related to the practices of repairing and reusing, which, besides reducing costs and saving materials (like the ones going on in the Bicycle Kitchen), sometimes are even leading to new entrepreneurial activities (like it happened with the material bank). It is also a matter of socializing and getting to know new people that, for example, are attracting in the space a number of creative workers looking for possibilities to enlarge their professional networks. These facts may lie at the margins of the economic growth discourse but it is easy to argue how they contribute to it. At the same time they are issues questioning and enlarging the understanding of production: is it necessary just carried out only by companies? What if it allows unemployed people to “get back on tracks”? What if it becomes a way to create social bonds and improve people skills? What if it results in recycling and repairing rather than consumption?

These questions are showing how STPLN is generating *things* that are opening for a wider understanding of what production is good for and that could lead to *prospects*. However, at the same time, STPLN is failing

in terms of composing, since “*the facts*” emerging in the space have not been recognized as such by the local actors working within the economic growth discourse. The decision to invest in the new prototyping lab is not bad per se, but it partially shuts down the possibility for STPLN of being a composition, since, the withdraw of the media cluster and the economic development agency from the composition, might relegate the space in a position (being a facility for leisure activities and cultural artistic explorations) which puts it back in the prospective of future-as-usual.

This story exemplifies how difficult it is to keep compositions ongoing and make *things* travel. If the *things* emerging from STPLN are not accountable in an economic growth discourse, they cannot involve actors related with that issues and this limits their possibility of becoming *prospects*.



Figure 4: One of STPLN companies

However this is a complex point, since even too much travelling can lead to *tinkering*. A meaningful example can be found in the opening of production, where free-software was renamed as open-source software, in order to make this model acceptable by the business community (Benkler 2006). This shift implied that some of the political agendas were left behind, but on the other side it opened the possibility for the open-source models to travel further. Peer-to-peer and sharing-based models are spreading in diverse realms, inspiring new ways of organizing production. Of course, it can be argued how giving up “free” for “open-source” was a way to make these models appealing to the market, but it has also created the opportunity for them to travel and inspire, for example, new models for delivering public services (Botero et al 2012). Making STPLN accountable in an economic growth prospective would allow the maker-space to travel further and create the possibility of opening for *prospects* in the future-as-usual of production. This certainly would imply that some ideas and ways of working in STPLN could be used to keep progress ongoing, but at the same time they would hopefully spread and support the generation of new *prospects*.

Trying to understand if we are *composing* or *tinkering* implies to be aware of how *prospects* can become futures. What emerges from the STPLN experience is that, for travelling further, compositions need to become

accountable in diverse discourses and this requires to care about who and what is involved in the composition.



Figure 5: Making curtains at STPLN

CONCLUSIONS

The paper tries to contribute to D4SI by introducing the idea of *composing together* to reflect on the long-term involvement in a social innovation experiment.

D4SI can be understood as a way of *composing together*, as an attempt of moving beyond being critical and rather engaging directly in the collective creation of possible alternative future *prospects*. *Composing together* aims at generating *things*, gatherings of human and non-human actors where practices and relationships can be explored.

This perspective reinforces a possible role for design in the generation of alternative practices for sustainable living and working, however, it also highlights criticalities as it emerges from the author’s involvement with STPLN, a maker-space in the city of Malmö. Particularly from this experience two issues are brought up.

The first one relates to the need of moving the attention from compositions to composing, from visions and hopes to a better understanding of the practice of D4SI. From STPLN it emerges how *composing together* is a situated practice that depends on the context specific situation. As a consequence, designers need to develop not only approaches to deal with togetherness, but also the ability to understand the specific setting they are involved in. Moreover, some reflections on the role of the designer in *composing together* are made, discussing how the task of enabler may not be the most appropriate one.

The second issue is related to the difference between *composing* and *tinkering*, or how to assess D4SI work. Particularly, from the STPLN experience, it emerges how, in *composing together*, it is important to reflect about how *things* travel further, that entails to consider how *things* flicks between *facts* and *concerns* and who and what is involved in the composing.

Considering D4SI as a way of moving beyond critique towards *composing together* represents a bold statement that is far from being proved. However, introducing this perspective gives the opportunity to discuss more in detail the actual practice and challenges of D4SI.

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OPEN WEARABLES: CRAFTING FASHION-TECH

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ABSTRACT

This paper investigates the role of the designer in the “opening” of culture in fashion and technology. In particular it explores the convergence of “open practices” at the vanguard of technologies and fabrication processes found in the history of Modernist fashion, as well as recent popular uses of rapid prototyping technologies, engineering, and more specifically wearables design practices.

1. INTRODUCTION

Two narratives that contextualize the relationship between open culture, technology, and the history of fashion are proposed in this paper.

The first narrative is rooted in turn-of-the-century Paris, where the concept and role of the fashion designer was birthed in tandem with unheralded innovations in the manufacturing industry. This transformation changed and challenged our relationship with garments, the changes stemming from shifts in clothing’s cultural capital and the processes associated with their production.

The second narrative stream explores the expanding landscape of current hybrid techno-artistic practices of wearables design and production—a field combining technical know-how from various fields, including engineering, textile innovation, fashion production and sartorial expression. The common thread tying these stories together is found in the increased access to materials, technologies and skill-practices since the modern era. Access to materials, tools, and information figure prominently in the drama of how fashion and technology came to be “opened up” through open design practices.

2. FASHION AND ENGINEERING

Fashion and engineering, as practiced-based disciplines, have more in common than is initially visible. To begin with, both are practices rooted in research and iteration

that participate in a continuum of evolution and constant transformation. The products of fashion and technology are transient, trend-driven, technology-based and irrevocably “of the moment.”

Fashion and technology are also both children of the modern era. Technology and fashion as we know it emerged at the turn of the century as a result of rapid change in material and industrial innovations, social and economic events, and mass-market transportation networks (Entwistle 2000; Lipovetsky 1994).

As cultural products, fashion and technology define and materially embody the times during which they are designed and used. As cultural artifacts, they are beacons of our desires, projected fantasies, hopes and beliefs. Fashion and technology crystallize the contemporary in an ever-unfolding and insatiable process of production. I will also argue that, perhaps due to their fleeting and evanescent nature, the survival and constant re-invention of fashion and technology is deeply entwined with open culture practices in which the sharing of information, techniques and processes are key.

2.1 MODERNISM, SEWING & FASHION

Before 1900, there were no real fashion designers. There were garment makers or seamstresses who gained a reputation by executing the sartorial visions of their clients, making to-order garments based on general stylistic trends or rank (Entwistle 2000; Lipovetsky 1994). However, they did not consider themselves artists or creative individuals. All this changed in Paris at the early turn of the century, when couturiers such as Paul Poiret marketed and crafted identities as “artists,” as opposed to mere “makers.” It was Poiret who, in 1904, pronounced himself a fashion “designer,” claiming the position of style arbitrator (Troy 2003; White 1973; Wilson 1985). Having worked at the House of Worth (1900-1904), Poiret was the first to align his craft with artistic practices such as Modern painting and sculpture that were coming to the fore in Paris and Europe at the time. In this climate of economic affluence, rapid social change and artistic dynamism, Poiret cast himself as a fashion innovator, gaining international influence and markets across Europe and America (Troy 2003). Within his active career (1903-1929), Poiret was dubbed “The King of Fashion” and

“Le Magnifique.” He was prolifically active in fashion, perfume, film and theatre costumes, and fashion training schools, as well as the international trunk shows that brought him to America numerous times. At peak of his influence, Poiret’s styles and opinions made numerous news headlines and transformed the ways in which his clients and society at large viewed fashion’s role in society (White 1973).

2.2 PARIS AND FASHION

Not coincidentally, the upgrading of the garment “maker” to that of a “designer” and “artist” arrived at a time of great technological and material transformation that affected the social and tangible make-up of everyday life (Berman 1988; Kern 1991). At the turn of the century, numerous technological changes transformed the social sphere, including the proliferation of transportation channels—from trains and automobiles to steam-powered ships—that facilitated the exchange of ideas, styles and social groups across a larger geographic area. Also in this time period, city architecture was completely transformed. Baron Georges-Eugène Haussmann re-tooled the Parisian cityscape, adding wide boulevards, street lights and clean, safe paved streets and alleys; these developments changed the way that the city was used and by whom. The modern city’s infrastructure of boulevards, civic parks and interior shopping arcades encouraged greater urban mobility, especially among the women who could now walk through the city safely, without social stigma.

These changes in transportation and urban design—along with an increase in economic prosperity and leisure time on the part of a growing middle class—contributed to the increased importance of personal sartorial expression, as well as the exploration of fashion innovation and variety (Entwistle 2000; Lehmann 2000). The modern era built a need for individuals to be seen as being personally expressive, combined with a desire to display newly acquired wealth, social standing and stylistic “savoir faire.” During this same modernist era were cemented the legacies of today’s major Parisian couture houses. Many now-ubiquitous couture labels had humble beginnings as “makers.” These artisans and craft-focused ateliers later evolved into significant style arbitrators and international economic powerhouses. Louis Vuitton, for example, was known as a luggage maker who dabbled in doll clothes up until the mid-twentieth century. Coco Chanel, the revolutionary designer who introduced “poor” materials and sportswear cuts to fashion, worked primarily as a seamstress until the First World War. However, it was Poiret who daringly embarked on a journey of making fashion fashionable for its own sake. Influenced by the bohemian scene of artists living in Paris at that time, Poiret is known for having done away with corsets and embraced Oriental themes and textiles; he was also influential in introducing the public to works of contemporary artists such as Raoul Dufy, featured in the couturier’s textile designs, party

invitations and set designs for fashion shows. In fact, Poiret is one of the inventors of today’s runway performance. Heavily inspired by theatre work, he mounted theatrical showcases of his fashion designs on custom stages in his couture house as well as department stores such as Gimbels in New York City (Troy 2003).

2.3 TRADEMARKS AND LOGOS

By all accounts, Poiret was very media savvy for his era. He took every opportunity to promote his name and brand. When he discovered that his designs were being forged in America and at home, he became president of La Chambre Syndicale de la Couture, laying the groundwork to protect intellectual property design in fashion. Many other growing couture houses were also becoming more and more invested in protecting their brand. This legalistic push to protect the integrity of creative elements, until then unseen in the garment industry, led to the creation of logo copyrights as seen today. To this day it is logos and trademarks that are prominently protected, much more than the aesthetic cut or style of a garment or accessory, though there have been recent cases to the contrary, such as Christian Louboutin trying to protect his famous red under heel.

2.4 PATTERN-MAKING AND DISTRIBUTION



Figure 1: Paul Poiret advertisement 1912.

The rise of the “designer” occurs, interestingly, in parallel with both the proliferation of home sewing machines and an increased access to products such as textiles imported from various parts of the world, giving everyday “makers” an opportunity to craft their own design (Breward & Evans 2005). This meant an increase in makers, as well as access to the tools to make things at a higher level of quality and customization. Therefore, it wasn’t only the logos by Poiret (and other designers) that were being copied. In fact, professional seamstresses and store manufacturers were reproducing

entire styles and patterns—sometimes as legal and “official” copies. For Poiret and his contemporaries, a more radical approach had to be taken to protect the “intellectual property” of their designs and their status as “designers.” The pirating of patterns occurred especially in America where Parisian styles were all the rage, and Poiret was considered the City of Light’s reigning monarch. In an effort to stave off imitators, Poiret created one of the first official designer “patterns,” sold and “authenticated” as an original “Paul Poiret” design. Although it was intended to protect the integrity of the designer, what Poiret had in fact inaugurated was the democratization of fashion as seen in designer patterns today from Vogue to McCalls. Instead of authenticating his products through their origins (made in his Paris atelier) or their logo, these patterns placed value on the design of the product, rather than the product itself. The design as opposed to the origin of making was most valued. Poiret can also be credited, via his proliferation of patterns, as the first populist DIY promoter of fashion, though he may not have thought of it this way.

3. OPEN DESIGN AND WEARABLES

The exciting ramifications of such a shift in thinking about fashion creativity, from a finished object to one which may be executed and potentially customized by others, inspired the values also at the heart of the avant-garde open design culture blossoming today. Design kits and DIY templates executed by individuals factor in and inevitably celebrate the vagrancies of different styles of interpretation, material choices, tool-exploration and end results. Fashion patterns, along with numerous kits from multiple industries, became popularized at the start of the 20th century. One could order kits, instructions and materials to build such things from homes to radios, from socks to furniture. These original templates form the core of open culture thinking today, a revival of pre-post industrialism and craft engagement as described by Sennet (Sennet 2008). According to Andersen and Gershenfeld, we are presently facing a new kind of post-industrial revolution of “making,” enabling individuals to enter the chain of production on a small and personal scale (Andersen 2012; Gershenfeld 2005).

Wearables, the result of the admixture of fashion and electronics, are closely aligned with the growing movement of open design practices and access to technology. Wearables has greatly benefited from a belief that the field has the potential to amalgamate contributions from many individuals and practices coming from the fields of engineering, electro-mechanical industries, textiles and fashion field. As well, the field of wearables and fashion-tech would not be where it is today without immense contributions by people working in electronics, craft, hobbyist and other forms of admixtures of tech-design experimentation that are increasingly open-sourced and available via networks such as the Web. In this section I want to highlight how current innovation in wearables is a

natural evolution of open design practices stemming from innovation and re-thinking in modern fashion, art and technological popularization.

3.1 MATERIALS

The field of wearables would not be where it is today without the belief that artists and designers had something to contribute to technology. Coined in 1991 by Steve Mann at MIT, “wearables” as fashion tech has principally been a door through which the material experimentation of electronics could be elaborated in design contexts, often related to the body, as this is the site of technological exploration for wearables. Books such as “Physical Computing” by Tom Igoe from New York University’s Interactive Telecommunications Program revolutionized the language of electronics, making it accessible to a whole new set of actors with art backgrounds and hacker mentalities (Igoe & O’Sullivan 2004). In Canada, robotics pioneer Norm White at OCAD schooled computational innovators such as David Rokeby, forever changing the landscape of media arts practices from users of tools (such as video cameras) to makers of tools (such as circuits and programming languages).

Closer to the field of wearables, Leah Buechley developed the LilyPad Arduino platform, the first instance of adapting electronics for wearables. From an engineering perspective, Arduino is like a cake mix for arts electronics, bringing all essential ingredients together and simplifying the language. Since then, other companies such as Adafruit’s Flora, Aniomagic and SparkFun have expanded the repertoire and accessibility of materials and technologies offered to users, making it even easier to customize electronics effects. Furthermore, “prêt-à-faire” (ready to make) DIY practices in fashion—incorporating the new production technologies of digital textile printers, 3D printing, and laser cut patterns—are being seen all over the runways, heralding a new way of conceiving of how to dress the body. In less than 10 years, we have seen the material landscape of wearable technologies not only expand but become dynamically accessible, affordable, and full of potential for creative “designerly” (as opposed to thinking that only engineering matters) results.

3.2 ACCESS = KNOWLEDGE + TOOLS

Open design practices flourish with access to knowledge and tools—this means placing not only materials and tools within easy reach, but the practices, methods and knowledge that give ready hands access to creative solutions. There are two prominent areas of access: the first is through publishing, formerly the Diderot’s Encyclopédie, now encountered in the everyday as how-to manuals, guide-books, and increasingly the Internet with its wealth of photo and video tutorials. Books such as Sabine Seymour’s “Fashionable Technology” and “Functional Aesthetics,” Syuzi Pakchyan’s “FashioningTech,” the collaborative “Open Softwear,” and Otto von Busch’s hacking couture guidebook “Becoming Fashion-able” have

proven important in bringing wearables to an audience of novices. Furthermore, sites such as Instructables and Craft, FashioningTech, and Etsy feature a wide range of technology, craft-based tutorials and ideas for materials, methods, providing inspiration and a community to share it with.

Other websites such as Thingiverse share files for the emerging practices of 3D printing and other forms of machine-tooled and 3-dimensional object making. Tangible meeting and working sites and fabrication laboratories (or FabLabs), such as ProtoSpace (Utrecht, Netherlands) and Open Design City (Berlin) as well as labs such as V2_ (Rotterdam) have made a significant change in the availability of access to machines such as 3D printers and laser cutters, as well as bringing individuals into contact with a community of technical and computational experts. Of course, festivals, fairs and events such as MakerFaire, SIGGRAPH, SXSW, Transmediale, FutureEverything and ISEA provide great opportunities to share knowledge and skills and meet the actors involved in the global shift of sharing design expertise. In short, the design, art and technical world is producing an increasing number of nodes of information, sharing, encounters, testing, advice and hands-on material making.

3.3 SOCIAL ADAPTATION = MADE 4 U

Another area of interest is how remote and online platforms are proposing ways for designers and consumers to collaborate in creating open designs. Using as a template the pattern adjustments and choices of textiles or embellishments that sewing patterns provide, online and rapid prototyping technologies offer new opportunities for social adaptations. Customization and user-input platforms invite experts and novices alike to reproduce, modify, improve, customize, and be inspired by the work of others. This type of network and platform fosters co-creation, and “personal design nodes” where the shape and making of design can be seamlessly personalized and adapted to use or aesthetic preference. It is both about the personal and the collective in as much as it solicits input from individuals for their needs and desires while also keeping the practice and knowledge open-ended enough for collective contributions and specializations over time.

Products such as the user-generated, nature-inspired jewellery by Nervous System and Shapeways propose new and exciting design collaborations where the results unfold unexpectedly. From within fashion, companies such as Unitestyles propose platforms to customize their designs, while the über-rarefied Maison Martin Margiela has been inviting users since 2004 to adapt unfinished designs to their liking and post them online. Finally, computational couture mavens such as May Huang propose 3D algorithmic designs, which are also user-generated. These online platforms offer a way in which the consumer may become part of the design process—an invitation which can at times be daunting, yet exciting. Even in the event of a design failure, the

consumer can better appreciate the importance of design and the power of networked and rapid prototyping technologies in making ideas tangible. These kinds of open access platforms have been thoroughly explored and documented at Amsterdam’s Open Design Lab of the Waag Society where designers are encouraged to create “open” design for commerce (Able, Evers, Klaassen & Troxler (Eds.) 2011).

3.4 UNZIPPING WEARABLE FASHION



Figure 2: Pauline van Dongen, Morphogenesis Shoe, 2011.

Open design materials, knowledge and tools, as previously mentioned, have democratized and ‘unzipped’ wearables practice. Increasingly fashion-tech is making use of an increasing complex array of engineering and computational skills, sartorial knowhow and material experimentation, making the design studio more akin to a laboratory producing new aesthetics and technologies to transform the body. What were previously craft or technical-only niche groups are becoming increasingly mainstream—yet independent—hybrid tech-fashion design studios. The factory is no longer over “there” but rather down the street, or in our living rooms. Access to high-tech tools and experts is ‘industrializing’ the practice of small scale designers, giving them more options to professionalize their craft through access to custom circuits, 3D printing, laser cutting, etc. These technical networks, both local and networked, help shape the hybridization of the wearables field by giving designers access to

specialized knowledge and tools, resulting in the expansion of their material repertoire and craft expressiveness.

Increasingly, fashion is playing an important role in communicating who we are— from the personal to the global—as it did at the turn of the 20th century (Barnard 2002). Fashion designers are regularly pushing the material envelope of what our sartorial choices can say about us. Contemporary designers such as Dutch Pauline van Dongen have collaborated with 3D printing companies like Freedom of Creation to create 3D printed shoes, while Iris van Herpen, also Dutch, has created entire garments out of 3D printing technologies. Anouk Wipprecht has collaborated with wearable art labs such as V2_ to develop interactive garments that paint themselves, become transparent or are made of a cloud of smoke. These garment designs, though speculative for the moment, are forging a new material vision of what our garments can be and how they might convey who we are in a dynamic technological fashion world.

Meanwhile, other aspects of wearables are forging emerging tangible interfaces for technologies to be embedded in garments in a very concrete way. Diffus, a Danish design studio, has paired with Swiss lace company Forster-Rhoner to develop working prototypes in wearables that piggyback on century old know-how in lace making. Together they have fabricated solar-powered embroidered handbags that combine embellishment with functionality. Moon Berlin, a Berlin fashion label exploiting light in their designs, have collaborated with the Fraunhofer IZM, an internationally reputable institution for the testing of technologies, to incorporate state-of-the-art stretchable circuits into their bespoke designs. All of these wearable designers are tapping into expertise and tools that are distributed on an increasingly collaborative scale. This is in part due to the many technical (garment, design, textile, electronics) types of expertise needed to create aesthetically and technically successful wearables. These are just a few of the examples of design and tech industries coming together to explore the potential of wearables. Often the collaborations are open exchanges, birthed out of necessity, stemming from this increasingly high-tech, hybrid, networked cottage/professional industry in which fashion innovation and electronics developments converge in professional yet highly craft-focused fashion-technology collaborations. Though the overlaps in knowledge fields of wearables at times come from divergent technical/artistic fields and economies, there is a desire for “sharing becoming a default standard,” as noted in the Creative Commons’ recent anthology of interviews *The Power of Open*. This is a revolutionary moment for wearables and 3D objects—similar to the paradigm shift that occurred in the 2D world of desktop publishing in 1985—which we should embrace, share, contribute to and protect via Open Design philosophies and practices.

4. 3ELECTROMODE



Figure 3: 3Electromode, “Future Matter” 2012.

4.1 DIY KITS

I want to take this opportunity to speak about my own involvement in open design, via the 3Electromode platform. 3Electromode has a vision to innovate in the field of wearables by combining technology with customizable prêt-a-porter fashion. As a small group of practitioners working in the field of fashion and technology, we aim to inspire a future where wearables are democratized and aestheticized. We are interested in developing accessible wearables combining DIY technology with current fashion research and aesthetics. We are fascinated with the potential for technology to create new modalities of interaction between the body and its environment, and are interested in the expressive potential of technology to transform the experience derived from garment use from the poetic to the practical.

4.2 PRÊT-À-PORTER TECH

Key to 3Electromode’s design ethos is the desire to create a library of open sourced fashion designs, which can be easily assembled as kits by anyone with an interest in wearables, electronics or fashion. The kits come complete with the printed garment, the necessary electronics and instructions, taking the guesswork out of electronics assembly while allowing the user to create a customized and fashionable design. Designs are printed

on textile printers on which also include the layout of electronic schematics and sewing directions. The methods for assembling the electronic components of the wearable are integrated into the design and can be visually followed, much like a paint-by-numbers picture, without having to refer to a manual. Each piece is uniquely designed, and comes with customizable options for different print patterns, colours, models and sizes, giving the user-end designer the agency to creating his or her own iteration. Computational variations are also included to modify the LilyPad Arduino program. So far, 3electromode designs have focused on integration of LEDs with various sensors, using the LilyPad Arduino platform for electronic components and programming. 3electromode's kits are a perfect entry point into wearable technology because of their graphic visualization of electronics assembly methods, while also creating the possibility to hand-make uniquely stylish and fashionable garments. In the process of testing out this open design platform, we at 3electromode have been interested in integrating feedback from the user-end designers and welcoming collaborations on the sharing of techniques, designs and applications. Ultimately, while maintaining a stylistic curatorial vision true to 3electromode, we are also interested in seeing how people might hack and interpret our work in an open design fashion.



Figure 4: 3electromode, "Strokes&Dots" 2012.

3electromode as a platform was created for selfish reasons—to create wearables that one could wear in the everyday that have a higher design value component than some of the one-off (and admittedly fashion-starved) productions made in a crafting context. It's really the meeting of the sewing pattern and DIY circuit-design used to create recipes for making fashion that is at the heart of 3electromode. Our designs are somewhere between a prototype for wearables and a way of having engineers discover fashion, or fashionistas discover engineering. 3electromode

articulates itself as a kind of bridge between fashion and technology.



Figure 5: 3electromode, "Strokes&Dots" 2012.

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DESIGNING SUSTAINABLE FUTURES

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ABSTRACT

This paper discusses how future studies and design could enable a more conscious and participatory engagement in our common future. The starting point being that representations of the future are often done in an abstract and quantitative manner, which hinders a broad engagement, and understanding of the implications of the scenarios presented. We discuss how on-going research including experimental design methodologies can be used to make images of the future more concrete and accessible. Finally, we argue, not only for prototyping as a method to make the ungraspable future more concrete, but foremost for a designerly approach to the most important of all stakes - the future.

INTRODUCTION: CREATING DESIRABLE ALTERNATIVES

In its most basic sense the future is one of three time modalities, the past and the present being the other two. According to Western secular philosophy the future does not exist in any other way than in our imagination. This renders the future outside the scope of objective investigation. That the future does not exist implies that it is characterised by openness and surprise but also that it is possible to influence.

Design is profoundly engaged in the future; in how to make tomorrow's everyday life better working, looking, smelling and tasting, more supportive to our bodily needs and the ecological limits of our planet. In short, design is about "how things ought to be" (Simon 1969). To accomplish this, design methods need to be able to cope with an abyss of complexity, contradiction and

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insufficient information (Nelson & Stolterman 2003). As such design can be seen as an archaeology of the future, since it like archaeology of the past, tries to make a coherent image of something we know very little about (Dahlbom et al. 2002)

Being a user-oriented and problem-driven practice, design have tended to focus on developing products and services that are incremental, close in time, familiar and intended for tomorrow rather than the next decades or century. But sometimes, typically in times of large societal challenges, the object of design becomes larger, more speculative and ambitious in scope. The past is filled with such examples, such as the Stockholm exhibition in 1930, where architects and designers created a modernistic, light city infused with dreams of a society with no housing shortage, diseases or dirt.



Figure 1: The restaurant "Paradise" at the Stockholm exhibition 1930

The exhibition and the later book "Acceptera" (Asplund et al. 1931), made a tremendous impact on artists, politicians and academia at the time. It convincingly demonstrated a new way of life and this "functionalism"

soon became the aesthetical language of the large scale Swedish societal reformation project “Folkhemmet” (i.e. “the Peoples home”) for the 20th century. Another and more recent example is how research and development within ICT in the late 1990s was inspired by imaginative scenarios from literature. One example being Mark Weiser’s famous visions of a world infused with computers (Weiser 1991), or Gibson’s “Neuromancer” – a more dystopic but still engaging description of a world of networked computers and digital data called Cyberspace (Gibson 1984). These two examples are very different, but they have in common that they envisioned ideas about the future in such a way that it attracted peoples’ creative powers and channelled their work to a joint goal.

Today we face challenges that are even larger than in the 1930s. While modernisation has brought about great achievements, we know today that the modern society also has severe consequences. Climate change, water stress and biodiversity loss are just a few examples of an on-going environmental and social degradation that must be halted. While many targets and roadmaps are formulated with a timeframe of fifteen, thirty or fifty years, the transition to a more sustainable society needs to start now. The last decade there has been an increased interest on the role of design in sustainable development evident in fields such as product design (Chapman 2005), design for social innovation and sustainability (Manzini & Jegou 2003), interaction design, (Broms et al. 2010), and critical design (Mazé & Redström 2009).

However, in light of the radical and systemic changes needed the typically small-scaled nature of design in which specific products or services are in focus is insufficient. There are a number of reasons to this. Firstly, for such small-scaled experiments, interventions or developments to make a substantial contribution in respect of sustainability they need to be widely disseminated or carried out in such a way that they alter also the larger scale structures of society (Manzini & Rizzo 2011).

Secondly, even if such an up-scaling would be achieved the gains achieved through cleaner production and greener technology are still being outpaced by the increasing volumes of consumption and rebound effects (Stø et al. 2006): “What does it help that airplane engines become 1 percent more fuel efficient if air travel at the same time increases by 5 percent?” (Sanne 2012, author’s translation). In order to counter or avoid rebounds and to achieve a more sustainable consumption it is not as much the products and services as the practices, i.e. what we do and how we do it that must be altered.

Thirdly, and related to both the first and the second point, the focus on products and services alone, or even taking these as the starting point, is problematic also as it fails to take into consideration the complexity of social practices, i.e. the socio-material micro-contexts in which these new products or services are to be fitted.

Only through a successful integration of the new product or service in the everyday life practices of people can a wide dissemination become achieved (Shove & Pantzar 2005).

Fourth, these new products, services and practices also need to be integrated into a bigger picture vision of what a sustainable society could be. A vision in which sustainability is seen not as a vague ‘something better’ but as a clearly defined level of resource use and environmental impacts that is within the carrying capacity of Earth.

However, imagining how a sustainable society could look like and how to get there can be hard. Partly because present structures and trends can appear almost impossible to alter – how will we ever be able to break out of this consumption bonanza? Partly because a sustainable future can appear so dull – no holiday trips to Barcelona, no fancy apartments, no basmati rice? One reason to why a sustainable future might seem dull is because it often is depicted on basis of a number of restrictions only – we are lacking desirable alternatives. This is where backcasting comes into the picture. Backcasting is an explicitly normative futures studies approach by which target-fulfilling images of the future can be developed. But as will be discussed later, when it comes to the potential of initiating radical and systemic changes such as a transition to sustainable lifestyles also backcasting has its shortcomings, something that we think a closer collaboration with design can help to abate.

The aim of this paper is twofold. The first aim is to discuss how design methods together with backcasting can create scenarios of sustainable futures that are engaging, participatory and concrete. The second aim is to introduce the on-going research project “Prototyping the Future” that seeks to accomplish such a merge. This also includes reporting on some early results derived from a pilot study within the project.

BACKCASTING

Backcasting is a normative futures studies approach that was developed in the 1970s as an alternative way of energy planning (Robinson 1982, Quist & Vergragt 2006). The prognoses of that time pointed at a future with an accelerating energy demand and a need for a substantial increase in energy production capacity. With the risk of energy crises in mind and a growing environmental awareness such a future was conceived as highly problematic and undesirable. In contrast to the predict-and-provide approach of traditional energy planning, backcasting enabled taking the starting point of what a desired future level of energy use would be, and designing policies accordingly (Robinson 1982, 2003). Since backcasting was first developed, energy systems as such have remained quite a dominant object of study, especially in connection with climate change but backcasting has also been used to explore more sustainable futures in terms of transport and mobility,

food, water, land use, buildings, cities, and household activities such as cooking.

A typical backcasting study includes by three central subsequent elements: (1) the formulation of a demanding target which cannot be reached without major societal changes; (2) the development of one or more images of the future in which this target has been met; and (3) an analysis of these images in relation to e.g. other societal goals and/or in relation to the present state. The resulting scenarios and analyses can be used to problematize contemporary trajectories and to raise awareness of the tension between short-term gains and long-term targets, through showing that an image of the future in which environmental targets has been met cannot be reached without more radical changes than are proposed today. Furthermore, backcasting can be used to examine how the gap between the desired (sustainable) future and the present could be overcome and what potential conflicts or synergies for other societal targets or high priority issues this could imply (e.g. Höjer et al. 2011; Robinson 1982, 1990). The images of the future developed through backcasting also serve an important role as counter-prognoses, challenging and altering what changes are conceived as possible, and how they could be initiated and managed (e.g. Dreborg 1996; Höjer et al. 2011; Robinson 1988). It is this function, the process of altering expectations, which is in focus here.

ALTERING EXPECTATIONS

In his lecture memo on 'Visibility', Italo Calvino writes: "[a]t one time the visual memory of an individual was limited to the heritage of his direct experiences and to a restricted repertory of images reflected in culture." (Calvino 1993, p. 92). The historian and philosopher Reinhart Koselleck (2004) conducts a similar line of reasoning through denoting our "field of experience" (that which we have experienced) constitutive for our "horizon of expectations" (that which we can expect). In other words, we cannot expect something of which we do not have any experience.

However, our pool of expectations is not only a direct result of our pool of experiences, but also of our imagination through which our experiences can be reconfigured and combined in new and unexpected ways: "The imagination is a kind of electronic machine that takes account of all possible combinations and chooses the ones that are appropriate to a particular purpose, or are simply the most interesting, pleasing or amusing." (Calvino, 1993, p. 91). To gain further insight into how scenarios contribute to this, Aligica (2005) proposes using theories of thought experiments and conceptual blending. Backcasting is a way to facilitate this reconfiguration and to focus the imaginative power in a desired direction. As other types of stories scenarios can thus be used to diversify and challenge understandings and practices through re-narrating everyday life habits in an unfamiliar way (Eckstein 2003; Rasmussen 2005), thus contributing to

activate creativity and stimulate discussions through a what Robinson (1988) denotes as a process of unlearning and relearning.

TWO PROBLEMS WITH BACKCASTING

To engage people in the development of an image of the future, or for disseminating results, the content of a backcasting study must be represented in a way that makes it interesting and accessible for the intended target groups. However, while backcasting scenarios can be used to provide exactly the kind of explicit and bigger picture vision of a sustainable society lacking in design, the scenarios produced are often too macro-scaled, quantitative and abstract to communicate with people who are not policy-makers or planners (Wangel 2012).

Part of this problem can be dealt with through changing the level at which the changes are elaborated. Besides traditional 'Policy Orientated' types of scenarios, there are also 'Design Orientated' scenarios where the changes are explored at the level of end-users (Manzini & Jegou 2000; Green & Vergragt 2002). The original idea of the design oriented scenarios was to create inspiration for 'designers' (in industry, government, universities or NGOs) to develop products and services that could contribute to realise steps towards these scenarios. Through being elaborated at the level of everyday life, design oriented scenarios also hold the potential to in a more tangible way than the policy oriented scenarios, show how life in a sustainable future could be like.

The other part of the problems associated with traditional backcasting calls for rethinking the ways images of the futures are being represented. In spite of the ambition to alter the expectations of people, the images of the future are often represented in rather technocratic and scientific ways only and are typically (mainly) disseminated as scientific publications. An image of the future is often described through a combination of quantitative and qualitative statements. The quantitative part of an image of the future can be described as a fictitious statistic, telling the reader about demographics, precipitation, the number of electrical vehicles per person, or other information seen as relevant or illustrative. The qualitative part of an image of the future is typically made up of a narrative through which the future state is described by words instead of numbers.

The starting point for the project "Prototyping the Future" is to abate these two problems through combining backcasting and design methodologies. Using an already existing backcasting study as the basis the project seeks to developing concrete, accessible and micro-levelled representations of desirable and sustainable futures in which sustainable life-styles has become the norm.

PROTOTYPING THE FUTURE

Prototyping the Future is a two-year project situated at Green Leap, an arena for design and sustainability belonging to CESC, Centre for Sustainable Communications at KTH - the Royal Institute of Technology in Stockholm, Sweden. The project brings together a multidisciplinary team that includes researchers from design, future studies and environmental systems analysis with practitioners in product, service and digital design.

Instead of developing yet another scenario of sustainable urban life we take as a starting point for our design process the book *Images of the Future City: Time and Space for Sustainable Development* (Höjer et al. 2011). The book develops six different scenarios of a future (2050) sustainable Stockholm based on how space and time is used by the citizens. Here fourteen researchers from numerous disciplines offer details on a variety of aspects of a future sustainable city, including travel, housing, eating, time use, consumption and urban form. In the book, areas of everyday life such as personal consumption, housing, food, transport and care are discussed in detail, providing a rich material for the design process. In spite of its title (and to the amusement of the designers in the team) the book is however completely lacking images.

The study presented in the book sets some important and strict delimitations of what a sustainable future is regarding the use of energy. For example embedded energy in consumer goods is accounted from a consumption perspective meaning that it debits the nation where the good is bought and used and not where it is produced. Sweden's use of electronics would therefore be attributed to us and not to e.g. China. From a consumption based perspective Sweden's ecological footprint is not slowing down as the official reports claim, but is steadily growing (SEI 2012). Another important outset is that the energy resources are equally divided between all citizens in the world. In other words, we will not be able to use more energy at the expense of others. Based on this and taken into consideration technical development, renewable energies and higher efficiency, it is estimated that we need to lower our energy use with 60% compared to present levels (Höjer et al. 2011).

We are of course aware of the inherently ambiguous nature of sustainability, but still settle for a natural science based definition of what a sustainable level of resource use is (in this case focusing on energy) while allowing for diversity in terms of how life could look like within these boundaries; in other words, to design (for) a variety of sustainable lifestyles.

The overarching aim of Prototyping the Future is to normalise sustainable life-styles. Normalisation is an interesting process as it can change what we perceive as perfectly normal to completely alien in a very short time, such as when smoking was prohibited in public spaces in Sweden. Going back to the discussion on

altering expectations it is also important to point out that expectations are not 'innocent' mental constructs, but are constitutive to what actions we take (or do not take) when striving for sustainability (Albrechts 2010; Sandercock 2003). As our expectations concerning what futures we consider probable, possible and preferable are not only the result of personal taste, beliefs and imagination, but are socially mediated (Asplund 1986, Edwards 2008) the process of normalising sustainable lifestyles must address people as social beings, and not as individual decision makers. The challenge is thus to develop representations of sustainable futures that can be shared, discussed, debated and altered, and that embrace and acknowledge a variety of drivers and barriers for change as well as diversity in terms of what a sustainable lifestyle could be like.

What we see before us is some kind of digital experience, or game, where a user, alone or in a group can explore what a sustainable lifestyle could be like. The aim is to make this 'game' available on the internet and also to log how users interact and what choices they make. In order to get feedback for further development we strive to create a prototype that is open, inviting and accessible for a multitude of different users. The project Prototyping the Future is however best looked upon as a prototype in itself, a first attempt to combine design methods, future studies, environmental systems analyses with prototyping methods and digital tools for design.

PROTOTYPING METHODS

The project adopts a broad understanding of design practice and research, where design is seen as a tradition of its own, a culture of inquiry and action (Nelson & Stolterman 2003). In this view, the process of design is an efficient way of enabling intentional change. Design provides an "ability to act based on an overwhelming amount of insufficient information within restrictive limits of resources and time" (ibid). However, we also acknowledge the creative and artistic part of the design practice, and seek to incorporate also these tools and methods into the research project.

Prototyping is an established method for design and innovation as a way of quickly making ideas tangible and to spur the creative process. The prototype is used to create a common platform for different actors and enables stakeholders to easily comprehend, engage in and discuss the proposition. The prototype becomes a vehicle for development; materializing ideas, norms, tacit knowledge and bringing potential problems to the table (Kelley 2001). Prototypes are a kind of early sketches that, as Schön (1983) remarks "talk back" to the designer thereby enabling the creative process. Sketching and quick models such as mockups comes from architecture and product design, whereas rapid prototyping originates from software development. Both concepts has merged and found its way into immaterial areas such as service design and lately social innovation where it has been described as a way to "fail early to succeed sooner" (Burns et al. 2006).

Today prototyping refer to all sorts of quick and sketchy ways to test ideas to stakeholders early in the design process. A prototype could be a “staging” of a service situation in a physical space, it could be a scenario made concrete by a comic strip or it could be a paper version of a an interactive web design. Prototypes does not even have to be rapid, slow prototyping is preferred were a more organic evolution is needed and could provide a gradual scaling up process. Prototyping could be seen as a vehicle to reveal both opportunities and dilemmas in a design space. This “agonistic space” allows a polyphony of conflicting voices to exist side by side (Mouffe 2000). The concept of an agonistic space has been used to describe living labs as prototypes, not for a solution for a problem, but rather as an arena for experiments in social innovation (Björgvinsson et al. 2010; Hillgren et al. 2011).

The outset for Prototyping the Future is that a similar approach can be used to envision also larger-scale changes such as a sustainable future. In some respects this is very similar to the Stockholm exhibition, however with less focus on architecture and urban planning. But exactly how this will be done is still a topic for research and design. Long term future envisioning is very different from ordinary product design. It resembles more of service design in that it constitutes of a system of practices interwoven with socio-technical materialisations. But while service design and social innovation mostly takes place in a near future and involves citizens and end-users that are present today in a participatory approach the design of sustainable lifestyles placed in 2050 become more problematic from the perspective of participation.

Backcasting studies seldom include pictorial images. One reason to this is because images are perceived to increase the risk that the entire scenario of the future is rejected on basis of details that are essentially irrelevant in relation to the changes explored. One example of such a detail could be the visual expression of electrical vehicles in a backcasting study of hydrogen futures. Within prototyping this issue is described as *resolution*. The design of the prototype, its finish and focus needs to be carefully crafted to direct peoples’ attention to the relevant issues at stake, and down-play those aspects that are insignificant in respect of the aim of the prototype.

RELATED RESEARCH

There is a vast amount of experiments and research in the field of future studies, backcasting and prototypes, but if we delimit our overview to the area of design and future envisioning’s, the work could be grouped into three loose categories; critical products, scenarios and digital tools.

The first category includes explorations of how critical design can create engagement and behavioural change, and make people aware of unsustainable lifestyles, for example energy consumption in everyday life. Here the goal has been to challenge the norm of a conventional

electricity meter and explore the possibilities of the design space. The Static! project explored this in depth, developing a number of design concepts, based on familiar products such as lamps, cords and heaters, which in various ways visualized energy use (Backlund et al. 2006; Mazé 2010). In the Aware project, energy conservation was seen in a larger perspective of lifestyles and consumption and the aim was to support sustainable behavioural patterns with new designs. The Power Aware clock, for example, takes inspiration from the kitchen clock and visualises in real time, electricity use of the entire home (Broms et al. 2011). As Pierce and Paulos (2012) conclude, research to increase awareness of energy and motivate individual conservation behaviour has grown to a field of its own within HCI during the last decade. Even if these projects in one sense are more conventional in that they resulted in physical objects, “designs”, they have in common with Prototyping the Future that the goal was to make something abstract and invisible (electricity/the future) concrete and graspable, to engage, create awareness, spur innovation and eventually lead to change of behaviour.

Another way to use design to visualize an alternative future is through using design approaches to create prototypes, fictitious props (Johansson 2005; Mazé & Önal 2010) or ‘Living Labs’ in which the future is experienced as an alternative present (Scott et al. 2012). In the work by Mazé and Önal (ibid.) fictitious “evidence” of future energy behaviour such as TV-reports, Wikipedia articles about Do It Yourself “socket bombs” used by eco-activists, creates a suspension of disbelief and spurs imagination of what is possible.

In the second category, one of the earliest examples of future scenarios with a design approach is the SusHouse project (Strategies towards the Sustainable Household 1998-2000). An EU project that looked into how the three household functions eating, clothing and shelter could be carried out in more sustainable ways (Vergragt 2000). Related to that but with a more participatory approach is social innovation and design for sustainability (Jegou & Manzini 2003). Here the focus is on enabling collaborative services and creative communities in a not too far away future. One approach argued for is to look for existing promising practises that can be scaled up, spread and eventually reach a system level. The ideas are mainly visualised through simple scenarios in the form of comic-strips, cartons, images or narratives (Jegou & Manzini 2008; Meroni 2007).

This approach has been developed in the more recent SPREAD project (SPREAD 2012) that looks at how sustainable lifestyles could be reached in Europe 2050. The project identifies unsustainable as well as promising trends and factors that influence behaviours for the future. The trend spotting and analyses has been material for workshops with citizens all over Europe and resulted in four different future scenarios for 2050. Finally, the project will result in a roadmap and

recommendations for policy makers for a sustainable Europe 2050. The scenarios are presented as timelines with different threads of social, technical, economical and political developments that eventually lead to the envisioned future. The four scenarios should not be seen as mutually excluding but rather as parallel activities and lifestyles for different groups or areas. The scenarios have also been complemented with short films that present different scenes of everyday life.

These examples have in common that they aim to engage participation and spur new lifestyles with the help of new products and services as seen from a *user* perspective. A very different approach is taken by city-planners who seek to involve citizens or visualize changes. In this third category, digital planning tools or games, almost invariably depict the city from above, either using a real map, or an image of a fictitious city. The Ipad game 2021, developed by Mistra Urban Games (2011) uses Google maps as a base to engage young people in deliberation over how the Gothenburg city area should develop. It should however be noted that this is in no way connected to real planning or policy-making. SymbioCity is a design awarded city planning game, where the player is the new Mayor of a growing city confronted with problems to solve to enhance social, economic and environmental factors. However, the not so hidden agenda is rather to promote Swedish clean-tech innovations than to spur the imagination. Other similar games are Clim City, IBM's City One, Simutrans, Dumptown, and City Rain, all of them building on the same strategy gaming concept and birds-eye view (see www.urbangames.se for an overview in Swedish). Most of these examples paint a very simplified picture of the future and the problems confronted and are focusing on short term and incremental changes. The simplicity can however be an asset as in 'My Blocks' ('Mina Kvarter') which is an application to the game Mine Craft where you build a world in blocks very similar to the popular toy Lego. The application was developed by Svensk Byggtjänst (a Swedish association for developers and construction companies) as a way to involve young people in the future of their neighbourhood.

These planning games are focused on altering the existing through intervention or co-creation, however without painting a larger picture of systemic change. Moreover, sustainability impact assessments are often missing or sustainability is approached in a rather incremental way.

PROTOTYPING THE PROJECT

As a first test of the project methodology a ten week long pilot study was carried out with third year design students at the Industrial Design bachelor program at Konstfack – the University College of Arts, Crafts & Design in Stockholm, Sweden. The ten students were commissioned to develop design proposals for products, services or systems that signified a future where sustainable lifestyles had become the norm. To allow

for also substantial changes this future was placed in 2060.

The design brief handed out to the students included a few but central starting points and demands. Firstly, their design proposal needed to address a major sustainability problem. In Sweden as well as in many other high-income countries most of environmental impacts come from activities related to food, transports and housing (Naturvårdsverket 2011). Secondly, the proposal needed to make a substantial contribution to decrease the sustainability problem, which also implied that the target group/s could not be too narrow. Thirdly, with the aim of showing a future where sustainable lifestyles are normalised it was important that the proposals were represented in a way that did not focus only on material and technical details but that also integrated them into the context of everyday life.

THE DESIGN PROCESS

The students were asked to work with a service design method introduced by two professional designers from the service design company Transformator. This method is a customer insight driven development tool in which the final solution is based on the logic, need and relevance for the user. A central part of the method is to gain a deep understanding of the needs, driving forces and behaviours of the prospective users and to use this as a basis for the drafting of prototypes. These are then used as trigger materials – as “what if-solutions” – used in subsequent rounds of user interactions. The prototypes are thus not to be looked upon as sketches of the final service, product or system but as tools to gain an even better understanding of the user. While this specific design method and the design tutors were not chosen by the project but by the Konstfack teacher, a user-centred approach such as this was seen as fruitful to the project as this encourages an understanding of both drivers and barriers for adopting more sustainable ways of life. In addition such an approach is also beneficial as this in a natural way places the focus on the societal micro-level of everyday life rather than the macro-levels of policy and planning.

The student projects were introduced by a lecture on the project Prototyping the Future in which also backcasting and the major environmental challenges society faces were explained briefly. The students were also introduced to the backcasting study “Images of the Future City” (Höjer et al. 2011) and were encouraged to use this as a backdrop to their work. The different stages in the design method were introduced by the Transformator designers. In short the students had to work with numerous iterations including interactions with prospective users, analysis and clustering, and prototyping. Besides the lectures the students met with the Transformator designers for tutoring, both individual and in group. The students also had two individual tutoring sessions each with a future studies and environmental systems analysis researcher from the Prototyping the Future project. This was both to ensure

that the developed proposals were within the scope of the design brief and to provide an opportunity for the students to discuss issues of sustainability, futures thinking and other related questions. The students were asked to deliver their proposals in three different forms: a short movie, pictures and a report.

RESULTS

After ten weeks of working the students presented their final design proposals. With few exceptions all ten proposals clearly fulfilled the requirements specified in the design brief; the proposals addressed one or more major sustainability problem, had a clear potential to abate these and were outlined and presented in a concrete way and integrated into an everyday life setting. The proposals differed widely both in terms of what type of changes that were suggested (physical/ technological, service, knowledge, values and habits) and the sustainability areas addressed (food, buildings, health, transport, consumption and education). While most proposals focused on one sustainability area only the majority included more than one type of change, for instance a combination of new technology and a change in values. As it is outside the scope of this paper to present all proposals the interested reader is directed to the project webpage (www.greenleap.kth.se) for further information on this matter.

The proposals also varied in terms of how imaginative they were, i.e. to what extent they diverted from what the students saw as realistic. It was a most rewarding (and painful) experience to witness how the students struggled with the seemingly internalized urge to create something realistic while at the same time being commissioned to create something radically new. Most of the students did however take this challenge on. With this in mind it is very interesting to see that many of the students, in spite of their ambitions to come up with something radically new, ended up with proposals that they after a while realized already existed. Adding to this tension was the (sense of) uncertainty resulting from the action research design method where the students were urged to 'trust the process' in a more fundamental way than they had been doing before. In the following three of the student proposals are presented. However, as the format of a paper does not allow us to present the movies we will have to keep to pictures and texts. This is unfortunate as it was in the movies that the proposals got the most life and meaning. These can however be accessed through the project website at www.greenleap.kth.se/projekt/prototypingfuture.

One of the most imaginative proposals was a new super-material, a gel-like substrate that through being added to facades enables urban vertical farming (Figure 2). The substrate keeps the plants in place and retains water, mainly gained through collected rainwater. The substrate also contains natural nutrients that are fed automatically to the substrate when needed. The substrate and the plants help to insulate the facades

during winter and summer, it reduces noise levels, enhance biodiversity and supports ecosystem services and provides a better air quality. In this future "...nature is closer to us. The houses are more beautiful to look at, interesting to feel and various scents follows you through the city. Food is locally produced. Food that is grown on your apartment is for you and your neighbors to consume."



Figure 2: Vertical farming by Hedvig Carlin

A seemingly much more down to earth proposal was the bike path "Way2Go" in which bicycling is made more convenient through providing a roof over bike lanes (Figure 3). As the roof is covered by solar cells this also contribute to a local production of renewable energy. In difference to the vertical farming super-material this is a proposal that is technically possible to install today. The proposal does however also comprise a redevelopment of the transport infrastructure with a strict prioritization of bikes, pedestrians and public transport over cars, which makes it much more radical and demanding than a first glance might reveal.



Figure 3: Way2Go by Tom Lindberg

Even more radical however was the proposal “Conscience” (Figure 4). Conscience is a sustainability monitoring system synced to each individual and business that tracks what and how often they purchase and recycle. The system is linked to economic incentives and disincentives; depending on your Conscience level you will either get tax cuts or penalties. Everything sold will need to have a “Proof of Conscience” code holding information on sustainability impact which can be scanned using a smart phone to see how a purchase would affect your Conscience. At any point of purchase or recycling the code and your individual Conscience is registered and your Conscience level fluctuates accordingly. Not only would this take massive investments in systems for generating and disseminating data, it also demands that governments start playing a way more active role in promoting – or coercing – sustainable development than has been seen to this date.

Your Conscience is your future.



Figure 3: Conscience by Tetsugaku Sasahara

DISCUSSION

In this article we have outlined the rationales for and possible benefits of combining prototyping methods of design and backcasting. While prototyping can help making backcasting scenarios more concrete and accessible, backcasting contribute by providing a solid, bigger picture of what a sustainable society could look like. However, even though stemming from two very different disciplines both backcasting and design are tools to make mental constructs about the future more concrete and to challenge them, to open up ideas of what is possible and to invite citizens to engage, participate and influence the scenarios and prototypes presented. In this way the future can be brought closer to us, and become a matter of a more informed discussion.

The project Prototyping the Future is still very much work in progress. Through the student pilot project it became evident that our tentative methodology and design brief worked sufficiently well in regards to the

intended outcome, but that there also are some aspects that need to be further considered.

One thing that was not tested in the pilot is how well the proposals communicate to people who have not been involved in the project. This is something that will need to be carefully planned in the continuation of the project so as to allow for reoccurring rounds of interaction with test groups.

One thing that became evident was that working with such far away futures as 2060 creates uncertainty and tensions that must be taken seriously if a balance between realism and radicalism is to be achieved. While broad user participation is often sought after, the pilot study points to that a user-oriented approach might not be the most fruitful way forward when aiming for designing something radically new. This is something that also can be seen in many participatory backcasting projects where participation tends to contribute more to realism than radicalism. To go beyond the present to create something new for an unknown future is admittedly hard; even in such a creative environment as a design student studio, and for most people it takes practical experience to learn to trust the process and deliberate from present normality while at the same time keep a critical eye open.

What is needed is an emancipated enquiry, a conceptual blending of different mindsets, where artistic and creative expressions are allowed to converge with a scientific approach. In the next step of the project Prototyping the Future, the research team will cooperate with a professional design consultant. The result of this stage will be ready in the end of 2013. What the end result will be is still very open. But as the students had to do, we too need to trust that the process of design will lead us across the abyss of uncertainty to somewhat safer grounds.

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SUSTAINABLE INFRASTRUCTURE FOR AD HOC SOCIAL INTERACTION

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ABSTRACT

We explore how to design sustainable infrastructure for ad hoc social interaction based on the conception of infrastructuring, meta-design and Living Labs. The exploration is based on a design experiment of establishing a Network Zone (a Living Lab setup) with support of a smart phone app. The objectives of our design program were to create connections and design possibilities for letting social interaction emerge through use that could continue beyond the project period. The experiment was part of a project in collaboration with a larger urban municipality (Copenhagen) to rethink the way we can offer services to senior citizens in order to strengthen social interaction among them. It was done in an urban outdoor environment. We add to the discourse that positions design as something that, rather than taking place before use, should happen in use – here by creating objects that are open for reconfiguration through use.

INTRODUCTION

In this paper, we want to demonstrate how we methodically can create sustainable infrastructures for social interaction. We explore this with an approach to the design process of meta-design (design after design) and infrastructuring (Björgvinsson et al. 2010 and Telier 2011) as well as the concept of Living Labs (Binder et al. 2011, Binder 2012). Social interaction is dynamic and cannot be designed, but only designed for. Through

an approach of design after design we want to design possibilities or potential things from where social interaction can emerge through use. The case we work with is from a project with the focus of designing for social interaction among senior citizens. In this co-design project we are collaborating with the municipality of Copenhagen, senior citizens and other partners on rethinking and envisioning possibilities for the delivery of services to the elderly in Copenhagen.

As populations age e.g. in Europe and especially in Scandinavia (European Commission 2009) there has been an increased attention turned to ways of maintaining quality of a good life for those categorized as elderly. Much attention has been on assisted living (AAL 2013) and on ‘aging in place’ through different technologies as a consequence of a lack of ‘warm hands’ in the care sector. Such agendas implicitly inscribe aging as a process of physiological decline (Ertner and Malmberg 2012). Less attention has been on the importance of maintaining social interactions as an important aspect of a good life as senior, and today we witness major public efforts to address the increasing loneliness among elderly citizens (Lindley et al. 2008) What if discussions in society about welfare technology focused on social aspects of life – on how to be involved with other people – in addition to how to cope with necessities like cleaning, personal hygiene and health issues? Being involved with other people and having a sense of belonging is an important part of human lives. The question is how we handle this (for some people essential) need when we for different reasons no longer are part of the community. A community that naturally exists when we e.g. are part of the labor market or have children living at home. During the initial fieldwork and dialogues with senior citizens and people from the municipality in the project (spring 2010) we on the one hand experienced some elderly who structured their everyday lives and social gatherings around the different activities in their local activity center (conversations with Ketty, Amy and Lily, VOC) and it worked very well for them to have something to attend almost every day during the week. On the other hand, we also met senior citizens who were not attracted to these places, because they could not identify themselves with the place or they found the

activities at these places too rigid or conventional (Robert, Anni, Muhammed and Jytte, conversations in workshop 1). The group of citizens who expressed the latter viewpoint was often somewhat younger – 55 to 75 years – and can maybe be characterized as the new generation of elderly. In our collaboration with the municipality we addressed this group of seniors with our design experiment. At the same time, we often met a wish to structure everyday life with the option of adjusting from day to day because a lot of the seniors were uncertain about their condition (physically, but maybe also mentally) on the particular day. We conceptualized this as ad hoc social interaction.

INFRASTRUCTURING AND META-DESIGN

We work in the field of participatory design and co-design, but also face the challenges of the move from the traditional workplace projects to projects in the public space addressed by Björgvinsson et al. (2010). Dealing with projects in the public space means that the people you are designing for are not necessarily known and the focus is on open up spaces of possibilities. To meet these challenges, Björgvinsson et al. suggest to position design as something that, rather than taking place before use, should happen in use, by creating objects that are open for reconfiguration and modifications. At MEDEA in Malmö, the researchers (e.g. Björgvinsson et al. 2010) are working with the notion of social innovations and are exploring how to create infrastructures for these innovations in the Malmö Living Labs with a focus on meta-design. Meta-design is also referred to as Design after Design. It is an aspect of design research that recently has increased in focus as a way to address the new challenge of participatory design of not designing for a specific purpose or target group. In our project, it means that we are not designing social interaction but designing by opening up possibilities for social interaction to emerge. In this perspective, the design researcher is provided with a new challenge to create an open design solution, which enables configurations and modifications in use situations. Inspired by Björgvinsson et al. (2010) we conceive infrastructures as the aim of a design process, which means that the end result of the process is not a concrete artifact. Instead, what is being designed are infrastructures for social interaction, which can continue after the project has come to an end. It combines the design situation with the use situation. We work with this in a setup we perceive as a Living Lab (Binder et al. 2011, Binder 2012). Our understanding of a Living Lab is that it is not a specific place but rather a network of people and resources that both have committed themselves to an agenda of change. Often this agenda is not new but already shaped by what the participants bring with them. The involvement of citizens is not as representatives, but as engaged individuals with their own priorities and experiences. The laboratory is the setting for a meeting of everybody in the network that is in motion. The municipal employees, representatives from the private service sector etc. are important

participants because they are also the ones who need to explore and practice the new relationships, as a co-production of services requires. The meeting in the laboratory is not a debate from fixed positions, but rather an open exploration of options. It can be difficult to determine exactly when the co-production is leaving the laboratory and becomes a natural part of everyday life. A new everyday practice establishes itself in the laboratory, and the relationships that for a long time were on trial becomes incorporated and anchored in time and space. A Living lab is more than a trial connection for new initiatives. It is a scene and a training ground for new relationships and networks (Binder 2012).

A LIVING LAB IN AN URBAN PARK

In this paper, we explore and discuss the design of a sustainable infrastructure for ad hoc social interaction among senior citizens through a design experiment called the Network Zone. It was part of a larger research project with the Copenhagen municipality focusing on social interaction among senior citizens. Together with project partners and senior citizens the project group established a Living Lab (the Network Zone) that took place in Valbyparken (an urban park in the area of Copenhagen). We wanted to explore if and how we could establish a foundation or an infrastructure to support the emergence of social interaction by extending our meetings in time and place. At the same time, the process of infrastructuring aimed at establishing connections with the possibility for continuation of the community beyond the research project. To sum up, the idea was to establish an infrastructure that could secure the seniors of an ongoing community of outdoor activities. The infrastructure, from where social interaction could emerge, had a potential of being accessible beyond the project, as a service to participants. In this paper, we especially focus on one of the elements in the process of infrastructuring, which was a smart phone app named after the overall Living Lab: Network Zone.

Through our design experiment and the three perspectives of design after design, co-design and infrastructuring we want to explore how we can design sustainable infrastructure for ad hoc social interaction?

In the first part, we present the background for this paper to give an idea of the project the experiment was part of as well as the Living Lab approach and methodological challenges related to this approach and to working with elderly. Our design program is presented in the next part, and forms the background and drive the specific design of the Network Zone that is presented in the following section called Design Experiment: A sustainable infrastructure. The subsequent discussion addresses the identified issues related to the question of how to design a sustainable infrastructure for ad hoc social interaction, on which we conclude.

BACKGROUND: PROJECT AND METHOD

The larger research project we have been part of is called SeniorInteraction (Brandt et al. 2012, www.seniorinteraktion.dk). We (the design researchers from the IT-University of Copenhagen and the School of Design) were invited to take part in the efforts of a bigger urban municipality (Copenhagen) to rethink the way they offer services to senior citizens. The project initially targeted a city district with more than 10.000 citizens potentially affected by these services. The municipality invited us because they believe that we could help them promote co-design and co-creation of services with the active involvement of senior citizens.

In the project, we based our research on a co-design approach. The focus was on creating dialogues and envisioning future possibilities for social interaction together with the senior citizens, but also the project partners and people working with senior citizens. In order to create a common platform or language, we staged the stories of the senior citizens' everyday lives. This took place in field visits at activity centers and private homes where we met the seniors with a workbook as a frame for the dialogue. The workbook was created among the researchers as an elaborated design program and made into a dialogue material similarly to a probing kit. We carried it along as we commenced a process of recruitment, and used it in the dialogue with the senior citizens. This took place in the project's initial phase (winter and spring of 2010). It was followed by a series of workshops where we all collaborated around collages, technology props and dolls in the process of envisioning possibilities by transcending the stories of everyday life into future scenarios.

Here, a design challenge was how we moved from the dialogues about possibilities to actually envision the future possibilities in the natural environment of the ideas. We established a space for change that took form as Living Labs. The Living Labs were established in the next phase of the project (spring to fall of 2011) to explore how new communities and new forms of co-production could grow within the actual space for discussion (Binder 2012). We report from one of the Living Labs where a network of seniors together with municipal employees, researchers and private partners established a Network Zone of outdoor play and exercises in an urban park. The aim was to make the park our space for change in which we could envision new possibilities for social interaction among the senior citizens. It was done by rehearsing the ideas and scenarios from the workshops in practice. In our Living Lab participants jointly and independently engaged with the possibilities within reach of their everyday life and their everyday environment – the urban park.

REPRESENTATION AND PARTICIPATION: SITUATED ELDERLINESS

Part of our methodological challenge was the question of representation and participation. Few of us see

ourselves as representatives of a group and even less so if the group we need to be part of is characterized by physical and mental decline, which is often the case when seniors become clients of the public senior service system. Conversely, the municipality has neither at official level nor among politicians a tradition for engaging with the individual. The answer to these challenges is to let the snowball roll (Latour 2005) by meeting people in places where they are - in our case in activity centers, clubs, etc., and encourage them that their everyday life stories are important to others than themselves. When we later invited the seniors to workshops they participated as Ove, Robert, Amy, Lilly, etc. and the stories they chose to share were about the communities that they were already part of, as well as networks they could imagine being part of in the future.

These questions of representation and participation lead us to more general methodological considerations and discussions when working with elderly using the concept of 'communities of practice' to approach this discussion (Brandt et al. 2010). Instead of focusing on recruiting individuals, an alternative approach might be to use everyday practices as a frame and starting point. The concept of communities of practice was originally developed to capture the skills and competencies enacted by people engaged in a professional practice. When expanding this concept to include everyday practices outside work life we could talk about communities of everyday practice where elderly are skillfully enacting everyday practices as seniors. Gradually as we get older, we enact what we would call situated elderliness. With situated elderliness we refer to practices that include activities that for some reason or another has become more challenging or perhaps even impossible to carry out by the person himself or herself. Things that we earlier in our life performed easily gradually or suddenly become difficult. Examples of specific situations where we experience the situated elderliness can relate to physical aspects of life, e.g. not being able to change a light bulb because using a ladder is difficult when we have balance problems or not being able to perform required banking or taxpaying tasks because you are not familiar with the digital tools required to perform these tasks. In these situations in a contextual sense we practice situated elderliness, but simultaneously we do not in general consider ourselves old, as we might be able to handle all other situations in our everyday life (Brandt et al. 2010).

It might be especially in these situations, we need to belong to a community - both for social interaction, but also to receive help with the little things in our everyday life we find difficult to handle; a community of situated elderliness where you can both help and receive help from others. It is this approach that we build upon when we work together with the Municipality of Copenhagen to rethink the way the public sector delivers services to the senior citizens. We explore the possibilities of

providing services that are no longer based on individuals but are targeted at communities instead.



Figure 1: Engagement in the game

DESIGN PROGRAM

The aim of our process is to design sustainable infrastructure for ad hoc social interaction based on the conception of infrastructuring and meta-design (Bjorgvinsson 2010 and Telier 2011) and the concept of Living Labs (Binder 2012). With a co-design approach to the design process we emphasize the collaborative work both together with the private partners, the municipality's employees and the senior citizens. The objective is to establish a Living Lab as a space for change, where it is possible to rehearse new practices in the process of rethinking and designing new services. The close relation to the everyday lives of the seniors has the purpose of making it possible to rehearse and enact new practices that can continue after the closure of the project.

The process of infrastructuring is never only a (technical) platform, but according to Susan Leigh Star and Geoffrey Bowker (2002) it is a sociomaterial thing. It means that the process of infrastructuring involves the situation the infrastructures is going to be 'sunk into' and includes the human and non-human actors of the assembly. Infrastructuring is about creating connections between the different actors. Telier (2011) continues about infrastructure referring to Leigh Star: "An infrastructure, like railroad tracks or the Internet is not reinvented every time, but is 'sunk into' other socio-material structures and only accessible by membership in a specific community-of-practice. Infrastructure or rather infrastructuring is a socio-material public thing, it is relational and becomes infrastructure in relation to design-games at project time and (multiple potentially conflictious) design-games in use" (Telier 2011, p. 277).

In the Living Lab Valbyparken, we tried to design infrastructure like spinning a web under the ad hoc community of outdoor activities. We wanted to explore if and how we could establish a foundation or an infrastructure that could extend our meetings in time and place, and establish a possibility for continuation of the ad hoc community of the seniors after the project

group (researchers and other partners) had left the Living Lab and the project had come to an end.

This design program on infrastructuring established the ground for our design experiment.

DESIGN EXPERIMENT: A SUSTAINABLE INFRASTRUCTURE

With the understanding of infrastructuring being a process of connecting humans and non-human actors we experimented with how to establish an infrastructure to support this continuation of the community. One of these actors was a smart phone app named the Network Zone. It played a role in trying to provide space for dialogue, planning and negotiation between the meetings in the park. This was a way of supporting social interaction in a community of outdoor experiences. In the design of the app, the central point was about being connected and trying to enhance or 'stretch', not replace, the face-to-face meetings. In the Living Lab period (summer of 2011- fall of 2012), the project group, including partners, met every second Friday at 10 am with 2-15 seniors showing up.

FROM FOAM DOTS TO SMART PHONE APP

The idea of the outdoor community in an urban park came from the initial phase of the project. During one of the workshops we played with foam dots and carbon props representing different forms of technology – a concept we coined the Super Dots (Foverskov and Yndigegn, 2011). The idea was to give the senior participants a sense of how you can be connected and how you can get in contact and see each other before, during and after an activity. One of the groups in the workshop that consisted of the three seniors Amy, Jytte and Robert, two industry partners (sports instructor and interaction designer), Bo and Marcus, and two researchers from the project group, Signe and Pernille, enacted the concept of the Super Dots when creating a doll scenario of a trip to Valbyparken. "The weather is nice and we're going to Valbyparken, but how can we find each other?" Jytte starts and continues: "I arrive with bus no. 3. Can't I get some clothes on, I do not like to be naked in the bus?" Jytte refers to the doll she plays with. Jytte's doll is getting dressed. "How can we find each other?" Signe asks the rest of the group. There is some discussion on what kind of technology props we need, and we decide on the one called the 'seeker'. "But we all need to have it turned on, otherwise we cannot find each other" Amy says.



Figure 2: The group creating the scenario using the concept of the Super Dots and the props.

With the help of foam dots, carbon props and our co-constructed scenario it became a story about how they could be connected during a trip to Valbyparken. Along the way, the group had different reflections on what kind of technologies they could use and how, for example to find each other in the park when they wanted to meet. But also on who should be able to find them, and whether they were interested in meeting with other people when they were on this tour together. There was some discussion on whether or not they wanted to meet with people they did not know beforehand. After the trip, being connected through screens in their homes, they shared the photos that Robert had taken during the trip. The scenario about the use of technology to be connected and support a common experience in the park was maintained from the initial workshops. To explore how this could work in the context of the seniors' everyday lives we moved the story from the scene of the doll scenario to the Living Lab in Valbyparken. It became a Living Lab centered around exercise and outdoor experiences, and of trying out new technology. We went from conversations about envisioning future possibilities of new services to the rehearsing of new practices.

FROM IMAGINATION TO REHEARSING OF NEW PRACTICES

In Valbyparken, the foam dots and carbon props were replaced with Android smart phones. The choice was to some extent a question of availability, but at the same time they could accommodate a lot of the functions from the concept of the Super Dots. Our senior participants' journey with smart phones began with some existing applications. We started our explorations with the location-based application Google Latitude and later Foursquare to explore the idea of being connected and visible to each other in the park. But the focus was not entirely on the application to start with: "what if we're only used to a phone with push buttons?" It comes from Anni, who seems a little nervous about the situation. "It's exciting, where we're gonna end up," one of the others in the group responds. We were met with this anxiousness the first times we introduced the smart phones as part of our meetings in Valbyparken. We were going on a treasure hunt and the stations had been put into Google Latitude, and the seniors, with a little help from the project team, had to identify the different stations and tasks. The experience was about how it was to find their way around the park via the application on the phone as a way of supporting and extending the game by the technology. The experience also came to be about how to use a mobile phone with a touch screen and to find the different features as the next snapshot shows: "Try to click and see what it says at the station," Signe from the project group suggested to Birgit, who held the phone. "I can't see anything, now there are different screens." After a short break Birgit continued to look and touch the screen. "Oh, now I have to wipe the screen, it's a little greasy." Øyvind came along, and they continued to look for the camera, because the task

said to 'take a picture'. Finally, the camera function was found, and Birgit exclaimed enthusiastically to the rest of the group. "Come all my friends, and I'll take a picture of you."

During the first meetings with the smart phones in the park, the focus was often on whether you could read on the screen, if you could take a picture and - now the map disappeared, how do I find it again? All the small trials you often go through when you get unfamiliar technology in your hands. This was a challenge and hurdle for everyone and became a determining part of the actual rehearsing of new practices of social interaction. The smart phones were part of the activities, and the senior participants in the Living Lab learned how to handle them, but initially there was a tendency of the smart phones taking away the focus of the social gathering. But the seniors' comments along the way showed us that it made them aware of what they wanted to do with smart phones and what they wanted to use.

In the experiment, our exploration was through Google Latitude and Foursquare, which gave us some indication of what we could do with the smart phones when we were in the park. But it was not our own applications - we shared them with a lot of other people, and there were many unnecessary features in the apps, which often caused confusion among the senior participants. We realized that in the process of rehearsing new practices we needed something local and adapted to our network. It made us realize that we needed to get our own application as soon as possible, but it also gave us an understanding of what we should include in the design of the application. Our meetings in Valbyparken came to play a central role in the development of our own smart phone app. In the process of creating an infrastructure in our Living Lab, it had to be woven into the social gathering of our communities, and be accessible to the seniors, which made the local anchoring essential for make it recognizable to everyone. We might have been able to use an already existing application from the pool of applications that provide access to online communication, but with an essential goal of making it simple we decided to make our own.

To support the social interaction before, during and after meetings we wanted a tool that first of all - similar to Foursquare - could make people in the network visible to each other when they were in the park. Second, you should be able to get ideas and tips in situ on what you can do and how to both inspire and support the seniors when they meet on their own and play games or do other activities. A step towards supporting the continuation of the network beyond the project period as a tool for the social gatherings. Finally, one of the central design requirements was to make it simple and easy to use for the senior citizens who had little or no experience with the use of smart phones. Compared to the blog (will be explained later) the format of the app makes it more adaptable in the sense of being part of and present in the park when seniors are out there, and

therefore potentially take a role in the activities going on in the park.

AN APP DEVELOPED IN A LIVING LAB

Based on the above, the requirements for our first version of the app were that it must be local and based in Valbyparken, it should be possible to communicate with each other, to create activities and see what kind of activities others have created, and sign up for these activities. When our senior participants are in the park, they should be able to check in, see what activities are going on in the park, and who is present. There should be pictures of those in the network, and you should be able to contact each other by sending messages or making calls.

The processed material we have on the life of the app in the Network Zone is mainly from within the project period, where the app was introduced and slowly adapted to the practices of the community. It means that a showcase of the app, influences the question of the sustainable infrastructure for ad hoc social interaction in which the app plays a role that can continue after the project period, and will have to be demonstrated at a later situation. The following snapshots from our experiment are stories of the introduction of the app during the project period.



Figure 3: The entry page of the app: Green: See activities, Yellow: I am here, Red: Contacts, Orange: Create an activity.

THE NETWORK ZONE APP COMES INTO PLAY

The introduction of the Network Zone app for the seniors took place in small steps along the development and testing of the application. The first time the seniors tried the app was in mid-October 2011. We had hoped that it could be ready so we could try the different features together during our morning in the park, but there had been some trouble getting the app online, so

we had to first try a 'beta' version. The seniors got introduced to the app, but the feeling of being connected or creating something together with others lacked. We came a step closer the following week. The app was now online, and some of us met with five of the seniors, who would like to spend extra time in the park. "You can just tap on the green, and then..." said Janja. We were a bit surprised when we suddenly observed Janja starting to show Tekla how to use the app, since Janja herself had been introduced to the app less than five minutes earlier. Tekla smiled happily when she succeeded in signing up for an activity. "But that's me who's there," exclaims Anne-Lise. We showed her how to register in the app to get access, when she noticed a picture of herself. A moment ago we drank coffee, and now we were in the process of exploring the new app, creating new activities and joining each other's activities. However, there were still things that needed to be changed and fixed in the app, so unfortunately the seniors could still not bring the smart phones home.

THE NETWORK ZONE ON 'HOME VISIT'

In mid-November 2011 our Network Zone app was finally ready for the first 'home visit' with the senior participants after meeting in the park in the morning. We had prepared some small bags for the seniors along with the phones, which contained a kit with an instruction manual for the app, an inspiration scenario of use, a sheet with exercises and a sheet with some evaluation questions. The exercises with feedback possibilities focused on how to create activities and sign up.

We were excited to hear about the seniors' experiences with the Network Zone app and the smart phones during home visits. After five days we received an email from Anne-Lise:

Table 1: Email from Anne-Lise after she tried the app at home.

Hello.

I have used the Network Zone to suggest some activities. Next, I signed up for other people's suggestions. It has worked well I think. Unfortunately we were only 3 who had the phones with us at home, but when it works with 3, it also works with others.

I don't know if it's only me, but sometimes when I create an activity the program says: Sorry the Network Zone has stopped unexpectedly. Try again - force it to close. But the activity was created anyway.

I do not know yet how it will be, but for me I wish that I could subscribe to a date. I like to plan. Maybe under activity before signing up, you could read the tips for the game.

I have used the phone to take pictures, send SMS, MMS and make calls. It has worked flawlessly.

All in all a good experience.

Best wishes from

Anne-Lise

The email indicated that Anne-Lise had had a good experience using the Network Zone app, but there had been some issues. Still, Anne-Lise had managed to overcome the problems in her own way. This insight that also showed Anne-Lise's transformation as a smart phone user during the period of our Living Lab. She started out being very hesitant about using the phone and now she had not only learnt to manage the phone and use our app, she was also a critical user with suggestions and ideas for enhancing the Network Zone app.



Figure 4: Anne-Lise, Janja and Tekla trying the app.

PLANNING BETWEEN THE MEETINGS IN THE PARK

In order to make quick iterations and to give the seniors the opportunity to try out the application as part of and between our meetings in Valbyparken, the first version of the app had limited functionality. Focus was on testing the features that would support the possibility of extending the meetings in the park, i.e. that you could continue the dialogue, planning and negotiation at home between meetings. The implementation of the app in the Living Lab should give the senior participants the opportunity to take part in determining what activities should be arranged for our bi-weekly meetings. With the app, they could initiate activities, and everyone in the network could sign up for the activities they wanted to join. It was not only about trying out the specific features of the app, but as much or perhaps even more about rehearsing new practices around the app in the Network Zone. Questions we asked ourselves were what the app meant for the community, and what life could evolve around the use of the Network Zone? Could the app support the continuation of the community of the Network Zone? Questions, that need some time beyond the project period to get insight into.

As a means of communication and another element in our infrastructure, we had a blog for our Living Lab. The Web-based blog: valbyparken.blogspot.com, which later changed platform and name to: www.motionidetfri.dk/valby is functioning as a bulletin board where upcoming meetings and activities are being announced with time and place. At the same time, it is a window into what is going on, because there are almost always reports with pictures and stories about what has happened after a meeting in the park. In the beginning,

it was mostly members of the project group that were active on the blog, but slowly the seniors took over, and now (in the end of the project period, October 2012) they take full responsibility for announcing events and writing reports afterwards. An example of a report written by one of the seniors around the time when the project period ends:

Table 2: Erik's report on the blog after a Friday in the park.

Friday, 19th October, 2012

We met at 10.00 am and again to a glorious morning. It was 13 degrees and dry, though the grass was a little wet.

There were 2 new participants, so we were Birgit, Janja, Anne-Lise and Erik, Børge, Erik and Anni and Erik.

We splitted into two teams, one team played Disc Golf and another played petanque, so after almost two hours (with sweat) we went together to our base at the playground and the day ended with a cup of coffee.

A lovely morning with outdoor exercises. We'll meet November 2 at 10.00 am. You might want to wear boots / wellies because the grass is wet.

EB

Erik who has written the report, provides the readers of the blog with a snapshot of their day in the Valbyparken. What he emphasizes is who participated, what kind of activities they did together as well as other information about the weather and the next meeting. Readers of the blog will know the central information of the Network Zone.

In the end of the project period (Fall of 2012) the senior citizens had slowly taken over the responsibility for the meetings in terms of planning and negotiating about the meetings – and communicating on the blog as mentioned above. In early October 2012, at the day before a meeting in the park, we were curiously awaiting if there would be a meeting in the park and to see which activities the seniors had planned. "Walk in the beautiful park", says one of the activities. We noticed that Anne-Lise created it, and that the venue is at the playground. Erik also created an activity. It is Frisbee on the volleyball court, and Birgit suggested Disc Golf. It sounded like a nice day in the park, but we did not find any commentary on the blog afterwards.

The app and the blog were used together for planning activities before meeting in the park and evaluating on the meetings afterwards and in this way connecting the participants. How much interaction and dialogue there were before, during and after the meetings in the park seemed to vary, but the group of 15 senior citizens were still meeting in the park every other Friday around the time where the project period ended.

OPEN INVITATIONS FOR NEW PARTICIPANTS

As Erik's comment also indicates new people joined in, but how did they become part of the Network Zone and get access to the app?

The app is local for the park and is a service to the seniors who join the Network Zone in the park. There are many open invitations to become part of the network: the blog online, the physical manifestations in the park, and the meetings in the park. When the Network Zone members meet in the park, it is visible to others that something is happening. The same goes for the traces we leave behind between the meetings. Also, representatives from the municipality of Copenhagen working with senior citizens play a significant role, as they can disseminate information about the Network Zone in Valbyparken.

Børge is an example of that. He was suggested to participate in the 'Exercise in the outdoors' as a part of his rehabilitation from serious illness. He came into the network some time after it was established and after the app was introduced, but he quickly became a part of the social community. Børge was skeptical of computers and digital media, and did not initially take up the offer of getting a smart phone app with him home. The second time Børge was in Valbyparken, however, he had already changed his view on the Network Zone: "In my family, we have never used computers and smart phones, because we think that they separate people from each other. But now I can see that they actually can bring people together." Børge ended up with a smart phone as well (Yndigegn 2012).



Figure 5: The group of seniors in Valbyparken's winter landscape.

DISCUSSION

Initially, we asked: how can we design sustainable infrastructure for ad hoc social interaction?

Our design program encompasses objectives of wanting to design possibilities for letting social interaction emerge among senior citizens as a way of rethinking services of the municipality. A complicated setup, which also needs a period of use beyond the project to actually be possible in some ways to talk about sustainability.

In our design experiment we established a living lab to try out the idea of an ad hoc community of senior citizens with focus on outdoor activities. The senior citizens and other partners were involved in the process and together we rehearsed new practices in the process of rethinking new services. In this part we discuss how we came about designing sustainable infrastructure for

ad hoc social interaction by exploring the relation between our program and our experiment by the two characteristics: Ad hoc and sustainability as the main criteria for the experiment and the development of the app. But this experiment also points to some issues of design after design and infrastructuring in relation to social interaction, which we will briefly touch upon in the end. In this discussion about ad hoc and sustainability it should be taken into account that we still need to process the empirical material of the period after the project.

THE MANY ASPECTS OF AD HOC IN THE NETWORK ZONE

What does it mean for the infrastructure that the social interaction we want to design for is ad hoc? And how did it play out in practice in our design experiment? As mentioned in the introduction, we wanted to address a wish among some of the senior citizens we were in contact with, of being able to adjust participation in community activities based on the mental and physical condition at the specific time of the activity. So, we tried to establish a Network zone in which the membership is fluctuating and not determined by formal structures, contracts or other regulations.

IN THE PREPARATION OF A (POSSIBLE) MEETING

"Ad hoc" also refers to the character of the things going on before the meetings in the park. As we reported in the section of our design experiment, we saw the seniors initiating activities by using the Network Zone app to suggest and sign up for specific activities: 'Walk in the beautiful park', one of the activities said, created by Anne-Lise, who also suggested that they should start at the playground. For the same day in the park, Erik also created a Frisbee activity at the volleyball court, and Birgit suggested Disc Golf. The app was used for planning activities before meeting in the park. The planned activities that appeared in the Network Zone app gave everyone an idea of what was going to happen, but just as important that *something* was going to happen, and that there were others who were going to come. And maybe also who is going to come which can be important for each individual when making the decision of showing up. Instead of just joining the already planned activities, it is possible to take an active part in both the planning but also in the ongoing negotiation or adjustment of activities that can be created through communication channels in the app. The ad hoc aspect of the activities relates to the negotiation that could be made just before the meetings when e.g. the weather determine wishes of change in plans: "shouldn't we meet on Monday instead, the weather is going to be nice." The introduction of the app and this possibility made the seniors part of the planning. They came with suggestions on what they wanted to do, but they still referred very much to the catalogue of activities that we had presented to them.

RE-DESIGN OF THE NETWORK DURING A MEETING

During our meetings we have witnessed how ways of organizing activities were very dynamic and ad hoc. Organization of activities is adjusted in the situation in the park based on the actual condition and mood of the seniors participating in the specific activity, weather conditions, availability of exercise equipment, and how many participants show up. In this last part the Network zone to some extent differs from existing ordinary activity catalogues for seniors in activity centers. We have not yet seen this in practice but adjustments of the activities or the overall program for a given day could be supported by the app. The app could facilitate an ad hoc redesigning of the gathering to make the community intact. Senior citizens arriving late, were still able to find the group by using at the function of signing in at a particular place in the park.

THE AFTERMATH OR IN-BETWEEN MEETINGS

The possibility of extending the dialogue with the app and blog supports the idea of making space for evaluation or openings for meeting again. Erik's messages in the report: "You might want to wear boots / wellies because the grass is wet" is a small evaluation of the meeting and a thoughtful message to those who will be attending next time. This creates a small connection between meetings and signal to people that there will be another meeting (we will meet again).

THE CONTINUATION OF THE FIXED FRIDAY

In the program we initiated, we wanted to establish a thick infrastructure (Telier 2011, p. 285) of social and technological elements that would support ad hoc social interaction. Our notion of "ad hoc" in the project group was often a perception that it also included (last minute/ongoing) changes in the agreements – such micro planning, that the especially the mobile phones have made possible. But when we recently visited the Network Zone and the elderly in the park it struck us that the simple structure in the form of a fixed arrangement with a fixed venue works for this local group of senior citizens. The fixed biweekly Friday - which was a set-up we started in the project period when the Living Lab was established to start somewhere - has survived the completion of the project and is continuing. It means for the senior citizens that there is a constant rhythm of meetings that carries their activities, but they have the ability to come and go - add or remove - depending on their mood, etc. on the specific Friday in even weeks. This puts a question mark on the actual use of the app and whether it has a role in supporting the ad hoc social interaction in this community.

THE SUSTAINABILITY OF THE NETWORK ZONE

What makes the infrastructure sustainable in the Network Zone concept when membership is fluctuating and not determined by formal structures, contracts or other regulations? Is it possible for the Network zone to sustain and continue after the project period? And what role does the app play in this continuation?

The process of infrastructuring came very much to be about connections between the human actors. When we initially had difficulties getting senior citizens to show up for the event, it very much complicated our experiment of establishing a thick sustainable infrastructure regarding the app or not. The Network Zone contained some fixed points such as the park, the base at the playground (see Erik's reportage), the meeting place by the lake and a tool shed with exercise equipment (a shed we gained access to after making arrangements with the park manager). These constitute some physical manifestation of the zone. But to create a thick infrastructure with the mutual constitution of the social and the technical (Telier 2011) the app, the blog with news and stories, the Friday-meetings in the park (if anybody shows) as well as representatives from the municipality of Copenhagen knowing about the Network Zone in Valbyparken play an important - maybe essential - role. However the body of the Network Zone is probably the senior citizens. As individuals they come and go as it suits their everyday life, but as a group it is persistent.

The project group's participation was temporary in the sense that we had to withdraw ourselves from the Living Lab, when the project period ended. This meant that in the process of infrastructuring, it was also about transferring the responsibility for the continuation of the Network Zone to (some of) the elderly, and people from the municipality of Copenhagen, who would continue to have a connection to the community. On the one hand, a fine transfer process slowly happened, in which the introduction to write on the blog and the app meant that the senior citizens began to participate in the planning and the evaluation of the meetings e.g. Erik's reportage on the blog. It was also reflected in the small interaction in the park, for example when Janja explained Tekla how to sign up for an activity. We also experienced some of the senior citizens helping each other when some had problems with finding the camera, finding the pictures they had been taking and now had disappeared or to reload the app, when it had been unused for a while. On the other hand, there was a challenge in the process of infrastructuring in creating links between human and non-human actors regarding us – the project group – who for a long time had been part of the Network Zone. We also accounted for a large part of the social community. The question is what it means when we build this scaffolding around social interaction, but end up removing a part of the content in the form of ourselves? How much of the sustainability is about us being part of it - and what does it mean for the possibility of the Network Zone to continue after the project is completed. When we last visited the elderly in the park we were greeted with comments like: "It is not the same as when you were part of it" and "please, come again, it's good for us to meet with other (younger) generations". None the less there is still a group of senior citizens (approximately 15) that continues to meet every second Friday. Sometimes they are all showing up and at other times they are maybe only five.

TO SUM UP: INFRASTRUCTURE BECOMES SUSTAINABLE THROUGH USE

In this paper, we have pointed out our experiment of how we tried to create a sustainable Network Zone for ad hoc social interaction among senior citizens. Even if use is not regulated through any contracts, formal rules or the like, we have pointed to how an infrastructure can support the hoc social interaction and be sustainable through participants' use and ongoing adjustments on top of the Network Zone of the physical and digital manifestations we spun underneath their activities.

How much interaction and dialogue there was before, during and after the meetings in the park varied, but the infrastructure is there and support members of the Network Zone (or 'Exercise in the outdoors', as it is now called), who would like to meet in the park. With the app as one of the elements we have spun a web under the community, which means that the Network Zone Valbyparken continues even when the project is completed. The dialogue and activities continue with the seniors at the helm. It is a portable foundation with some fixed points besides the app such as specific places and items in the park and a blog with stories about what has happened, which is persistent even if other actors - project members, other partners and the various seniors who have taken part - come and go. The app will live a life when it is used by the community. We have created an infrastructure for ad-hoc communities that are locally rooted, but the sustainability of the network zone is established through use.

So, would it die if the people using it now were not there anymore? Maybe? But some of the 'stable' elements of the Network Zone or 'Exercise in the outdoors' e.g. the app, the online blog, the sports instructor and the people from the municipality are now wrapped together as a service concept and is going to travel to other parks in the area of Copenhagen, where the idea is to establish new communities of outdoor exercises building on the experiences from our Living Lab.

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COLUMNS ON THE FINAL PAGE SHOULD BE OF EQUAL LENGTH

EXPERIMENTS ALL THE WAY – DIAGRAMS OF DIALECTICS BETWEEN A DESIGN RESEARCH PROGRAM AND EXPERIMENTS

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ABSTRACT

Experiments take various forms, have various purposes, and generate various knowledge, depending on how and when they are integrated into a design research study. In this paper, as reflective (co-) design researchers/practitioners, we exemplify and argue ways in which different experiments can be at the core of a research project throughout the study. As former PhD scholars, with design backgrounds, both of us were engaged in the XLab project (2006), proposing a programmatic approach to experimental design research. This paper reflects our experiences of adapting this approach in PhD studies.

Furthermore it exemplifies, discusses, and adds to the understanding of different experiments during a design research (PhD) process. In the paper, we also reprint our two modifications of the original XLab ‘working diagram’ and discuss rationales for adapting this as a part of the research process.

INTRODUCTION

Since Frayling (1993) coined the term ‘research through art and design’, many have been addressing and exemplifying ways in which design examples and practice can contribute to the field of design research. Today it is commonly acknowledged that very often

different experiments play a central role in practice-based design research (see e.g. Brandt et al. 2011; Koskinen et al. 2011; Gaver 2012).

As early as 1983, Donald Schön described how design practitioners engage in different types of experiments (Schön 1983). He observed and argued that experiments in practice are different from experiments in science, and he defined three types of experiments: exploratory, move testing, and hypothesis testing. The main point was that each type of experiment has a different purpose and generates a different knowledge (ibid).

To investigate this area of design research, in 2006 the Danish Centre of Design Research hosted the ‘XLab’ meta-project which included a series of three hands-on and reflective workshops: ‘Beginnings’, ‘Per:form’, and ‘Intersections’ (see Brandt et al. 2011). As PhD scholars at that time, both of us were engaged – one of us in the core team, the other as an active workshop participant. Inspired by Frayling, Schön, and others, XLab explored and proposed a programmatic approach to design research with experiments at the core of the research projects (ibid; Binder & Redström 2006; Brandt & Binder 2007). This main argument was condensed into a working diagram, which is further explained below (for other discussions about the diagram see also Bang 2010; Bang et al. 2012; Eriksen 2012; Markussen et al. 2012).

This paper aims to add to the above mentioned body of work in terms of discussing and understanding different experiments in design research and in terms of adapting existing diagrams and views to fit one’s research.

First, we introduce the original XLab working diagram. Then we discuss different selected experiments and how they intertwine with our adaptations of the diagram. The XLab workshop titles are used as a reflective layer structuring the discussions and reflections also relating to Schön’s classic (1983) and Gaver’s recent (2012) views of experiments. We end the paper by reprinting our modifications and discussing rationales for how we both identified a need to modify the working diagram.

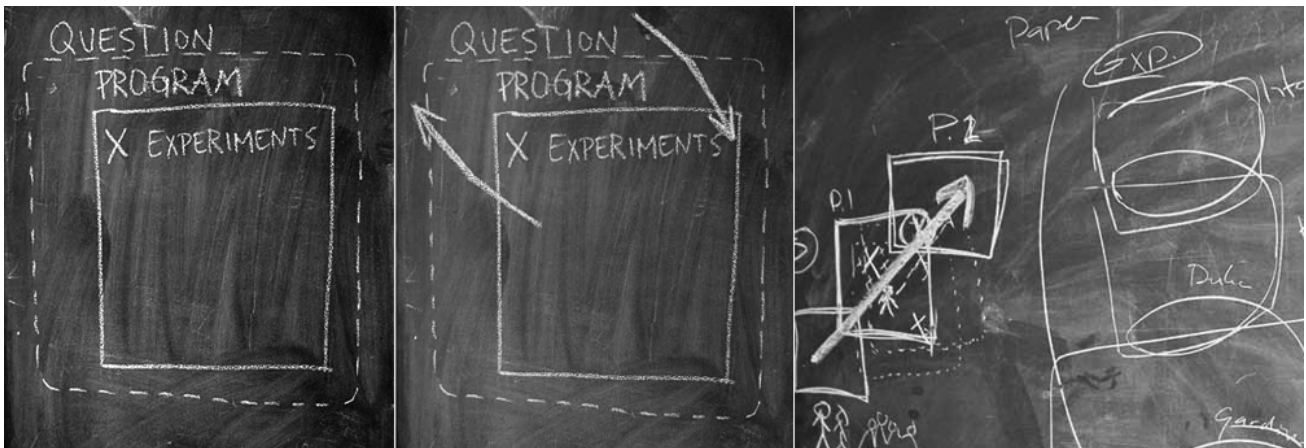


Figure 1-3: Figure 1 (left): The XLab diagram, visualizing the central role design experiments are suggested to take in exemplary design research (re-printed from Brandt et al. 2011:24). The arrows in figure 2 (middle) emphasize that a research project may be initiated from 'the outside' or from 'the inside' (re-printed from ibid:26). Figure 3 (right): As new knowledge is gained the 'program' drifts; later come stabilization and closure – leading to the formulation of the next research program (re-printed from ibid:34).

A WORKING DIAGRAM

The XLab meta-project (in 2006) provided a way of understanding and working with experimental design research (Brandt et al. 2011). This approach is captured in the working diagram, visualizing the central role a research program and design experiments are suggested to take in a design research project (Figure 1). Thus, the diagram was developed to help understand, visualize, and talk about design research as a dialectic relationship between an open program with experiments at its core. Developed in parallel with the diagram, with the notion 'exemplary design research', it is acknowledged that design experiments in a research project also must engage with a wider research context and question (Binder & Redström 2006; Brandt & Binder 2007).

Figure 1 illustrates the dialectic relationship by positioning the 'Program' between core 'eXperiments' and a larger (research) 'Question'. The arrows in Figure 2 emphasize how a research project may be initiated from 'the outside' through a larger (research) question or from 'the inside' through design experiments. Finally, Figure 3 illustrates the processes of drift, stabilization, and closure that lie in a programmatic approach to experimental design research.

From the XLab project, it is suggested to view a research 'program' as stating an attitude and position,

and capturing core issues and research intentions. At the same time, the 'program' is understood as being 'open' for explorations, surprises, and new insights for example from practical experiments (Brandt et al. 2011:37). As such, there is a fine balance between being open to new insights caused by the practical research and ensuring that the work is loyal to the frames and intentions that lie in the program.

It was recognized that experiments in a research project build on or complement each other. That is, they assist in practically exploring, challenging, expanding, and substantiating the research program. Thus, when a program is initially formulated and initiated it includes no, or only a few, experiments (from previous work). Throughout the research, more experiments are added in order to challenge and substantiate the program.

In the original diagram 'Question' can be viewed as a research question that has a larger scope than the program (Brandt & Binder 2007). This means that it refers to a reality outside the program.

In the next sections, we describe how we continually explored the programmatic approach and diagram in our respective former PhD studies in order to adapt and operationalize it to fit our specific (co-)design research contexts. (Hereafter MAE refers to Mette Agger Eriksen and ALB refers to Anne Louise Bang.)

Mette Agger Eriksen / PhD title: *Material Matters in Co-Designing – Formatting & Staging with Participating Materials in Co-design Projects, Events & Situations*

PhD start: Jan. 2004 (Studies almost paused for a year three times). Thesis defended: June 2012. Affiliation: Malmö University. Four years full time studies plus one year teaching. Financing of studies: European 'Palcom' project (2004-2006), the Danish Centre of Design Research (2006-2009 / 50 %), The Swedish Research School (bits 2007-2012), the rest by Malmö University. Prior studies: Architect / user-centred industrial designer. During her studies MAE has engaged in and drawn experiments from five different co-design research projects (WorkSpace, Atelier, PalCom, XLab and DAIM), from a workshop series and teaching mainly interaction and service design. Experiments here are 'co-design events' / workshops.

Anne Louise Bang / PhD title: *Emotional Value of Applied Textiles – Dialogue-oriented and participatory approaches to textile design.*

PhD start: Jan. 2007. Thesis defended: May 2011. Affiliation: Kolding School of Design. Three years funding including one semester teaching and knowledge dissemination. Funding: The study was conducted as an Industrial PhD, which means that it was partly funded by the Danish Industrial PhD programme and partly by Gabriel A/S – a company in the Danish textile industry. Prior studies/practice: Textile designer. During her studies, ALB had the opportunity to develop experiments in close collaboration with the design unit at Gabriel, and with students at Kolding School of Design teaching mainly design processes in textile design. Experiments here are mainly 'co-design events' / workshops.

Table 1: The paper draws from two finalized practice-based, co-design research PhD studies. Their formalities and contexts are briefly outlined above.

BEGINNINGS: GET GOING WITH EXPERIMENTS

In the XLab project, the ‘Beginnings’ workshop had a focus on how to understand the workshop participants’ different projects as program-experiment relations and drifts (Brandt et al, 2011: part 1) (see Figures 1-3). Here we have a similar focus on roles of previous and early experiments as a part of framing the research program, but also emphasize how experiments assist in shaping the experimental methodology and establish engagement with the specific research context.

FRAGMENTS FROM MAE’S BEGINNINGS



Figure 4: Published 2-page ‘researcher’s statement’ (Eriksen 2004) combining nine previous experiments and textual descriptions.

Prior to MAE’s PhD studies, she engaged in two multidisciplinary EU ‘disappearing computer’ projects, other co-design workshop series, and some teaching. In addition to MAE’s design background, from these experiences she brought a

participatory design (PD) research approach and a collection of experiments about engaging tangible materials in staging co-design work, mainly at workshops. From MAE’s background as an architect, she brought the approach of working with a ‘program’, which she in addition to PD wished to apply in the PhD studies, rather than start by formulating one clear-cut research question.

Building upon MAE’s previous co-authored publications about some of her previous experiences/experiments, very practically having to write a PhD study-plan and an official ‘researcher’s statement’, for the first time forced her to individually formulate research interests – a research program. This statement/program (Figure 4) briefly described her main initial research context (WHERE), the approaches (HOW), and with the nine previous experiments, revealed some of the qualities and challenges she had discovered so far of materially engaging various stakeholders in co-designing, which she wished to further explore (WHAT).

In parallel, from day one, her PhD studies were intertwined with a new EU-funded participatory IT research project, PalCom (PalCom), with many of the same colleagues from the previous years and many new people too. There were many different agendas, but the project provided use contexts and a network of people (and materials). Thus, to get new, shared experiences, right away MAE’s initial PhD studies largely were spent engaging in various activities (experiments) with multidisciplinary stakeholders at thematic workshops.

FRAGMENTS FROM ALB’S BEGINNINGS



Figure 5: In the “Fabric-as-Upholstery-Workshop” the Repertory Grid technique was explored as a tool for dialogue.

The first experiment that had a significant influence in ALB’s project was conducted in the pre-doc period developing the research in collaboration with the partner company. It was decided to conduct a pilot experiment in order to experience (instead of just talking about) ways in which an experimental approach could be an advantage for the project. This also contributed to strengthening the partner’s engagement in the PhD studies.

In the pilot experiment, ALB explored whether a variation of the Repertory Grid (interview technique from psychology) could support the dialogue about sensory perception of fabrics and other flexible materials, which in this case were examined as if they were upholstered. For many reasons, the pilot experiment had a lot of flaws and malfunctions (for a thorough description see Bang 2007; 2010). However, over time it turned out to have a significant influence on the experiments in the PhD study. Firstly, the Repertory Grid was continually explored and refined through the project as a tool for dialogue in design practice/design research. It was a way to structure a dialogue about soft and immeasurable concepts such as emotional value in relation to applied textiles. Secondly, the experiment caused a reframing of the emerging research program from a narrow focus on tactility to a broader focus on emotional value.

Thus, the pilot experiment heavily contributed to the first tentative objective and formulation of the research program. It also laid out the ground for experimentation during the PhD study, ‘suggesting’ ways in which the next experiment could be formed and conducted. It became the ‘mother’ of the series of iterative experiments in the PhD study, allowing ALB to continually explore and (re)frame various themes.

REFLECTIONS ON/ BEGINNINGS: GET GOING WITH EXPERIMENTS – WHEN TAKING A PROGRAMMATIC APPROACH TO EXPERIMENTAL DESIGN RESEARCH

The XLab project suggested that as a design researcher it is necessary to establish a knowledge regime or a hypothetical worldview in order to frame and contextualise the specific research inquiry (Brandt et al. 2011: part 1:19). Additionally, the team behind XLab claims that in order to concretise the hypothetical worldview, the program needs the materialisation in the form of experiments. In a similar way, the experiments need precise frames in order to turn them into more than undirected exploration (ibid: 35). Further, as argued and captured in Figure 2, there is not one linear way of doing design research, since the program can emerge both by formulating questions and positioning the work in a research context, and by conducting experiments (Brandt & Binder 2007).

These views intertwine with a pragmatic understanding of knowledge production, emphasizing learning-by-doing, which inspired by philosopher John Dewey, is a basis for Donald Schön's understanding of the practice of a reflective practitioner (Schön 1983; 1992). As stated, what we exemplify and discuss in this paper is being reflective (co-) design research practitioners. Schön argues that experiments in practice are different from experiments in (traditional) science, because the (design / research) practitioner has an interest in transforming the situation into a preferred one. Schön describes experimenting as: *"In its most generic sense, to experiment is to act in order to see what the action leads to. The most fundamental experimental question is, 'What if?'"* (Schön, 1983:145).

As described in the introduction, Schön defined 'exploratory experiments' as one of three different types of experiments. An exploratory experiment, he describes, is undertaken only to see what follows in order to get a feel for things and it succeeds when it leads to a discovery (ibid). This corresponds with Gaver's characterization of research-through-design as a research practice addressing wicked problems, where the situation at the same time is formulated and addressed (Gaver 2012).

In general, the XLab project can adhere to the same understanding of experimenting and doing research. As described on the previous page, both of us used experiments to form our first tentative research program. In traditional (scientific) research, experiment(s) are not carried out until a proper hypothesis has been formulated; we therefore had to ask the question: "What is it that makes experiments in the absolute beginning of a project so fruitful?" Trained as reflective design practitioners, experienced in working with design programs and briefs, we both found it very fruitful to get going with experiments and reflecting upon these from the beginning of our PhD studies and inquiries. We learned while doing and reflecting on

them – either a collection of previous ones or one pre-study experiment – and they played important roles in enabling us to verbally and in text describe our research interests and programmatic positioning. With our backgrounds, only doing this from theoretical points of view would have been challenging, but as our examples show, the experiments enabled us to frame and reframe our focuses. In other words, this argues for not spending half a year formulating the right research question before starting to experiment and gather empirical data.

Documenting the experiments – in our studies considered as co-design workshops or events – generated the 'data', upon which we could reflect and intertwine when framing our initial programs. However, conducting the experiments was not only an empirical data collection. As exemplified by ALB, conducting one main pilot experiment as a part of the pre-doc period, also largely worked as a way of getting a shared experience with people from the partner company (the specific research context). The pilot experiment further engaged them in the PhD study, and in shaping the experimental and participatory research methodology. Thus, this ('exploratory') experiment had a crucial influence on the further development of the PhD study. It helped ALB to formulate the tentative project description/program and it laid the groundwork for the series of iterative experiments that were conducted later.

MAE's beginnings were quite different. When she began her PhD studies, she already had experience with experiments in different design research contexts and was confident about her participatory design approach. In parallel with starting new participatory activities/experiments in a new project as a part of engaging herself in that research context, an important part of beginning the PhD studies was to choose relevant examples in the collection of previous experiments, and initially analyse and reflect upon these as a part of formulating the first research statement/program.

For MAE it was challenging and took much iteration to formulate the research interests in images and text on a few pages, but on the other hand, it proved important to materialize and temporarily complete this as a text that was published and printed. It became a text that MAE returned to, and it assisted her in the move from being a research assistant to becoming a PhD scholar with her own research interests, agendas, and program. This and later re-formulations (e.g. on websites, in yearly PhD study plans and in published articles) assisted her to navigate and position her work in the PalCom project and other research projects she participated in later during her studies.

Despite two different starting points, this shows how the program of a specific design research does not come out of the blue, but emerges from a combination of: i) establishing a research context, ii) previous and new experiments related to that context and iii) programmatic formulations of interests and challenges – sometimes phrased as questions.

PER:FORM: ITERATIVE REFLECTIONS WITH EXPERIMENTS AND DIAGRAMS

In the XLab project, the 'Per:form' workshop had a meta-level focus on performing and making an actual experiment to reflect upon what really happens in practice (Brandt et al. 2011:part 2) Here we further emphasise performing iterative reflections on and with the experiments and actions. This is intertwined with re-visualizing and re-formulating the diagram and program – both as a part of positioning the work and developing initial knowledge claims.

FRAGMENTS FROM MAE'S PER:FORM

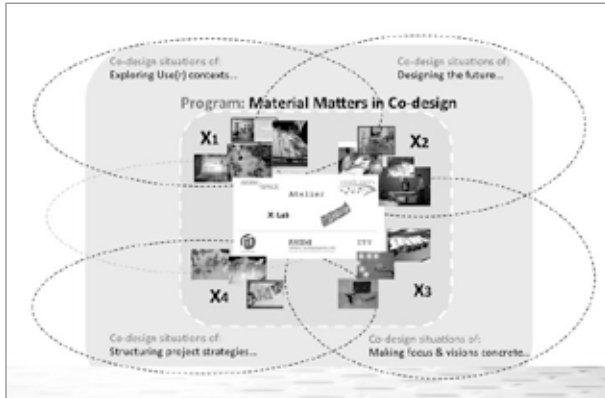


Figure 6: The diagram above focuses on naming different clusters of experiments (X1-X4) from the central co-design projects in MAE's study. The purpose is to expand and challenge the program.

About two years into MAE's PhD studies (in 2006), the PhD program drifted somewhat. Initiated by publishing an exploratory paper with initial claims (Eriksen 2006), the naming of her program changed first from the initial focus on 'Materially Grounding Imagination' (X1 in Fig. 6) to the more overall 'Material Means', to the more fruitful 'Material Matters', which developed and stabilized as the research program (Eriksen 2012).

Also, at that time, MAE was mapping and reflecting upon the experiments she already had, and she e.g. saw a large collection of experiments exemplifying co-designers working with various forms of mock-ups, prototypes, and scenarios as useful collaborative ways of imagining and 'designing the future' (X2 in Fig. 6) – generally, well-established and very fruitful practices of engaging tangible materials in multidisciplinary co-designing. However, relating this to the large body of PD literature about such practices, it was clear that many others were researching this too. MAE realized that she needed to make a programmatic decision. Either, she could narrow her focus and really study those materials in co-design situations, or she could aim for a broader collection of experiments also addressing other materials and focuses of co-design situations, events, and projects. She chose the last.

This decision and program re-framing were affecting the specific staging of MAE's coming co-design experiments. Practically (and interventionistically) it pushed her to explore co-design situations in which materials were engaged for other purposes than e.g. prototyping (X3 and X4 in Fig. 6) – for example during the XLab project. Theoretically, this move also pushed MAE to explore broader perspectives of how materials are participating and performing in co-designing, which is the main focus of the PhD thesis.

FRAGMENTS FROM ALB'S PER:FORM



Figure 7: The diagram above represents a late stage of the PhD study where ALB tentatively organised the experiments in groups, as a part of planning the structure and content of her thesis.

Throughout ALB's PhD study, each design experiment challenged and substantiated the research program in various ways. This was challenged in the sense that each experiment revealed knowledge gaps in her research, and was substantiated in the sense that each experiment added to the knowledge generation. Thus, the experiments were conducted in an iterative process, with each design experiment building on the previous one. Reflecting upon each experiment, three main themes dominated the iterations (Bang 2010).

One major theme was the study of emotional value in relation to applied textiles. During the experiments, ALB's focus on textiles changed from a narrow focus on 'textiles as material' to a broader focus on 'textiles as part of an object in a context'. This change in focus influenced the choice of materials in the experiments.

Another major theme was the dialogue about emotional value. As ALB described earlier, the Repertory Grid proved to be a useful tool for dialogue in a pre-stage of the PhD study. As it happened, each experiment throughout the project explored a modified version of the Repertory Grid and thereby refined the use of the technique in the field of textile design.

The third major theme was participation. One of the objectives with the project was to explore ways in which different stakeholders could participate/contribute to the design process in the collaborating company. Different participatory approaches were tried out during experiments, and in the final stage it was decided to continue with design games and therefore the final experiments tried to refine an appropriate procedure.

Thus, by mapping the different experiments and themes ALB's program was being 'filled out'.

REFLECTIONS ON/ PERFORM: ITERATIVE REFLECTIONS WITH EXPERIMENTS AND DIAGRAMS – TO CREATE PROGRAM DRIFT AND STABILIZATION

In addition to arguing for program-experiment dialectics and thus for learning with experiments, an XLab project recommendation was to acknowledge that the program drifts as new insights are gained during the process (Figure 2+3 / Brandt et al. 2011).

This too is tightly coupled with Donald Schön's views of practice as a reflective conversation with the material of the situation, for example, as continual naming, framing, and reframing of what problem to attend to (Schön 1983; 1992). Schön further argues that reflection in action happens through understanding the back-talk of the moves made and the materials in the situation. Such back-talk can be probed and simulated by what he calls a 'move testing experiment', which is an action to produce an intended change with an end in mind. It is affirmed when it produces what it is intended to do, while also making it possible to go beyond the initial understanding of the problem. Further, he argues that it is essential as a reflective practitioner to master reflection-on-action or 'double-loop' learning processes (ibid).

Partly related to this, Bill Gaver argues that *"an endless string of design examples is precisely at the core of design research"* (Gaver 2012:938). Related to the idea of design space, Gaver views one artefact/ design/ example as filling out one point in a design space, while a collection of multiple examples – what he calls a 'portfolio' – establish an area or domain of concerns and judgments in the design space (ibid: 944).

As described on the previous page, both of us made many sketched and graphic diagram modifications during the research in order to assist our reflective processes in relating the program to selected experiments. Figures 6 and 7 are steps in the modification/development of the diagram. Each of them matches a specific situation in the PhD study and expresses actual ideas of the dialectics among our unique research context, program, and experiments.

As the stories and diagrams show, much in line with what Gaver suggests, both of us were clustering and naming collections of multiple experiments as a part of identifying programmatic concerns and themes.

MAE's diagram (Fig. 6) reflects a time in her PhD project in which there still was time to open up and further explore the program (and design space). As described above, her inventory and contextualization in relation to PD literature and the mapping of experiments from different projects, resulted in a reframing of what the program 'Material Matters...' covered. The intension and outcome of the reframing was to stronger position the research and to provoke, challenge, expand, and thus partly drift the program. This programmatic

decision closely intertwined with a material methodological shift to stage exploring other corners of the program.

As already captured in ALB's Beginnings, likewise, when reflection upon an experiment was carried through, ALB also learned when a smaller or larger adjustment of the staging and thematic framing of the next experiment was needed, to further explore her research topic of emotional values (Fig. 7). Yet, the intension here was slightly different – to 'fill out' and sharpen the program through the chain or iterations of experiments. This way of working with the program-experiment became a process of continually learning with every experiment, as a part of driving the research forward.

In other words, in both PhD studies the WHY, WHAT and HOW of the programs were continually contested by the experiments and by relating them to the wider research context – often resulting in a reframing with a new diagram modification.

Further, as briefly emphasized in the reflections on Beginnings, MAE's story also emphasizes how publishing an early argument, also further into her studies, proved fruitful. Not only because of the academic merits of publishing a peer-reviewed paper, but largely because it manifested one of the minor program drifts and materialized the current program. In this exploratory paper (Eriksen 2006), the title was similar to the current title of the program and as a core of the paper, it intertwined description and brief analyses of selected experiments/exemplars clustered in pairs. With these she argued for an activity at co-design workshops – there called 're-representing' – that she saw needed further work. This activity – later called 'rematerializing' was further explored and became a central contribution in the PhD thesis (Eriksen 2012).

The stage ALB was in at the time of the modified diagram in Figure 7 represents a period when her program was stabilizing, and she was beginning to frame emerging themes. This was done by filling out the program with collections of two-three experiments, and then naming these as themes addressing the (at that time) dominant research themes. Such modified diagrams, worked for both of us as a way to practically begin structuring the content and arguments of the PhD thesis.

Also at these stages, more or less in the middle of our studies, experiments still played a central role – but here we address the iterative performing of experiments of a more reflective character. By sketching and naming the dialectics between the program and collections of experiments, these smaller individual experiments could be viewed as 'move testing', to use Schön's phrase. For both of us these adapted diagrams became a material, whose back-talk assisted in understanding where we were in our studies and in naming and (re)framing themes, focuses, and initial claims.

INTERSECTIONS: MAKING EXPERIMENTS AND PROGRAM TO EXEMPLARS AND ARGUMENTS

In the XLab project, the last 'Intersections' workshop had a focus on being each other's peers by relating three, at that time, newly defended PhD theses, to understand different ways of making arguments with experiments in design research (Brandt et al. 2011:part 3). Here we further place emphasis on intersecting in both our processes of physically drawing our material together, generating knowledge, and making arguments. This process meant intersecting our still-at-play program, selected exemplary experiments, chosen theoretical perspectives, and research contextualization and questions.

FRAGMENTS FROM MAE'S RESEARCH



Figure 8: 'Material Landscape of Co-designing' drawing different insights, concerns, and arguments together in a catalogue (copied from Eriksen 2012:343).

While writing the PhD thesis, MAE continually worked with how to 'draw together' (e.g. Latour 2004) the programmatic arguments in a 'designerly way' (Eriksen 2012). Eventually, in the latter analytical process of reflecting on the chosen exemplary experiences/experiments and drawing together issues and concerns related to the program, *material matters in co-designing*, MAE engaged in another experiment. She was physically intersecting main insights and arguments made in the previous chapters/parts of analysis of selected exemplary experiments with different theoretical perspectives.

For about three days, MAE's living room was changed into a laboratory, where she, with various tangible materials, built a three-dimensional so called 'landscape'. With a camera, she zoomed in on and captured details in the landscape highlighting certain points, then into the computer and merged with different styles of texts. MAE often found the image was not quite capturing the point she wanted to make in that close-up, which caused another iteration of the landscape. What MAE made and 'rematerialized' was a tangible but abstract 'landscape' in which her understanding of and proposed staging of (future) co-designing were intertwined and drawn together. In the thesis, this catalogue of 25 images and corresponding texts ended up being a very central part of the concluding chapters (further see Eriksen 2012).

The title of MAE's program and thesis, *Material Matters of Co-designing*, did not change for several years, but its detailed positioning and programmatic statements still developed while writing the thesis. Making the 'landscape' assisted in finally stabilizing and closing the program and arguments.

FRAGMENTS FROM ALB'S RESEARCH



Figure 9: Writing up in a practice-oriented way. The dark paper snippets pose questions that are answered by the following bits of text and images representing analysis and experiments.

While organising and analysing the material for the PhD thesis, ALB realised that she needed to find an approach, which allowed her to use design skills in the writing process. ALB learned that the Bauhaus designer, Anni Albers always made scrolls when she wrote her essays (Albers 2000:vii). She did this in order to create an overview of the text, securing flow and continuity. Figure 11 shows how ALB physically worked with the text. She cut it in pieces and combined these pieces with questions and images from various presentations and experiments. After that, she revised and rewrote the text on the computer and repeated the cut-and-scroll process. ALB did that numerous times, step by step building and physically making the PhD thesis.

This 'scroll-work' was conducted in parallel with the final analyses of the experiments. It assisted ALB in the final selection and combination of experiments for the thesis. It was a means for extracting the arguments/exemplars and making decisions for the final structure of the thesis. In the end, this way of approaching the writing-up and analysis processes enabled ALB to extract four main themes – each theme consisting of an argument and a tool/framework.

The four themes, which express the core of the 'Answers' to ALB's program, *Emotional value of applied textiles*, are centred on 1) the textile design process and applied textiles, 2) understanding and exploring emotional value in relation to design of applied textiles, 3) the rules and procedures of a Repertory Grid as tools for dialogue among a group of participants and 4) stakeholders' participation structured as design games (Bang 2010:246).

REFLECTIONS ON/ INTERSECTIONS: MAKING EXPERIMENTS AND PROGRAM TO EXEMPLARS AND ARGUMENTS - TOWARDS CLOSURE

The XLab project argued that at some point in a program there is a *“need for distillation, of bringing things together”* (Brandt et al. 2011:part 1:47). This means that a program is ready for closure when experiments do not provide new knowledge or are about to change into a new program with new objectives. Further, with the notion of ‘exemplary design research’, Binder and Redström (2006) also argued for practical experiments/examples to be made into exemplars in relation to the specific area of research.

Donald Schön proposes that we think of the practitioner’s knowledge in terms of a repertoire: *“As a practitioner experiences many variations of a small number of types of cases, he is able to ‘practice’ his practice. He develops a repertoire of expectations, images, and techniques. He learned what to look for and how to respond to what he finds”* (Schön 1983:60). In other words, a core part of becoming a reflective (design research) practitioner is to gather a repertoire of (e.g. experimental) experiences with which to act (and here, argue). Additionally, the third kind of experiment Schön has observed in practice is the ‘hypothesis testing experiment’, which is a process of elimination that succeeds when it affects an intended discrimination about competing hypotheses. We do not use the phrase ‘hypothesis’ in our work, but the logic of hypothesis testing is the same as in (design) research. In practice, the programmatic ‘hypothesis’ or worldview in our work also was implicit in the pattern of our moves.

As described earlier, Bill Gaver emphasizes that what to expect from research through design is many examples or what he calls artefacts or designs that embody designer’s judgments and concerns (Gaver 2012). Further, he suggests that the collection of examples is made into what he calls ‘annotated portfolios’ capturing conceptions and contributions (ibid: 944-45). By this, he argues that to respect the richness and particularity of the design examples, the role of theory is to annotate these rather than to replace them. Still by focusing on a collection or portfolio of examples, it can establish a balance between particular details and teased out concerns.

When it was time to write the thesis in our PhD processes, we both had a research program that was clearly positioned in relation to the research context as well as a repertoire and collection of experiments / examples that could assist in arguing for the program. In design research, as in other research, it is necessary to conduct a systematic analytic inquiry in order to meet academic standards. Yet, when working with the program-experiment dialectics (unfortunately) this is not straightforward since many perspectives and angles could be relevant in the analyses. It surely is a challenging job to choose the ‘right’ (angle on)

experiments, annotate and analyse them with the chosen theoretical perspectives, and turn them into exemplars, which can be offered for critical knowledge dissemination among peers. During our analysis and writing processes, it was therefore highly relevant for both of us to ask: “Which examples/ experiments can/should be highlighted and turned into exemplars supporting an argument ready for critical knowledge dissemination?” and “How should these exemplars be integrated in the thesis?” As exemplified on the previous page, using hands-on design skills and designerly ways to analyse the experiments and express the arguments/ exemplars allowed us to approach the writing process as an (hypothesis-testing) experiment in its own right.

MAE decided to integrate six complementary co-design experiments as Exemplars in a special layout, placed in pairs before the three main parts/arguments of the thesis. She then refers to and goes into details with these from different angles throughout the text (further see Eriksen 2012). Additionally, she chose to work with the ‘landscape’ as a part of ‘drawing materials and arguments together’ in more than words. In a sense this was a ‘hypothesis testing’ experiment, to use Schön’s phrase, as all her main arguments had been made in the previous chapters in three main parts. But was it possible to also materially draw these together in her concluding chapters? As described, after various iterations, it worked, and this assisted in finally closing her program and thesis.

ALB chose to work physically with the text in parallel with developing and conducting the analyses of the experiments. In her thesis, she chose to present each exemplar in two ways offering both a design tool/framework and a refinement of existing theory. This was a way for her to emphasise the relevance for design practice and at the same time contribute to theory development in her area of design research.

As described here and in the Per:form discussion, both of us have continually adapted and operationalized the XLab diagram to match the current state of study. This displays how we both experienced a certain resistance in making the stabilized XLab diagram fully work for us as it was. In the next section, we present our two modified versions of the diagram (Figures 10 and 11), which were materialized and closed towards the end of our studies. Yet in different ways, we both intended to contribute to the XLab discussion on practices of doing experimental design research, and we both intended to capture the dynamics of the program in our revised diagram. What we found a need to emphasize was the relationships among the program, practical experiment and theories, and related works (in short ‘the research context’), and how these together become the arguments or ‘Answers’ claimed in the PhD theses. The above discussions of hands-on practices of intersecting theories and experiments were parts of making both our theses into one long argument for the closed programs.

ADAPTING AND OPERATIONALIZING THE XLAB DIAGRAM - TO TWO OTHER DIAGRAMS

We both found the arguments, vocabulary, and illustrations of the program-experiment dialectics suggested by the XLab project highly relevant in relation to our different co-design research contexts. However, in practice, we also both found a need to reformulate the surrounding 'Question' in the XLab diagram and operationalize and adapt it to our work. Throughout our PhD studies, we both made many variations of the diagram – Fig. 10 and 11 are our final published version.

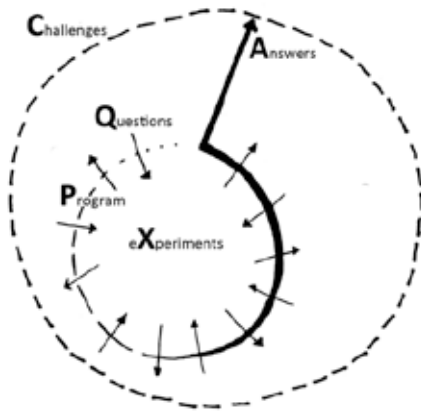


Figure 10: ALB's modification of the working diagram – capturing the dynamics of a research program (P) framed within an overall challenge (C) (reprint from Bang 2010:50).

In line with the original diagram, we fully agree that the program is surrounded by and positioned in 'a wider context'; however, we both found the word 'Question' misleading in the context of experimental design research, as it can be (mis)understood as the commonly used 'research question'. Questions have been central in both our co-design research studies, but not as the overarching, hypothetical 'research questions', which in many fields is guiding a specific research. For both of us the final 'research questions' were not formulated until finalizing the PhD thesis. Thus, as illustrated by ALB in figure 10, to both of us various kinds and many questions were asked and formulated, framed, and reframed as questions or statements testing claims, as both our projects and arguments dynamically developed with the experiments as well as theoretical and research context positioning.

In our view, an experimental programmatic approach means reframing questions continually, which is in line with the arguments of the XLab project, but in ALB's operationalization and subsequently reformulation of the original XLab diagram, she also aims to capture the dynamics of her research project. With this modification, ALB suggests distinguishing between two types of research questions. The first type of research questions is identified as 'overall challenges' (C) within which the initial program is established (similar to MAE's notion of 'concerns and issues' (Eriksen 2012)). The second type of questions (Q) more specifically functions as 'dynamic guides' during the project in the sense that these research questions are continually shaped and sharpened during the project to keep the program alive.



Figure 11: MAE's modification of the working diagram – capturing the stabilized program between experiments (X) and the larger positioning in relation to Theoretical perspectives and related works (T) (reprint from Eriksen 2012:74).

Likewise, in MAE's final version of the diagram (Figure 11), what surrounds the program has been rephrased from the larger 'Question' to be more specific by emphasizing 'Theoretical perspectives and related works' (T). In other words – her operationalization of the diagram aimed to capture how the various chosen (academic and research field) references assist in positioning and contextualizing the research, and sharpening and stabilizing the program/arguments. The reason for doing this was to match how her program and final programmatic statements and arguments slowly and finally matured and stabilized when writing the thesis. In her project, in addition to what was learned with the experiments while doing them, the different chosen theoretical perspectives intertwined in and influenced the later reflection-on-the-experiment-actions when writing the thesis.

In MAE's thesis work the larger challenges/concerns, the specific program focus, and the theoretical perspectives worked as data qualifying the arguments. Thereby, it practically assisted in choosing which parts of the experiment to highlight and discuss when these are changed into exemplars. In this way, the final, materialized and stabilized PhD thesis worked as one long argument for the program.

During ALB's thesis work, the program finally stabilized as 'Answers' (A), which are combinations of experimental and theoretical perspectives. An 'Answer' is thus offered as a practical tool as well as a theoretical consideration. Thus, in her work, theoretical perspectives and related works are considered to be included in the program constantly relating to the overall challenges.

SUMMARIZING AND CONCLUSION

Throughout this paper, we have exemplified and discussed different practices of being a reflective (co-) design researcher. With backgrounds as a user-centred industrial designer and a textile designer, we were both highly influenced by the programmatic approach to exemplary and experimental design research co-developed in and proposed by the XLab project. Overall, we have shown how the program-experiment dialectics – clearly positioned in a research context – have been central to both PhD studies. Building upon that, we have also shown how different experiments have been at the core of and intertwined in our work all the way. In other words, we have shown and argued ways in which experiments were important to both of us all the way: in the beginning of framing and reframing the specific research program and contextualizing the study; in the middle part where we were performing experiments intertwined with continual programmatic reflections; and in the closing part of writing the thesis and intersecting experiments and theoretical perspectives by formulating contestable exemplars and arguments.

Finally, the XLab working diagram inspired our work. Yet, as displayed, we both found a need to continually modify the diagram in order to constantly adapt it to where we were in the process, but also to finally propose revised versions to display how the approach worked for us in practice as co-design researchers.

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SACRED SERVICES: THE POTENTIAL FOR SERVICE DESIGN OF THEORY RELATING TO THE SACRED

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ABSTRACT

As we move deeper and into a service economy, differentiation of service offerings occurring through the customer experience is becoming central to the success of service providers. The emerging discipline of service design must find new ways to orchestrate settings for customers that will result in favourable and memorable service experiences allowing for differentiation to take place.

Services are defined through their intangibility where customer's efforts are deemed inseparable from creating favourable experiences. The temporal nature of services mean that time is an important dimension. These factors can be a challenge for the service designer.

Around the sacred, rituals and myths are created to concretize and comprehend its intangible nature. These socially driven constructions give structure to time and seasons, narratives to fundamentals truths and meaning, whilst alleviating anxiety through life changes and allowing for euphoric experiences.

This paper draws from the theory relating to sacred, mainly from the social sciences, but also through a 'bricolage' approach, which aggregates relevant and useful concepts from the humanities. It argues that service design can benefit from the operationalization of theory relating to the sacred as a way to create favourable experiences and value for service customers.

BACKGROUND

The body of research that this paper contributes to is part of the project Norwegian Centre for Service Innovation (CSI). An eight-year project which is the collaboration between several Norwegian research centres and some of Norway's largest service providers.

INTRODUCTION

'Due to co-production customer behaviour is of greatest relevance for the success and failure of the service' (Mager 2009:p.41) where the customers social and cultural background can determine the experiential outcome (Maffei, Mager et al. 2005). Services providers hope to deliver favourable experiences but they must also address customer needs (Koivisto 2009; Clatworthy 2011).

Cannadine (2012) argues that there is still the need for ritual and myth in modern society and while modern society still yearns for the sacred or euphoric experience, it is now often only fulfilled through consumption, creating myths and ritual to realize these yearnings (Belk, Sherry et al. 1987). Traditions, myths and rituals can and have been invented where none have existed previously (Hobsbawm 2012). These rituals and myths are then agreed and regulated through community (Durkheim 2008). Ecstatic, joyful experiences can be realised through contact with the sacred through ritual and myth (Eliade 1961; Belk, Sherry et al. 1987; Durkheim 2008) shared through the effervescence of the community (Durkheim 2008) the context within which Marx argues is our natural state of being (Meigel 1970).

This paper argues that insights from theory relating to the sacred can offer the potential for addressing service design challenges to achieve a positive outcome for both service provider and customer alike.

STRUCTURE

The paper will begin with a summary of the theory relating to the nature of services followed by a summary of the theory relating to the nature of sacred through the constructions of community, myth and ritual. It will offer two examples of sacred mechanisms experienced in consumer society. It will then consider the potential

sacred theory has for the field of service design. Finally it will describe further work to be undertaken as a way to operationalize this material for the creation of New Service Development (NSD) tools.

SERVICE DESIGN

Service Design as a field of research is still emerging (Schneider, Stickdorn et al. 2010; Clatworthy 2011). Theory relating specifically to Service Design therefore is limited. This section will draw from this theory and from the related fields of Service Management and Marketing.

A commonly used definition for service design is 'Design for Experiences that reach people through touch-points, and that happen over time' (LiveWork 2008).

Service designers do not deliver experience but the channels or structure by which an experience can be had by the customer (Zomerdijsk and Voss 2010), communicating this through the service itself (Ramirez and Mannervik 2008).

The value of this experience 'is inseparable from the customers own efforts' (Thorbjørnsen and Clatworthy 2010: p.3) and described as Service dominant (S-D) where value is created in use as opposed to a Goods dominant logic where value is created in exchange. 'In S-D logic, the roles of producers and consumers are not distinct, meaning that value is always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences.' (Vargo, Maglio et al. 2008: p.146).

Some service design and service marketing literature argue that the nature of services can broadly be defined by their intangibility (Mittal 1999; Bebeko 2000; Maffei, Mager et al. 2005; Tether 2008; Miettinen and Koivisto 2009) as they are at times unseen and non-material in their nature. This naturally creates challenges for those designing services who must, 'visualize, express and choreograph what other people can't see, envisage solutions that do not yet exist, observe and interpret needs and behaviours and transform them into possible service futures, and express and evaluate, in the language of experiences, the quality of design' (Holmlid and Evenson 2008: p.341).

INSEPARABILITY. SOCIO-CULTURAL VALUES

Service experiences are inseparable from the customer's own efforts where value is co-created between the service provider and the customer (being present or not) (Lovell and Gummesson 2004; Vargo and Lusch 2004; Edvardsson, Gustafsson et al. 2005). This presents a challenge for service design and delivery.

Service providers try to create the right context to allow for optimal circumstances for a favourable service experience. For example sight, sound, smell, taste and touch will effect the way a customer experiences any

given service (Wilson 1998; Steinbrück, Schaumburg et al. 2002). The more deeply a customer engages with their senses the more likely they are to have a memorable experience (Haeckel, Carbone et al. 2003). However the socio-cultural values of the customer will determine how they will consider the intrinsic value of an experience as not all of these types of cues can be culturally shared (Ayabe-Kanamura, Schicker et al. 1998)

This is described as the 'relational dimension in which the user perspective is included i.e. the social and cultural aspects that characterize and influence the service experience' (Maffei, Mager et al. 2005: p.7).

It is the customers socio-cultural 'baggage' that can determine how they will experience the service offering. It will also effect how customers will experience fellow customers sharing the same space, the presence of which can sometimes be positive in creating possible social interaction (Martin and Pranter 1989; Voss and Zomerdijsk 2008), particularly if there is a shared commitment or brand loyalty (McAlexander, Schouten et al. 2002; Belk and Tumbat 2005). However in certain situations the presence of other customers can spoil a carefully orchestrated service experience (Martin and Pranter 1989).

Service spaces are also often shared by service staff, sometimes referred to as 'actors' where 'service scripts' are followed in the hope that consistency of experience might be delivered (Diller, Shedroff et al. 2006). The 'performance' of these contact personnel can be essential in delivering a positive exchange between customer and service provider (Cook, Bowen et al. 2002). Again inseparability can be a challenge if customers respond negatively to service staff efforts. For example it can be easy to detect the mechanism of the delivery of scripts by service staff (Nixon 2011) which might be experienced as fake. Genuine or involuntary expressions of emotion are understood as such and experienced much more positively by the those they are directed to (Ekman 1997) and within a service context the customer will better experience a genuine expression of positive emotion than one that is 'acted'. In addition repression of genuine emotions and faking expression in a work context can also lead to negative, mental health effects in the long term (Grandey, Fisk et al. 2005).

The customer's perception of, and relationship to the service brand is an essential element in a customer's experience of a service. Customer loyalty is an intrinsic part of any positive customer experience (Berry 2000; Prahalad and Ramaswamy 2004; Verhoef, Lemon et al. 2009). Berry argues that 'Branding plays a special role in service companies because strong brands increase customer's trust of the invisible purchase' (Berry 2000: p.128), making tangible that which is difficult to evaluate by the service customer. This argument is reinforced by Belk and Tumbat (2005) who suggest that certain brands, specifically Apple, can instil in many

some of the devotion and positive response observed in religious and sacred experiences. In this way the brand then becomes part of the socio-cultural identity and values of the customer (Diller, Shedroff et al. 2006). This further strengthens their relation to it and can in turn connect them to the brand community.

TEMPORALITY

'It is hard not to imagine a service that does not happen over time' (Holmlid 2007: p.7). Socio-cultural values may effect the way a service is experienced, however these values change little over time (de Ruyter and Bloemer 1996). Mood however is more dynamic in relation to time and cannot be controlled by the service provider (de Ruyter and Bloemer 1996) not at least in the time directly leading up to the service encounter. Service designers use frameworks such as service journeys to try and control or at the least make concrete time for the life of the service (Koivisto 2009). The service timeline as a framework tries to make sense of this temporality, creating touch-points of experiential delivery that creates a dramaturgy to the service's life, heightening the experience through a sense of expectation (Schneider, Stickdorn et al. 2010). Here the aim is to give structure to the service journey, hoping that the tempo of this structure is balanced to avoid boredom or alternatively stress (Schneider, Stickdorn et al. 2010). Within this structure, at touchpoints the value of the service is evaluated, experienced in the moment and is as such perishable (Miettinen and Koivisto 2009). This is value-in-context where 'value is temporal, because time becomes an important dimension' (Kimbell 2010: p.3) in the experience of services.

THE SACRED

This chapter will examine the nature of the sacred and the related phenomena of Ritual, Myth and Community. This is primarily framed by social science theory, however there will be reference to some theological and philosophical positions as both fields have played an important historical and cultural role of an unfolding understanding of these themes.

BACKGROUND

For sociology the definition of the sacred is as follows "Something set apart from the everyday world which inspires attitudes of awe or reverence among believers" (sociology.socialsciencedictionary.com 2008) For theology the sacred underlies everything and it is perceived by society when it reveals itself to society (Otto 1923). However for sociology, society constructs and controls the sacred through some form of agreement or authority (Geertz. A 2004)

This paper takes the view that the sacred can be experienced in secular structures and not exclusively in that of the religious. With religion being but one context within which the sacred is experienced (Rook 1985). Many scholars support this view and this chapter will refer in part to two papers using a sacred lens to

deconstruct consumer behaviour which grounds this view. 'The Sacred and the Profane in Consumer Behaviour' (Belk, Sherry et al. 1987) and 'The Cult of Macintosh' (Belk and Tumbat 2005) consider how 'consumption has become a vehicle for experiencing the sacred.' And how 'the ritual substratum of consumption and describes properties and manifestations of the sacred inherent in consumer behaviour.' The papers also address how 'consumers sacralize or desacralize dimensions of their experiences' (Belk, Sherry et al. 1987: p.1). In this view a sacred experience then can happen outside of religion, with only the experiencers predisposed relationship to the sacred subject as the primary agency for how they might understand the context of where the sacred is experienced (Antes 2004).

SACRED EXPERIENCES

But what is the nature of a sacred experience? Belk, Sherry et al (1987) summarize the characteristics of the sacred experience as 'ecstatic', existential, 'joy', 'outside of self', 'peak experiences', like the 'enchantment' of 'love, hope, ambition, jealousy.' (Belk, Sherry et al. 1987: p.7-8). When these experiences are shared together within a community it raises the spirit from the mundane in what Durkheim calls 'collective effervescence' (Durkheim 2008). An experience of some rituals would also seem to 'foster enduring episodic memories for initiations, in some cases exhibiting all the features of classic 'flashbulb memory' (Whitehouse 2001: p.178).

The community is central to the sacred experience (Belk, Sherry et al. 1987; Belk and Tumbat 2005; Durkheim 2008; Fry 2011). The community that gathers itself around that which is agreed to be sacred relies on mechanisms that in essence create the core of the community and in addition make the intangible substantive through symbolic action and narrative. This is the symbiotic relationship between community, ritual and myth.

This paper considers community, ritual and myth to be key pillars for creating the sacred experience. The following section will illustrate the importance of community and how myth and ritual are essential expressions of the community when connected to each other and the intangible sacred.

COMMUNITY

Knott argues that there is a growing 'contemporary desire for belonging, and its spiritual meaning and significance.' (Knott 2004: p.76). He suggests that in our postmodern 'time of tribes' (after Maffesoli) that we understand communities long detached from a definition of relating to 'locality' but relating to faith. This is not the faith as in religion but as faith in shared ethics, aesthetics and customs. Marx too disassociates the term community with locality adding that it is in community that mankind finds its true nature. (Megel 1970)

The community through 'communitas' has a levelling quality that unifies groups beyond social demographic identity to create new, shared values and flattened structures (Turner 1995). It provides 'standards for human behaviour and human relations. They regulate relations between individuals and groups. They decide on important issues like what constitutes a man, what constitutes a woman, and how relations between them ought to be. They create contexts for identity, meaning, morality and politics. They decide what is good and what is evil. They are, in sociologist Emile Durkheim's words, ultimate authorities, forces and raise individuals above themselves. A community is a consciousness of consciousness and the highest form of human mind' (Geertz. A 2004: p.193).

This level of influence that community can represent, especially that of religious community, has been described as malevolently controlling by some in popular literature (Hitchens 2007; Dawkins 2008), however for De Botton most faith communities are defined more by their 'fellowship' breaking down demographic barriers and making it possible for us to 'engage with our fellow man without it being strange' (De Botton 2012: p.32). He argues that faith community rituals allow people the structure to know how to behave with others, encouraging enthusiasm and inspiration.

Belk & Tumbat highlight many of these communitas structures described by De Botton in the Apple devotee. (Belk and Tumbat 2005). This camaraderie connects customers in a 'fellowship'. Furthermore the inclusion of the Apple store staff that genuinely connect to the brand broadens the fellowship of the community, where emotions and enthusiasm is genuine.

MYTH

The myth and the community are inseparable concepts for Jean Luc Nancy. It is the myth that communicates the will of the community and the community that communicates the will of the myth. In 'Communicating itself, it brings into being what it says, it founds its fiction' (Nancy 1991: p.56). For Nancy 'myth and myth's force and foundation are essential to community and there can be, therefore, no community outside of myth' (Nancy 1991: p.57). What this suggests is that the myth becomes its own reality through its communicating of itself and as community is in itself its own myth, it too is brought into existence.

But at the core of myth there is something meaningful for the community. Segal somewhat reductively defines myth 'as simply a story about something significant' (Segal 2004: p.5), however for a community it is the something significant that binds it and creates a shared commitment (Durkheim 2008).

Campbell (2008) goes beyond a concept of myth as a story of something significant and sites Freud to build the argument that myth is not a fictitious narrative but a metaphor for some form of truth. An account of truth

that is as valid as any other. This therefore considers myth not as lies but as symbolic metaphors that allow us to make tangible the abstract.

For Barthes (1973) the myth is the symbolic signifier of a meaning that contains a whole system of values, understood and read through its communication. It is in this way that the mythologies of brands such as Harley Davidson connect to existing systems of values of the customer, connecting 'to meanings people already recognize and want' (Diller, Shedroff et al. 2008: p.31). This is a powerful connection to meaning where those who connect to these myths 'happily integrate this meaning into their lives' (Diller, Shedroff et al. 2008: p.28).

RITUAL

Ritual seem intrinsically linked to myth. Through ritual, myth becomes action (Segal 2004) with ritual becoming more efficacious in combination with myth and vice versa (Eliade 1961).

Rituals are rules of conduct which prescribe how a man should comport himself in the presence of sacred..... ritual prepares one to approach the sacred and may be enacted as an individual or, more commonly, as a group' (Belk, Sherry et al. 1987: p.7). These rules of conduct are for Turner "a stereotyped sequence of activities involving gestures, words, and objects, performed in a sequestered place" (Turner 1961: p.36). Offering as Van Gennep would have it, passages in both literal and metaphorical senses that allow participants to express and experience a change of state. (Van Gennep 1960). Ritual in this view is offering sequential structures to deal with the intangible defined here in the corpus of the sacred. It is also the instrument for dealing with change. In Malinowski's view it creates a framework for us to deal with the anxiety of this change (Homans 2012).

Rituals can be an expression of inward emotion and a reaffirmation of values (Geertz 2000), held through the community. However it is through its enactment it creates the conditions to generate emotion and to strengthen the conviction of these values (Durkheim 2008). Islam and Zypher describe this as such 'Ritual Action it is proposed is a form of social action in which a group's values and identity are publicly demonstrated or enacted in a stylized manner' (Islam and Zypher 2009: p.116). Rituals can therefore strengthen convictions, emotions and values in the motion of expressing them, whilst in turn it has the function of communicating this outward.

For Van Gennep 'Rites of Passage' still play an essential role in modern society. He argues that the ritual function is to help us deal with 'life crisis', a route for transition from one state to the next, for example marriage, pregnancy, betrothal, puberty etc. What Van Gennep offers is a structure for this transition; separation, transition, and reincorporation (Van Gennep 1960).

However in Eliade's view ritual also allows for us to make transition to an alternative emotional plane, connecting us to 'sacred time'. This is not temporal time in so far that it connects to the context of the now but connects to 'primordial time' that exists outside of our cognitive perception of the now (Eliade 1961). In this way what ritual does in effect is lift the subject out of their profane (everyday) context and into an alternative consciousness. This 'sacred time' is not dependent on the temporal time that existed before it as the subject is lifted and reconnected to the primordial, independent of the previous context.

However Eliade goes on to explain that on a meta-level, time can also connect to the meta-ritual of the calendar year that moves and renews itself throughout the year. (Eliade 1961) This gives structure to the year. Micro rituals can exist within bigger ritualistic structures (Whitehouse 2001). Where these smaller ritualistic acts strengthen and reinforce the meta-level rites that they exist within (Rook 1985). The Catholic Church is a good example, from micro rituals such as hand washing within the structure of the weekly performed ritual of the mass, which in turn exists within the meta-ritual of the liturgical year. (Catholic Encyclopedia 2012)

THE SACRED IN CONSUMER SOCIETY

This section will offer two short examples of sacred structures in consumer society.



Figure 1: Heading for 'Macca' on 5th Ave.

APPLE

Belk and Tumbat's (2005) paper 'The Cult of Macintosh' argues that customers of Apple demonstrate typical human responses to the sacred that in turn facilitate unparalleled devotion and attached value to the brand and heightened experiences of the product.

Through a series of constructed myths, a community of Mac devotees understand the brand and their relationship to it. They construct 'Hero Myths' surrounding Steve Jobb's, reflecting Campbell's heroic journey narrative analysis and 'Satanic Myths' for figures such as Bill Gates. These myths create a deeper account of why, for them, Apple and its founder are so special. It goes beyond functionality of the product but

creates a new way to experience and understand the brand values.

Through interviews with Mac devotees we also hear of witness and evangelising – spreading the good news of salvation through transcending corporate capitalism. Where the sense is Apple is not motivated by the desire to make money as it is by the desire to bring to the world truly "neat stuff" (Belk and Tumbat 2005: p.213).

Apple devotees even go so far as to tattoo the logo onto their bodies to demonstrate their devotion.

Finally by the time the iPhone was launched in 2006 Mac devotees appropriated mythologies and symbols from religion to communicate their feelings towards the impending technological release, referring to the new phone as the 'Jesus Phone' (Campbell and La Pastina 2010).

KIT KAT

It would seem that Kit Kat added a ritual to the consumption of their chocolate bar. Nestle say it themselves 'Nestle Kit Kat has a unique finger format with a 'breaking' ritual attached to it.' (<http://www.nestle.in/brands/chocolatesandconfectionery/nestlekitkat#.UO7Br6X-dUQ> 2012)

'The ultimate triumph of any brand is to be part of a ritual.... there are brands that plan to be part of a ritual. ..like what Kit Kat did in Japan' (<http://www.aneyeonsaudi.org/tag/kit-kat-in-japan/> 2012). This observation is shared by endless sources on the blogosphere. Kit Kat introduced a transitional ritual, communicated through TV advertising to allow consumers to disconnect from temporal time to 'sacred time'; from work to break. The advertising demonstrates to the consumer how to open the product packaging and then in a specific ritualised way, to break off a single stick of chocolate, to hold the stick firmly on each end and then, 'break'. This is reinforced with the words 'Have a break, have a Kit Kat'.



Figure 2: In Sacred Time.

This mode of consuming Kit Kat has been communicated for several decades and on several continents. As one Indian Marketing blogger writes, 'More than the shape, Kit Kat differentiated itself by a ritual....Kit Kat taught Indian consumers a new way of eating this product. Kit Kat used advertisement to promote a ritual for eating a Kit Kat'

(<http://marketingpractice.blogspot.no/2007/08/kit-kat-have-brand-have-kit-kat.html> 2007)

POTENTIAL FOR SERVICE DESIGN

Service design is defined by its intangibility, by the inseparability of the customer's own efforts in co-creating experiences. The customers social cultural values and mood, impact as to whether the experience is favourable. Time is a factor that needs to be negotiated and concretized through the design process.

Theory relating to the sacred proposes structures for making tangible the intangible, for giving structure to time, for alleviating anxiety, for reconnecting and to an extent reformulating personal values through meaningful narratives and in turn communicating these values to others. It allows for passages to extraordinary, memorable experiences.

Descriptions of the sacred experience such as 'ecstatic', existential, 'joy', 'outside of oneself', 'peak experiences', 'enchantment', 'effervescence', seem to offer heightened and favourable experiences for the customer.

Service providers allude to create extraordinary and memorable experiences as a way to ensure a competitive edge. (Prahalad and Ramaswamy 2004). Sacred experiences could be argued to be 'extraordinary' creating lasting 'flashbulb' memories.

Community offers potential for creating understood standards, behavioural norms and shared cultural reference points that could lead to positive experiences in service settings. People feel contentment in community. There is the potential for other customers to be seen as participants in a service 'fellowship'. This can include front-line employees, breaking down hierarchical power structures in a service exchange. 'Faith' in this shared experience could lead to genuine and involuntary expressions of emotion, positive emotion and commitment from staff communicated to customers creating the potential for 'enthusiasm and inspiration'. (De Botton 2012) a phenomena currently demonstrated by Apple staff in flagship stores, not at least during opening rituals.



Figure 3. Apple staff at opening of Cerritos new store. Halleluia!

Imagine if the same sense of community and commitment was constructed for a telecom company? Customers would be keen to demonstrate to other customers that they are sharing the same network. Could myths be co-created that connected to the community's shared values? Would the service include some form of ritualistic action that allowed subscribers to communicate outward or to others in the community their commitment to the service. Would customers look forward to contacting the call centre, as they know they would speak to an employee that 'believes' to the same extent as an Apple employee does today.

Myth if applied correctly, if connected to communities concept of truth and values can be the vehicle for creating the community in itself. Harley Davidson instigated the HOG (Harley Owners Group) community that creates and is the mythology of itself. It has a symbolic nature that allows for a cognitive narrative around the intangible. Disney World described as a pilgrimage destination by Alexander Moore (Moore 2012) uses myths of America past, present and future to connect the customer to a shared narrative of self, to meaning and renewal.

Finally ritual offers the potential of new frameworks for structuring, sequencing, conceptualizing and experiencing time, to create highpoints and seasons for service journeys not at least for services that are deemed as life-long such as insurance or banking.

What would a meta-ritualized framework look like for a life insurance policy? How could time be communicated in a cyclical seasonal way? Could highpoints be created on an annual basis where payments, that are practical and intangible be made more substantive through myths that connect to an unspeakable truth of death and perhaps even renewal?

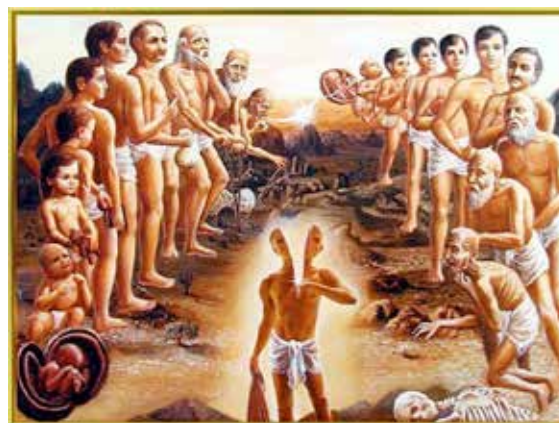


Figure 4: All of life insurance.....and the next?

Could micro-rituals alleviate anxiety at pain points during a service journey, for example during security checks at the airport. In a setting where shoes and earthly possessions (at least metal ones) are already removed from the body, could a constructed rite of passage using Van Gennep's theory of separation, transition, and reincorporation build an experience that

brings the customer out the other end renewed with even greater anticipation for their onward journey? How would the objects used in security checks be perceived if they were manipulated as part of a ritualized experience? Could this fit within the larger structure of a medium-size ritual that starts on arrival at the airport that builds anticipation for the journey where security becomes just one part of a grand orchestrated ritualized experience?



Figure 5: The Sacrifice.

If we consider Eliade's view of ritual as a conduit to sacred time, ritual could create service experiences that are not affected by the 'temporal' time directly surrounding the touch-point, detached from mood and context. Could extraordinary service experiences be 'switched on' through ritual?

CONCLUSION

To remain competitive service providers need to orchestrate settings for special experiences, which create value and are memorable for customers. They must deliver on customer needs not only on a functional level but also on an emotional and socio-cultural plane, connecting deeply to customer values and identity.

Theory relating to sacred described in this paper seems to offer new opportunities for service design. It could address some of the conceptual challenges relating to designing with intangibility, temporality whilst connecting to customer's socio-cultural values.

Ritual and Myth can give expression to shared, powerful internal meaning, whilst strengthening them through enactment. Strengthening them both for the individual but also for the broader community.

Rituals happen in set sequences and on several levels from major 'once in a lifetime' rites of passage to annual cyclical rites. From occasional ceremonies to daily ritual acts. Taking this theory into the design process offers new and richly layered structures for understanding time.

This theory is currently being tested through a process of operationalization that is creating tools based on these ideas. This form of research by design is being prototyped and tested in New Service Design settings, to investigate its usefulness for the field.

FURTHER WORK

To test whether the theory presented in this paper has relevance for service design, empirical research is currently taking place through a research by design methodology.

This testing is being carried out in New Service Development (NSD) settings as part of the Centre for Service Innovation together with the private sector service partners. Tools are being developed for service design that operationalizes theory relating to the sacred. These tools will then be used in co-design settings for the analysis of existing services and the generation of new services or service offerings.

Prototyping and testing will take place throughout 2013. The outcomes will be evaluated together with NSD teams using a qualitative mode of enquiry, combining observation, interview and expert evaluation. The following research questions are being pursued:

Do rituals need to be agreed or exist within a community to have meaning for the individual?

To what extent can artefacts used in a service exchange be perceived as sacred objects contaminated through mythological association?

Can mapping using complex ritualized structures offer deeper insights and richer structures for service designers?

Can the use of ritual sequence i.e. Van Gennep's 3 steps of rites of passage, offer concrete methods for designing dramaturgical narratives or transitions?

How does the designer utilize the link between myth and community? Does the myth already have to exist within a community, can one be designed and placed into the community or can find some form of communal truth to design around?

The expected outcomes of the research will be a tool kit. The specific form of these tools are difficult to predict at this juncture due to the iterative nature of the development process.

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BECOMING THE ENERGY AWARE CLOCK – REVISITING THE DESIGN PROCESS THROUGH A FEMINIST GAZE

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ABSTRACT

This paper explores the border between technology and design (form giving) from a feminist perspective. Looking at the energy system and how it has been integrated in the household, we want to address the underlying structures that have been built into the ecology of electrical appliances used in daily life, preserving certain norms that could be questioned from both a gender and a sustainability perspective. We have created an alternative electricity meter, the Energy AWARE Clock, addressing design issues uncovered in an initial field study. In this paper, we will make parallels to these issues. We also use feminist technoscience studies scholar Donna Haraway's theory of the cyborg in order to clarify useful concepts that can be derived from feminist theory and that can act as important tools for designers engaged in creative processes. From our own experience with the Energy AWARE Clock this approach has great potential for questioning and rethinking present norms within sustainability and gender, from the viewpoints of design research and design practice.

INTRODUCTION

Constructivist technology studies argue that those who design technologies are, in the same stroke, designing society (Latour 1988). We agree, and in this paper argue that it is important for Feminist Technoscience Studies (FTS) to incorporate a design perspective. In addition, we emphasize the potential of knowledge transfer in the reverse direction, i.e. acknowledging the fact that design research may benefit from knowledge within FTS.

As an illustrative example we re-visit a design-case of an experimental artefact, the Energy AWARE Clock (from now on referred to as EAC), an alternative electricity meter that was developed using a research through design approach (Frayling 1993) to explore how the notion of electricity as a commodity can be reformed, so that a more conscious usage becomes the norm. In line with the focus of the discussion within FTS, many researchers view research through design as a designerly inquiry, focused on the making of artefacts with the intended goal of societal change (Binder & Redström 2006).

The EAC was a design experiment resulting from a larger research project called AWARE. The project resulted in several fully working design prototypes that explored different angles in the use of electricity from a design perspective. One of these designs was the EAC that was later evaluated for three months in a user study in nine households just outside Stockholm, Sweden. The results from this user study, as well as the initial field study and the design process, have been covered in depth in a previous paper by the authors (Broms et al 2010).

We have previously discussed how the traditional feminist interpretation of form follows function is visualized in the form language of technological artefacts that contributes to the division of domestic labour (Ehrnberger et al 2012). In this article we explore these relations in further depth and examine the very

border between what we perceive as design (meaning the form given artefact) and pure function, and how this distinction affects our values in everyday life.

As the practical context for this discussion we will look closer at the energy system and how it has been integrated in society and the household in particular. Inspired by the feminist discussion within FTS, we want to better understand how design contributes to the division of roles in the household and how this relates to the energy system. For example, how are different spaces used and what physical properties of things reinforce and constitute present norms and traditions? Understanding these relations is important for new practices to form, creating new objects and spaces adding to the present ecology of household products, tools and services.

Drawing on themes derived from the field study informing a design process (Broms et al 2010), we make parallels to arguments in Haraway's cyborg theory. By doing this we want to highlight how feminist theory may be integrated in the creative design process and how concepts from feminist theory may act as important tools for a designer. Connections to feminist theory were insights that continuously grew and expanded through the design process for the EAC, and by analysing this process in retrospect we can gain valuable insights about some of the numerous small and large design decisions that were not as clearly articulated at the time.

The first author already had experience of incorporating a feminist perspective into a critical design process from a previous project. Experiences from this process influenced the design work of the EAC as well even though a feminist perspective was not explicitly set out within the research program.

Next, we will look more closely at the history of gender roles in relation to electricity in the household. Then we will expand on some theoretical starting points related to feminist theory. Finally, we will use these to analyse the design process of the EAC and conclude by discussing the results and potential of this method.

THE GENDERED ENERGY SYSTEM

In this section we will look more closely at how gender roles in the home have developed throughout recent history, how this development is linked to the shape of places in the home and how they are populated by technology in different ways. We discuss non-places and non-things, man caves and the conceptual integration and design of the energy system into the household.

GENDERED DIVISION OF THE HOUSEHOLD

Feminist critique of design states that since Modernism, the view of women as belonging to the private sphere and the man belonging to the public sphere has been crucial to how artefacts are designed (Sparke 1995, Attfield & Kirkham 1989, Ahl & Olsson, 2002). Often,

the focus for this discussion is the dichotomy of home versus work. Less discussed is the fact that this dichotomy in the post-war period became threatened when the family was "in crisis" due to the fact that during the war women had left the home to work. The 50s was a decade where enormous amounts of cultural capital were invested in the ability to reconstruct the nuclear family and live out a set of highly structured gender roles in the home (figure 1). Women went to their household duties while men were encouraged to take over chores previously done by professionals, like plumbing, electricity work and reparations of the house. The housewife and the "handyman" became symbols for the dichotomy that the family and the household were built upon (Gelber 1999).



Figure 1: The kitchen, filled with technical artefacts belonging to the female sphere (illustration from unknown children's book, 1956).

Although recently there has been some movement across gender domain boundaries, the gendered division of domestic labour still dominates. Thus, of the technologies present in the modern household, only a small number are used equally by women and men: those used in the routine tasks of cleaning and cooking are more commonly used by women and girls, whilst those used in the non-routine tasks of home maintenance and gardening are more commonly used by men (Sullivan 2000, Prhat 2004).

NON-SPACES, NON-THINGS

The division of domestic labour has led to the fact that spaces in the home have become gendered. For example, the kitchen is still considered a female sphere while the garage is considered a male sphere (Massey 1994, Prhat 2004). The anthropologist Marc Augé writes about urban *non-spaces*, meaning spaces that are not designed with everyday activities in mind – for

example parking places, wasted plots and airports (Augé 1995). Similarly, our homes have spaces that are reserved for storage, technological devices or just passage. Spaces like the garage, the attic or the cellar are not seen as a part of the household sphere since they are not a part of our daily life. While the kitchen, the living room and the bedroom have become targets for interior design, the non-spaces have been left untouchable and isolated from aesthetical influences. From a feminist perspective, this could be explained by the fact that these spaces belong to the male domain of the household. They are designed for pure function, the machinery and maintenance of the house, isolated from everything that could be associated with everyday life and consumption (Sparke 1995). Therefore, they also become invisible and through that impossible to question. In fact, there is a growing trend in the U.S where men occupy these kinds of spaces and turn them into 'Man Caves'. According to Wikipedia (Wikipedia 2012), a Man Cave is:

(...) a metaphor describing a room inside the house, such as the basement or garage or attic or office, or outside the house such as a wood shed or tool room, where "guys can do as they please" without fear of upsetting any female sensibility about house decor or design.

As the definition implicates, these spaces are reserved for masculine tasks. Consequently, the artefacts and the technology connected to these tasks or activities are intended for men. As previously mentioned, power tools and electronic equipment are traditionally considered 'male'. But there are also other artefacts connected to these spheres, artefacts that are not even considered artefacts but just regarded as representations of a technical system. The boiler station, the electricity fuse box and the energy meter are just some examples of these devices. But they are artefacts, even if of a different kind. The first category is concrete tools connected to the *male* space and these may be used for carrying out *male* activities. The second type are tools that are not necessarily used. Instead they represent a connection to the technical system. Together they constitute systems that operate the *social stage* of the house, but, just like the spaces they operate in, they have become invisible (Ketola 2001). Sometimes it is necessary to interact with these artefacts, for example when a fuse needs to be changed or when the boiler is overheated, tasks that are performed predominantly by the man in the house – the handyman (Prhat 2004).

It is in the home where gender roles are created, maintained and reproduced (Pinto 2006). Research shows that the technical artefacts play a central role in this, as they are a part of a social system that is directly linked to gendered places and activities. As previously stated, the form language of these artefacts helps perpetuate this understanding (Ehrnberger et al 2012).

THE ENERGY SYSTEM IN THE HOUSEHOLD

Today, the energy system has become a natural part of the machinery of the house, and the technological interfaces to this system are perceived as pure function with no correlation to aesthetics values. A clear example of this way of thinking was an advertisement from 1998 by the Swedish energy company Vattenfall where the energy was described as just "two holes in the wall" (Löfström 2008).

However, looking back in history, we can see that representations of the energy system have been far from just two holes in the wall. During the industrial revolution, electricity as a commodity became increasingly common in households. For the growing amount of electricity users the increasing number of related artefacts that became part of the interior and the front end of the electrical system – like radiators, lamps, light switches and power outlets – were often carefully decorated to fit with the aesthetics of the home.

Research shows that the more invisible these systems get, the harder they are to criticize (Ketola 2001, Löfström 2008). This discussion constitutes the basis within feminist theory in a very similar way: the society is described as built upon the invisible white heterosexual male norm. To be able to criticize the norm, it must first become visible. Feminist theorists suggest different ways of doing this, some of which could be utilized in a similar fashion within the sociotechnical context and the energy system.

FTS AND DESIGN

Feminist design critics have discussed design from a sociotechnical point of view, pointing out the correlation between design, technology and social change (Attfield 1989, Attfield & Kirkham 1989, Sparke 1995) but there are few design experiments that present design strategies for such change (Ehrnberger et al 2012). The critique within FTS touches design issues, often referred to as *material embodiment* (Cockburn & Ormrod 1993, Wajcman & Mackenzie 1999). For example, Wendy Faulkner suggests distinguishing between gender *in* technology and gender *of* technology (Faulkner 2000, p. 83):

In the former case [in technology], gender relations are both embodied in and constructed or reinforced by artefacts to yield a very material form of the mutual shaping of gender and technology. In the latter [of technology], the gendering of artefacts is more by association than by material embodiment.

Here, it becomes quite clear that a more profound design perspective is needed. For a designer, gender *in* technology and gendering *of* artefacts by association should not be distinguished from each other, since they intersect. The way an artefact is technically constructed often affects designers in their form decisions (the material embodiment), which in turn affects people's associations. This agrees with the feminist interpretation

of form follows function, where the machine (the man) takes priority over the body/ the form (the woman) (Attfield 1989, Sparke 1995, Ahl & Olsson 2002). Ehrnberger et al describe an illustrative example of this where a drill and a mixer switched product language (material embodiment). The switch revealed how people's associations were fixed to the particular product language that in turn was connected to ideas about gender and technology (Ehrnberger et al 2012).

THE CYBORG THEORY

The energy system is a sociotechnical system, meaning that it consists of technical artefacts and processes as well as actors, organizations and institutions that are linked together in the utilization of energy. The view of energy as a sociotechnical system implies that knowledge, practices and values also need to be taken into account to understand the process of change in such systems. This approach derives from Science Technology and Society (STS). However, in this section we will first make a short account of the Actor Network Theory (ANT), in order to explain the theoretical direction of this paper. ANT is distinguished from many other theories within STS for its distinct material-semiotic approach. We will then continue by focusing on the theory used in this paper, the feminist cyborg theory by Donna Haraway, which derives from ANT.

ACTOR NETWORK THEORY

Actor-network theory is an attempt to explain how material-semiotic networks tie together to act as a larger whole. The clusters of different actors that constitute this whole can be both material and semiotic, both human and non-human. These networks are rarely static but exist in a constant state of making and re-making. Since the networks are constantly changing, the social relations within are constantly performed and negotiated otherwise the network would dissolve.

Bruno Latour uses the term *black box* for any sealed network of people and things. For example, the energy system in the household can be seen as a sealed network. As previously mentioned, it consists of representations, which in turn contain components, but we only interact with the designed (form given) artefacts of this system such as lamps or domestic appliances. Latour states (Callon & Latour 1981, p. 285)

A black box contains that which no longer needs to be considered, those things whose contents have become a matter of indifference.

To open up the black box and to visualize the elements, Latour means that something in the system needs to happen or break down. We mean that design could be a tool to make things 'happen'.

DONNA HARAWAY AND THE CYBORG THEORY

FTS scholars have long identified the ways in which socio-technical relations are manifested not only in physical objects and institutions but also in symbols,

language and identities. In line with ANT, humans, scientific facts and technological artefacts are treated simultaneously as semiotic and material.

In our analysis, we have foremost been influenced by feminist theorist Donna Haraway. Of all the FTS scholars, she and Sandra Harding have the broadest notion of technoscience as a *material-semiotic practice* (Harding 1998). Haraway's term *natureculture* (Haraway 1991) refers to the interaction of different sciences in order to fully understand how they influence each other. Also, as with design, she sees science as a process and argues the importance of instability and uncertainty in ensuring constant movement in research. As the field of design research is growing, establishing concepts such as *discursive design*, *critical design* and *conceptual design*, we find this view of knowledge making interesting.

In this article, we apply an interpretation of Donna Haraway's cyborg theory as an analytic framework of the design process described (Haraway 1991). Haraway deploys the metaphor of the cyborg to offer a strategy to break loose from power structures. Haraway means that the world is built upon dualism, which creates boundaries and restricts our capacity to think in other categories than the dominating. The cyborg is a symbol for paradox; it is a hybrid between organism and machine. It is a creature of social reality and at the same time a creature of fiction. Haraway suggests using the Cyborg as "a figure of thought" in order to stop the separation between binary divisions such as nature/culture, science/society, private/official, masculine/feminine, man/machine and so on. We find these arguments applicable in this study, since our research context deals with the dichotomy of the household and the border between design and technology.

Drawing on the three interview themes as described in previous work (Broms et al 2010) we make parallels to three selected arguments in the Cyborg theory in order to clarify useful concepts that can be derived from feminist theory and that can act as important tools for a designer engaged in a creative process. These concepts are *diffraction*, *the male gaze* and *metaphors*.

Diffraction

Haraway proposes the notion of diffraction as a critical practice for knowledge making (Haraway 1996). The diffraction metaphor could be likened to a prism, where a light ray can take numerous different, and sometimes intersecting, paths depending on the entry point and angle. Similarly existing information can be divided into multiple readings – perspectives – that overlap each other. This is different from general notions of reflexivity, which Haraway argues do not go far enough to attend to effects that are relationally produced. Diffraction, on the other hand, allows multiplicity, differences and enables critique, thus clarifying which differences matter, how they matter and for whom.



Figure 2: Left, an air pump hidden behind chairs. Right, an informant uncovering an electricity meter in the basement.

The Male Gaze

Feminist theorists argue that the world is perceived from the perspective of a white, middle aged, heterosexual man. Donna Haraway calls this *the male gaze*. She rejects the power that the male gaze assumes as it (Haraway 1988, p. 581):

(...) mythically inscribes all the marked [that is female] bodies, that makes the unmarked category claim the power to see and not be seen, to represent while escaping representation.

This means, that males act, females appear; females watch themselves (through the male gaze) being looked at. The concept of the male gaze has been influential in feminist film studies and media studies, discussing how the camera puts the audience in the perspective of a white heterosexual man. When referring to bodies, Haraway makes no distinction between human bodies and embodiment.

Metaphors

Donna Haraway is often mentioned as a metaphor theorist. In her work, both visual and lingual metaphors are consequently used as tools in order to challenge cultural borders and categorizations. As already mentioned, the cyborg is an example of a visual metaphor. However, the cyborg is not simply material, but an embodied material-semiotic actor that is constructed and marked by understanding and practice of materiality, technology, and linguistics (Haraway 1988). Examples of lingual metaphors by Haraway are *manmachine*, *mananimal* and *manwoman*.

FIELD STUDY

The start-up of the design process consisted of several activities, such as overviews of the energy field, workshops with stakeholders and word association. In conjunction with these activities a field study was conducted in order to inform the design process and to gain an understanding of the individual households'

living spaces and context. For this we used qualitative methods and collected data through home observations, photographs and interviews with members of households. Our queries evolved mainly around three topics – the home as the material framing and context for everyday actions; savings and energy efficiency as driving forces and activities; and finally electricity consumption, how and where it is used. A total of nine households were interviewed, each selected to reflect different living conditions and lifestyles. Each interview took about two hours and was followed by a walk through the house while discussing and photographing things of interest for the study. The interviews were then transcribed. Notes and photographs were categorized in order to subsequently analyse and identify general topics and ideas. Three major design themes were identified. These themes were clearly salient and stood out from the collected data: complexity, visibility and accessibility.

COMPLEXITY

The feedback our informants got on their electricity consumption was primarily through two communication channels: the electricity bill and, in some cases, the energy meter. This did not provide enough feedback, as information from both channels was perceived as too complex (Broms et al 2010). The language for communication with the user could be argued as being technocratic and male-oriented. They were designed from the idea of electricity as a commodity, communicating out of the non-spaces of the house and in the one-dimensional technical lingo of kilowatt-hours. Visibility

Representations of the electrical system in the household are more or less successfully disguised; hidden behind covers and assimilated to the background surface, for example painted white in an effort to neutralize any visual impact. In the study, one informant had more or less successfully covered an air pump that

was deemed visually unpleasant behind a set of antique chairs (figure 2). In addition to this the electricity is produced in large-scale power plants that usually lie far away, separating production from use and making it less natural to reflect upon. Electricity is an invisible norm that these days is rarely thought about unless it for some reason, ceases to function – for example in a power outage.

ACCESSIBILITY

The energy meters were often placed in ‘non-places’ (Augé 1995) like in the basement or the garage, as elaborated on earlier, and therefore isolated from everyday areas like the living room or the kitchen that are occupied by more members of the household. Movement pattern has implications for accessibility, which in turn is related to engagement. It is difficult to become engaged in the electricity consumption of the household when information regarding this is presented in places rarely visited. In the field study, an 81-year-old male had made a habit of going down to the basement and writing down the current position of the numbers on the electricity meter. In this way he could deduct the rate of electricity consumption by subtracting yesterday’s readings from today’s. Among the informants interviewed, he was the only one dedicated to carrying out this ritual (figure 2).

THE DESIGN

The Energy AWARE Clock was designed with an overarching idea to communicate energy use as an integrated part of everyday life and to have its own utopian design, although one could argue that the connotations to a clock bears resemblance to an archaic design (Forty 1986). The meter visualizes the daily electricity use of a household on a, by default, 24-hour clock-face, and is intended to bear resemblance to an ordinary kitchen clock, both in form, location and use. The external shape of the Energy AWARE Clock resembles a two-dimensional house and has a front covered with a partly dark, partly transparent, acrylic sheet mounted on top of a colour display. On the display a circular graph is shown that renders the home’s present use of electricity (kW) and also the historical consumption over time (kWh). A complete rotation on the clock-face can represent anything from a minute to an hour, 24 hours, a week, or a month depending on which view that is selected via a button on the front. There is only one other button, placed to the left, that toggles a numerical kW representation on and off. The angle of the pointer on the display represents the current time whilst the length of the pointer represents the amount of power being used at that specific moment. When an electrical apparatus is switched on it shows up on the display immediately in terms of a longer pointer. As time moves on the pointer leaves a trace showing the historical electricity use. The shape of the resulting graph indicates what has happened during the course of the day. Previous turns fade away slowly and the consumption of the current day is drawn on top of that

of previous days, making it possible to compare the current electricity consumption with that of the day before and the day before that. Data about electricity usage is sent wirelessly to the display from a small unit attached to mains fuse box.

REFLECTIONS ON THE DESIGN THROUGH THE CYBORG THEORY

Starting from the cyborg theory we will now reflect upon the design process of the EAC (figure 3), considering each theme in light of our interpretation.

COMPLEXITY AND DIFFRACTION

The theme of complexity from our field study may be broadened by linking it to the concept of diffraction. With the EAC, we set out, in one sense, to make it easier to understand and react on feedback regarding electricity use. But rather than simplification and abstraction of the information to be displayed, we instead strived for complexity in lines with the concept of diffraction. This is because in terms of experience, it is often complexity rather than simplicity that is sought and appreciated (Norman 2004, Stolterman 2008). The most meaningful artefacts in our lives are not necessarily those that are simple in their communication. On the contrary, they may open up for a multiplicity of interpretations and uses in a similar way as we found with diffraction. Instead of using one-dimensional numbers and units accepted by the industry for communicating electricity consumption, we created a circular graph reflecting the usage throughout the day. The shape of the pattern not only gives clues about the electricity used in relation to a specific time or activity, it also, on a higher level – similar to the concept of diffraction – ties together the visualized electricity use patterns with all kinds of everyday events – similar to a diary. Television-sets switched on in the evening, microwave ovens turned on for short times, freezers and fridges going on and off, and much more – all electrical appliances are overlapped creating an intricate pattern presented for the householders to reflect on. No single answer is given, no behaviour is affirmed or condemned; electrical patterns are presented as a reflection of real life patterns in all their complexity. Tacit design knowledge analogous to the concept of diffraction was here used as a design approach where different interpretations and readings are integrated into the design and allowed for.

VISIBILITY AND THE MALE GAZE

To be able to criticize the norm, it must first become visible. This notion of the male gaze could be applied to the idea of the electrical system in the households. What is visible and what is hidden and who decides this? As previously mentioned, most devices of the electrical system are disguised, hidden and isolated from the everyday living area. According to Haraway, this could be explained by the fact that male gaze has, through history of development, put these devices in unmarked categories “to represent while escaping representation”.



Figure 3: The Energy AWARE Clock was designed to encourage a more central placement in the household.

This means not only that these devices become invisible, but also that the invisibility itself steers our notion about how the energy system works. Again, research shows that the more invisible these systems get, the harder they are to criticize.

To approach the problem of invisibility, the EAC was designed to stand out as an object in its own right, making electricity ubiquitous and tangible. It was important to move away from the instrumental form language of the traditional energy meter that was associated with invisibility and pure function (the male gaze, if we apply our interpretation of Haraway), and instead try to make it aesthetically compelling so that it would encourage visibility in regards to placement. We chose the shape of a house, a semiotic related decision to symbolize the household as a whole, where the circular graph and the electricity patterns become central to the house. The EAC was made with the intention to visualize information about the electricity system in a way that broke away from the present norm of a hidden culture that is hard to reflect upon.

ACCESSIBILITY AND METAPHORS

Just like the form language, the very word “energy meter” has bearing upon which context it will be placed and categorized in, bringing forth connotations to non-places in the home. As previously mentioned, instrumental objects in the household are often covered or hidden from the daily life. In order to break loose

from these connotations and transcend into a another set of product metaphors, we used the image of the clock object and called the new meter the *Energy AWARE Clock* in order to further strengthen this new marriage between energy metering and the procedure of daily timekeeping. The power of language over thoughts and acts cannot be underestimated. Here, the usage of metaphors has a great influence on our way of thinking, acting and talking (Lakoff & Johnson 1980). The clock metaphor is intended to signal to residents to put the EAC in a central, shared space of the household – just like an ordinary wall clock - in order to engage all residents in reflecting upon the use of electricity, and establish a relationship to the electricity system in more accessible areas of the home. The choice of materials further enhances this.

CONCLUSIONS

In this paper we have explored how feminist theory may be combined with design research as a strategy to break away from a gendered interpretation of technology that influences our design decisions. We have applied concepts from the cyborg (Haraway 1991) to analyse interview themes from fieldwork that were initially carried out to with a focus on energy visualization. The energy visualization artefact was developed with the intention to make electricity consumption a conscious part of everyday life for all householders.

Attending to the interview themes that constituted the areas of inquiry – complexity, visibility and accessibility – we have applied suitable concepts central to the cyborg theory – diffraction, the male gaze and metaphors, respectively – to clarify how feminist theory can be used in relation to the design process, using the EAC as an example. Looking at the energy system as a whole, making no division between what should be allowed to be designed (form given) and what should be pure function, a more open and inclusive approach could be used in the design process.

Based on our results, we believe the discussion within FTS and the design field could more easily approach each other if we reflect upon and define the very word “design”. While FTS scholars often use the word design addressing more functional characteristics such as *facilities* or *features* in the technology, designers use it in terms of aesthetic characteristics, the form language (Ehrnberger et al 2012). We suggest seeing these two meanings as one, mutually transforming each other. To follow STS scholar Donna Haraway, they “become with” each other in a social process (Haraway 2008, p. 4). This approach would not only offer the possibility of learning more about the relationships between technology, design and gender but would also open up negotiation between them and, through that, engender a societal change.

In the subsequent three month EAC user study one of the results was a higher and more even engagement between men and women concerning electricity consumption (Broms et al 2010). However, this is just one of many potential benefits when using concepts from FTS in design research and practice, allowing approaches that question all kinds of norms and encouraging new ways of thinking. At the time of writing this article, a commercial version of the EAC, called simply Aware Clock, has become available which make the authors hopeful of having produced research results that initiate real change.

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THE SOCIAL FABRIC: EXPLORING THE SOCIAL VALUE OF CRAFTSMANSHIP FOR SERVICE DESIGN

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ABSTRACT

This paper addresses the social component of craftsmanship in relation to service design. The transferal of crafting skills and knowledge can be considered a service that is co-created between master and apprentice. The social aspects of learning craftsmanship will be discussed in the light of how they could benefit designers in the development of Product Service Systems. Workshops in bobbin-lace making that took place as part of a research project about smart-textile Product Service Systems serve as the foundation of this analysis. A group of designers assumed the role of apprentices in these workshops. The aim was not only to apprehend the basics of this historical craft, but also to get an understanding of the concept of craftsmanship. In this paper we discuss our observations and reflections on being designers as apprentices and how the insights gained can apply to service design.

INTRODUCTION

Services are created by and for people, a fact that guarantees social relevance but also introduces social complexities in creation and delivery. Experts in many disciplines need to cross boundaries and design and develop collaboratively in order to reach valuable results. That is not always an easy task: habits, vocabulary and culture often vary tremendously from discipline to discipline. A manager, an engineer and a designer, could be from the same country but when it comes to their professional expertise they may just as well speak Chinese, Greek and Welsh.

In the development of Product Service Systems (PSS) the process is often taken on with a designerly approach, with “design thinking” as a foundation (de Lille, Roscam Abbing & Kleinsmann 2012). Within this research project on Smart Textile Services (STS) the development of a PSS is investigated from both a designerly and a craftsmanly approach. This paper will discuss the craftsmanly approach to designing and delivering services based on the insights regarding craftsmanship gained during several bobbin lace-making courses, taken as a part of this research.

Crafting together in a workshop, family or other group setting more than the production of practical and decorative objects, historically used to have an important social function. Using this as an example could help cross interdisciplinary boundaries in creating PSS. The social context of craft may offer us an interesting method to reflect on services. We experimented in a real craft setting of bobbin-lace

making to see how service design could benefit from a traditional way of learning and practicing crafts under a master in a group of apprentices. Based on this experience we would like to focus in this paper on what service design could take from and contribute to the social context of craftsmanship.

The STS research is conducted within the Creative Industry Scientific Programme (CRISP), a collaboration between Dutch knowledge institutes and over sixty industry and social partners with a joint aim to develop academic and applied knowledge in the field of PSS.

SERVICE DESIGN

The concept of “service” as defined by Service Dominant (S-D) logic, involves goods representing a mechanism for service provision as well as intangible, dynamic resources, inputs for co-created value, and relational, economic and social processes (Gummesson, Lusch & Vargo 2010). In other words: goods and services are parts of a whole, which cannot be viewed separately. In contrast to product manufacturers, service providers shape the service together with users, who thus become part of the production process (Morelli 2002). Tangible and intangible aspects of services are linked in carefully designed Product Service Systems (PSS), where the tasks of a designer go far beyond the usual focus on form and function and sometimes require the designer to let go of control.

Service design cannot operate on its own. To create an optimal service experience, specialized competence from design disciplines is needed (Holmlid 2007). A range of different stakeholders need to be involved. Service designers work with service providers, managers and marketers, with users and with experts such as psychologists and anthropologists. All bring in their specific knowledge, experience and objectives, but coming from such varied positions often speak a different “language” and may have difficulty understanding each other. Here, designers can add value in the design process of PSS in various ways, by playing different roles (for example leading, facilitating or producing) acting like “glue” between disciplines (Ten Bhömer et al. 2012).

Product Service Systems are developed in an iterative process, going through many cycles of tweaking and adjusting, using tools and methods from various disciplines. It could be argued that services are “evolved” rather than designed, as is the whole field of Service design itself (Stickdorn & Schneider 2011). A service cannot be designed, produced and then supplied in the way a product can. The process of tweaking and adjusting continues in practice, varying with the context in which the service is implemented. Designers are well equipped to intuitively steer and accelerate this evolution, as they can imagine desirable futures and pave the road towards them by quickly connecting many disciplines, methods, materials and tools. This is why they are invaluable to service design.

However, we are of the opinion that a service could not just be designed, but could also be crafted. Let’s compare this design approach to a craftsman’s approach. “Each of the craft disciplines has a multicultural history that is recorded mostly as objects, many from societies that have long since disappeared. (...) A huge body of objects serve as an enormous reference library for craftsmen.” “Craft looks to the past for techniques, visual cues, meanings and ideas.” (Metcalf 1993). Where designers are more oriented towards the future, craftsmen come to innovation by retrospection. Here lies an interesting difference, but also an opportunity for the imaginative service designer and highly specialised craftsman to meet and support each other.

Craftsmanship is taught hands-on by passing on knowledge, traditions, telling stories and demanding lots of practice while continuously focusing on a great level of detail and depth. As such the transfer of craft skills and knowledge could be considered a service. This is a service that like other services, as Morelli explained, is being refined in practice by service providers and users. Craft knowledge and skills have been passed down through generations in as many different ways as there are crafts and depend greatly on a social context to be preserved and to evolve.

THE SOCIAL SIDE OF CRAFTSMANSHIP

Some refer to craftsmanship simply as highly skilled manual work. Richard Sennett in *The Craftsman* (2008) describes his interpretation of craftsmanship as a basic human impulse, an engagement and a very balanced connection between hand and head, but also quotes Karl Marx, “who framed craftsmanship in the broadest possible terms as “form-giving activity.” Sennett emphasises that self and social relations develop through making physical things, which enable an “all-round development of the individual.” (ibid. p.29) with which he makes an interesting point about the social value of craftsmanship. Crafts are not just about skills, they are a way to express and develop oneself and relate to others.

This social aspect is also beautifully expressed by Betsy Greer, who writes in her book *Knitting for Good*: “I began to understand that there are benefits to knitting with others beyond just teaching them something new and then setting them free. We can have conversations that unfold just like the knitting itself. Instead of only speaking for a minute in passing, when you are knitting with someone else, you have a chance to see where a conversation takes you without having to rush. Just as your knitting has a rhythm, so do the conversations you engage in while you work. The ease of conversation prompted by craft helps us connect with others beyond our own racial, economic, or social backgrounds, allowing everyone involved to learn about someone new and foster a sense of belonging.” (Greer 2008, p. 54-55). So the rhythm of repetitions in practicing a craft serves to develop material consciousness and tacit knowledge, but also as a tool for conversation and reflection which can only occur in a social context.

An important place to practice and proliferate crafts has always been the workshop. Throughout history master craftsmen have shared secrets of the trade with their apprentices in the workshop (Sennett 2008, p.64-65, 73-75). The relation between a master and his or her apprentices is important, but the service of proliferating craftsmanship is not only delivered from master to apprentice. The interactions between apprentices are also a key part, as they help and challenge each other and may compete or share in order to advance. Everyone in the workshop plays a role in the transferal of knowledge and for this being both receptive and willing to share is necessary. Keeping things to yourself is counterproductive. By sharing expertise, the body of knowledge remains in motion, helping both the craft and the people practising it develop. We call this social construction of craftsmanship a “social fabric”.

It can be hard to make a clear distinction between craft and design. Not in the least because the design discipline is rooted in the arts & crafts movement. While it is obvious “craft” and “design” are not two words that describe the same phenomenon, it is impossible to pinpoint exactly where the boundaries between the two lie. Because of this it’s not the field of craft but the attitude of craftsmanship and its social affect, or social fabric, we choose to discuss here, in order to make clear its value for service design.

CONTEXT OF APPLICATION

Textile crafts have been practiced for many centuries, starting with very simple tools and techniques to create fabrics, gradually becoming more and more complex. All crafts have either gone through a similar evolution or been displaced. Innovations took many generations of craftsmen to mature. Today most textile production has moved from being low-tech and high-craft to being high-tech and low-craft. Hand crafted textiles were once valuable possessions, often being used over several generations, carefully mended as they wore and even used as a way to show off status and wealth, for instance by the use of certain hard to make colours and more refined techniques. Now textiles have become mass produced consumption goods, affordable for everyone and discarded as soon as signs of wear become visible or a new trend appears. Machines have taken over manual labour and much tacit and explicit knowledge, tradition, symbolism and meaning have been lost, being replaced by mechanical and technological knowledge.

New technological knowledge is emerging rapidly and is leading to the development of “smart-textiles”. Textiles are suddenly given new properties they’ve never had before. The use of technology allows textiles to be programmed, to change and adapt, to sense and to react to certain behaviour or circumstances, making them seem very smart indeed. New possible applications for textiles are radically different, ranging far beyond the already very broad ways in which we apply textiles. Therefore services around these products are becoming much more important.

Though this all sounds very promising for the future, smart-textiles are still in their infancy and they may benefit from a craftsmanly approach to mature and become a meaningful and welcome addition to our daily lives. In the time of industrialisation “Crafts were considered too time demanding for mainstream (...) but now re-considering some decisions that led us to mass production, they sound inspiring and worth looking into.” (Kuusk, Tomico, Langereis & Wensveen 2012). With the emergence of FabLabs and open-source electronics for textiles such as the Lilypad Arduino microcontroller, small scale personal manufacturing or “technology craft” could become a real alternative for mass-production and a way for textile industry to supply to a new kind of demand, delivering services in addition to products. Industry could work much closer with and for end-users who could use their semi-finished products and individualise them, for instance by programming their behaviour, to their personal tastes (figure 1).



Figure 1. Smart-textiles capable of measuring stretch as semi-finished products developed in STS project, hooked up to a Lilypad Arduino microcontroller

In this way a deeper involvement of end-users in the production phase could be allowed, shifting from a top-down to a bottom-up development, generating a greater sense of value and attachment through participation and personalisation. It is important we define the narrative of smart-textiles if we want them to be more than gadgets (Tharakan 2011) and crafts may be able to help us do so. Bruce Metcalf (1993) writes: “self-expression needn’t be the highest goal of the craft practitioner. In a secular world, craft can serve others by offering a medium for personal meaning--a receptive screen upon which to project significance. Instead of conveying total self-absorption in expression, a craft object can perform a service (...) Craftspeople can move into areas of subject matter that art and design have declared to be irrelevant for almost a century, and in so doing, they can actually become socially responsible.” With which he points towards the social meaning that stems from the culture and community in which crafted objects are produced and used, but which may be open to different interpretations. This could be applied to the field of smart-textiles too: meaning and purpose could be

created bottom-up instead of being predefined in the design phase, helping to build a narrative.

EXPLORATIONS IN BOBBIN-LACE

To experience and test the principles mentioned above, the historical craft of bobbin lace-making was studied over the course of several workshops by the STS research group in the role of apprentices, working with an experienced craftswoman as our master. Lace-making was chosen because it was a craft that none of the participants had any prior experience with, so that everyone would start at the same level. This also offered the possibility to explore applications within the field of smart-textiles with few preconceptions. The goal was to learn the basics of the craft, and to get an understanding of the concept of craftsmanship and how that could be useful for creating Smart-Textile Services.

Bobbin lace-making has a long history and its forms and styles differ from region to region, as such a lot of cultural and historical meaning is embedded into the patterns. The bobbin technique is one of many techniques for lace-making. Others are needle-lace, tatting and forms of crochet and knitting. Each is a specialty of its own and most lacemakers only master one of them. Today its symbolism is no longer as alive as it once used to be. The pure pleasure of making is now the main incentive to practice this craft, as it is nearly impossible to sell handmade lace commercially and compete with modern machine lace (Verhaegh 2012). Some lace-makers however, manage to sell their work as art.

The lace-making workshops took place in March 2012 at Museum de Kantfabriek, a museum devoted to hand- and machine lace-making and its history. To keep the craft alive, the museum hosts courses in lace-making and offers experienced lacemakers a place to come for meeting and practising their craft and to present and sell their work.

EXPERIMENT AND TRADITION

Our lace-making teacher Mrs. Verhaegh was an attentive older woman with a great passion for her craft which she had been practicing for over thirty years. She herself had a very formal training at a traditional school for handicraft and after that taken many advanced/expert classes from other very experienced lacemakers she admired. After she had thoroughly studied the theory and history of lace-making and mastered the many traditional techniques of bobbin lace she started experimenting with more modern forms of lace. Her taking this direction is quite exceptional. She told us that many if not most lace-makers are concerned with preserving the traditions as they are for the future and only few try to create new work from the old techniques. After many years of practicing traditional bobbin lace-making she was convinced that the only way to preserve the craft she cares so much about, is in fact by building on the traditions, to show that making lace doesn't need to be old-fashioned and can still have value in this day and age.

As designers doing research through design, focusing a lot on making and reflecting as a meaningful way to do research (Kettley 2010), we immediately started to experiment with new materials and tried to control and transform the techniques we were taught in different ways - regardless of our lack of experience - which our teacher was intrigued (and despite her own experimental work maybe slightly shocked) to see. We tried making lace with conductive yarns, creating a plus and a minus side to our lace, which could be used in a soft-circuit (electronic circuit built up using soft materials such as fabric and yarns). Another experiment involved using yarns dyed with thermochromic ink (figure 2), so the colours of our lace would change with temperature.



Figure 2. Experiments dyeing yarns with thermochromic and UV ink

LESSONS FOR LACE AND LIFE

We were however, soon confronted with this lack of skill when our new concepts became too complex for us to realise. The dyed yarns for instance were less flexible than the special linen and cotton yarns provided to us, making it extremely difficult to follow the patterns and get an even result (figure 3). Basic knowledge and some exercise with the lace-making technique had inspired us, but didn't suffice to create the things we conceived of. The difference between our designerly approach and the craftsmanly approach of our teacher was clearly illustrated, also showing exactly where we might complement each other in developing new applications for lace in smart-textiles.

Learning crafts from a master is different from learning on your own from a book or other sources. Life-lessons are shared between the lines. Many of the instructions in our lace-making workshops contained -besides practical information- some life-lessons our teacher had herself learned while studying lace-making. For instance: the importance of working meticulously. You will not learn how to fix your mistakes, until you've understood how not to make them in the first place. In both lace and life carelessness will show. This may seem inapplicable to the iterative process of service design, where failures early in the process are welcomed and expected to lead to a better end-result, but is in fact a valuable lesson about knowing what you're doing first, before diving into the unknown.



Figure 3. Dyeing yarn with thermochromic ink (left) and using it in a traditional lace-pattern (right)

These hidden stories contributed the social fabric that came into existence while practicing craft together. Not just in these particular lace-making workshops, but also throughout craft history. Betsy Greer writes: “One of the remarkable things about knitting and handcrafts is their ability to transcend societal differences, as every culture has its own craft history based on its own idiosyncrasies.” (Greer 2008, p.5).

KNOWLEDGE IN MOTION

Part of the group and the teacher herself were native Dutch speakers, the other part of the group had a very limited understanding of Dutch. All the participants were speaking English, which was a tough challenge for our master. Because English often proved to be too difficult, she explained many things in Dutch, relying on the others to translate. This resulted in different ways of apprehending the instructions between the Dutch and non-Dutch speakers and presents an interesting opportunity to compare how the language of crafts relates to spoken language in this social context. The non-Dutch speakers were learning mostly by doing and copying, the other part of the group was also sharing in stories from experience, which were sometimes hard to translate or didn't seem relevant at first but made sense later on and in the end gave a better understanding of the concept of craftsmanship. Not having to focus on listening however made the non-Dutch speakers look deeper and more focused at themselves, their movements and non-verbal insights gathered from unspoken communication and group dynamics.

Practicing crafts in a group evokes sharing on different levels, from the very practical to the philosophical, which was easy to confirm during the lace-making workshops. When working/making together, it's easy to talk about each other's goals and share tips on how to reach those. It could be a simple trick on how to tie a knot to let it disappear into the work or a way to deploy the crafted object to benefit a charitable cause. Everyone in the group can add to this knowledge with the craft project as an instigator or a tool for conversation. This connects well to the co-creation of services with the people that will use these services eventually. Service

Design could take inspiration from how, through crafts, co-creation has been achieved over the ages.

By physically working on something and getting into a flow the craft project can become a metaphor for the service that is being created. The crafting can serve as a common language to share expertise and experience between the different stakeholders involved in the service. “Designers are used to work with rich information and creating different kinds of representations. As Schön (1983) puts it, designers interact with these representations in a conversational way. These representations are thus far from being incidental outputs but are rather central inputs in the thought process.” (De Lille et al. 2012). Just as sketches or prototypes are used to discuss a product design, different steps in the crafting process could be used to discuss different phases of a service.

CHANGING SOCIAL STRUCTURES

Craft is closely linked to identity. It has for instance religious, mythical, social and economical layers and can be a tool to cross boundaries between them. Craft has the potential to change social structures and be more than functional and aesthetic even today; in India Gandhi used crafts to educate people about self-reliance and democracy (Tharakan 2012). The social fabric of crafting creates a sense of belonging and of ownership, which is important when working with multiple stakeholders. For designing Smart-Textile Services “Collaboration between these [textile, technology and creative industries] partners will require a sense of common ground” (Ten Bhömer et al. 2012). Practising crafts can bring people of different backgrounds together and facilitate collaboration required between stakeholders for creating great PSS.

Since all participants were trying to learn the same basic skills in the lace-making workshop, it was easy to compare each other's work and estimate how everyone was progressing. This led to a friendly sense of competition (I'm faster than you! My work looks neater!) encouraging each other to try harder. At the same time the person who was ahead would assist the one lagging behind or getting frustrated and explain or

demonstrate again the things they'd just learned. Of course the teacher was also going around, commenting and giving practical individual tips (figure 4). The relations were therefore in a constant flux, but everyone was always moving forward, since it was in our mutual interest to make progress and be able to move on to the next part of the instructions. The teacher drove this further, by taking the work of the person who had progressed the most to introduce the next step. This is similar to a team mental model for describing how knowledge is constructed and shared in order to reach a common goal (Ten Bhömer et al. 2012). This model is used for service design in another part of the STS research. While in this case the team mental model wasn't consciously deployed, it was a natural by-product of craftsmanship.



Figure 4. STS team members practicing lace-making in the workshop

REFLECTIONS ON EXPERIMENTS

Experiments between traditional crafts and new techniques or technology can serve to preserve these crafts and continue their evolution instead of making them obsolete. Which is valuable also for the development of smart-textiles that can borrow from knowledge, symbolism and traditions created over the ages; *complementing* rather than replacing them, with mechanical and technological knowledge.

Learning from a craftsman in person and practising craft in a group, richer information is shared and not just verbally. This richness can easily lead to new insights and directions. Regardless of their level of mastery of a craft, all apprentices can continuously contribute to the group's knowledge through their personal experience and reflections on crafting. This is co-creation in a new sense that could complement existing co-creation and co-design practise in services. Taken further, crafting could be used as a way to facilitate collaboration, co-creation or co-design and become a service itself.

So far we've discussed our experiences in the light of *designing* services, which was the main goal for taking these bobbin-lace making lessons. As we've seen

Metcalf (1993) argues that craft objects can perform a service and we have now shown that crafting could itself be considered a service through its social context. However in reflecting upon the workshops, we have also seen that craft may continue where design cannot. "Given that the service design is not finished until the service is performed, there is a high degree of dynamicity in the deliverable." (Holmlid 2007). The interaction between customer and service provider that shapes the service will change depending on factors such as location, time, mood, personality etc. The designer does not have full control over this, therefore it's worth considering the approach of a craftsman in this situation as well.

The most optimal scenario can be designed, but a craftsmanly approach could improve the service delivery under these changing circumstances because of its evolving nature. The iterative cycles in designing a service take place before production, while in crafts the iterations happen at the same time as production, which allows for quick adaptations. The repetitions in crafting a service may help to create social consciousness and expertise and could thus be applied to refine the service as it is being performed.

Another valuable lesson from craftsmanship for service design is the way skills and knowledge are shared. For craftsmen it is necessary to have certain principles, protocols and traditions. They need to protect their secrets of the trade, but if they are not shared and built upon, the craft will disappear. Sharing creates a narrative, a context and a foundation for the craft in a community. It generates interaction and relationships, which are all important in service delivery too. Service providers need to create a durable bond with their users through interacting with them. Systems and products depend on considerate interactions to become a comprehensive Product Service System.

Ultimately it is the deliverer of the service who plays the role of experienced craftsman and the designers of the service should cater to him or her and offer the best tools to create a desirable end-result. Just as a hammer could be used to fix the leg of a chair or to swat a fly, it is up to the craftsman how to use his or her tools and up to the designer to consider different needs and to try to take into account all possible scenarios to provide them. To achieve this the service designer and all stakeholders involved can take inspiration and examples from the methods of traditional craftsmen, be they lace-makers, woodworkers or goldsmiths.

FUTURE RESEARCH

To continue this research into of Smart Textile Services we intend to further test these findings in practice, doing research through design. By taking a craftsmanly approach, we would like to create a social context from which a narrative can arise alongside the technological developments and more meaningful and empowering examples of smart-textile PSS can be created.

One way we are doing this is by creating an interactive patchwork of knowledge. We're inviting people from different backgrounds in textile and technology, including textile manufacturers, technology experts, designers, traditional craftsmen and tinkerers to exchange skills and knowledge in a craft setting. Their expertise is represented in different patches that are combined together to become part of a larger patchwork in which new connections can be made between high-tech and high-craft and between product and service.

These connections are made hands-on, with groups of stakeholders. Rather than becoming a co-designed smart-textile product, the patchwork will serve as a conversational tool that invites a discussion both with words and with hands and facilitates knowledge exchange between different groups in an informal way inspired by the concept of the social fabric. Looking at craft as a service, combining high-tech with high-skill, we expect to be able to achieve more profound results than if the technology was leading.

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INVISIBLE MAN: LITERATURE AND THE BODY IN DESIGN PRACTICE

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ABSTRACT

As a culturally produced text, literature is seen as a lens with the potential to draw attention to the values, ideas, and beliefs that underlie a society. In this paper three key themes in H.G. Wells' novel *The Invisible Man* (1897), are discussed: firstly, the ways that the body may be fashioned through dress and individual practices; secondly, how wearable artefacts may socialize bodies and symbolically communicate; and thirdly, how the fashioned body may challenge personal and cultural boundaries. Collectively, these issues draw attention to the relational network of body, culture, and dress. These relationships are highly relevant to design research in fashion, dress, and wearable artefacts, which all use the body as a site. This study is seen as being an example of how literature may be utilized as a speculative device to encourage experimental and creative design research practices. My doctoral research, which emphasizes the body and skin as sites for design, is used as an example of a cross-disciplinary approach that draws on the issues raised through an analysis of the novel.

THE INVISIBLE MAN: LITERATURE AS A CRITICAL LENS FOR DESIGN RESEARCH

Originally serialised in 1897 and published as a book in the same year, H.G. Wells' novel *The Invisible Man* has

since been republished in countless editions and interpreted in a number of films, showing an enduring popularity and on-going relevance to audiences. As a literary trope the Invisible Man allows us to speculate on what the physical and psychological ramifications of living in an unseen state might be, while highlighting many of the ways that human bodies visually communicate. The novel acts as a lens to critically examine the complex relationships that form between body, culture and dress through the device of the unseen human. In my research the implications of this intersection of agencies is addressed through developing methodologies for dealing with the living body as a site, and generating wearable artefacts that explore practices of fashioning the body.

Three key themes that emerge through Wells' text demonstrate the relational network linking body, dress and culture. The first of these is the way in which bodies may be fashioned through dress and individual practices, the Invisible Man's self-induced transparency being an example. Following this, the body is examined as a cultured and cultural agency that engages with systems of social communication. Through Wells' text, the body and wearable artefacts are seen as capable of being invested with symbolic meaning in a cultural context. The Invisible Man is then discussed as an example of how the fashioned body may challenge personal and cultural boundaries, representing the desire for discipline and order within society.

Literature has the potential to encourage creative avenues of exploration. This novel incites readers to consider ways that experimentation with the body and worn artefacts might alter experiences in the world, as well as drawing attention to the ways that bodies and wearable artefacts symbolically function. As a research device, it highlights the living body as site for and of design through wearable artefacts and practices of dress. Projects from my research are used as an example of how the issues raised through the analysis of this novel may encourage the body and skin to be made 'visible' as sites through experimental and creative approaches to design research and practice.

THE FASHIONED BODY: DRESS AND THE WEARABLE ARTEFACT

Joanne Entwistle has said that fashion is about bodies, and in particular, it is about 'fashioned' bodies (2000a, 1). All bodies are fashioned, and even the naked body is produced or given meaning through cultural readings, as Nina Jablonski observes:

Even when we adopt the "natural look" and don't adorn our skin at all, we are making a social statement. Our skin talks even when we don't; it is not a neutral canvas. Through the expressive functions of skin and body decoration, we have expanded the communicative potential of our bodies and reinforced the primacy of the visual sense in our sensory repertoire. (2006, 164-165)

Jablonski recognizes that our skin is not passive, but is a temporal, transformative, and communicative surface constantly invested with meaning. Skin has the ability to visually communicate subtle information about our health, ancestry, lifestyle, affiliations and aspirations. Yet this emphasis on visual primacy tends to overlook the broader phenomenology of skin as a conduit for the transmission of tactile meaning. Didier Anzieu's (1989) concept of the Skin Ego suggests that touch is fundamental to the forming of our 'psychic envelope' that establishes barriers around the self, filters exchanges, and links both touch and emotion to our 'impressions' and how we 'feel'. Claudia Benthien (1999, 227) says that 'many kinds of touch do not *mean* something; they already *are* something (for instance, affection, desire, or anger)', and further to this, gestures of touch can mean many things, posing difficulty in transmitting information. As an interface, skin is prone to miscommunication, misinterpretation, and outright deceit – powders, paints, plastic surgery, cosmetics, and artificial tans can all fashion the skin and alter the narratives that it tells (Anzieu 1989, 17). Joanne Eicher's definition of 'dress' and dressing elaborates why this is a practice not limited to the realm of fashion but one that can equally apply to the 'dressing' and social readings of skin. She explains that dress is a coded system of nonverbal communication that enhances social interaction; dressing occurs when 'beings modify their bodies visually or through other sensory measures by manipulating color, texture, scent, sounds, and taste or by supplementing their bodies with articles of clothing and accessories and jewelry' (Eicher 2012, 78).

H.G. Wells' character of the Invisible Man is a wilful young scientist who modifies his body by using drugs to bleach his blood. With the help of a gas engine working two dynamos that radiate a vibrational frequency, he lowers the refractive index of his body to that of air and renders himself unseen, much like the effect of a piece of glass becoming invisible when immersed in water.

Describing the experience to his contemporary Dr. Kemp, he relates that his 'limbs became glassy, the bones and arteries faded, vanished, and the little white nerves went last' (Wells in Parrinder ed. 2005, 100). The modification of his body has taken permanent affect, and much like tattooing, the process of altering the appearance of his skin has also altered the way that his body visually communicates socially. While this may not enhance social interaction *per se*, the decision to manipulate his body so that it appears transparent has been done with at least some intention of it changing his ability to interact with other people. Harangued by a prying landlord that he wishes to escape, he makes the snap decision to transform himself and goes on to use his invisibility as a tool to enable breaking and entering, stealing, and beating people without fear of being recognised or facing repercussions. While his intent is far from noble it is clear that the Invisible Man has 'dressed' his skin, changing the way that his body is perceived, socially read, and interacted with.

As a cultural body practice, 'dress' is as much about the *practice* of dressing the body as it is about the *things* that are used for adornment. In my own research I prefer to use the term 'wearable artefact' or 'wearable' to explain the latter, partly as it has an inherent openness that reflects my cross-disciplinary design approach (rather than one tied to the connotations of 'an article of dress'), and partly because this is a trope that is implicit to the body, the act of 'wearing', and also the process of material 'wear' – all of which are central to my design approach.

Like dress, wearable artefacts can be sensory modifications to the body (e.g. invisibility, perfume, or cosmetics), garments, jewellery, or accessories; wearables may be in fleeting contact with the body, or in a prolonged and trusting relationship with the wearer such as with a prosthetic; as a practice of dress they may be applied, inscribed, absorbed, implanted, marked, worn, or borne by a body; a wearable may also be a carried object like a cane or spectacles, an artefact that has become incorporated into the body schema. The wearable artefact is a device for the 'fashioned body', and the body is the site that gives it meaning and context. The practices of 'getting dressed' and 'wearing' imbue both the body and artefact with a new array of meanings. Without the body as a site wearable artefacts may appear displaced or evoke the body's absent presence. Cultural historian Elizabeth Wilson observes that in the museum:

We experience a sense of the uncanny when we gaze at garments that had an intimate relationship with human beings long since gone to their graves. For clothes are so much part of our living, moving selves that, frozen on display in the mausoleums of culture, they hint at something only half understood,

sinister, threatening; the atrophy of the body and the evanescence of life. (Wilson 1985, 1)

Robyn Healy (2009, 108) also explores this in the context of encountering garments in fashion exhibitions, where empty clothes remind us that a human body should occupy the clothing space. Both Wilson and Healy's observations illustrate the close association of clothing with the living, moving body, and highlight one aspect of why the figure of the Invisible Man is so unsettling. In Wells' novel it is the relationship between the unseen body and dress, and the cultural readings of this strange scenario that are of particular interest. Garments worn by the Invisible Man are not unoccupied, nor alienated from the living body like those in the museum. The man within the clothes is corporeal in every sense, yet the effect of an invisible body wearing clothing is similar to that of clothing inhabited by empty space, and the uncanny sense of disembodied threat that Wilson describes. The implications of this are vast. In the fictive scenario of *The Invisible Man*, not only has the protagonist chosen to be rid of a basic and fundamental form of social communication – the expressive, visual medium of the skin and body – as a result he has also altered the way in which wearable artefacts are culturally read on the body.

THE CULTURED BODY: DRESS AND SOCIAL COMMUNICATION

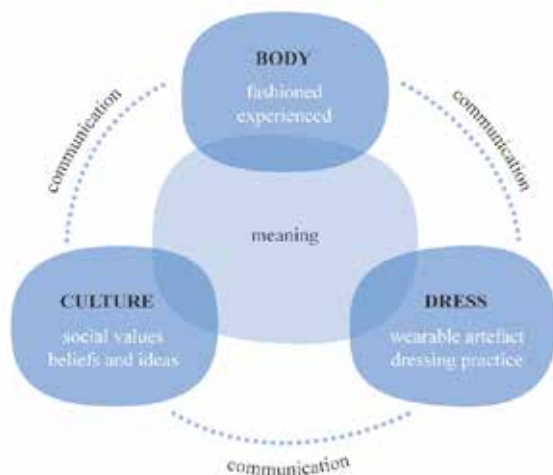


Figure 1: Representation of how meaning may be produced through the relational network between body, culture, and dress.

The Invisible Man highlights how wearable artefacts may play a role in socialising and fashioning the body. The scenarios played out in the fictional village of Iping show how readings of the body can be steeping in cultural meaning through reflecting individual and social values, beliefs, and ideas. Cultural environments reinforce individual and social ideas of how bodies should ideally look, how they should act, and what constitutes an acceptable or desirable body. The way

that bodies may reflect or be produced through cultural meaning is addressed through the two schools of communication thought: process communication and semiotics (structuralism). Process communication poses that information is transmitted from a source through an encoded channel or medium that must be interpreted by the receiver (Barnard 2007, 138). Semiotic communication takes the position that meaning is not sent or received but is produced through individual readings, this means that the meaning is unfixed and may be influenced by an individual's changing values, agency, or even mood (Barnard 2007, 139-40). While process communication relies on the transmission of meaning through cultural agencies with the knowledge to successfully decode the information, semiotic communication suggests that an individual's construction of meaning constitutes them as a member of a culture (or not). Both schools of thought recognize that interference and interpretation is likely to occur, a point highly pertinent to the reading of fashion and dress, and the fashioned and dressed body, as social communication.

Fred Davis takes a sociological interest in fashion and dress, discussing the difficulty of identifying exactly how certain forms, textures, colours, postures, and expressive elements take on symbolic meaning to a culture. He notes that ambiguity is rife in contemporary dress codes as the meanings of garments or styles shift temporally, and meaning is dependent on factors such as context, social variations in what are identified as signifying cues, variations in interpreting signified information, and the tendency to 'undercode' or make presumptions when the meaning of communicative cues is uncertain (Davis 2007, 150-153). This can be observed in an analysis of Wells' novel, which reveals the complex relationships between body, culture, and dress, and particularly how meaning is produced through these interactions. Set in a world that resembles our own, or at least resembles Wells' nineteenth century England (Priest 2005, xvi-xvii), the novel imagines ways in which an individual with an unvisualised body would have to adapt in order to survive physically and socially. The Invisible Man has transformed and fashioned his body in an innovative way, but without forethought or an engagement with society he faces physical, psychological, and social challenges. He exists in a world where his fashioned body is unrecognised and unlikely to be understood. As a result, he must develop new ways of functioning within the world; by renegotiating his body's relationship with dress he is able to gain social recognition, physical protection, and a sense of humanity.

The Invisible Man occupies a unique position - wearable artefacts play a truly pivotal role firstly by making him visible, and secondly in socialising his body and enabling symbolic communication within the cultural environment. His body is given a visible form only through the shape of things that come into contact

with him, like his clothes. Dressed, he becomes socially acceptable, albeit unusually attired. The cut of his clothes, quality of the cloth, and texture of his waxed paper nose become points of interest for the villagers he encounters, eager as they are to gain some information about the unforthcoming stranger in their town. Through the eyes of hotelier Mrs. Hall, he is described as a startling presence:

His forehead above his blue glasses was covered in white bandage, and that another covered his ears, leaving not a scrap of his face exposed excepting only his pink, peaked nose. It was bright pink, and shiny... He wore a dark-brown velvet jacket with a high black linen-lined collar turned up about his neck. The thick black hair, escaping as it could below and between the cross bandages, projected in curious tails and horns, giving him the strangest appearance conceivable. (Wells in Parrinder ed. 2005, 7)

Despite his alarming appearance he is greeted in Iping with interest rather than outright fear, but the villagers quickly characterise him as an unsettling, inscrutable figure partly because they cannot engage in a visual discourse by catching his gaze or reading his expressions. Mrs. Hall and Henfrey the clock-jobber relate the experience of seeing 'the muffled figure of the stranger staring more blackly and blankly than ever with those unreasonably large glass blue eyes of his. He came down stiffly and slowly, staring all the time; he walked across the passage staring, then stopped' (Wells in Parrinder ed. 2005, 33).

The Invisible Man is perceived as an object of distrust, capable of covert observation while giving nothing of himself away. This is not surprising considering that the Invisible Man's motivation to become an unseen entity is an anti-social desire to observe but not be observed. In becoming invisible he actively rejects communicating through visual codes such as his body and dress, which facilitate relationships and maintain continuity and stability between self and society. Fashioned and dressed, the body is a cultured and cultural entity that reflects individual and social values, beliefs, and ideas. His decision to periodically forgo clothing in order to remain wholly invisible becomes a symbol of his social detachment and desire to hold power over those around him. However, he must still negotiate the complexities of living in the social world if he wishes to survive. Without clothes he faces physiological and psychological hardships.

Following his transformation the Invisible Man is naked and vulnerable to the elements, socially isolated, and homeless. Within moments of making his debut into the world he stumbles because he cannot see his feet; and he is violently and inadvertently trampled and hit by those around him on the street, as they are unable to

anticipate his movements or spatial presence (Wells in Parrinder ed. 2005, 103-107). He is driven to assemble an outfit to disguise his true appearance in order to socially function and seek out human comforts. Clothes provide him with much needed physical protection, but they also fulfil a number of psychologically protective functions. Benthien writes that human beings have an archaic fear of the possession-taking gaze of others, and the base desire to protect themselves from this through 'covering oneself – even if, as in many cultures, this is done merely through symbolic ornaments or a specific inner attitude that regulates the act of looking' (Benthien 1999, 99). John Flügel (2007) expands upon this by identifying psychological dangers as moral, magical, and spiritual threats as well as the general unfriendliness of the world.

For the Invisible Man dress is a symbol of human qualities, offering psychological protection against the dehumanising effects that invisibility has on his psyche. Through dress and dressing, his body takes on a physically visible form that enables him to be recognised by, and exist within, society. By comparison the invisibility represented in Ralph Ellison's book *Invisible Man* (1952) is far more difficult to overcome. The invisibility related by Ellison's narrator is psychological, a wilful denial of the social presence of African-Americans in America's South. Wells' Invisible Man need only dress in order to be socially recognized. However, social acceptance proves to be more difficult. It becomes clear that it is not just dress or the act of dressing that will render the Invisible Man as an accepted, cultured body. There is also a system of social practices associated with dress that he must conform to. Through acts like wearing his full coat, hat, and gloves while inside near a roaring fire, and refusing to observe religious days 'even in costume', he conspicuously violates the subtle cultural codes of Iping (Wells in Parrinder ed. 2005, 5-6, 21). The combination of his improbable appearance and persistent wearing of attire that is unsuited to the situation or environment, have the effect of making him more visible and less socially acceptable.

THE UNDISCIPLINED BODY: SUBVERTING SOCIAL BOUNDARIES

Wells' imagining of how the fashioned body may challenge personal and cultural boundaries is the final theme explored in this paper. The 'social unacceptability' of the Invisible Man is due to his anti-social conduct just as much as the threat of his invisible body. Within both the socio-cultural context of Wells' original Victorian-era English audience and the audience of today, the Invisible Man reads as a body 'painfully and violently out of control, a body "uncanny" in Freud's sense that should have remained repressed' (Wisniewska 2010, 191). His characterisation is typical of the late nineteenth-century Gothic body, with contemporaries that include Dr. Jekyll and Mr

Hyde, Stoker's Dracula, and Dorian Gray. The Gothic bodies of this era are made monstrous through the clustering of various deviant qualities, and act as a disciplinary warning of what kind of corruption (and punishment) can occur when body and mind are not subject to self-control.

The Invisible Man embodies the threat of the unseen and transformative through his modified body. Physically, he is an abomination of scientific irresponsibility. He has transmuted himself into an invisible entity without thought of the ramifications. He relates:

I could not go abroad in snow – it would settle on me and expose me. Rain, too, would make me a watery outline, a glistening surface of a man – a bubble. And fog – I should be like a fainter bubble in fog, a surface, a greasy glimmer of humanity. Moreover, as I went abroad – in the London air – I gathered dirt about my ankles, floating smuts and dusts upon my skin (Wells in Parrinder ed. 2005, 116).

In this passage we gain insight into the disgust that he feels for himself in a half-visible state. The Invisible Man no longer envisages himself as whole but as a subhuman hollow within clothing, a space around undigested food, or a hole amongst the elements. He describes himself as being an insubstantial surface, a greasy glimmer or watery outline, a faint bubble, or grimy skin. Any passage through rain, dust, dirt, fog, snow and mud will render him partially visible, and he cannot eat without the unassimilated food being observed as a floating blur. He has the choice of being wholly clothed and socially recognised (though outcast), or being wholly invisible and depriving himself of food and the protection of clothes, neither of which are ideal. It becomes clear that the Invisible Man does not wish to be a part of society so much as he wishes to dominate it. He sees invisibility as having certain advantages and his intentions are far from noble – to rob, hurt, and ultimately begin a Reign of Terror, killing anyone that does not obey his orders. Roaming naked in public he symbolizes animalistic urges, going in the face of Victorian era values at a time when nakedness was associated with primitive culture.

He poses a moral and physical threat to both society and the individual, and as such can be identified as a form of what Mary Douglas calls 'social pollution'. Douglas explains that cultures provide positive patterns that give order to ideas and values:

The idea of society is a powerful image. It is potent in its own right to control or to stir men to action. This image has form; it has external boundaries, margins, internal structure. Its outlines contain power to reward conformity and repulse attack. There is energy in its

margins and unstructured areas. (Douglas 1966, 114)

In particular, she identifies transitional and boundary states to be most at risk (Douglas 1966, 96, 121). Threats to margins and boundaries, especially the imposition of new ideas or systems, can pose a danger to social structures and order, and thus may be viewed as pollution. Cultures may also project perceived threats to social order onto the body by attributing power to body margins and allowing their 'deepest fears and desires [to] take expression,' as the body comes to stand for any threatened social boundary (Douglas 1966, 121, 115). By mirroring situations that endanger social borders a more manageable 'body pollution', a culture can enact rituals of cleansing to banish the social threat and regain control. In this way the villagers of Iping come to identify the Invisible Man, who has been escalating in violence and indecency, as a threat to both their cultural values and lives. In the novel's climax the villagers resolve to cleanse their society of pollution and restore social order, hunting and killing the Invisible Man to reinstate and reinforce the primacy of their culture.

THE VISIBLE BODY: AN APPROACH TO DESIGN RESEARCH AND PRACTICE

The subversive body does not have to be a body that is violently out of control, merely a body that operates at the margins of accepted practice. While the Invisible Man meets a grisly end for his undisciplined and anti-social behaviour, it is conceivable that in the hands of a responsible, socially conscious scientist such as the character of Dr. Kemp, that the ability to become invisible could have been applied to achieve great things in Wells' fictional world. What this theme does demonstrate is the strong links between body and culture, and the ability of one to test the boundaries of the other. Wells' novel is a lens that illustrates how the body may be a personally and culturally invested text that may be fashioned using the practices and artefacts of dress, to communicate values and meaning. The themes raised in the novel also reflect the difficulties faced when navigating the theoretical and practical issues of designing wearable artefacts that engage with the body and dress.

In this section of the paper a selection of my research projects, which focus on the relationships between bodies and wearable artefacts, are used as an example of the ways that experiments in design research may draw on the forum of literature. Analysis of the novel is part of an on-going experimental approach to practice that I have adopted in order to study the body as a site for and of design. The Invisible Man has the potential to be a helpful lens, inviting creative and critical exploration of the relationships between body, culture, and dress.

Following the understanding of human interactions with dress and wearable artefacts as an embodied practice (Merleau-Ponty 2002, Entwistle 2000a), the provocation of the Invisible Man has been to render the body 'visible' in my research. The novel has been a device to overcome what jeweller Susan Cohn has called 'the canvas fallacy' – a tendency to reduce the body to a still life, to discourage attention to the living body and instead use to it as a 'background to jewellery ideas' (Cohn 2009, 8). In response to *The Invisible Man*, my approach has been highly experimental, drawing on a cross-disciplinary background in jewellery and object design as well as concepts from fashion, sociology and anthropology. It has resulted in implementing a methodology with the intent of designing for the living, moving body and not for a static canvas. This includes techniques for carrying out in-depth analysis of the body as site, and the development of projects that produce wearable artefacts in intimate relationships with the body's form and surface. The outcomes are projects that consciously draw attention to the body's surface, specifically to the transformative qualities of skin and its communicative potential. They aim to engage with the relational network between body, culture and dress that is highlighted by the Invisible Man's act of 'fashioning' his body.

BODY AS SITE: EXPERIMENTS IN SITE ANALYSIS TECHNIQUES

The development of site analysis methods for the living body has been key to this research. By encouraging a highly detailed understanding of the body over a period of time, these methods have offered a way to overcome the canvas fallacy. Rather than designing wearable artefacts against the background of an 'invisible body' the process of analysis allows a living, transformative body to take centre place and inhabit the wearable work.

The aim of the site analysis techniques was to produce data that could inform a series of wearable artefacts open to the possibilities presented by the living body. This included a series of studies using visual documentation techniques capturing the minute and shifting details of the body's spaces and surfaces. Observational drawings and photography were developed into a collection of image sequences that zoomed from microscopic to macro views, gathering information about the same area over different periods of time, and at different scales. While the series of images illustrated the complexity and temporality of the body, it also became clear that this technique would not suffice to gather the breadth of complex information that the projects required.

As a result I began to experiment with new methods of gathering data, firstly by creating etched casting plates of the body sites that reflected the depth of skin details and body spaces, and secondly by taking moulded impressions of motile areas in sequences that captured

the range of movement. To gather information that was only fleetingly present body casting techniques and materials including alginate, silicone and latex were utilized. These produced 3D representations of the body's forms, surfaces and textures. In order to gather data on the embodied experience associated with a site, a 'skin diary' was also kept, documenting sensory perceptions over a period of time.



Figure 2: Body site analysis techniques (top to bottom) skin detail drawing, photography, etching plates, detail of a body cast.



Figure 3: Details from applications of *Gold Leaf*, pictured on an ear, elbow and between two fingers.

The first wearable artefacts to come out of the site analysis findings were the Material Application Projects (MAPs). The MAPs were produced in response to the desire to experiment with temporal wearable artefacts, and to collect feedback on the types of experiences people had with artefacts there were in brief contact with their body. The changeability of the body as a site, revealed through the analysis process, led to a design response that shied away from the static and instead embraced the potential of the transient, transformative body. I wanted to create wearables that could be read as an extension of my jewellery practice by subverting what it meant to 'dress' the skin using a jewellery artefact. This was in response to the ways that the *Invisible Man*'s process of fashioning had the ability to redefine how he related to his own body, as well as how his body related to others. Most of all, with this series I

wanted to avoid the body being treated as a static background site. This meant placing the living body at the centre of my practice rather than the artefact as a design object. It also raised the challenge of producing a wearable that when removed from the living body's context would avoid evoking an 'invisible body', a fictive form with the potential to inhabit the hollow spaces of unworn pieces.

The MAPs were realised by creating unique, one-off wearable artefacts for voluntary participants. *Gold Leaf* utilized gold leaf sheets and liquid latex typically used for special-effects makeup. Participants chose the site for their wearable, and the skin was dressed using the latex and gold. The application was made in response to the forms of their body and their personal preferences. Over the course of a single day (the wearable's lifetime) the gold leaf took on qualities that reflected those of the wearer's skin. Applied as a membrane, the gold and latex warmed to the temperature of the body, shifted with the wearer's skin, and cracked in response to repeated movements and gestures. Like the *Invisible Man*'s garments, *Gold Leaf* acted as a covering that simultaneously concealed and gave form to the body's characteristics. The MAPs created an unnatural gilded veneer that drew attention to the site's forms and textures.

In feedback gathered from participants the experience was likened to wearing a form of jewellery, particularly as the gold leaf was visually interpreted as a precious material. The changing quality of the surface, produced through the movements of the wearer's skin, drew awareness to the body's perpetual transformation. Situated so closely to the skin, the wearable artefact was not only a form of dress but was also engaged in the body's perceptive experience, presenting the possibility of mediating the wearer's sense of touch and highlighting their surface motility. It was seen as both a personal experience as well as a performative piece observed and interpreted by others.

When removed from the living body at the end of the day the pieces disintegrated, and with them, the spectre of the 'invisible body'. In terms of moving away from the static effect of the canvas fallacy this could be considered a relatively successful project. The moving body reproduced individuating characteristics in the gold leaf, which drew participants' attention to a relationship between the living body and wearable artefact, as well as its communicative potential. These qualities are explored in the exhibition item, *Hands On*. Participants are invited to experiment with the form of their own hands by creating temporal wearable skins using gold leaf, dyed liquid latex and cast components. They are encouraged to reflect on the imaginative, performative act of fashioning and wearing a new skin by documenting both the artefact and their thoughts on the experience using media provided.

Participants can also interact with the strings of brightly coloured latex *Fingers* on display. These artefacts are cast from the hands of different people then are joined in mixed arrays. Much like *Gold Leaf* and *Hands On* these pieces address the themes of *The Invisible Man* by drawing attention to the ways that wearable artefacts may redefine how we relate to our body and the bodies of others. The pieces are palpable and flexible with the fingerprints of the original bodies concealed on interior surfaces. Only by engaging with the work through a combination of visual, tactile and material senses can the subtle differences in these details be perceived. Wearing *Fingers* introduces surfaces of unseen, unfamiliar bodylines that intercede between the acts of touching and touched. This slows down the experience of concurrent endogenous and exogenous sensations that occur when we use one hand to touch the other, raising awareness of the interchangeable states of object and subject known through this phenomenon of ‘double touch’. As artefacts intimately aligned with the skin surface they engage with the living body’s experience of touch, mediating how the wearer can feel by introducing the invisible touch of others.

100 HAND SITES

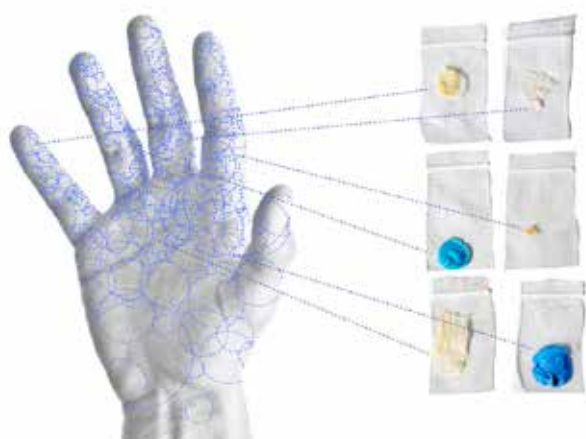


Figure 4: Diagram representing the cast sites in *100 Hand Sites*, and a sample of the casts (shown stored in airtight bags).

100 Hand Sites is a project that also emerges from the techniques developed through analysis of the living, moving body and the skin surface. It is a series of body casts that record the changing forms and textures of a single hand, with a focus on experimenting with what a site for design on the body might be. Made using dyed liquid latex, this on-going collection has long outgrown the one hundred sites of the title, and is potentially without end because of the difficulty in definitively mapping an area of the living body. Complex and dextrous, the hand is capable of an infinite number of permutations that alter its form and surface. Added to that, the living body is perpetually in a process of being, becoming, and breaking down. It transforms from moment to moment, and over an extended period of time the body accrues marks and ages - the cells of today are not those of tomorrow.

The project then, is a collection of fleeting body moments. Each cast preserves a site that existed briefly and is gone forever as the body continues to transform. The casts themselves range in size from a pinhead to a whole palm. Many of them need to be viewed closely or with a microscope in order to recognize the texture of human skin or to identify the form they capture. They are delicate and membranous, embedded with skin cells removed by the latex as it is peeled off the living skin. The casts themselves will continue to evolve over time as latex is an organic material prone to wear, colour change, hardening, and deteriorating in areas exposed to skin oils as it ages.

In contrast to *Gold Leaf*, this is a project that conjures the ‘invisible body’ into being. There is an eerie sense that these skins are flakes separated from their source, much like Wilson’s museum of empty clothes. Yet, the pieces evoke an absent body rather than a transparent form like the Invisible Man’s; they are a collection of bodies and moments that have passed rather than living relics. *100 Hand Sites* didn’t definitively isolate what a body site might (or might not) be, but it has resulted in a collection that visualises the temporality of the living body and its potential to endlessly transform. As such, the living body as a site that presents the possibility to design for bodies that have already passed, that may only be present for a moment, or that do not yet exist. Heeding Wells’ moral warnings to engage in socially responsible research and practice we can perhaps take a cue from the Invisible Man and see this as a challenge to innovate new ways of dressing, fashioning, and transforming the body.

DISCUSSION

In the first part of this paper three key themes in H.G. Wells’ *The Invisible Man* have been analysed in terms of issues that arise in the research of wearable artefacts. Firstly, the cross-disciplinary trope of the wearable artefact was introduced to describe the particular relationship between the body as a site for design and the artefact that dresses it. The Invisible Man was identified as a fashioned body, along with a discussion of the ways that bodies may be fashioned through culture, artefacts, and practices of dress.

Secondly, the ability of wearable artefacts to play a role in socialising and culturally fashioning the body was addressed. Bodies and wearable artefacts were seen to be part of systems of social communication, and ascribed with symbolic meaning. In *The Invisible Man* this is illustrated through the way that clothes allow the protagonist to function within society. However, repeated violation of subtle social codes that surround clothes and clothing practices also prevent him from being fully accepted by the Iping community. The symbolic meaning of clothes was also explored through examples within Wells’ text, which demonstrates ways

that dress may provide physical, spiritual, and psychological protection.

Finally, the Invisible Man is seen as a fashioned body that challenges cultural values and boundaries. Within the cultural milieu of the novel and its original audience of Victorian-era society he is positioned as a subversive and transformative figure, a form of social pollution that must be disciplined. As a culturally produced text, literature is seen as a lens with the potential to draw attention to the values, ideas, and beliefs that underlie a society. Collectively, these issues show the network of meaning that constructs, and is constructed by, the relationships between bodies, culture, and artefacts.

In the second part of this paper, *The Invisible Man* is viewed as a lens through which to creatively and critically examine design research. In light of the themes raised by the text research projects that focus on the living body as a site for design are discussed. These examples demonstrate an experimental approach to design research techniques, in response to the challenges of analysing the living body as a site, and making the body 'visible' through the performativity and practice of wearable artefact design. The figure of the Invisible Man is seen as a sign of possibility that encourages experimental and imaginative design research practices, a disciplined approach, and an awareness of the relational network surrounding the body and wearable artefact. This study is seen as being an example of how literature may play a role in experiments in design research and practice. As an unseen entity the Invisible Man is a device through which to speculate on how the visualised body plays a role in constituting the functions of wearable artefacts and their meaning to social audiences.

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THE INGENUITY OF AGEING: AN EXPERIMENT TO EXPLORE THE ROLE OF DESIGNERS AS A MORAL SUBJECT

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ABSTRACT

As a dialogue with the advocates of the idea of ‘design process as *Things*’ of which designers become facilitators and supporters for design process, we attempt to argue that designers should understand their role as a moral subject and their values in design should be revealed and discussed with design participants. Regarding the ways of deliberating values in design process, we employed Ricoeur’s ideas of utopia and ideology as the key concepts guiding the design of our experiment with a group of retired academics in China. We argue that designers could accomplish this task through a critique of ideology and of identifying utopian elements from the participants. In conclusion, we maintain that both designers should align with the critical role of designers as a moral subject so as to ensure better design ‘outcomes’ that could improve lives for our future selves.

INTRODUCTION

As a team with a sociologist and a designer-researcher, we began our collaboration five years ago and have worked to research the role of designers in the design process. We endorse Participatory Design (PD) out of the belief that the user’s involvement would enhance the quality of the design outcome and that the practice wisdom of users is an invaluable resource during design

(Ho *et al.*, 2011; Ho and Lee, 2012). However, we question the current PD development that designers are relegated to a secondary position vis-a-vis that of participants, and eventually merely playing the supportive role in the design process. It turns out that designers are no longer necessary for direct negotiations with participants and that issues around the quality of design have been left undetermined. We argue that designers should play a critical role in the field of design, especially when this profession has much been involved in the pursuit of social change, since the political and moral judgement of designers would play a part in setting the goal of social change. For the purpose of the demonstrating how designers live out their moral values, we draw our experiences from our one-year experiment involving a group of older people that are actively ageing on a university campus in China.

WHEN DESIGNERS MEET PARTICIPANTS

We learned that almost every approach to PD emphasises the need to rethink the roles of the participants, especially those who are known as ‘users’ or co-creators. In the PD framework, the design process is generally understood as a problem solving process. Correspondingly, users’ identity has been confirmed as an experience and resources provider who could contribute much to design. However, in the current discussion within the field of PD, designers are re-positioned to a supportive role rather than a contemporary of other participants (Bjorgvinsson, *et al.*, 2012). Designers’ roles are also reshaped as ‘developers, facilitators, and generators’.

It has been suggested that designers may take up a new role in the task of *infrastructuring* public *things*, and of supporting future appreciation and appropriation of design at use time (Ehn, 2008, 94; see also Bjorgvinsson, Ehn and Hillgren, 2010; 2012). This view is a tricky re-lelegation of designers from the role of active participants to that of supportive participants.

Ehn (2008) has proposed a new conception of the design process in a way that the participation process as a design process is for the realisation of a 'socio-material assembly' conceived as *Things* which could be interpreted as 'the outcome of the design process'. A design process has also been divided into two parts: design-for-use and design-in-use.

Of most importance, because design-for-use could not restrict the possible range of the ways of using the outcomes from the design process, in the process of design-in-use, there always new ways of interaction and application, that would result in innovative appropriation of the design outcomes. Generally speaking, design process is inevitably characterised by uncertainty and ambiguity. In the light of this understanding, design projects could not be guided by any engineering perspective, which is rationalist in nature and could not be informed by a top-down perspective that would finally hinder adaptation to the changing conditions.

Conversely, design process should be regarded as *Things*. Ehn further characterised the social domain of the design process in which all parties are inevitably involved in an entangled design-game where participants, whosoever they are, have constructed '*a socio-material design thing, a meaningful potentially controversial assembly, for and with the participants in a project*' (2008, 94).

According to Bjorgvinsson, *et al.* (2012), designers, in this new version of PD, have a new challenge of which PD '*is seen as a way to meet the challenges of anticipating or envisioning use before actual use, as it takes place in people's lifeworlds*' (Bjorgvinsson, Ehn and Hillgren, 2012, p. 104). In order to facilitate meeting such challenges, designers of PD should prepare opening up the possibility of use as design or design-after-design. This task has been termed as *infrastructuring*.

In our view, this idea brings designers to a new domain where designers have been assigned a fundamental obligation to design events, such as Yschumi's suggestion of 'event architecture' by which controversial things are opened up to support multiple, heterogeneous and controversial design-games in use. Manzini and Rizzo (2012) also constructed a new typology of the role of designers as *triggers, codesign members and design activists* that designers pick up the duty of supporting a platform or infrastructure for negotiations or even serving as the trigger and design activist of design initiatives.

We find this re-positioning of the designers in PD problematic. Firstly, when we are talking about PD and regarding designers for infrastructuring, designers turn out to be supportive members of a design project. This raises an issue of the legitimacy of using design knowledge in design. Secondly, it would lead to the exclusion against designers' involvement. Just as Manzini and Rizzo (2012, 202) have pointed out that

some examples of 'bottom-up social innovation can be considered as particular cases of participatory design: a participatory design, where, every often, no professional designers are involved'. Thirdly, given that reification and appropriation of design outcomes in the design process is full of negotiations and internal struggles, designers, as triggers and design activists, must learn how to negotiate with participants in the context of conflicts. Ability to deal with conflicts and disagreement during the design process is necessary and valuable. If designers become infrastructuring organizers, on what basis could designers endorse or refute some kinds of arguments in question.

We concede that design as a profession has more opportunities to go beyond commercial setting, which has been largely informed by a product-centric perspective, and make contact with a new design domain in which innovation is about social change. Design Activism is surely a case in point (Thorpe, 2012). The idea of Design for Social Innovation also sets a good example of the involvement of designers in the process of social change. For examples, the Malmö Living Labs, the Young Foundation in the UK and Manzini's DESIS network promoting the concept of 'collaborative services' are real attempts to bring forth social change. Once designers take the supportive role in this process, the goal of social change is seemingly set by participants rather than through the negotiation between designers and people. We find this re-positioning of the role of designers in PD is unacceptable.

THREE ESSENTIAL COMPONENTS FOR BEING PARTICIPATORY DESIGNERS

In response to these issues arising from the new assigned role for PD designers, we point to three essential components which would constitute a responsible PD designers involved in facilitating social change through design process. Drawing from Hekman's conception of moral being, we argue that designers, just like any individual human being, are inevitably a moral subject. Being a supportive role in design activities just entails the irresponsibility of designers in being a moral subject. We also employ Ricoeur's critical theory to search for the values enshrined by designers to judge the quality of resultant design outcomes. We shall detail how we have applied Ricoeur's concepts of ideology and utopia to our experiment so as to show the significance of this kind of theoretical discussion. The third component is the idea of treating human action as a text on which designers' interpretative schema is applied.

A) DESIGNERS AS A MORAL SUBJECT

First of all, Hekman (1995) pointed out that every individual is inevitably involved in a moral language game in their daily lives. Designers participating in the design process are also involved in a moral language game with their counterparts. To Hekman, in every

culture, to become a person is to become a moral person. As she argued, *'my moral beliefs constitute who I am as a person. When I make a moral statement, I am not saying that I believe this is right but could just as well believe that something else is right. I am asserting that this is right; I would be a different kind of person if I believed differently'* (Hekman, 1995, 127). In other words, we should not define ourselves as designers without mentioning our moral judgement and belief. Once 'designer' as an identity has been endorsed and turns out to be a kind of subjectivity, we meanwhile assert our belief and moral judgement. This is what Hekman said of the 'form' of the employment of moral language game. This form is needed by everyone, no matter if one is a designer or just an ordinary person. Regarding the contents of the moral language game, we acknowledge that the morality of our culture is a historical product, and is always located, historical and contextual. This discussion has two implications. Firstly, designers have their own moral language games as their moral language content is specific, as long as the subjectivity of a designer is formulated. Secondly, there is a plurality of moral language games, like those in which participants are involved. This entails the possibility of having various kinds of language games. In the process of design, a designer should, in the light of his or her morality, determine which language games are regarded as hegemonic while others as marginalised moralities in a design process.

B) IDEOLOGY AND UTOPIA

In order to formulate the distinction between hegemonic and marginalised language games, here we move on to Ricoeur's theory of ideology and utopia. This theory is insightful as it provides us with a framework to deal with the critique of ideology. In the design process, we have to illustrate the ideological dimension of the participants' appropriation and reification in order to ask participants to rethink their actions. This is important in the context of disagreement and conflicts. If we take PD *'as a way to meet the challenges of anticipating or envisioning use before actual use, as it takes place in people's lifeworlds'* (Bjorgvinsson, Ehn and Hillgren, 2012, p. 104), it is necessary to accept that colonisation of the lifeworlds exists and the critique of ideology should be conducted in order to accomplish de-colonisation.

For us, to conduct the critique of ideology is to expose the project's distorted visions of the world to designers ourselves and to the participants. In our view, distorted visions of the world protect the *status quo* and constitute a social domination. In PD, this task is of utmost importance as we oppose any domination. This view is certainly shared with Ehn and his colleagues as they are working towards *'infrastructuring in support for communication and community building free of coercion at use time'* (2008, 99).

Our question is then how to accomplish free of coercion. We accept Ricoeur's idea that the critique of ideology is

not equivalent to the elimination of ideology. One of the necessary step to achieve free of coercion is not the elimination of ideology, but the search for the moves to go forward. In his view, human beings can never step outside the ideology itself. Our way out is to step inside ideology and search for the possibility of moving forward. His search is supported by his belief that ideology should have a social dimension apart from distortion: *'If social reality did not already have a social dimension, and therefore, if ideology in less polemical or less negatively evaluative sense, were not constitutive of social existence but merely distorting and dissimulating, then the process of distortion could not start'* (1986, 10).

To Ricoeur, the 'positive' side of ideology is its role to serve an important role in supporting and legitimising authority and *the status quo*. Ricoeur pinpoints a social dimension of ideology, which is said to be the source of identity and integration for communities and therefore something constructive. To put it simply, ideology has not only the negative dimension of distortion, but also the positive side of legitimising authority and the source of social identity and social integration. Thus, we could understand Ricoeur's conception of ideology at the superficial level where ideology represents a kind of distortion. But at a deeper level, it provides a belief in the legitimacy of authority and the identity on which communities can be built.

By the same token, Ricoeur employed a similar method to understand utopia. At the superficial level, it only represents some sorts of fantasy or story or escape with little grounding in reality. Despite this negative dimension, utopia provides the rupture and challenges so that a dynamic vision of possibilities is kept. The positive dimension of utopia is its ability to call a society into question from an imagined, possibly critical, vantage point. *'Utopia is the mode in which we radically rethink the nature of family, consumption, government, religion, and so on. From 'nowhere' emerges the most formidable challenge to what-is'* (1991, 184).

Utopia and ideology constitute a practical circle, which could not be decoupled, as it is the unrelieved circle of the symbolic structure of action. Moreover, Ricoeur argued that this circle is not vacillating continuously but becomes a spiral and progressive orbit. As he maintained, *'it is too simple a response, though, to say that we must keep the dialectic running. My more ultimate answer is that we must let ourselves be drawn into circle and must then try to make the circle a spiral. We cannot eliminate from a social ethics the element of risk. We wager on a certain set of values and then try to be consistent with them; verification is therefore a question of our whole life. No one can escape this. Anyone who claims to proceed in a value free way will find nothing'* (Ricoeur, 1986, 312).

We take ideology and utopia as polar opposites of a single *'cultural imagination'* that *'mediates and*

integrates human action through interpretive schemas that both constitute and distort a society. It is the same symbolic structure that is prefigured in narrative discourse that also constitutes social life as the cultural imagination' (Kaplan 2003, 62).

In our analysis of the design process as an active way of accomplishing desirable social change, we should focus on how ideology and utopia are constructed through different discourses. In other words, even if we endorse the view that the design process is a *thing*, an assembly with an entanglement of many different design games. We should go further to identify the ideology and utopia embedded in those discourses and to carry out a critique of ideology and the hermeneutic of suspicion.

C) HUMAN ACTIONS AS TEXTUAL ELEMENTS

Given that the design process is a kind of *Thing*, '*participative, entangled, meaning-making design games*' (Ehn, 2008, 95) in which different language-games are involved, we could take this design process as a kind of text. We do disagree that everything in the reality is text, but we would argue that all human action could be understood '*as if*' it were text because of the similarities between text and human action, such as the fact that the methodology of human interpretation could be applicable to both' (Langdrige, 2004). Thus, design activities as human actions could be taken as 'textual' elements.

In the light of this, we would take the process of reification, in the language of Bjorgvinsson *et al.*, as a kind of textual manifestation. In the encounter of reified material or non-material objects emerging from the design process, we have a choice: whether we should search for its 'inner meanings' like a kind of 'as-if' text or give a critique of it. We should elaborate more on this choice.

In our experiment of engaging retired intellectuals in Mainland China, we explored our ways of identifying the positive and negative sides of both ideology and utopia from participants. In the context of disagreements, we could point out the positive dimensions of one party and show that to their opposite counterparts, whereas in the context without conflicts, we could highlight the positive dimensions of ideology and utopia in order to establish the objective of the design process

THE EXPERIMENT: FRAMING AGEING INNOVATION DESIGNED BY INGENIOUS OLDER PEOPLE

To us, '*improving the quality of goods and services and the quality of life for the elderly*' could be seen as an objective for social change. Our original plan is to translate the experiences of PD to the situation in China and see if the role of PD in accomplishing social change could be maintained in the social situation of modern China. What we have done is '*to engage design in change*'. The reason for choosing China as a place for

case study is related to the conventional image that China does not advocate the form of democracy as open as those institutions in the US and European Countries. Relating to the experience of PD, the democratic system in the industrial system of the Scandinavia countries certainly facilitate the adoption of the rationale of PD which has its roots in the movement towards democratisation of work places whereas in China this sort of movements seems unattainable. However, we discovered that engaging design in change has already occurred in the lifeworlds of Chinese people. They had practised their 'ordinary design' for their lives in retirement. Our concern then is not to prove the existence of the possibility of engaging ordinary people in design activities. Instead, we aimed at showing that it is possible to transform individual efforts in design ordinary lives into design at communal level in China. We anticipate to find out a kind of localised mobilisation of participation in design through our study of the Chinese retirees in PD.

During searching for design partners in China, we found an interesting situation at Tsinghua University in Beijing; one of China's most renowned universities, it is an important centre for nurturing talent and conducting scientific research. Tsinghua University has just celebrated its 100th anniversary with more than 30,000 staff members and students. In addition to current students and staff members, there are over 50,000 residents living on campus who support staff members and their families. For instance there's a kindergarten, primary and secondary schools and a shopping centre to support the community. It works like a town. Interestingly, over 6,000 retirees are still living on campus, and many of whom are scientists who hold respected social status as subject experts, as well as mentors to many of China's current key political leaders in the Communist Party, the ruling party in the Chinese government. We decided to conduct a study of this unique NORC of retired academics.

These retired intellectuals have developed their own ways to continue their work lives after the official retirement age. They are not the commonly perceived 'old people' who request our help. Instead they are people who develop tools to help themselves. It is very important for us to learn these 'tools' from these ingenious older people so that we can employ them to our future selves. We are particularly interested in how these retired people design and develop their own ways to tackle ageing. We are also interested in whether they could be convinced and mobilised to organise a participatory research/design project. We determined to conduct our labs there since according to our evaluation there is a high possibility for mobilising people to participate in design activities.

THE METHODOLOGY: BUILDING A PARTICIPATORY DESIGN COMMUNITY

This project has two main sessions. The first part is to achieve the mobilisation of participation. We conducted

interviews in order to persuade the retirees to participate in this design project. The second was the participatory design labs in which design ideas are collected and discussed. The first session of this project started with personal observations and later through interviews. Upon the data collected through interviews, we identified interviewees' matters of concern and their utopia that, in our view, is the driving force by which participants get involved in the design process. This tactic is important as this would give the participants an clear idea of what they themselves would like to change, what foci on which they have the desire to 'make a difference' In our interaction sessions, we had a number of tactics to identify ideology and utopia, including:

(a) The identification of the 'Other' in the sense that any ideology would inevitably position the 'Other' as 'competing', 'less desirable' and even 'confrontational', the establishment of the 'Other' would help reinforce one's identity in a community;

(b) The encouragement of self-narratives, showing the interviewees that in conflicts an actor will be entrenched in an ideological position which gives no alternative ways of being or self-narrative to the interviewee him-or-herself;

(c) The recognition of positive elements in what is currently upheld by the 'Other' in order to show how kinds of difference making could give belief to the interviewer;

(d) The recognition of the importance of the positive elements to 'Other's' lived experience;

(d) The concept of 'emplotment' is introduced to ask the interviewees to draw together the fragmentary episodes of their own life into a unified narrative through the telling of one's life story; and

(e) Envisioning utopian alternatives which should be realisable (if not, it would turn out to be a fantasy) and not be fragmentary (if not, it would turn out to be subject to free reign). The guideline in this respect has been summarised by Langdrige that the participants '*must be guided away from mere fantasy and instead encouraged to focus step-by-step on practically realizable aspects of their utopian reconciliation, working back from their utopias to the present such that they can identify a route out of the conflict and/or better understand the nature of the conflict itself* (2005, 230)';

In our analysis section, we focused on themes by which we could delineate the trajectory of our analysis. Here we focus on two issues: the concept of *Tsinghua Ren* and the perception of communal efforts in dealing with ageing. In respect to the study of the concept of *Tsinghua Ren*, we conducted interviews, data analyses, testing out our interpretation with the interviewees and finally persuaded participants by mobilising them in our 'design festivals'. They were further engaged through PD workshops in conjunction with Chinese traditional festivals on campus, examining if design activities

would bring forth 'good' design ideas from the participants. With this in mind, we employed the insights from our analysis of ideology and utopia interviews to design our PD workshops. The following is a tentative analysis of the interviewees.

ANALYSIS 1: INTRODUCING THE CONCEPT OF 'TSINGHUA REN'

Throughout the year's study, we interviewed over a dozen retirees (figure 1) through the existent network of the Tsinghua Association of Senior Scientists and Technicians and Tsinghua Gerontology Centre. All of the members we met were ingenious older people, improving their quality of life through their own ways with self-initiated activates for ageing well. Many of whom are locally famous for their new ways of retirement living. Instead of conducting formal interviews, we conducted 'creative dialogues' with them in their homes or work places. In our analysis, there is a central concept around which they have attached their identity and status. To us, it is a kind of ideology, which is to a certain extent a distorted social imaginary.

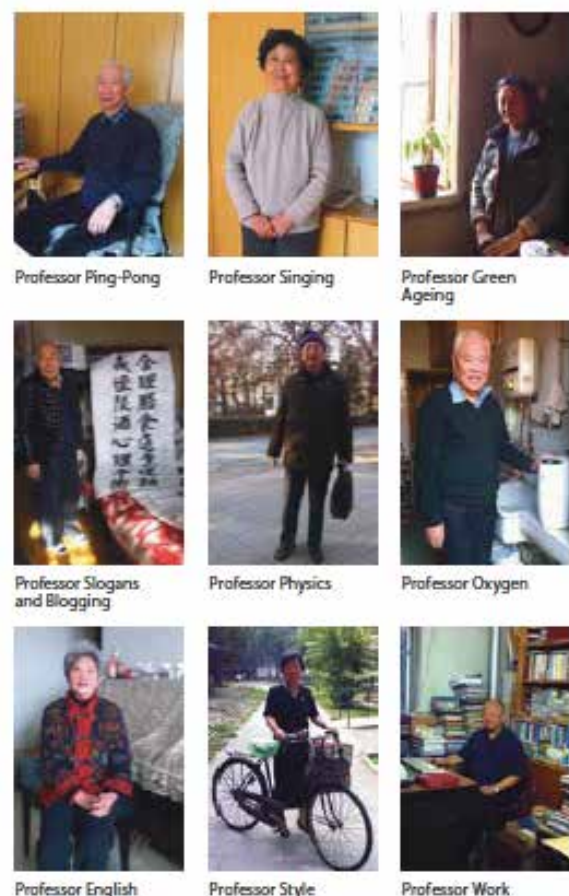


Figure 1: Portrait photos of retired intellectuals

We intensively 'interviewed' four retirees during our fieldwork and this gradually developed into a kind of partnership for co-investigation. The data was collected and analysed through the techniques of theme analysis guided by the 'open coding' method of Classical

Grounded Theory (Glaser, 1978). Basically, they stressed their identity as being part of the *Tsinghua Ren* in the sense that they belonged to the community of the University of Tsinghua. We could not find any clear boundary of such a community and clear criterion for membership, but they would say that it was better both physically and socially to live within the Tsinghua campus. Certainly, *Tsinghua Ren* is a social imaginary among the interviewees. We tried to describe how this identity shapes their daily practice and living in terms of their Quality Of Life (QOL) profile provided by the World Health Organisation (WHO): *Being, Belongings* and *Becoming*.

BEING (WHO ONE IS)

The interviewees rarely showed any great changes after their retirement. As all of them were living within the campus, they kept a key identity of *Tsinghua Ren* and one of the changes after retirement was just more focusing on their personal health. Perceiving this pioneering university in the Mainland China as a first-class university, they were proud of living in the community. Their concern over personal health was about their own physical ability to continue their contribution to the university and nation. Many retirees are keen to keep fit and fully committed to maintaining their health. They used their run-down apartment building (four to five storey block with no lift) and took their old bicycles to poorly accessible communal areas to maintain fitness and flexibility. For example, a retired electrical engineering professor: retired for 20 years, has played ping-pong every day at 4pm. He was happy to play with anyone in the facility. He explained that, '*Playing ping pong is good for my body as well as meeting new and old friends!*' In addition, he and his wife, who was also a professor of engineering, had a habit of going to the Summer Palace, a national park next to the university, every morning. They commented '*we come here every day between 8am and 11am when it is the best time to take in oxygen for our bodies*'.

Another case reveals the dialectic nature of ideology. Professor Styling likes to dress up every day as she had a view that being decent is a form of life within Tsinghua, '*Tsinghua Ren* should behave in a way of decency', she expressed. In one occasion, she expressed her resentment against other female workers in front of us. Clearly, *Tsinghua Ren* as a social imaginary in her mind is a cohesive community but with social disparity. She despised those ladies on campus who did not dress up as good as her. This story reveals the ideological dimension of the Tsinghua University Campus as a cohesive community. In reality, it is easy to find Tsinghua residents of various socio-economic status. But this story also shows the utopian idea held by Professor Styling. She expected all *Tsinghua Ren* to be well educated and living in a decent lifestyle. While the ideological conception that the Tsinghua community was composed of refined and educated people gave her a kind of distorted picture, the non-congruence between

the utopian social imaginary and the real situation also provides the drive and motivation for her to participate in the communal association. She participates in communal activities and even organised a number of academic activities to make public the contribution of the Tsinghua retirees. She expects that better social exposure of the retirees' activities and social contribution to the nation will give the pride and self-esteem of the group a boost. Indeed it will support all Tsinghua people and therefore they would live up to her ideal *Tsinghua Ren* imaginary.

The non-congruence between utopia and the ideological social imaginary brings forth positive effects to the group. Especially when building motivation towards participation in our design study. After the identification of this concern among the interviewees, we highlighted the possibility of doing and designing some 'good' communal activities for all the people in the Tsinghua campus. The result of this finding becomes the effective tool for persuasion in the mobilisation of participation.

On the other hand, we found that the belief in the 'ideological' existence of the *Tsinghua Ren* community provides our interviewees with a clear sense of belonging and a social identity, a topic we should elaborate more on later sections.

BELONGING (CONNECTIONS WITH ONE'S COMMUNITY)

The second level of the QOL profile is about the sense of belonging to community and environment. In our analysis, the retiree's sense of belonging has been granted by the identity of *Tsinghua Ren*. This group of ingenious older people grew up together as classmates, colleagues and neighbours. They also went through the political transformation of China and learning to live as a collective. Nevertheless, their social integration among *Tsinghua Ren* is supported by the ideological tenets that Tsinghua University was one of the components of their nation, the People's Republic of China. They had to accomplish their lifelong contribution to the nation even if they were retired from their formal academic positions at Tsinghua. As they say, '*Once a Tsinghua Ren, Always a Tsinghua Ren*'. They would not consider terminating their work and innovation. Professor Styling recollected her days in the Tsinghua laboratory. She said that in every working day, the researchers there were anxious as the people from the Prime Minister's Office would ring them up and ask if there were any progress and discoveries from their work. She was proud of being a member of the Tsinghua laboratory since this research office had a strong link with the social development of the nation and a good relationship with the authority. As we have argued, *Tsinghua Ren* is a kind of imagined community in the sense that it is ideological, but the identity provides the claim to constitute an identifiable community, the Tsinghua community. This ideological imaginary does not only create the ground for them to

accept the legitimacy of the Tsinghua University but also the ground to accept the legitimacy of the political authority of the nation.

On the other hand, the *Tsinghua Ren* identity has a competing the 'Other', which is the *Peking University Ren*. *Tsinghua Ren* is frequently compared with *Peking University Ren*. As an interviewee pointed out, within the academic field and the central government of the Mainland China, there has been a wide-spread belief that *Tsinghua Ren* are strong at scientific disciplines whereas *Peking University Ren* at humanistic subjects. *Tsinghua Ren* had long been motivated to focus on scientific discovery and innovation in order to maintain this social imaginary about *Tsinghua Ren*. Two retirees' experiences demonstrate this orientation. For 40 years, Professor Physics worked as a nuclear power expert under the government's agenda and contributed to military development. Retirement also meant freedom for him, where he can work on self-initiated projects related to his own expertise. Originally trained as a physicist, in his second year of retirement, he invented a new method of X-ray body scanning, which got a national patent with investment to continue research for its applications. After eight years, he received a second round of investment and is working with young researchers to develop new social applications of this technology in the healthcare domain. He claimed that being a Tsinghua professor also entailed a continuation of innovation in order to live up to the ideal of scientific *Tsinghua Ren*.

Professor Oxygen's experience of his own self-initiated project had a more difficult path. As a trained chemist, he was also given the task of researching nuclear development during his whole academic career. After retirement, because of his own health, he started to research oxygenation, especially through eating and drinking. He called the liquid form of oxygen Fitness Oxygen, which was patented nationally. He claimed that his innovation of liquidised oxygen had a higher degree of purity in comparison with those produced by the American factory. All the research was carried out in his own kitchen or laboratory at his previous department outside of school hours. More importantly, he used his own body for the first test of his invention. He got support from a voluntary elderly group (including retired medical experts, professors and physicians) to help him to conduct a long-term trial. He aims to prove that this new product could help our bodies to get many health benefits. After ten years, the production was limited because it was an alternative health care concept that required formal clinical trials. However, he has a blog that many people read every day. In his narrative about his personal development, he regards his knowledge as his involvement in Tsinghua University which was also the major academic institution contributing to the development of his nation. Clearly, the identity of being a *Tsinghua Ren* has not only legitimised the existence of Tsinghua as a

community but also legitimised the authority of the nation.

We see that the social imaginary of *Tsinghua Ren* does not only constitute a distorted picture about the existence of a cohesive *Tsinghua Ren* community but also provides a strong imagined community to which the retirees attach socially. Through this attachment, they endorse both the legitimacy of the university but also the nation. Meanwhile, it also constitutes an *Other* with which *Tsinghua Ren* must compete. The ideological social imaginary in terms of *Tsinghua Ren* results in a very positive social effect: social integration is maintained and motivation to design lives after retirement is groomed.

BECOMING (ACHIEVING PERSONAL GOALS, HOPES, AND ASPIRATIONS)

As we have argued, the dreams of utopia are important, as they bring forth positive impacts on the motivation of people to seek social change. In our case, the utopia we identified among the interviewees was a sense of becoming which is really about actions that go beyond individual expertise to transfer knowledge to everyone so that others can age well.

Back to Professor Styling whom has been a professor of micro-electrical engineering even though her original field is chemistry. She once explained to us her viewpoint of current education: '*Students are now trained without hands-on ability and they are incapable of solving diverse problems outside their own expertise... however, when we studied, we were trained with the principle of problem solving and hands-on ability that can apply to any subject.*' Since retirement, she has worked as the office manager for the Tsinghua Association of Senior Scientists and Technicians where she was promoted and enjoyed active engagement with external organisations and current students. She appeared to be dissatisfied with the current forms of knowledge transfer within Tsinghua. But she knew that current educational approaches were affected by the rational model of knowledge transfer at the expense of experiential learning. She told us her analysis of the teaching approach of the university and expressed that when the university became 'modern', it would inevitably result in the dominance of administrative calculation and rational arrangement. Hence, hands-on teaching and job placement were no longer popular in modern teaching. It could be said as a fantasy if one expected to change such a strong tide of education philosophy. But her 'utopia' appeared to be more manageable and achievable. She just designed more linkages between external organizations and current university students through which students could gain direct application experience and hands-on training at the workplace. Her dream of utopia, the restoration of the teaching method used in her good old days, motivated her to participate in communal activities.

These retirees' stories demonstrate that they have the motivation to design new ways of continuing the glory of being a *Tsinghua Ren*, a preserved or even distorted vision of their community. It is distorted, as *Tsinghua Ren* is not a real entity. At the personal level, they solved their basic needs of being, i.e. as retired people solving ageing problems. They were working hard to make sure that they themselves are ageing well. Of most importance, they were also concerned about how their experiences can help others within the community and beyond. All this was supported by the non-congruence between the utopian ideal of *Tsinghua Ren* and its current situation, and all these are also supported by the utopian and ideological social imaginary of *Tsinghua Ren*.

As a group of ingenious people, they are working and stimulating each other to tackle persistent myths about old age, a culturally based fear of ageing. At the same time, they were dissatisfied with the image of weak *Tsinghua Ren*. It is clear that this unique situation of collective living has become an incubator that allows innovations to happen. They are constantly developing ways to maintain their quality of life (being, belonging and becoming). The way for achieving this is the formation of the ideological social imaginary in terms of community to which members have a strong sense of attachment and belongings.

ANAYLYSIS 2: COMMUNAL EFFORTS IN DEALING WITH AGEING

How can our findings relate to design practice and research? In our second stage of study, we attempted to employ the concept of 'ingenuity of ageing'. Here we believe that design can be a social tool for co-designing ideas for a better world based on inspiration from interactions with socially marginalized people such as older and disabled people. After the completion of the first stage of 'creative dialogues' and analysis, we demonstrate how the investigation of a group of ingenious older people in China could be taken as a case to understand the social contexts of ageing. In the next step, our aim is to set up a design platform to evaluate whether designers could on the one hand accomplish infrastructuring for democratic innovation through the design process and on the other present a critique of social distortion that exists among the participants.

To enable older people to investigate their ingenuity of ageing, we explored the *Design Festivals* (figure 2) method in this project: five pop-up design stores were set up during five traditional festivals in the Chinese calendar. These design interventions were on an *ad hoc* basis but there are essential components: First, we put emphasis on the traditional values of being respectful to our ancestors. We took this as a chance to test if most retirees would take this opportunity to figure out some innovative methods to show their respects to *Tsinghua Ren* and their appreciation of unity. The festivals include the Spring Festive for the unity of families, the Qingming Festival, the festival to commemorate the

dead, the Dragon Boat Festival, a festival with high appraisal of loyalty, the Mid-Autumn Festival, September, a traditional festival for people to get together with their families, and the Chong Yang Festival, which was also named as the Elderly Festival, underscoring one custom as it is observed in China, where the festival is also an opportunity to care for and appreciate the elderly.



Figure 2: Design Festivals on university campus

Finally, we collected a variety of innovative ideas about the welfare of *Tsinghua* residents such as *Elders restaurant to maintain their health*, *Greener burial method, e.g. tree burial*, *Body donation advice*, *Class to learn how to take care of the old*, etc. Throughout the process of this stage, we found few disagreements and conflicts as participants had a strong inclination to do something for the imagined *Tsinghua Ren*. It seemed that they were thinking of the common needs of the *Tsinghua Ren*. They had mentioned nothing about the needs arising from poor families, gender and university students and the staff. It seemed that their thoughts were not in terms of any identity and social status different from *Tsinghua Ren*.

Throughout the second session, our activities revolved around the theme of their utopian dream. This was about the *Tsinghua* residents ageing with dignity - participants kept using their own ideal picture to, on the one hand, evaluate the current situation of *Tsinghua* Campus, and on the other to search innovative ways to realise their utopian dreams. We would attribute the smooth process

of service and program design witnessed in the workshops to the 'right' identification of the common concern of the participants, the future of the ageing *Tsinghua Ren*, and we also attributed it to our highlighting of the utopian dimension of the *Tsinghua Ren*, with which participants found no disagreement. If we compare our project with that organised by Bjorgvinsson et al. (2010), we start with our mission to 'create' and to 'conjure up' the matters of concern for the targeted participants whereas Bjorgvinsson *et al.* took the neighbourhood associations' matter of concern as given. In our view, focusing on the construction of the objectives of a PD would reveal more the salience of the role of designers as design triggers.

All along the design process, we should keep identifying the utopian elements emerging from the participants and keep avoiding the promotion of any innovation that would jeopardise the solidarity of *Tsinghua Ren*. This is the reason why we, as triggers, co-design members and design activists, would not encourage Professor of Styling, the longest term collaborator throughout the process, to organise any activities to change or modify the lifestyle of those she dislikes. We would not promote any private business-oriented activities, such as helping the professor who produces oxygen water at home, because this type of design activity would bring harm to the participants as a community. Given that we endorsed the idea of *Tsinghua Ren* as a *good* identity, a sense of social integration would help participants to foster a view that those who have different ideas and expectations are not one's enemy, and to strengthen the belief that further negotiations and conflict reconciliation is possible.

The second session ended with a number of proposed plans. We had no resources to actualize the ideas. However, we did have a session on the next possible steps. The aim of this session is to see if we could summarize our experiences in such a design process. We asked the participants to evaluate the feasibility of its implementation and actualisation. After a number of rounds of discussion, they reached the conclusion that all resources were controlled by the management of the university and what the plans need was the 'green light' from the management. However, most expressed that it was unwise to have any unconventional actions since the management was the iconic figure of their community. This conclusion seems to indicate again the paradoxical nature of our understanding of the social reality. On one hand, the central management of the university turned out to be the barrier against the actualization of their design proposals, but on the other, it served its utopian function in formation of the iconic figure of the *Tsinghua Ren*. How could the whole design project deal with this paradox? This question leaves us a big puzzle for our future study.

CONCLUSION

Our one-year experimental study demonstrates the new role of designers as design activists and the importance

of the idea of designers as a moral subject has been spelt out. By using Ricoeur's idea of ideology and utopia, we could on the one hand analyse participants' dreams and distorted visions of the world and on the other, have the perspective to know what social situation they would like to change. This is to enhance the social awareness. In our design process, we made use of interview data to identify the foundation on which the participants acquired their communal sense. In our case, it is the concept of '*Tsinghua Ren*'. This concept provides a strong sense of collectivity, to which the participants are keen on contributing. Although collectivism seems to be a factor restricting people from chasing individual accomplishments, in our case, such a collective sense becomes a strong reason for the retirees to live out their sense of being, belonging and becoming. When we focus more on the common goodnesses of the '*Tsinghua Ren*' in the second session of our research process, the participants were really excited in searching and designing for their 'virtual' community. In the second sessions, we also identified the barriers against their implementation of the proposed ideas through the discussion on the role of the management of the university. In this session, a majority of the participants came to the conclusion that the management of the university was the genuine leader of their community but simultaneously it was also the barriers against their proposals as they estimated that the management would take financial constraint as the reason for not implanting their proposal. To the participants, they were aware of the necessity for dialogues and negotiations between them and the senior management of the university. However, in the design process, we also reported to the participants that their idea of being a '*Tsinghua Ren*' would entail social exclusion. Their image of a good and decent '*Tsinghua Ren*' would exclude those who could not live up to their standards, whatsoever the standard set. To us as the designer and design organizer, PD is a moral, political and social practice in which the morality endorsed by designers should be deliberated in the interactive process with the participants. Designers would not be happier with doing infrastructuring and avoid being involved in moral and political negotiations. When taking the design process as a *Thing*, which has an unpredictable occurrence and is characterised by ambiguity and uncertainty, designers should have a solid perspective on their roles and missions and clear command of their moral practices. Of course, we have not done anything to examine the extent to which our analysis is also suffered ideological colonization. We are not able to show if our research practice could lead to more 'positive' design outcomes for the participants and the retirees at large. To some extent, our position as research activists is free of critique and examination by any parties. Throughout the process of data collection and analyses, the skills and techniques were also subject to the management of the researchers. This needs another round of deliberations in order to reveal the openness of our design research format which is

supposed to be full of uncertainty, ambiguity and free of professional manipulation. In other words, the goal of being free of coercion in the PD has not been reached through our experimental lab in Tsinghua.

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CARDBOARD HOSPITAL – PROTOTYPING PATIENT-CENTRIC ENVIRONMENTS AND SERVICES

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ABSTRACT

Cardboard hospital is a co-design method and prototyping environment for creating patient-centric hospital spaces and services. The method development was situated within a building project of a hospital wing in which the aim was to find new ways for including patients in the design process. The method was developed through combining participatory design methodology with the professional capabilities of a set designer.

Cardboard hospital provides an environment that supports participatory design processes and guides participants towards participation as an artistic practice. The paper is situated in the theoretical framework of pragmatic aesthetics and builds on the notion of an aesthetic experience. The results encourage towards a wider utilization of set design capabilities and aesthetics in co-design environments.

INTRODUCTION

In this paper we describe a method developed in the intersection of healthcare, architecture and service

design. The case in question was about designing new, patient-centered hospital infrastructure and the services and experiences it should support. The result, ‘Cardboard Hospital’ is a prototyping environment and a co-design method that was developed in order to address the question of embodiment in building processes. It provides a way to explore different meanings that arise from spatial experiencing through an immersive and tangible set up of real-sized prototyping elements. In the participatory workshops the needs and experiences of the patients were explored and formulated into initial concepts of future hospital spaces. The result is an inspirational method that can be used in a wider methodological framework of research-based design process, including contextual inquiry, participatory design, product or service design and prototyping activities (Leinonen, 2008; Leinonen 2010).

The method was created for use in a real-life building process of a new hospital wing situated in a large hospital in mid-Finland. In three prototyping workshops the participants constructed hospital spaces using body-scale blocks and other materials. At the same time they reflected on the service aspects related to healthcare from a patient-centric point of view. This paper describes first the theoretical background detailing recent changes in healthcare and earlier work in the field of participatory prototyping, then details the design process and finally describes the prototyping workshops. The paper concludes with a reflection of the methodological insights and presents directions for further development.



Figure 1: The cardboard hospital set-up

DESIGNING FOR PATIENT-CENTRIC CARE

Patients are an underutilized resource in the operation and development of hospitals. When developing healthcare systems the voice of the patient is often limited to rigid feedback systems or public hearings. This is partly due to the nature of the clinical provider-patient relationship, which is seen as paternalistic and characterized by rigid power structures (Teutsch, 2003). This view places the hospital staff in the role of experts and in turn assigns a passive role for the patients. Considering the historical development of hospitals to treat acute conditions, such as infectious diseases, emergencies or physical injuries where the patient expects to be treated efficiently and then quickly let out, this approach has been considered sufficient. The results of this kind of patient-provider relationship can be witnessed in western hospitals built in the latter part of the 20th century and they reflect the build-up of hierarchical hospital organizations. Hospitals are complex socio-material constructions that contain an emphasis on historically embedded work aesthetics and focus on functional aspects of hospital operations (Kronström-Johansson, 2008).

Research points out that introducing non-functional, human elements into the hospital environment such as art, natural light and elements of nature and social spaces has been proven to increase patient well-being (Ulrich et al., 2004). However, the non-participation of patients in the design of healthcare environment has created environments that are more focused on aspects of work than what constitutes a pleasant environment for the patient. Hospital aesthetics remind us of images of sterility, functionality and impersonality. Patients have described hospital as gloomy, frightening or distancing (e.g. Saarikangas, 1996). Instead of considering the service paths of the patients, the spatial layout of the hospital campus situates units according to their organizational hierarchy, often forcing patients to walk great distances within the hospital corridors.

Patient-centric care is an approach that aims to address issues caused by the provider-focus of healthcare institutions. It aims to improve the quality of care through increased focus on patients and their

experiences. In general, patient-centered care is seen as a move from a paternalistic, provider-focus to one that involves the patient more in the planning and execution of their care (Robinson et al., 2008). It also provides an alternative to traditional ways of collecting quality assurance, such as feedback forms or audits. Issues addressed through a patient-centric approach include patient preferences and values, emotional support, physical comfort, information and communication, coordination of care and the involvement of family and friends (Gerteis & Daley, 1993). The involvement of patients (and their families) in the hospital processes takes place on four levels. First, they should be able to participate in the organization of care and inform the staff on what should be developed. On the second level, participation should extend to the improvement of the clinical system. This includes planning, implementing and evaluating change. On the third level, patients should be able to participate in processes that aim at hospital-level changes such as building processes. Fourth level addresses participation in local policy making related to healthcare. (Shaller, 2007)

Patient-centered care guidelines advise the participation to be in the form of full membership in development teams, hospital committees and special councils, but detailed descriptions of participation methods are not addressed. In addition, committee participation might be an effective way of influencing decision-making processes in hospitals, but it does not fully utilize the capabilities of patients or hospital staff. Discussions can address some of the areas related to patient experience, but they do not necessarily translate well to new design ideas. They also do not fully address the embodied experiences that take place within the current and future hospitals, which can be seen as essential when designing for patient-centric hospital environments. While many hospitals are placing patient-centric planning of their infrastructure and services in the core of activities, they often lack the skills or tools to put this vision in practice (Robinson et al., 2008). In the next chapter we will review research on physical prototyping as an approach for stakeholder participation.

PROTOTYPING AS EMBODIED ACTIVITY

Recent studies suggest that physical sensations play a far larger role in our thinking processes than simply providing feedback or stimulus. We are engaged in a continuous cycle of reconciling ourselves with the environment as we experience it through all of our senses. Johnson (2007) points out to the inseparability of mind and body in the meaning-giving process. Physically, our senses are continuously connected to our nervous system and its ability to create order and priority, in other words to plan and design. Our thinking, both on the practical and abstract levels, derives from the interaction of our mind-bodies with the surrounding environment. In short, we give meaning to things through interaction with the world. Focusing on our inner thinking processes or a single sense can lead to an inferior result. For example, children are proven to

learn equations faster and remember knowledge for longer if they use gestures (Goldin-Meadow, 2010). The connection between our bodily sensations and thinking processes is evident in many historical design practices. They situate design within studios in which design activities are physical and knowledge is embedded in physical artefacts such as prototypes or other kinds of inspirational material (Binder, 2007). Their reflective conversations with the materials (Schön, 1992) are especially evident in the practice of prototyping.

Physical prototyping have been used in participatory design to support non-designers abilities for expressing personal experiences in various projects. Notable of these, and in relation to this project, are the UTOPIA and Florence projects conducted in the 1980's (Ehn, 1993). In these projects, much attention was paid to supporting the ability of participants to express themselves using their own language and their own terminology, and through design-by-doing. Techniques such as paper mock-ups or 'cardboard computers'¹ were developed in order to create a platform for knowledge, experiences and meanings that might be difficult to articulate in a discussion. Whereas earlier dialogue-based methods forced the participants to use the language of experts, reinforcing the already existing values embedded in that language, these projects connected the terminology to the practices that were associated with it. By refocusing from 'saying' to 'doing', the emphasis shifted from verbalised and 'surface' knowledge towards tacit knowledge (Polanyi, 1966), which is embedded in our ways of acting in the world.

Physical prototyping has become a standard tool in the method pack of participatory design and co-design. Most of the early participatory design projects were situated in the work context in which the idea was to involve people doing the work in the design of their work tools and environments. In this case, the context is approached from the perspective of patients while focusing on the interplay of hospital work processes and patients' physical and mental needs.

Furthermore, we see the role of physical activities in design processes go beyond the focus on 'doing'. Here we refer to the work of John Dewey (1934) and his notion of artistic practice as a way of expressing meaning. Following his view, art is seen as a way of conveying meanings that are embodied and emotional and artifacts created by artists are a language, albeit a different one to spoken or written one. They are able to communicate experiential meanings through interaction with their audience. However, meanings do not emerge from every object, only objects that are aesthetic and artistic, i.e. when the parts form a whole that is harmonious enough in their composition to bring out an

experience. Even though these meanings might sometimes be hard to translate into words, this type of embodied meaning is no less a meaning than an articulated one. Rylander (2011) relates this to the work of designers as 'language innovators' whose aim is to create objects that generate such experiences. What if the notion of aesthetic experiences were extended to refer to the experiences of participants in co-design processes? By doing so, one would have to consider an aesthetic dimension in addition to the pragmatic and functional aspects of co-design. In order for this to take place, the aesthetics of the co-design environment and the materials used should be given sufficient attention.

Agger Eriksen (2012) suggests that materials used in co-design should not be handled as only parts of a method, such as tools, sketches or prototypes but rather as central agents that affect the results of the collaboration. The assemblages of materials form a complex and continuously shifting entity, which has an effect in the dynamics of the co-design process. Building on Goffman's (1959) theatre metaphor, she suggests that co-design should be seen as staging performances. Also the environments guide the activities that take place in them depending on where they are situated and what meanings they do or do not embody. Marc Augé (1995) uses the term "non-place" to describe temporary, transience places that cannot be defined as relational, historical and concerned with identity. These are environments, such as unplanned wastelands, airports or building sites, that do not prescribe meanings or social relations, but can nevertheless become embedded with them, turning from 'non-spaces' into 'spaces'. He describes an "uncertain charm" in the unfinished, identity-less places and sees them as heirs to ancient adventures, generating a feeling of 'continuing adventure' and where things can happen.

TOWARDS A METHOD

The context for the project was a new hospital wing that is planned for completion in the year 2016. More specifically, the project scope addresses the designs of a patient ward and a polyclinic². The brief for the project was to explore ways in which patient needs could be more fully taken into account in the building design process. In fact, the aim of the hospital was to place patients in the centre of the activities done in the hospital. We were asked to support them by creating a method through which patient participation and multidisciplinary collaboration could produce results that can be utilized in the building planning. Our design team consisted of a designer with background in participatory design and co-design methods and a designer with competencies in both set design and interior design. For us, this case gave an opportunity to explore the intersection between co-design methods and set design in a real-world case. Our aim was to study how the aesthetic and spatial understanding derived

¹ The relation between the title of this paper and Ehn & Kyng's "Cardboard Computers: Mocking-it-up or Hands-on the Future" is not coincidental. At the time cardboard and paper were used as prototyping material for IT systems and interface design.

² We also organized a workshop for the design of a new operating theatre, which is not included in this paper

from the field of theatre and film could be utilized to create an experiential workshop environment.

The first meetings were held when the architectural planning process of the building was still in the early phases. This allowed for the inclusion of co-design workshops in the start of the design process before any specific plans for the building were created. The first decisions in the project related to the planning of a series of workshops and adding of a clause in the contract that required the architects to participate in the workshops and to utilize the results in their planning. In this way, the workshops allowed for the architects to learn of the needs of patients before they started to create the first drafts of the building. These aspects laid the framing criteria for the project and guided the design of the participatory method and the co-design environment.

Traditionally, participation in the building project is organized as a series of stakeholder meetings during which architectural plans are discussed and commented on. However, most patients and staff are not experienced or educated in reading blueprints as they require specific professional understanding. Thus commenting is easily reduced to addressing individual elements in the design, not the experiences these elements will create as a composition. These types of hearings also force the stakeholders to use language and terminology they are not familiar with, further reducing their possibilities for influencing the design outcomes.

We wanted to address these issues by creating a setting in which the participants can share past experiences and create ideas for desired hospital spaces without being forced to use foreign terminology or unfamiliar representations. This setting would allow for the reflection of real experiences and quick experimentations of spatial arrangements. Moreover, we wanted to place emphasis on the aesthetics of the workshop setting in order to make the workshops more experiential. The aim was to create a learning environment for engaging in a design practice that is pragmatic as well as artistic in its nature.

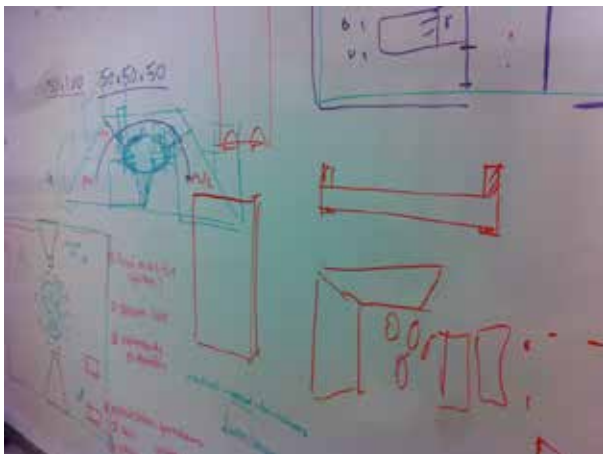


Figure 2: First drafts of the set-up

Early on it was decided that we were going to work with real-size elements. The reasoning behind this decision came from the context of patient experiences in a hospital. Even though hospital interactions can also be modelled with miniature scale models, they do not engage the whole body and were considered inadequate when dealing with holistic patient experiences in hospital spaces. A prototyping environment that engages all senses allows for the participants to be present as subjects within the environment instead of trying to project their experiences on miniature characters.

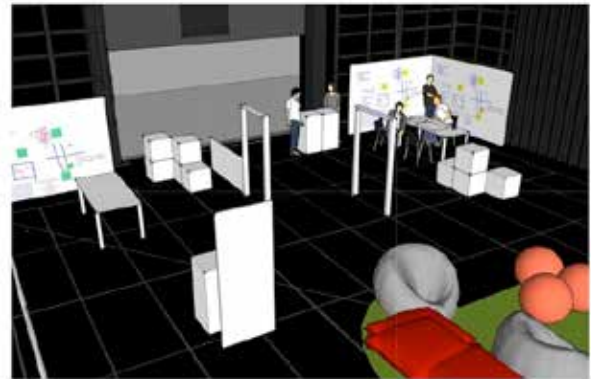


Figure 3: A 3D rendering

Workshop planning was done through meetings during which participatory methods were discussed and reflected on the set design. The main aim of these sessions was to iteratively create a vision that would combine the methods with set design. The discussions did not center on methodological issues alone. Inspiration was drawn widely from other areas such as trends in hospital design and arts³. After the initial meeting the workshop plans were further worked on and discussed in subsequent meetings, first as 3D-visualizations of the setting and later on as a miniature scale model. These functioned as communication devices between the team members and towards the hospital staff, but also assisted when decisions were made on the final forms of props, the layout of the space and number of items needed in the workshop. Finally, a few weeks before the workshops the set was constructed and tested with other researchers from the university.

³ Of particular inspiration for the spatial setup was the movie "Dogville" directed by Lars von Trier. The stripped film set proved to us that the environment does not have to be strictly representational in order to allow for experiences



Figure 4: A scale model

DRAWING FROM SET DESIGN

Unlike when designing for scripted film or theatre, in the cardboard hospital it would be impossible to exactly predict the actions that would take place on the set. The aim was to create an environment for exploration so it needed to support practically anything that might come up. The solution was to provide an open-ended environment where meanings could be given and the set modified concurrently. This guided set design and set some restrictions for the materials.

The set for the cardboard hospital was built at the black box theatre situated at the university. Much attention was paid in choosing a place for the workshops, since the place needed to have not only the basic practical elements, but also an appropriate character for the workshops. The idea was to create a setting that would support exploratory and individual ways of acting and doing things while being an aesthetically inspiring environment for creative activity.

As a flexible theatre space with excellent technical support the black box was perfect for the workshops. The neutral coloured surroundings, flat and open floor and the gridding around the whole space allowed the set and the workplaces to be arranged as desired. The acoustics at the black box are typically designed to be excellent, so that the stage can be located anywhere. This provided the workshops a great environment in which even large groups could discuss, experiment and build things at the same time without causing excessively distracting noises. The lightning could be built and adjusted for the needs of every workshop individually. This also provided good conditions for the video and photographic documentation of the workshops⁴.

The black box as a space has a very intimate feel due to its acoustics and twilit, black surroundings. This was considered an important factor when choosing a place

for the prototyping. We considered this type of setting as ideal for sharing thoughts and ideas of intimate experiences. The environment needed to have a private and warm feel, while at the same time allowing for practical work.

One challenge was what kinds of materials we wanted to use in the workshop. The aim was to design a set of human-size tools and props, which could be flexibly used to build the surroundings needed. In smaller scale prototyping and scale models the material consumption, budget and things like material resolution are easier to handle, but since the prototype was built in real size and used in a relation to real actions it needed to be durable, practical and easy to handle yet creative and well finished. For fast and easy prototyping by people with very different kinds of physical capabilities things needed to be lightweight enough to be easily movable. To be able to actually try things out, the structure also had to be strong enough to support body weight in case of e.g. sitting or standing on. Total expenses and the way of recycling the elements after the prototyping were also under consideration.

Rigid cardboard called Re-board was chosen to be the main material for the structures. Even the biggest elements like doorframes and big cubes could be easily moved by one person because of its lightweight yet firm quality. Since the built things would be given new meanings during the prototyping activity, there needed to be an easy way to point out what is being made. To enable writing and drawing straight onto the material the cardboard was laminated with a white glossy surface. In this way all the surfaces could be drawn and written on with a whiteboard marker and easily wiped for re-naming or re-using. The material was completely recyclable, so all the elements could eventually be recycled as cardboard waste⁵.



⁴ The documentation video for the cardboard hospital can be accessed at <https://vimeo.com/juhak/cardboardhospital>

⁵ Most of the materials were stored and were later on used for smaller scale prototyping workshops. At the time of writing, six months after the workshops, they are still in a workable condition.

Figure 5: Examples of props used

There were 7 types of cardboard elements: doors, boxes of two sizes, walls, screens, signs and small screen-like props⁶. All the parts were designed to respond the measurements of everyday environments so that the essential spaces, furniture, and props could be marked with more or less real-size counterpart. For more spatial feel there were six movable cardboard doorframes built to mark the entering in and out from spaces. Besides the cardboard, the toolkit had white tape and rope to attach things together or mark larger areas by lining the floor. For adding colour, texture or more organic shapes there were some coloured quilts, pillows, fabrics and beanbag-furniture available. For making and modifying tools there was a tool-table with cutters, markers, iron wire, extra re-board and few other materials. A guiding principle in planning the props was that we should ourselves be able to come up with at least five different meanings for each piece.

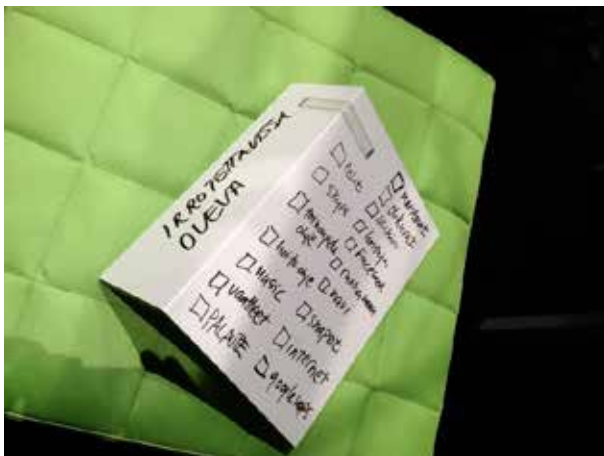


Figure 6: Screen-like prop

The main elements were tested before the final order as prototype-versions. According to these tests the bigger cube shrank to 100cm height (from 120cm) for easier handling and hand-sized holes were added to both sides. Doorframes and their supports were widened for stronger structure and supporters for the screen props were made bigger to balance them better when standing. In addition four bigger re-board walls were built into the corners of the prototyping space. These corners formed working areas with tables and seats while the walls provided space to write and draw on. When moving from talking to actual prototyping the corners with the notes could be used as a part of the spatial models.

As a whole the set design embodied the idea of moving from saying towards doing. From our experience workshops easily resort to verbal communication and participants are often hesitant when it comes to physical activity. In this setting, we created places for discussing

⁶ In addition to these, a couple of specialist healthcare devices were modelled for the operating theatre workshop

from where it is easy to move towards trying out and evaluating ideas on the spot. In this way, the set design supports and inspires both envisioning activities in future spaces and building the setup to match these activities. The set design becomes a way of communicating and inspiring, showing and telling, and sharing stories and ideas in a creative way.

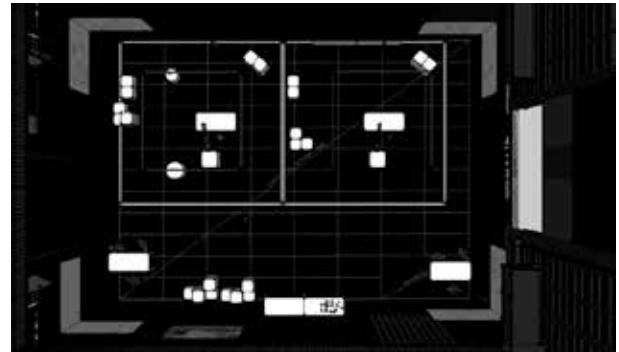


Figure 7: The set-up from above

4. WORKSHOP STRUCTURE

The cardboard hospital was built at during a two-week period, during which it hosted three workshops. Two patient-centered workshops (patient ward and polyclinic) roughly followed the following structure.

Pre-workshop sensitizing task

We received tens of photos embedded with rich meanings. The contributions included images of summer porches, forest views, cluttered TV corners, New York traffic signs and playful statues, to mention a few. The photos placed emphasis on creating hospital spaces that allow for everyday routines, set up shared rules for behaviour, convey human emotions such as humor and utilize color and composition to create aesthetic environments.

The participants had been given a task a month before the workshops in order to sensitize them for the task and to collect material to be used in the workshops. They were asked to take photographs of environments that were important for them, both within and outside hospitals. In addition, they were asked to answer a few questions related to their choices. The resulting photos and descriptions were printed as a deck of cards that was used in the workshop. In this way the participants had already thought about how their surroundings affect their lives and we were able to tie their experiences in a tangible form into the workshops.

Entering the workshop

The entrance to the space was through a cellar-like foyer and a small door, after which the space opened up to over ten meters high. We wanted to use this quality to create an experiential first impression and to frame the design challenge. Since an open, empty space might be hard to start with, the doors were leading to 'opening sets' designed to be something to begin with. Upon entering, one first saw a composition framed by some of

the props that resembled some of the forms found in hospitals such as corridors or a lobby. This hinted at ideas of what you actually could do with the pieces. The participants were also invited to explore the space and try moving, lifting or writing on the materials themselves before the workshop commenced.

As facilitators, we did not want to present any rigid proposals to start with. However, we did want to stage the workshop space so that just through experiencing it, one could get a feel of the general type of space that we were designing for. So, for the patient ward workshop we divided the space into two square-like areas along the longitudinal side to resemble a space for 'being in' and when organizing for the polyclinic we created two long sides to signify 'walking through' a process. As said, these were not clear-cut propositions but rather loose assemblages constructed with the material props in the space that could be easily changed and modified.

Introduction to workshop activities

The workshop started with an introduction to the case, aims, working methods and timetable. The workshop is framed as early study into the patient needs and the methods are explained sufficiently for the participants to understand what is expected of them. The props and their roles were described and demoed to the participants. Special care was taken to point out the open-endedness of the material. To set the context, the participating architects had a presentation about inspirational hospital environments and design solutions.

Sharing and discussing the theme

After the introduction the participants were assigned into two groups and given slightly differing tasks. Both groups had to design for the same functions, but their focus was different. For example, with the patient wards the other group was designing for efficiency while the other was focusing on the quality of the service. The task started with a general discussion on the theme, which was documented on the wall by the facilitator. The aim was to identify central themes that the participants consider important in their hospital experience.



Figure 8: Discussing experiences in the workshop

Constructing a conceptual tool

During the workshops the image cards gained new meanings through exposure to other participants. For example, a kitchen meant to convey orderliness came to signify homeliness or routines of dining. By pointing out images and explaining their meanings the participants discussed and shared what they thought hospital environments should look like.

After the general discussion the task moved towards introducing a conceptual tool that allows for the structuring of the discussion before moving towards prototyping. For this purpose, in the polyclinic we utilized the customer journey map onto which the discussion could be framed. Together with the participants we constructed and discussed each stage in the journey both from the point-of-view of services offered and the infrastructure in which services take place.

Next we utilized the sensitizing cards to prioritize and identify those environments that could support the ideas and themes identified earlier. Several decks were spread on the table and each group picked up six cards that they felt were important in the design of the environment. These were then placed on the wall and identified with a theme. After this the participants were asked to work by themselves for a while, familiarizing themselves with the information that was created and adding ideas on post-its to the wall.



Figure 9: Repurposing props

Building and testing prototypes

Initially the groups seemed at loss and not knowing how they should begin. Encouraged by the example of a few, the participants started to move the props in the space. Materials were moved in spaces, repositioned and discussed. The position of walls, door frames and boxes started to suggest different meanings, from patient rooms to nurses on duty. The groups diverged with some working on a different part of the space while others were finalizing other parts by writing or drawing on the elements or refurbishing the rooms with canvases. Discussions were held on how the spaces should operate after which the elements were moved to correspond accordingly.

After a small pause the groups started to work on a shared vision for their desired space. The architects were asked to help draw an initial outline of how the space could look. The group was asked to provide pointers and comment on the drawing.

After the group had agreed on a general vision they were asked to start prototyping the spaces with the material available to them. They were instructed to repurpose the props in any way they felt possible and to write or draw on the props to signify the meanings of the compositions. The facilitators guided the process by asking questions and making suggestions, but largely refrained from the building activity. This was done in order to prompt the participants towards action instead of doing things on their behalf. Slowly forms started to emerge and the groups alternated between building the environments and reflecting on how they worked. Towards the end of the prototyping activity the group guided others through the structures and explained their functions.



Figure 10: Drawing on props

Sharing the results

During the last phase of the workshop the groups shared their results via a walkthrough of the environment. The participants explained to each other the decisions, ideas and functions that they had created in the space. The facilitators guided the discussion and prompted questions regarding the solutions.

Documentation and reporting

After the workshops the results were documented and photographed. They were collected in a report that is circulated among the building team of the hospital. This report presents the results and can be used later on in the project to reflect on the building plans.

REFLECTION

The workshop setting was designed to allow for the various interactions and tasks that we thought would take place during co-design. The idea was to design for activities beyond those directly related to task-oriented collaboration and to consider the event as an experience in itself from start to finish. As a main characteristic, we wanted to allow for an experience that would inspire the

participants to create something new while being still grounded in their everyday lives. From the activity that we witnessed a few aspects supported the notion that the set-up of the workshop space had an influence in the way the participants collaborated during the workshops.

Scale-wise, the set was designed to refer to our everyday things to enable regular actions and building the basic environments. Tables, chairs, beds, walls, lamps, equipment and props could be size-wise identified, but their forms were simplified and they did not directly refer to anything particular. This guided the participants to use the set creatively and flexibly to meet the needs of their own particular plans and visions. By choosing a visual style very different from our everyday places we also helped people to set themselves out of the familiar. The hospital environments have many historical conventions according to which they are built and arranged. By stripping the self-evident and obvious from the elements we framed thinking from how-things-are to how-things-ought-to-be. The props used in the workshops were designed so that they could be repurposed and combined according to different functions that the participants had in mind.



Figure 11: Detail of a patient ward

There were a few things brought in from the existing hospital environments to the cardboard hospital. A hospital bed, walking support and a wheelchair were there for testing the interiors with real assistive devices. What we learned is that bringing in too realistic things seemed to frame thinking too much in existing solutions in early design-phase workshops. This became obvious during the patient ward workshop where the placing of the hospital bed immediately became the centre focus of one group. While the hospital bed certainly plays an important role in patient rooms, placing it in too prominent role early on could be seen as hindering the emergence of other, more creative solutions. When we removed the hospital bed from use in the second workshop, the activities seemed to focus more on the patient experience rather than where the bed should be located. However, 'anonymous' and non-specialized furniture that can be found in any interior such as chairs, tables and benches worked fine when added to the

cardboard prototype. It seemed important to maintain a specific kind of visual concept through choices in material substance, form and composition. Items that break this concept can disrupt the mindset and guide towards conventional solutions based on current set-up of hospital spaces.

The resulting method can be seen as something between a practical toolkit and a narrative stage design. The idea was to build an environment for trying out the actions taking place in the future hospital without being too faithful to existing aesthetics. The visual concept of the setting was inspired by the minimalistic and open-endedness appearance of the black box theatre. As an aesthetic environment the cardboard hospital situated itself in a non-place, as it does not especially refer to any specific place making it open for new meanings and change through the interaction of the participants. Although the space was recognizable as a generic architectural construction, most of the visual elements did not point towards a specific place or time. This temporal and geographical ambiguity created a state between times, which can make it easier for participants to imagine alternative states of things. Like in a movie or theatre, one has to be faithful to the era/style/genre that is chosen not to break the illusion of the story telling.

Similarly, the notion of non-spaces was adopted to the set design as a concept of 'non-things'; pieces of a set that could be used in many different ways and named or changed rapidly into another. Even though they hint at possible functions, they do not embody ready meanings or functions and could be repurposed by the participants. During the workshops the props readily assumed various meanings through being combined, turned, stacked, drawn or written upon or taken apart. They became ways for signifying experiences that should be allowed by hospital spaces: aquariums or fireplaces generating a feeling of homeliness, signs or monitors for guiding behaviour or small enclosed spaces for supporting patient privacy.

It was important that practically anything could be marked or built and changed and rebuilt as the ideas developed. The set invited itself as a tool to think and experience the possible outcomes. It would not be a ready-made as a solid settlement but a platform for different developing different kinds of solutions. Bringing in too realistic materials or things can break this illusion and thus hinder early phase prototyping when ideas are still developed freely. In this case, the hospital bed was an element referring too strongly to something that already exists. It was not a 'non-thing' or something where meanings could be created but a thing with already defined specific meanings in today's hospital environment. As such it did not easily allow for expressions of artistic practice: it did not invite drawing, writing or modifying. Thus, a hospital bed stayed a hospital bed from the start of the workshop to the end of the workshop.

We believe that creating an aesthetic setting at this point of the design process supports the emergence of creative and artistic practices. In addition to creating conditions in which needs from the user context can be discussed, the setting needs to create conditions in which the creativity of the participants can flourish. Thus, the workshop setting has a dual role of framing and inspiring the action. On the other hand the set design guides behaviour and interactions within the workshop, on the other it invites participation in an artistic practice not as an outsider, but as a creator and a designer.

CONCLUSION

This paper describes a method that was developed for prototyping hospital environments and services. It builds on the notion of aesthetic experiences and co-design as artistic practice and aims to incorporate these notions in the design of the workshop setting and elements. From a research perspective the case was done to explore the ways in which Dewey's notion of the aesthetic experience can be utilized when conducting prototyping workshops. From the workshops we learned that the focusing on thinking about the aesthetics of the setting does have an effect in the dynamics of the co-design activities by inviting the participants to take part in artistic practices. We introduce the notions of non-space and non-things to point towards environments and objects which do not point towards fixed or established meanings and are open for reinterpretation.

From a design process perspective, the case could have benefited from a possibility to extend the workshops to continue along the building design process and to refine the results gained from the first workshop. In this way the cardboard hospital would follow the design process and as a prototype gain more fidelity with each testing phase. This would open the possibility for combining the method with other existing evaluation methods such as virtual simulations and test prototypes constructed of wood panels. We also noticed, that people who participated in several workshops quickly became more competent and encouraged to use the props for prototyping. Based on this observation, combining the cardboard prototyping method with existing practices of forming stakeholder panels in hospital development processes would make sense. We suggest this as a possibility for further studies.

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DESIGN EXPERIMENTS WITH SOCIAL MEDIA AND MUSEUM CONTENT IN THE CONTEXT OF THE DISTRIBUTED MUSEUM

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ABSTRACT

The relationship of digital technology to museum practices is a field that continues to grow and acknowledge the potential of development. Development that will require new understandings related to museum content travelling across contexts, participatory methods suitable to designing digital technology into museum communication and new forms of relationships with visitors and citizens. In this paper we explore the use of a small-scale prototype experiment as the basis for exploring mobile social media based practices related to the distributed museum within the city. The design experiment is staged with inspiration from critical design, in which design thinking and cultural investigation are combined to inquire upon the role social media can have for extending the spaces of museum communication.

INTRODUCTION

Designing for the distributed museum requires noticing the scales and dimensions that characterize the new museum of the 21st century (Bautista & Balsamo 2011). These dimensions involve a continuum of locations from fixed, physical and material locations to digital locations in mobile and virtual spaces in addition to the scaling between open and closed structures that

invite users into activities of access to content versus content production (ibid). These new shift the implications for structuring and redefining the nature of the museum visitor experience. It also goes beyond providing a more or less attractive medium for presenting content (Macdonald 2007), into the design as an implication for making museum content relevant within a variety of public spaces.

For the purpose of addressing design experiments as a means to explore the relationship between the distributed museum and existing cultural practices of social media, we will expand upon three different challenges that have arisen as valid investigative needs from observed outcomes of a design experiment. These challenges include: content travelling across contexts, participatory methods suitable to exploring mobile social media participation, and sustainability of the media involved – all of which we feel point to needed critical design addressing the advancement of communication practices of the distributed museum. This is not to implicate only three potential challenges to the future. Rather, that these are three of the most valuable research directions that emerged from the experiment highlighted in this paper as potential for future design experiments exploring the communication practices of the distributed museum. We contend that this emphasis on discovering future needs from small-scale experiments is applicable across scenarios beyond just this investigation.

INTRODUCING PARTICIPATORY DESIGN APPROACHES TO THE DISTRIBUTED MUSEUM

Several design-related perspectives have been proposed in museum communication design to highlight the social interaction and situated experiences that unfold while using digital technologies during museum visits (Brown et al. 2005, Vom Lehn et al. 2001, Galani & Chalmers 2002, Economou 2004). Within fixed and

located museum exhibitions, the physical nature and material qualities, the sensory characteristics and cultural identity of the site as well as the digital layers of the virtual involved, are identified as assembling into the situated context that has an impact on how a visitor interprets an exhibit or a site. The social and material aspects of such located museums exhibits are seen as grounded in the experience of place and the lived experience of the physical world in the museum, and have been analyzed at the personal, social, cultural and physical levels (Tuan 1977, Ciolfi & Bannon 2005, Ciolfi & McLoughlin 2011). These categories are also relevant for designing experiments for museum communication that goes beyond the physical museum involving mobile technologies to establish new forms of social, personal and cultural encounters of the distributed museum in physical locations.

Museum communication is in this way emerging beyond historically known visitor relationships and therefore in need of increased integration of methodologies. This can be supported by designerly inquiries (Cross 2001, Nelson & Stolterman 2003) into these new relationships. If we understand design as a uniquely human activity of inquiry and action research (Stolterman 2008), investigations through design experiments can provide a methodology for museums to further develop their mission of engaging visitors with contemporary communication practices. We see the need for such connections to be further explored in the everyday context of the city – and for the case we are presenting here, in the context of interrupting the communication in the city of today with content from the past.

A broad scale of design methods (Sanders & Stappers 2008) address the need to understand everyday cultural and social practices with digital technologies in research-based design. Two approaches that have grown out of the participatory design (PD) and co-design experiments in Scandinavia, Design Labs and Living Labs, are relevant for building a participatory framework for design experiments related to mobile, fluid, open and scaled spaces of the distributed museum in a city context; ones that we have used as a framework in exploring the variables of online participation with museum content within a physical site outside the fixed construct of a museum. The frameworks of a Design Lab is that of a controlled environment for executing prototype experiments (Binder & Brandt 2008) and as a structuring tool for participatory enquiries in transparent and delimited processes that are scalable (Binder 2007). Whereas Living Labs framework (Følstad 2008, Näkki & Antikainen 2008) are a means to establishing physical or virtual spaces where stakeholders may co-create, explore, experiment and evaluate (Schaffers et al., 2007, Westerlund & Leminen, 2011) or agonistic spaces where stakeholders meet to question and explore possibilities (Björgvinsson, Ehn, Hillgren 2010). In the context of museum innovation, the participatory approach does lift up several noteworthy challenges and

ambiguities related to connecting museum content to ongoing social innovations outside the museum. The design experiment we describe below highlights such methodological challenges.

These two lab approaches were combined as methods to explore how distributed museum content can relate to existing mobile social media practices in the context of a city; allowing the design experiment as a provider of democratic entry into museum innovation. Within this framework, the social photo sharing app Instagram was employed as a design probe (Mattelmäki 2006, Gaver et al. 1999) and thus as a mediated platform for PD (Reyes & Finken 2012) to explore variables of cultural and social practices with mobile technology and photosharing activities along the river. Therefore our design experiment becomes an endeavor to critically explore the practices of the distributed museum. This by turning the question of participation around. Asking how the distributed museum may participate in ongoing communication practices of people within the city instead of how people can participate in the museum.

MOBILE AND ONLINE MEDIA SHAPING THE DISTRIBUTED MUSEUM

In museum design a central discussion revolves around how digital media shapes the transformation of cultural institutions. Central issues within the contemporary re-conceptualization of museums as knowledge institutions include efforts to build new relationships to society and thereby relationships with the museum visitor (Vergo 1997, Davies 1998). A number of concepts are used to define visitor roles in new museum encounters; the integrative museum, the engaging museum, the participatory museum or the social inclusive museum. Contemporary explorations into the possibilities of integrating social media and mobile technologies align with these longer institutional transformative processes in building visitor relationships. Social media is embraced as a feature in the new museum, capable of taking the conversations beyond the museum and integrating multiple “voices” (Black 2010). While these media provide multivocality and new forms of re-mediation, they also recast questions about control, authority, ownership, voice and responsibility (Knell 2003, Russo et al 2008, Stuedahl & Smørdal 2011a, Stuedahl 2011) as museums are ambivalent to practices of computing (Parry 2007). New museum paradigms related to digital technologies offer not only opportunities for reimagining interactions within a physical museum space, but allows for taking the museum beyond the walls and grounds of its physical location (van Mensch 2005) into a distributed space.

Handheld technologies have long been used for guiding and giving access to additional information sources in museum exhibitions (Aoki et al. 2001, Filippini-Fantoni 2008, Hsi 2008). Recently, mobile phones have been embraced to enhance museum learning (Hsi 2002, Walker 2008, Vavoula et al. 2009) to restructure, contextualize and personalize a museum visit (Kahr-

Højland 2011) or to enhance visitors co-compositional activities of sharing photos across time (Konstantinos 2005, Stuedahl & Smørdal 2011 a & b). Some museums are currently exploring smart phones, iPads and augmented software and apps as mobile guides for outdoor experiences to provide content from collections and archives into new contexts, such as fairs and events (e.g. Stejdelike museums ARtours), and as part of city guides (e.g. Streetmuseum by Museum of London), where images from the museum collections and archives are showcased by way of GPS-coordinates. QR-code based projects such as Decoding Art, where QR-code plaques are attached to public art provides examples of how museum content can be technologically distributed to new situations of use (piloted by Manchester Art Gallery).

Mobile phones have enabled amateur image making, or “Photography 2.0” practices, to expand the dominant museological narrative (Galani & Moschovi 2010). Applications such as Tumblr, Instagram and Pinterest have allowed museums to build new relationships with online communities of interest through imagery (Colquhoun & Galani 2013). Also, Instagram photo taking has been defined as a new visitor practice in exhibitions (Hillman, Weilenmann & Jungselius 2012) while projects related to the photo sharing database Flickr (Dalton 2010) or to online collection-based projects explore the dynamics of social tagging and folksonomies related to museums art collections (Trant 2009). This includes crowdsourcing actions of correcting, contextualizing, complementing, co-curating of photographic historical content that increase the quality of museum collection (Oomen & Aroyo 2011, Colquhoun and Galani forthcoming 2013). While mobile media provide opportunities to foster social connectivity and re-encounter experiences beyond the museum walls are welcomed, very few museums have explored these as means to build sustainable visitor relationships (Wasserman 2011).

While sustainable relations with visitors are part of current crowdsourcing and community projects, these projects mainly translate into participatory activities of co-creation, contribution and collaboration (Simon 2010). There are few studies on what motivates visitors in mobile, virtual communities and how the relationship to museum content is established outside of museum contexts. There is a growing need for design language and methodological approaches (Wasserman 2011) for ways that museum content may connect to one’s sense of ongoing presence (Licoppe 2004) and relate to the emerging conventions of interpersonal relationships (Ling 2008) that mobile technologies provide.

The design experiment we report here is designed to explore the aesthetical, cultural and social dynamics, tensions and potentials that museums may meet when integrating social photosharing applications within distributed communication practices. In particular, when museum content is staged for encounters within external spaces by visitors who would not enter the physical

museum space. In our case museum content was presented in an outdoor setting within the central city. After a description of the design experiment using Instagram, we describe three defined challenges relevant to evolving the relationship between the museum visitor relationships within a distributed museum. This small-scale experiment and in-process documentation illustrate the critical design thinking needed beyond the core functionality of digital technology to address what an experience of the distributed museum may mean in the not too distant future.

THE AKERSELVA DIGITALT PROJECT:

The Norwegian Museum for Science, Technology and Medicine indexes the industrial heritage of Norway. Together with the Oslo City Museum and Oslo City Archive they embarked on a project entitled Akerselva Digitalt with the objective of establishing an active museum communication practice outside the museums—more specifically, along the Akerselva river where the buildings and sites that lie along its path are central to the industrial history of Norway. A walk along this river may potentially give insights and understanding of the central cultural, economic and societal transformations in Norwegian society over the past 150 years. The museums have previously communicated this history by arranging city walks, allowing access to online portals with documented industrial history, published text books and participated in cultural events along the river. In the project, they have launched a mobile app that gives 3G based access to location specific mp3-files. Building upon this audio guide, the museum invited researchers¹ to explore how visitors can be involved through a socially-driven mobile platform – and how visitor contributions can be integrated in concert with museum-produced content.

In investigating the challenges related to understanding what kinds of mobilities and participatory activities groups of users and visitors along the Akerselva River may find meaningful, the research team developed an approach that consisted of both a social-media component and a physical installation within a co-design framework. The walkway along the river has the characteristics of being a place for recreation, an alternative road for walkers and bikers. While inside the old factory buildings along the river have settled an emerging creative industry and a variety of educational activities. It was decided that a small-scale experiment, an operable prototype, would allow for critical reflection upon which a deeper set of research questions could be developed to identify the strengths and weaknesses of a socially-driven mobile platform in order to then iterate subsequent prototypes (Brown

¹ Researchers from InterMedia, University of Oslo related to CONTACT project financed by The Research Council of Norway 2009 – 2013.

2009) toward conceiving a new concept of museum interactions along the Akerselva River.

THE DIGITAL DESIGN SET-UP: INSTAGRAM FOR SOCIAL SHARING OF HISTORICAL MUSEUM CONTENT

The social and cultural interaction probe of this experiment used the photo sharing app. The applied ethnography (Sander 2002) was based on characteristics of probes as a means for explorative design (Mattelmäki 2008). The experiment invited Instagram-users to participate in the experiment by means of self-documentation, suggesting reflection upon personal context and perceptions to support the explorative character of our project through social mobile interactions along the river. We discovered that Instagram had several photo streams related to the river #akerselva, and that citizens seemed to share natural as well as social and culinary experiences of their time along the river. Therefore the first probe centered around using the Instagram as a distribution channel for historical images within these already established mediated relationships. The images that were published in the experiment were derived from the online and open photo database oslobilder.no provided by the Oslo Museum, and the portal industrimuseum.no provided by the Norwegian Network for Industrial History. We established an Instagram user called @akerselvdigital to give people the ability to follow this stream of archival photos.



Figure 1: @Akerselvdigitalt photo stream on Instagram

The decision to publish historical images was an investigation into manners in which the museum content could fit into ongoing cultural practices on Instagram. Therefore, hashtags then became a semantic tool for both outreach and a potential prompt to trigger historical

reflections. Our choice of hashtags allowed for conceptualizing of the museum content and mediated the relationships between historical images and current ongoing cultural and social activities in Instagram. Together with the images the hashtags could provoke and direct reflections directly onto historical issues. Some photos were published with excerpts of the museum text used in oslobilder.no, and some were published with only one sentence of context for the image in addition to a prompting question relating the historical to the present day. One example is the photo from the Seilduken factory from 1884 stating that 30-40% of the industrial production workforce along the Akerselva was executed by children. The prompting question asked, "What do we use children for today?"



Figure 2: Photos from the archives published through Instagram

The photos were also published with the name of the photographer, the year, the owner of the archive and the digital source. All photos were tagged with the #akerselva hashtag, and with clusters of hashtags that drew attention to themes related to Akerselva history. The themes could be place related, such as "#seilduken", one of the main factories – or they could be related to an historical phenomena, such as "#children work" or "#osloactivism", #politicalprisoners, #russia, or more contemporary themes such as "#pussyriots, #mathallen (a new local food hall), #akerselva, #brenneriveien, #vulkanoslo (the burgeoning design community and environment for creative industry in Oslo), or #teknisk museum".

PHYSICAL INSTALLATIONS ALONG THE RIVER WALK EVENT

To observe how the situated use of Instagram may connect museum content to a physical context in the city, the design team arranged a physical installation across three sites along the river to carry out the experiment and obtain any observable empirical clues on how social practice with historical content may play out onsite. The goal of the physical set-up was to explore a) visitors experience with the cultural dynamics of Instagram related to place, and b) the media-based dynamics of social following which we will not focus on in this paper. It was decided to carry out the installation as a performance activity at the yearly riverwalk, or Elvelangs, that occurs on 21.September, the day of autumnal equinox. This event

samples installations from artists, musicians and local people living along the river with up to 3000 people attending various parts of the 5-mile walk along the river beginning around 8 in the evening and lasting until 11. It is a very stimulating performative evening in which visitors young and old participate in various cultural exhibits and performances along the river. This seemed like an opportune time to set-up an engagement activity capitalizing on the interest of people in the environs of the river walk.

The three installation points were defined according to the relevance of the content and the physical accessibility in accordance to the number of people taking part in the walk. Being a physical area for pleasure and leisure time while at the same time having multiple histories of working class, women's history, immigration, gentrification e.g., there was a need to involve the relationship of content in selecting the exact installation sites. Each addressed a theme derived from historical narratives of the sites;

- women's work related to the canvas factory #Seilduken that today houses the Oslo National Academy of Arts, Norway's largest college of higher education in the field of the arts
- cultural activities and musical activities in the area late 19th century, #Brenneriveien and #Blå a former textile production facility that now serves as a locale for concerts, art studios and a hip-hop youth club
- citizen activism located at Anker bridge #osloaksjonisme, a site for many activism events like the Hunger March in 1932 focusing on unemployment and workers social conditions



Figure 3: One of the three installation points. iPads were available for viewing the photo stream in real-time (left), with cards with text prompts to encourage interactions by way of the QR codes.

Printouts were made of the Instagram photographs that were published on the @akerselvadigital stream, scaled 200%, and marked with a QR code. These printouts were then laminated for durability and strung at the specific locations relevant to each theme. The QR-codes on the laminated printouts linked users directly to the Instagram stream, making an onsite connection between the physical site where the event occurred and the digital space being curated on Instagram.

Accompanying text and questions were intended as trigger points for reflection over contradictions between the past and now. In inviting river walkers to access by way of QR-codes, we hoped to provide an incentive to participate by adding their own photos or comments stimulated by the prompting texts.

It became important to allow access by those who did not carry a smartphone with Instagram. For this, iPads were wired and strung across at the three sites allowing for the same access to the stream of photos from @akerselvadigitalt. Therefore in each of the three installation points there were 10-12 laminated historical photos digitally-enhanced to replicate the Instagram aesthetic strung across the space, an iPad allowing for instant access to the @akerselvadigital stream on Instagram and a researcher who acted as a silent observer of the activity surrounding the activity.

AKERSELVA EXPERIMENT OBSERVATIONS

The installation was accessible during the entire three hours of the riverwalk event and remained up for some days after (minus the iPads), in the end gaining around 50-60 new followers to the @akerselvadigital stream on Instagram. We found that the sites chosen for each installation were important in regards to awareness, attention and dwelling time. Sites with enough physical space to dwell naturally gathered the most people. People were intrigued by the blending of the historical photos with instant snapshots from contemporary events and situations at the riverwalk that were appearing together in the Instagram feed. They made sense of the text on the laminated photo-cards but did to a lesser degree engage with the contemporary issues related to the imaged phenomena – such as the prompting text encouraged them to do. We got more comments and likes on the published photos that had an open description – while nobody answered prompting questions or responded to the solicitation to contribute.

It also became clear that defining the features for participation had to be explained differently for both the digital and physical spaces. The physical translation of Instagram photos into laminated cards seemed to require more descriptive text and a clearer prompting to act than the photos that were experienced within Instagram on the mobile phone. The physical text had to be designed with a clear idea of what kind of contribution people could make that was relevant for their situated context of the walk – and also how the user-made contributions would land in the Instagram project within the museum framework. People participating in the walk constantly uploaded photos of installations and situations experienced and hashtagged with #akerselva, making it difficult to find ways to tune them into historical reflections in this context. The solicitations articulated in our Instagram entries did not work well in crossing contexts between online and physical representations. And it seemed that translating the Instagram photo and hashtag texts into a physical form required another level of prompting – a physical invitation which set out

verbatim instructions on what the user was to do in the interaction.



Figure 4: The most popular installation point of the three locations.

DESIGN EXPERIMENTS AS PATHS TO FUTURE CHALLENGES

In assessing an outcome for participation along the river, the social-sharing app of Instagram was chosen over other relevant social-media options as it differs from web-based hybrid databases such as Flickr, that have been used in present museum, library and archive commons-based projects (Colquhoun & Galani 2013). In employing Instagram, we opened a space for a participatory and experimental approach that examines equally the layers of personal, social, cultural and physical interactions with the Akerselva river. In this way we used an interventional ethnographic approach to establishing a design lab in a living context of the city. The personal, social, cultural and physical aspects of lived experiences during museum visits, explored in earlier HCI and CSCW research (e.g. Ciolfi & Bannon 2005, Ciolfi & McLoughlin 2011) are quite relevant to take notice of in setting up mobile design experiments for the distributed museum. Theoretical investigations into these levels of place-based experiences can lead to frameworks through which the process of not only questioning the context and intention is brought forward, but also addresses the physical interaction with museum content in the city as it relates to user experience. Our design experiment gives some indications on the role of content in locational experiences related to the continuum between physical place and online space that requires further exploration, that meaning from social media-driven communication platforms within the context of the distributed museum are less about the devices themselves and more about the social and cultural activities that are performed with,

around or through them as part of a meditational process. To this end we have identified key challenges that have arisen as investigative directions as a result of the Akerselva design experiment, challenges that in turn suggest literacies needed in the design of museum communication practices within a distributed museum.

PARTICIPATORY METHODS: EXPLORING MOBILE SOCIAL MEDIA PARTICIPATION IN THE CITY

Media-moderated communication is as much tied to a place as anything, however there is a fundamental change in how a sense of place is now experienced (Malpas 2012) with help of technology. Such activities are driven by cultural dynamics that can be described as unstable at best. There is no valid prediction method for determining what type of engagement will have lasting legacies or what will exist as momentary blip on the cultural landscape. In advancing the concept of the Akerselva guide as a socially and culturally mediated, spatial and temporal based experience, the project will need to ask deeper questions of use, or intention and outcome in order to determine the next appropriate iterative path to follow. Intervening by adding museum content in existing Instagram-streams, we define the design probes as means for breaching activities for exploring ongoing cultural practices by contradicting them. These breaching interventions are inspired by the breaching experiments introduced by Garfinkel and Goffman where breaks into small, everyday rules are used to understand the psychology of social systems. By using a breaching approach to PD, the design team were the participatory actors and the existing cultural practices in Instagram was the established design space. The breaching design action had to follow the rules of Instagram publishing, liking and following – and could therefore only exist as interventions that break with ongoing cultural practices through the introduction of thought provoking text that pointed to the historical contradiction of the place. By turning around the question of who participates in what in the design experiment, we had to realize that the design space is given – and we as designers had to think about ways we can participate in the ongoing activities of imagery creation and documentation activities within the city.

MUSEUM CONTENT ACROSS CONTEXTS: TENSIONS BETWEEN THE SOCIAL CLASSIFICATION OF COLLECTIVE MEMORY AND MUSEUM TAXONOMIES

In Instagram we encountered a challenge in translating and connecting the institutional metadata with the existing folksonomies that were connected to place in Instagram. Mixing such social tagging and folksonomies with the structured metadata of an institutional classification system has become a major discussion as institutional cultural memory content then mixes with the social processes of online communities (Trant 2009, Dalton 2010). Studies of museum crowd-sourcing photography projects involving amateur photos show that these forms of integration may transform the authentic photos into curatorial frameworks, stripping

the amateur imagery of its unique spontaneity and subjective context (Galani & Moschovi 2010). In this experiment we turned the question of museum participation around, asking how museum content could participate in the ongoing stream of amateur photography practices on Instagram. It is in this turn, the mixing of curatorial content into everyday amateur content, that arises a potential challenge of the relevance of existing practices of hashtagging and the relationship of the hashtag to the user and thus the museum content.

In the river experiment, the choice of hashtags was a strategic decision in that it should poignantly address the specificity of place, while at the same time being flexible to work as location unspecific designations (Wasserman 2011) that could inspire reflections on Instagram. Hashtags were also chosen to connect historical photos to existing tags of contemporary reference to connect pre-existing communities of users. This was both an endeavor in connecting ongoing social practices of place making in Instagram with historical phenomena of the city and a connecting of interpretative tags of historical photos to existing tags that connect communities of users. A multifaceted structure of hashtags provided focus on the types of interpretive material the project hoped to receive from the users. Ideally we would like people to contribute with contemporary documentation photos mirroring the historical photos - but realized that this required an engaged community of followers that would contribute independent of the physical event. This made us aware of the power of the semantics, the hashtags and the descriptive texts as well as the photos chosen from the archive. In this way defining the features for contributions required a design awareness that was deeply informed by knowledge about everyday events of the river.

However, if we now consider this perspective from a more intensive ethnographic study of the patterns of use within the assignment of social-media hashtags, and what those patterns reveal as far as perception and understanding of the subject, we may now begin to cultivate a system of classification that could bridge the gap of institutional metadata and the folkonomies associated with social media consumption. This made us aware of the need for preliminary ethnographic research into the assignment and application of hashtags, to be able to provide prompts for the participation that could provide insight into the associations that users make with their interactions with archival content outside a museum space. The breaching experiments with design probes seems for us to be a promising methodological approach to capture the cultural dynamics of the distributed museum through photosharing applications for historical content.

SUSTAINABLE OUTCOMES AND LASTING LEGACIES

Sustainability practices remind us that we can't implement an outcome without being fully aware of its technological shelf life. Within the sphere of the

distributed museum, the concerns of such sustainability become multifaceted. Museums have been keenly aware of sustainability for decades; knowing that a science exhibit that once served for novel and curious engagement for the visitor can slowly, or even quickly, fade into a backdrop of Jurassic structures, silently calling out to be addressed when finances and time allow. This is a continued evolution with the stakes even higher as technology and social engagement advances at a rate that can quickly outpace fiscal resources. The 2012 Mobile in Museums Study funded by the AAM (Tallon 2012) cited the primary challenge in museums with an established mobile platform as 'keeping the experience up to date.' This can also be expanded to include sustaining interest in maintaining the relationships once the excitement of an initial launch is executed and technology moves forward.

The currency of technologically mediated experiences continues to rise with the convergence of platforms accessible through mobile devices. Such experiences have also been challenged by the potential open-ended nature of the activity and the manner in which they can come to be shaped through collaboration as well as the reliance of the software for the outcome. These experiences are often application-dependent in a world where cultural practice very often privileges one form over another. The livelihood of hardware can be measured by sales whereas the livelihood of social media is quite often measured in likes and clicks. Without an ability to conduct analysis and critique of underlying cultural relationships regarding technological engagement, ones that can lead to meaningful experiences and deeper understandings of the use, content, and place actors at play within these new communication platforms, fatigue of continual participation requests and technology interactions may be inevitable.

Choices of application interaction, such as Instagram, will continually need to be readdressed and re-evaluated in order to make decisions leading to prudent use of the technology in the quest to provide value and knowledge as a viable outcome. The Akerselva experiment was born from a query into methods of creating sustainable relationships with museum visitors using social media. However, in a world where social media is being used to capture historical events in real-time, where it has been documented that the world "loses 0.02% of its culturally significant social media everyday" (Nelson & Hany 2012), what becomes of content generated via participation needs to be a vital part of the sustainability conversation. It opens up larger questions of how collective memory building will be housed, archived and studied in the future context of a museum collection.

CONCLUSION

Conducting experiments and explorative studies to advance critical design research, validates the process as a critical benchmark within the design process. This

underscores the need for experiment-based outcomes to be analyzed, critiqued and reflected upon. The multiple levels of the distributed museum needs to be explored beyond the historically well established practices of museum exhibition design. This becomes especially relevant in the advent of social media and mobile communication, as these media cast around roles and authorities related to museum content and historical interpretations. The Akerselva Digitalt experiment continues to explore the dynamics of Instagram followers, by arranging interviews to get more directed feedback. This may give us data that could lead to a more empirical analysis of longitudinal user experiences.

In framing an investigation into new forms of museum communication practices within the context of a design experiment, there can often exist preconceived notions of the outcome. At times these notions are confirmed in the concluding results or reflective analysis. However the Akerselva experiment revealed to us that experimenting with social and mobile media within city spaces under the guise of the distributed museum needs a longitudinal approach to be capable of analyzing users experiences of this type of interaction. Social media dynamics are based on collecting followers, a time-based technological function, making it difficult to understand the ways interaction can take part in cultural practices on a more sustainable level. Physical small-scale experimental installations can not only identify immediate physical and socio-cultural parameters, but also make apparent larger questions and investigations. Our experiments indicate that museum images and texts do have to be given a new form to advance museum communication practices within technology-mediated distributed museum. Using existing social media applications as design probes may first introduce involved museum practitioners as to how future museum design processes can be set up and what kind of outcome they might expect. Bringing methods of living labs and design labs into museum design experiments with mobile and social media requires a clear articulation on how the museum content relates to ongoing social and cultural practices of potential visitors. This focus will be better served with an expanded understanding of how a PD framework may fit the practices of actors involved, how complexities of semantic taxonomies involved include software and institutional structures as well as peoples practices, and that meaningful outcomes depend on creating sustainable relations.. The development of critical design approaches, ones that go beyond the novel interaction between museum content and technology, will influence the direction of museum communication practices of the future distributed museum.

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PRINTED MATERIAL AND FABRIC

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ABSTRACT

As wearables get more complex and closer to the skin, so do the requirements for the packaging and the placement of the electrical components. The advent of 3D-printers and flexible printing materials provide means of building fabric-like structures. We tested a flexible material without moving micro- or meso-structures, as the material itself would be fabric-like. Tests were conducted according to SFS-EN ISO 13934-1, suggesting directions for using printable materials. In the end, we created a corselet and a corset, along with a connector suited for attaching various materials together.

INTRODUCTION

Wearables have been developing over time, more rapidly in the last few years. There have been developments in usability and feel, starting from the study in the wearability as conducted by Gemperle et al. (1998), which basically showed that it is important to understand the characteristics of the body, in order to have a usable container. The forms and contours of the proposed casings are possible to build with CNC and vacu-forming, but also with the rapid manufacturing methods. Even though these casings were intended to be wearable, the focus was not on the textile itself.

The advent of rapid manufacturing methods gave new possibilities to the development and the concept of

textile itself. The key interest areas for using rapid manufactured textiles are seen as “high-performance textile market and the smart of intelligent textile market”, as explained by G. A. Bingham et al (2007). The paper also suggested that such structures could be designed to house the electric components.

Form giving using 3D-printers has already found a way to fashion industry, as originally used by Freedom of Creation, and more recently Iris van Herpen, to name a few. There are even printed bikinis already on sale by Continuum, getting even closer to the skin. These approaches are based on rigid micro- or meso-structures, where the textile-like behaviour is achieved by using chain-mail like structures, or otherwise flexible movement created with rigid components achieved with SLS rapid manufacturing. On the other hand, Bickel et al. (2010) have used 3D-printed materials to create controlled deformation behaviour in a shoe.

As mentioned earlier, there has been a strong indication of the electronics to be very much closer to the surface, i.e. Skin or clothing fabric of the user. There are for example button casings by Hännikäinen et al. (2005), which are attached loosely on the surface, sewable constructs by Buechley (2008) and flexible circuits for having them directly at the surface as demonstrated by Linz (2008), and even wearable systems that withstand water and can be washed have been presented by Iso-Ketola et al.(2005). The ways of integrating functional circuitry to a garment vary from being housed in a clearly external casing, to sewing it as a part of the fabric.

It would seem that there is room for a lot of interesting combinations of 3D-printing and fabrics, and for that end, naturally flexible materials and some practical examples that are easy to adapt should be explored. By having a 3D-printed material as a relatively equal substitute to a fabric, the possibilities for prototyping and development might be increased. This might allow

the design of the electrically functional parts to be more intimately integrated to the design of the garment, thus removing the artificial feeling of the material. It would also have the added benefit of enabling the use of traditional garment design methods, where the pattern and clothes designer can use the same skills as with fabric.

Having a goal of standardised approach on wearable development, the very first steps that are needed, is to understand the material properties and the behaviour of the printable material. For this end, we propose that the materials should be evaluated as they would be fabrics, and built with as such.

ON MATERIALS AND PRODUCTION

Even as the 3D-printer, or rapid manufacturing machine is a device capable of constructing three dimensional objects, even hollow or arbitrary ones, we chose to start with flat, thin pieces resembling fabric. There are different ways of operation for the 3D-printers, but with the inkjet-based printing one can create naturally soft and flexible materials. This means, that the produced material is similar to soft rubber, if it would be printed out as a homogenous block.

Objet Connex 350 3D-printer was used to print out different test samples, as it has possibility for a variety of material qualities. The maximal printing volume is roughly a cube of 35cm x 35cm x 20 cm. The printer can print one or two materials, along with support material at the same time. There is a possibility to use digital materials, which are a mixture of two materials, a hard nylon-like called VeroWhite+ and a soft rubber-like, called TangoBlack+. The material mixtures vary by having different Shore values, flexibility, and a colour as a byproduct. The material that was chosen for the test was the TangoBlack+, which is the most flexible material, and therefore seen as the most similar to fabric in general. As it is also used in a variety of material mixtures, it provides a good base for future comparisons.

The surface quality of the material being printed can be selected as glossy or matt. With a glossy surface, the printed object appears to be much stronger than similar object with a matt surface, as verified with manual testing and discussing with the printer manufacturer. One distinct characteristic of the glossy finish is the selectiveness: only the top surface of the object being printed is glossy. It is not uniform on all sides and therefore not suitable for the tests. There were no other limitations for the usage of the glossy finish that we could see, but chose to use matt for its uniform result.

The chemical properties are also very important, but were seen as less relevant as a starting point. Materials are intended for hand held prototypes anyway, and thus can have brief skin contact. On the other hand, the surface area of the hand is very small compared to the body and garments are worn for longer periods of time, and therefore caution should be taken when using

something with a large surface area. There is also a material that is suitable for medical use, but is impractical for the purposes of the test, as it is rigid and impractically hard if printed as solid blocks. Since the flexible material can be covered with actual fabric if needed, the chemical properties were not seen as inhibiting factor.



Figure 1. Preliminary samples

The material is printed with inkjet printheads, and cured with UV radiation. This creates distinct patterns which, by visual inspection, would appear to have an effect on the properties of the object. As the moving inkjet heads deposits the material, stripes and layers parallel to the direction of movement of the print heads are formed. The layered structure forms the overall object, and suggests directional differences in durability. In order to get an estimate before printing, a set of preliminary samples were printed. There were some differences that are visible at the surface, as seen in the Figure 1, when the light reflects from the surface. The samples were printed as having a matt surface, and thus were covered with support material from all sides during print. The size of the samples was roughly 10cm x 10cm x 3mm patches, with a variable pattern of parallel holes.

The preliminary samples were visibly different in outlook. Depending on the print direction, the outside surface appeared either smooth or fuzzy and the printing direction was clearly visible in some samples. Judging from the samples, it appeared that there was a considerable difference in the output quality of the different printing directions.

Since the samples were varied in quality, it was decided that all possible configurations should be tested in order to find out what kind of differences there were in the physical durability, feel and outlook.

TESTING TENSILE STRENGTH

As textiles in clothing are prone to forces when the wearer moves, it was decided that the pieces should be tested according to standardised methods. We also chose to test the material with textile methods to see how well it behaves "as a textile". As such, we chose to use standardised methods to determine the elongation and the breakage force of the materials under inspection. It was seen important to have a reproducible and unambiguous measurement method, and as such could provide additional insight by suggesting requirements for the durability of built-in electronics.

ABOUT THE TEST

In order to determine the breakage force and elongation before breakage, the SFS-EN ISO 13934-1 was used. While it is not recommended to be used for anything else than somewhat non-elastic materials, there are no explicit restrictions for that. Since we wanted to test the material as a fabric, the method was accepted as a good starting point, especially since there was no prior work to be found.

The standard consists of stretching the fabric sample, until it rips apart or otherwise breaks. During the stretching and breaking, the forces pulling the sample apart are measured. The samples are attached with one sample-wide-clamp at each end, which hold it in place by squeeze on both ends. The tests are repeated with at least six similarly prepared samples, first of which will be used for calibrating and setting the system.

According to the standard, the fabric should be tested separately by stretching it from two directions: parallel and orthogonal to the yarns it has been constructed with. Since there are no yarn directions in printed materials, we decided to create the artificial holes and to test all possible combinations. We counted six directions of printing, and decided to have the artificial holes as parallel and as orthogonal. Before testing, all samples are held in constant conditions for 24h.

For the test, measured distance was set to 100mm, stretching speed to 100mm/min and the initial load to 0N. The tests were conducted at Tampere Polytechnic textile laboratory, using Zweigle-machinery. The test setup, with a sample under test, is shown in figure 2.

MATERIAL PREPARATION

Although we wanted to test all possible printing directions, the dimensions of the machine restricted some. As the standard requires at least 20cm long samples, the printer was unable to print samples when it would be built straight upwards. Otherwise there weren't any issues, and samples were built using matt surface for uniform surface quality. The material samples were 3mm thick, 20cm long and 5 cm wide, with a square weight of 223g/m². The thickness should also accommodate placement of simple sensors, thin circuits and flexible circuit boards, for future work.

There were three different separate patterns: with parallel holes, orthogonal holes and a plain, solid piece. The dimensions of the holes were the same in all samples: 12.5mm long and 2mm wide, rounded rectangles. The holes were placed in a symmetrically tiled pattern. Since all patterns were tested in all possible print directions, there were four layers for the printing directions, with three patterns for each layer.



Figure 2. Sample under test

Each pattern was printed 5+1 times, as required by the standard. One sample was used to calibrate the system for each individual pattern-layer combination, and five samples were tested to get a variety of results. Total of 72 samples were printed for tests. The layers were labeled A, B, C and D. "A" is the most used and the default placement in the software, flat on the surface and parallel to the movement of the printhead. "B" is otherwise the same, but orthogonal to the printhead movement. "C" is standing one side with the wide side up, again parallel to the printhead movement. Finally, "D" is similar to "C", but orthogonal regarding the movement. The ends of a set of samples are shown in

Figures 3. to 5., where the plain samples, orthogonal and parallel are shown, respectively.



Figure 3. Outcome of four different print directions on plain pieces



Figure 4. Outcome of four different print directions on orthogonally patterned pieces



Figure 5. Outcome of four different print directions on parallel patterned pieces

The differences in the print direction are most visible in the orthogonally striped samples. The “C” and “D” directions are considerably fuzzier than the “A” and “B”. The surfaces of the “C” and “D” samples are also much softer to touch, almost suede-like. The others feel

like soft, non-polished rubber, without any remarkable characteristics.

RESULTS FROM THE TEST

In general, the samples with orthogonal holes were the weakest, with breakage values around 9.4 Newtons. The samples with the parallel holes had over four times the strength, breaking on average at 42 N. The strongest samples were the plain ones, with an average withstanding a force of 60 N. The strength results are summarized in table 1, and elongation in table 2.

Table 1. Strength of the samples

A	Orthogonal	Parallel	Plain
Avg[N]	9,3 ± 0,2	41,8 ± 1,2	65,7 ± 7,3
%	2,1	2,9	11,1
B			
Avg[N]	9,1 ± 0,3	38,5 ± 1,4	65,7 ± 5,0
%	3,8	3,7	7,6
C			
Avg[N]	9,5 ± 0,4	42,3 ± 1,5	54,9 ± 4,7
%	4,6	3,6	8,6
D			
Avg[N]	9,5 ± 0,3	44,2 ± 2,6	53,3 ± 10,3
%	3,0	5,8	19,3

The plain test samples were the most durable. Layers “A” and “B” were somewhat more durable, with values of 65.7 N, than the “C” and “D”, with values between 53.3 N to 54.9 N. The layer “B” had the most even distribution with 7.6% variability, and the “D” layer had the most varied, with 19.3%. The elongation of the samples were greater with “A” and “B”, between 124.3 - 124.7 mm, than “C” and “D”, between 103.0 - 105.1 mm.

The parallel test samples, regardless of the printing direction, were very similar in breakage force. They vary between 38.5 - 44.2N, with “B” having the weakest value, and the “D” with the strongest. The variation of the results was smallest with “A” at 2.9%, and the greatest with “D”, at 5.8%. The elongation of the samples varies from 108.4mm with “B” to 126.9 mm with “C”. Most varied is the “D” with the variability of 6.2%, and most constant with “A”, with a variability of 2.6%.

Table 2. Elongation of the samples

A	Orthogonal	Parallel	Plain
Avg[mm]	186,5 ± 3,5	117,4 ± 3,0	124,7 ± 15,9
%	1,9	2,6	12,7
B			
Avg[mm]	181,6 ± 4,0	108,4 ± 4,7	124,3 ± 13,1
%	2,2	4,4	10,5
C			
Avg[mm]	184,0 ± 3,9	126,9 ± 4,9	105,1 ± 11,7
%	2,1	3,9	11,2
D			
Avg[mm]	172,8 ± 6,8	121,8 ± 7,6	103,0 ± 24,7
%	3,9	6,2	24,0

The orthogonal test samples were also very similar on different printing directions, with the values ranging from 9.1 N to 9.5 N. The results were most varied with samples from direction “C”, with 4.6%, but least varied with “A”, at 2.1%. The “A” had also the greatest elongation before break, at 186.5mm. The smallest was with “D”, at 172.8mm. Least variability was at direction “A”, at 1.9% and the most with “D” at 3.9%.

The graph plotted during the test displays the elongation as a function of force. All three similar sample sets with different print directions exhibit similar characteristics, although there were minor differences. Graph of the test for direction “A” with parallel holes was shown in Figure 6, plain ones in Figure 7, and the orthogonal holes in Figure 8. It should be noted, that the parallel and plain samples exhibit abrupt behavior for breakage, but with the orthogonal one the breakage event takes a longer. While comparing the graphs to the numerical values, it can be verified that the orthogonal holes were most consistent in behavior.

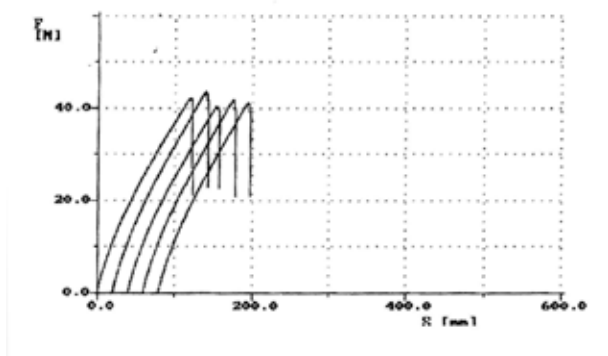


Figure 6. “A” set with parallel holes.

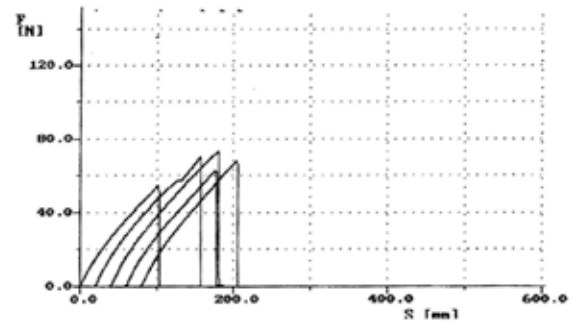


Figure 7. Plain “A” samples

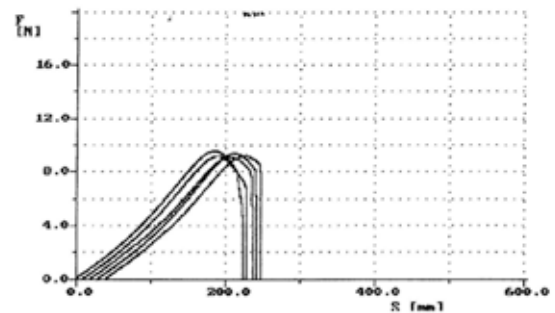


Figure 8. “A” samples with orthogonal holes

By visual inspection, with orthogonal samples, printing direction “A” had three of the samples broken from more than one line of holes, with very neat breaks. Only one of them had a rip elsewhere other than the breaking point. In general “B” was cut in the most controlled fashion, with just one or two lines of holes broken and only one that had a small rip not in the locality of the breakage point. The breakpoints however, exhibited small dents at the points of breaking. Level “C” had only two one line breaks, and the breakage points resembled small dents. With “D”, the rips were very random, and the breaking points were large dents. Typical breakage can be seen at figure 9.

The parallel samples were cut almost always either diagonally or in V shape, as shown in figure 10. There were few instances where the sample was cut at the very end, against the clamp, producing a straight line. The visual outlook between different printing directions with parallel samples was minimal.

Finally, in Figure 11, there can be seen a very typical breakage point of a plain sample. These were very uniform with the visual inspection, although there were a few samples that had been cut against the clamp. Similar to parallel ones, there weren’t any major differences in the breakage between the directions.



Figure 9. Typical orthogonal breakage



Figure 10. Typical parallel sample breakage



Figure 11. Typical plain sample breakage

ANALYSIS

According to the data we collected, the sample set "A", printed with sample direction parallel to the print-head movement, was the most uniform regarding the strength and the elongation, and should be used when designing garments.

Introduction of the holes to the material created consistency in the behavior due to more uniform elongation, but weakened it noticeably. With parallel holes, the material was similar in durability to plain samples, when stretched at the direction of the samples. By sacrificing a small amount in breakage force for pattern, uniform behavior and material breathability could be achieved. If there would be a need for controlled expansion, or to set a limit for the durability, then a pattern could be designed specifically for that. Furthermore, materials with directional holes seem to have their macro-level behavior similar to knitted fabrics, being that they stretch considerably more to one direction, and much less to another.

The plain samples were the most durable, but lacked in flexibility. In this form, the material behaves a bit like woven textile, with very little elongation to any direction. Another problem was the solid surface, which does not allow any air exchange. The samples might be made thinner by using glossy finish, if the same durability would be needed.



Figure 12. 3D-printed connector as a functional part of a garment

MAKING GARMENTS AND ACCESSORY

In order to test the suitability of the printed material in full garment creation, corsets and corselets [13] were designed using traditional pattern drawing methods. As they were seen as the most difficult to get correctly close to skin and fit, they were chosen as a reference. To

experiment with the usage of the material with textiles, we designed a 3D-printable connector and started by creating a soft fabric corselet, as shown in Figure 12.

As seen, the connector was initially attached by sewing it directly to the fabric with a direct stitch. Due to the softness, the material in the 3D-printed connector tends to rip from the ends, where the sewing edges are. To overcome this, we partially re-designed the connector for attaching different textiles together. In order to have more uniform approach, we decided to have the locking mechanism as generic and common to all uses, and the rest of the connector specific for different uses. For the fully printed garment, connectors would be integrated to the materials, as it allows seamless connectivity.

Since manual sewing tends to be time-consuming, a button-like version was made. While possible to be sewn by hand, it was intended to be attached with the button stitching machines. The button-stitchable connector was created by having a normal button as a starting point, to have as little changes to the existing methods as possible. Decorative function was seen as secondary, as this was the first time creating such objects. Utilising a cardboard mock-up and the 3D-printed connector mechanism, the final connector was developed. All parts involved in the process are shown in Figure 13, along with the printed connector. As intended for the automatic stitching machine, the connector being stitched to a fabric can be seen in Figure 14. The connector was also utilized as a part of a smaller accessory, and was used in a bracelet, an underside of which is shown in figure 15.

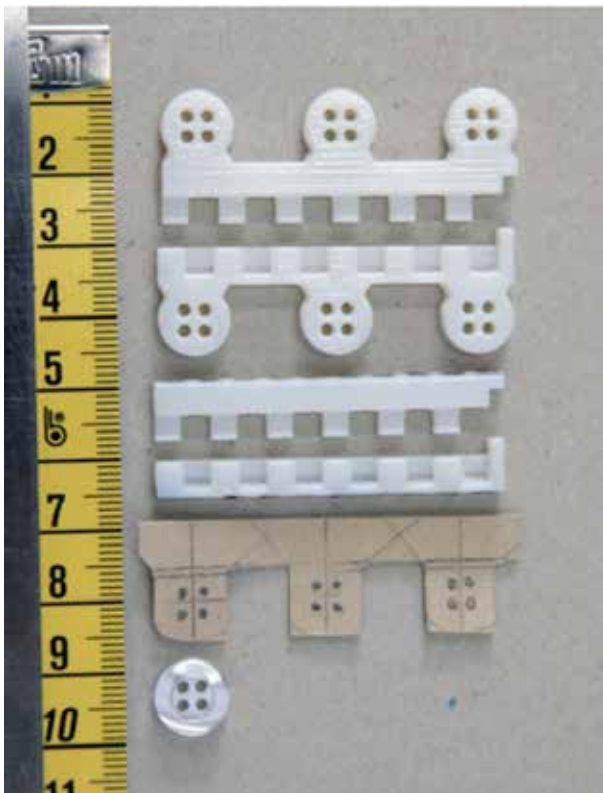


Figure 13. Connector development



Figure 14. Attaching the connector with a machine



Figure 15: Bracelet with fabric and printed connector

In order to see the suitability for full 3D-printed corset, we started by creating the patterns by hand. The individual pattern pieces were then taken to Rhino in a digital form. The biggest problem was the adjustment seam, but it was decided that it would be compensated directly with the placement of the connectors. The corset pieces were filled with the same pattern as the orthogonal samples, and as per our test findings, would allow for small amounts of movement and deformation without breaking.

As corsets normally have bones that give the garment its distinctive shape, we chose to utilize and interpret it as means to attach the pieces together. We used the connector seamlessly integrated to the material for attaching the pieces. Although bones usually are within

the length of the corset, we decided to split them to smaller pieces to overcome problems of the curves in the body and to allow the flexibility to be utilized, and to see how the material seams behave. The constructed full corset can be seen in Figure 16. The material in the body was flexible even in the meso- and micro-level, although the connectors were made from hard, non-flexible materials.

While the fully printed corset was a good fit towards the mannequin body, it was quite heavy. This eventually caused the some breakages while assembling. Surprisingly, the material appeared to behave in brittle manner if bent too much, something that could not be seen in the standardized test we chose to use. The corset on the other hand, does stretch and move slightly, following the findings from the test. If the material was kept close to the 3D-printed shape, it kept the stretchy property without being brittle. This should be noted more while designing garments, and can be avoided by changing the surface quality to glossy, as it strengthens the material. Finally, using the connector and the button structure, 3D-printed parts can be attached to textile parts interchangeably, as can also different materials be used for the printing. One such example can be seen on Figure 17, where a transparent soft material corset piece has been connected to a textile piece.



Figure 16. The full corset printed with flexible materials



Figure 17. Textile and 3D-printed piece

DISCUSSION

The 3D-printed flexible materials can be seen as usable, fabric-like material, even without complex micro- or meso-structures creating the feeling of flexibility. It might be made thinner by using the glossy finish, and suggests a direction for future work. Due to the fundamental nature of this work, we chose to test the material as homogenously as possible. The standard we used gave us directions for evaluating flexible 3D-printed materials, and in overall the process seems to give new possibilities for getting closer to the skin, by allowing it to be seen as a fabric.

To demonstrate the applicability, a functional garment was printed and built, using a combination of flexible materials and rigid connectors.

Further work is needed to probe the possibilities and methods for connecting the material to the fabric, and evaluate how it alters the durability, behavior and feel of the overall construct. There are also a lot of interesting possibilities in taking the aesthetic qualities into the design: 3D-printed shapes are not constrained to any specific shape, other than for functional requirements.

Wearable electronics should be further explored, embedding them to the materials, and as the material behaves like a fabric, we have the benefit of co-creating with traditional pattern creation methods.

ACKNOWLEDGEMENTS

We would like to thank our functional textiles team, which has naturally evolved around this thematic area.

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A FORAY INTO NOT-QUITE COMPANION SPECIES: DESIGN EXPERIMENTS WITH URBAN- ANIMALS AS SIGNIFICANT OTHERS

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ABSTRACT

This paper examines the project, *Urban Animals and Us*, as a journey - or *foray* - into the 'terrain vague' between people and (other) animals with whom we share urban space. Through three design experiments developed around speculative prototypes and co-design tools, we attempt to bring 'wild' urban animals - like magpies and gulls into contact with the residents of a senior retirement home, to explore what new practices can arise between, otherwise, unconnected life-worlds. We expand the notion of *companion species* from philosopher of science Donna Haraway and begin to position the current project within a growing interest in animals in contemporary design research. Through analysis of the design experiments and the subsequent discussion, we argue, that a foray into interspecies relations, can inform the practical research agenda, and, help to re-articulate the dominant anthropocentricity of design research.

INTRODUCTION

Recently, domesticated animals, like sheep, dogs and pigs seem to be enjoying new attention from several anthropologists and design researchers around the world (Mancini 2011, Haraway 2003, 2008, Tsing 2012). We might attribute this development to the increasingly expanding notion of design, and the adventurous desire to extend design research into new areas of the sociocultural or natural domains. While most of the research projects analysed in this paper maintain a close affinity to technoscience, they almost univocally depict animals, as what American feminist, biologist and philosopher of science, Donna Haraway (2003, 2008) has called a *companion species*. This paper seeks to expand on the concurrent notion of companion species by proposing a category of familiar animals in an urban context, that *not-quiet* fits the interspecies dependencies we would attribute to *significant others*. Or, to be more precise, the precarious potentiality of new relations between animals and humans that raises significant new questions regarding the predominant anthropocentricity in design and design research.

Importantly, these design experiments do not aim to eradicate the human perspective. Rather, it is an attempt to investigate the possibility of a pluralisation of perspectives in design by insisting on placing human and animal actors as equally capable of action. Hence, we aim to expand the horizon of *how* and *whom* we design *with* and include into the design process. As an exploration of what decentralization of the human perspectives in design might entail, we explore the notion of *foray*¹ through our current design research project *Urban Animals and Us* (UA & Us). The term is

¹ The title of this paper is, unsurprisingly, meant to resonate with Uexküll's notion of *foray*, as it mimics the title of his booklet: *Foray into the Worlds of Animals and Humans* (2010)

appropriated from experimental biologist Jacob von Uexküll, and developed in the paper as an investigative approach that combines tools and formats from the field of co-design, with a speculative approach by which design prototypes are used as means to explore worlds that lie beyond our direct access.

In the paper we first give an overview over animals and experimental design research that we then relate and expand to the notion of *not-quite companion species*. We continue by describing how the UA & Us project access speculation along with specific co-design tools as a methodological bricolage. In the case section of the paper, we expand the theoretical underpinnings by providing evidence of the design experiments in the field. Here, our designerly research agenda has been to conceptualise the neighbourhood in the Danish city of Helsingør as an urban ecology that we co-inhabit with many different species. Through a set of three practical design experimentations developed in close dialogue with four collaborators, we explore questions such as; how do we take a not-quite companion species perspective into account? And, in the forming of new interspecies behaviours, how do we foster relationships that enable communication among species? We continue by giving a more detailed description of the first experiment as an unfolding of a foray into other relations between humans and birds. In the final section we conclude by relating the case to a larger set of issues of ecological changes in order to show how attempts to make a pluralisation of perspectives can provide a productive alternative starting point for design.

ANIMALS & EXPERIMENTAL DESIGN RESEARCH

Pigs and other domesticated animals make up a surprisingly ubiquitous source of material in the industrialised production of designed goods, whereas animals in general, seem to occupy a limited space in design discourse.

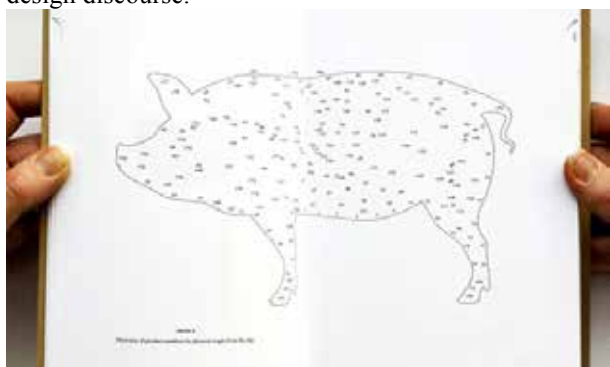


Figure 1: Christien Meindertsma's "PIG 05049" is mapping the animal through skin, bones, meat, organs, blood, fat, brains, hoofs, hair and tail becoming human-centred products.

In the book project "PIG 05049" Dutch designer Christien Meindertsma makes this abundantly clear by tracing the corporal remains of pig no. 05049 from a pig

farm in Rotterdam to, no less than, 185 products ranging from food to porcelain and ammunition².

Similarly, a mapping of the historical role and significance attributed to animals in design research could undoubtedly be of significant value, but lies beyond the scope of this paper. In the following section we will instead attempt to position UA & Us in relation to a disciplinary initiative and two experimental research projects, in order to elucidate shared focal points of what perhaps could be viewed as a new disciplinary interest in animals, in the making.

ANIMAL MANIFESTO

In 2011 a group of researchers from the human-computer interaction community (HCI) published an animal-computer interaction (ACI) manifesto in the ACM Interactions journal (Mancini 2011). Some of the central questions for a new research agenda proposed in the manifesto are: (i) how do we involve animals in a design process, and (ii) how can we develop a user-centred design approach towards animals? Other questions are: (iii) how can we elicit requirements from nonhuman users and (iv) with what criteria do we evaluate the technologies we develop for animals?

To a large extent these questions are mirrored by the interests put forth in UA & Us - there are however, differences. Perhaps this is most evident in the questions of evaluation of technologies developed for animals and the categorisation of non-human animals as 'users'. The objective here seems to be in line with the main strand of human-computer interaction research, with the primary difference being the substitution of humans with animals. The central mechanisms of a teleological design protocol is continued, albeit now with a new series of challenges pertaining to difficulties in gaining access to the requirements seen from an animal perspective. In a roadmap presented on their blog³, the ACI special interest group, among other things, suggests that collaboration with other established science disciplines such as ethology, behavioural medicine and animal psychology could be one way of gaining knowledge about animals. While it certainly seems like a sound projection of a feasible development, it also falls inside the well-trodden disciplinary bounds of HCI research.

We make a point of this, because it marks a divergence with respect to the experimental approach we propose in UA & Us. The gulls and crows, as significant others, are not perceived as non-human users for which we have located a specific problem to be met through means of design and technology. Rather, they are primarily co-constituents of a common urban context surrounding the

² <http://www.designboom.com/design/christien-meindertsma-pig-05049-book/>

³ The authors of the manifesto has since formed a research blog spearheaded by a ACI special interest group. The members are mainly researchers affiliated with departments of computer science and interactive systems: <http://www.open.ac.uk/blogs/ACI/>

nursing home Grønnehaven, with the potentiality of entering into new relations through designed interactions based on imaginative speculation rather than science facts.

NETWORKED RELATIONS & MULTISPECIES ETHNOGRAPHY

At the University of Wellington in New Zealand Dr. Anne Galloway currently leads a three-year research project entitled Counting Sheep: NZ Merino in an Internet of Things. As the title suggest, this project emphasises the animal – the merino sheep - in relation to emergent cultural and technological changes:

“Using NZ merino as our case study, we will work with farmers, industry and government to imagine possible technological and social futures for the production and consumption of merino sheep and products.”⁴

The aim of the project is to enhance public understanding and participation in new technologies through the intermediary of design research and especially the engagement in the production of future visions of agricultural technologies.

What makes the research project proposition interesting with regards to the position of the animal, is that it first of all represent a multiplicity of actors and events: “high country stations, sale yards, A&P shows, shearing competitions, dog trials, offices and labs to talk with breeders, growers, shearers, wool sorters, scientists, industry representatives, government policy makers and others” (Ibid.). The merino sheep, in other words, seems principally to be constituted by it’s networked properties. This in not to say that the project doesn’t take a concerted interest in the actual sheep, which is evident from the project’s accompanying research blog (<http://www.designculturelab.org/page/2/>), but rather that it relies on an epistemological approach that foregrounds multispecies- and multi-sited ethnography (Kirksey 2010) in accordance with an actor-network theory schema. An approach, that also manifest the sheep as companion species as well as products of the evolution of *naturecultures* (Haraway 2003), something we will return in the next section. UA & Us could be conceived of in a similar manner, as it certainly involves networked relations between seniors, gulls, computers and a nursing home institution - it also marks a difference in degree, as it puts greater emphasis on context (the urban), and the ontological contingences of the objects and animals involved. These qualities are more approximated to those found in the next project we will describe.

CO-HABITATION IN URBAN CONTEXTS

Amphibious Architecture is a floating installation in New York’s East River⁵ that collects information on

⁴ <http://www.designculturelab.org/projects/counting-sheep-project-overview/>

⁵ The installation was developed by the Living Architecture Lab, Columbia University Graduate School of Architecture, Planning and Preservation; the Environment Health Clinic at New York University; and the architectural firm The Living.

pollution levels and the presence of fish in the river, and it enables public inquiry into these matters via text message. Glowing lights on the surface relegate the interaction and activities to below the surface in real time. As David Benjamin from architectural firm The Living explains, one of the most important results stemming from the interaction was that “when people decide to ask a question about their environment through our SMS system the river becomes a contact on their phone. And when people start talking in a smart way to objects and public places in the city, all kinds of new things become possible.”⁶



Figure 2: A SMS received from New Yorks East River fish describing how many fish they are and pollution levels through a floating installation.

The contingent potentiality of *new things to come* as a consequence of having objects (such as rivers) and animals (such as herrings) on ‘speed-dial’ comes very close to the ambitions of UA & Us. What is shared by these objects and animals is proximity and the co-habitation of an urban context. Amphibious Architecture enables us to enter into new types of relations with objects (including animals) and potentially over time make these entities significant others. The objects and animals (e.g. rivers, gulls or herrings) of interest belong to a different category then the pigs and sheep of the previous projects, in that they historically and biologically share less interrelations with humans. They belong to a sphere one-step further removed from humans, and thus - following Donna Haraway - could be designated as not-quite companion species. This notion will be elaborated further in the follow section.

To briefly sum up the above ‘triangulation’ of UA & Us among other experimental research projects with a vested interest in animals, we might content that they combine the focus of animals with interactive technology as well as an orientation towards collaborative, anthropological and user-centred design methodologies. The notable exception from the latter being Aquatic Architecture, that more closely resembles an art installation than a process oriented design project. What furthermore can be drawn from the above comparisons, is the importance of (i) context and proximity, in Aquatic Architecture, (ii) the correlation

⁶ <http://www.wired.co.uk/news/archive/2011-08/26/amphibious-architecture>.

between ethnographical informed collaborative methods and design speculation, in Counting Sheep: NZ Merino in an Internet of Things, and finally (iii) the insistence on a formalised research agenda, that places animals centre-stage as promoted by ACI.

DESIGN EXPERIMENTS WITH NOT-QUITE COMPANION SPECIES

In this section we will identify the theoretical cornerstones for the notion of not-quite companion species and subsequently provide a provisional framework for the methodological underpinnings of UA & Us.

In 2003, Donna Haraway published a small book called “The Companion Species manifesto – dogs, people and significant otherness”. For Haraway – famous for her “Cyborg Manifesto” (Haraway 1985) – the notion of a companion species denotes a more extensive category than companion animal to include entities like “rice, bees, tulips and intestinal flora, all of whom make life for humans what it is – and vice versa” (Haraway 2003: 15). But the notion should also be understood as (i) something within the history of evolutionary biology, yet simultaneously mechanistic and textual; (ii) species as a philosophical category by which we define difference; (iii) the complex juxtaposition of the material and the semiotic; and (iv) the impurity of conflation between scat and refined cultural commodities. The last point is driven home by Haraway’s specific interest in dogs, from poo-scooping to breeding. In sum, Haraway’s manifesto aims to implode the hygienic categories of nature and culture into the far more complex and messy “choreography of ontologies” – or naturecultures – and the companion species epitomises this changes⁷.

Companion species, like Haraway’s dogs or Merino sheep in New Zealand can be characterised by their long historical interspecies relationship with humans. Recently, anthropologist Anna Tsing (2012) has argued for the extension of companion species to mushrooms. This indeed broadens the context by a huge margin, and suddenly our claim to perceive gulls, crows and even rats as companion species seems a lot less radical as they, after all, still belongs to the kingdom Animalia. But it also places the urban animals, we’re interested in, nicely between the close proximity of the human habitat (e.g. dogs or intestinal flora) and the wider (and wilder) ecologies of fungi, of which mushrooms – according to Tsing – enjoys a symbiotic relationship with humans (Tsing 2012: 142) that extends far beyond the cultivated landscape.

This brings us to a simple yet crucial aspect of companion species: namely that it always requires a minimum of two species to enter into relation (Haraway

2002: 12). For all the examples given here, including our own, the ‘significant other’ is viewed from the position of the human. When we propose the prefix not-quite to companion species it is merely to emphasis a category of animals with more opportunistic, weak and – perhaps most importantly – precarious interspecies relations with humans, much in the same way as herring in New York’s East river. They are all animals that most of us find difficult to categorize as companions, even though we co-inhabit the same (urban) space.

Haraway makes a compelling argument for the primacy of the relations over relata, when she writes:

“Dogs are about the inescapable, contradictory story of relationships – co-constitutive relationships in which none of the partners pre-exist the relating, and the relating is never once and for all” (Ibid.)

To this we might contend that not-quite companion species, with their precarious, could-be relationships, should be defined just as much by the shared context in which relations are potential, yet not always given.

SPECULATION AS PREMISE FOR EXPERIMENTATION

The experimental nature of the project does not follow a more traditional design protocol. I.e. there has not been a successive identification of problems followed by optimum solutions nor reliance on firm epistemological grounds (e.g. substantive knowledge of animal behaviour and psychology). Instead, since the inception of the project, the potential relations between crows, seniors, gulls and nursing home staff as not-quite companion species, are merely figments of our imagination, or at its best precarious. Hence, *speculation* along with adapted methods from co-design has become the experimental *modus operandi* of the project.

Speculation has a rich and varied history in both design and other fields and disciplines. In ethology a prominent precursor to a speculative approach in understanding animal behaviour is found in the work by Baltic German biologist Jacob Johan Uexküll (1867-1944). Uexküll is probably most renowned for his idea of *Umwelt*: the perceptual life-world of living beings (Uexküll 2010). For him, *umwelt* is always a world or environment *for* someone. The only way we can attempt to access this subjective position is ultimately through informed speculation or a foray [streifzüge] into a world experienced by the subject. Thus, for example, Uexküll would analyse ticks, sea urchins or bees informed by knowledge based on observations and behavioural experiments, but to leap from facts to the subjective experience he would have to utilise speculation to depict, for instance, the *umwelt* seen by a bee or in our case a gull.

In his recent book *Alien Phenomenology*, American media philosopher, Ian Bogost links Uexküll’s “*plurality* of incommensurable yet strangely overlapping worlds” (Bryant 2010) with the notion of *carpentry*. For Bogost, carpentry combines the ordinary

⁷ Haraway’s work in this area is echoed by other prominent scholars, perhaps most notable Bruno Latour in his critique of the ‘modern constitution’ and its effect on the global environment. See Latour: We Have Never Been Modern (1991) and Politics of Nature: How to Bring the Sciences Into Democracy (2004).

meaning of woodcraft with the idea of constructing things that do philosophy:

“Blending these two notions, carpentry entails making things that explain how things make their world. Like scientific experiments or engineering prototypes, the stuffs produced by carpentry are not mere accidents, waypoints on the way to something else. Instead, they are themselves earnest entries into philosophical discourse” (Bogost 2012: 93)

Bogost diligently points to a methodology that at least partially resembles what we aspire to with UA & Us. With the difference, that we are more interested in how not-quite companion species make up each other's worlds and would rather contribute to a design - instead of a philosophical - discourse.

A foray into the worlds of seagulls and seniors entail a mode of experimentation, which is potentially transformed through the deployment of speculative prototypes that may, or may not, actualise new interspecies relations. But, much in the same way as Uexküll's scientific observations and behavioural experiments informed his speculation on the subjective world of bees, so is the encounter with the various actors structured by methods and tools from co-design.

METHODOLOGICAL BRICOLAGE

We have until now described UA & Us as an experimental project, and more specifically as a foray into the uncharted territory of human-animal relations, by means of co-design tools and speculative prototypes. In the context of the overall project this paper expounds a foray to account for an explorative approach that joins the eventual “becoming with” (Haraway 2003, 2008) of a potential companion species – with speculation, as a way to operationalize that which has not yet been actualised.

As a theoretical framing, a foray into not-quite companion species, critically addresses the prevalent anthropocentricity of design research by exploring the relations *between* species as a potential to enter into (other) interspecies perspectives of the world, rather than, designing *for* animals.

Methodologically, the extension of co-design tools and methods to animals is further governed by a different line of design research in the tradition of experimentation with the interpretive ambiguity of the multivalent relations between people and design artefacts (Gaver et al. 2003)¹⁰. In UA & Us the experimental prototypes are not designed to be ambiguous in themselves, but rather to prompt people to imagine new kinds of relationships with animals and

¹⁰ Gaver, et al., develops the idea of “ambiguity as a resource for design” as an antidote to the dominant discourse of usefulness, efficiency and predictability in computer-human interaction (HCI). Ambiguity, in their account, is an attribute of the interpretations of artefacts and a quality that produces richer and more personal relationships between people and design artefacts through the active (and pleasurable) engagement in meaning making.

invite them to collaboratively explore the possibility of these relationships through design events (Halse, et al. 2010: 71). Hence, speculation becomes a premise for the design experimentation. Albeit, speculation here is less preoccupied with the *interpretative* ambiguity of relationship (Gaver 2003) and more directed towards the ontological possibility of co-constructively sparking new relations into being.

CASE: URBAN ANIMALS AND US

In the section below, we will describe design intentions, collaborative set-up, as well as the materialization of the design experiments that unfolds. Guided by the question of how we materially nurture relationships that enable communication and new relations among species we explore different ways in which to present and involve a multiplicity of species in the urban heterogeneity. The aim has been to let ‘them’ intervene, as much as ‘we’ intervene in each other's everyday. In each experiment a experimental prototype has been constructed to further explore the field cross-species communication.

STAKEHOLDERS AND COLLABORATIONS

The design experiments in UA & Us are accommodated and deployed at the retirement home Grønnehaven. The practical experimentation and final designs have been developed in close dialogue between the authors, the local municipality's volunteer-centre and an architect-duo in an on going collaborative process. Finally, a small interaction design bureau has come to aid us with technical and digital issues. Nonetheless, the main relationships discussed throughout this paper are more centred on the experiments where the different actors come together in new ways - with the focus on the retirement home Grønnehaven, its seniors and the local animals in the urban milieu of Helsingør.

DESIGN SET UP AND PROCESS

Situating the project as a speculative co-design means that we have intentionally tried an alternative to a top-down organization. UA & Us has been carried out in an open events format (Halse, et al 2010). An event involves many participants, covering many different tasks, such as presentations, collaborative writing, material experimentation and analysis in an open-ended format. Another important issue is that an event stretches over time. More specifically to our project, this can be seen in the joint writings of our blog, www.urbananimalsand.us, the tinkering with Arduino boards and Raspberry computers, field visits with hunters and ornithologists, as well as the many hours spent in the local wood-workshop. Nonetheless, the design concepts were initially developed by the design researches as initial sketches. Later, the hand-drawn sketches were presented to the stakeholders and collaborators where they critiqued, evolved and analysed the initial concepts and drawings.

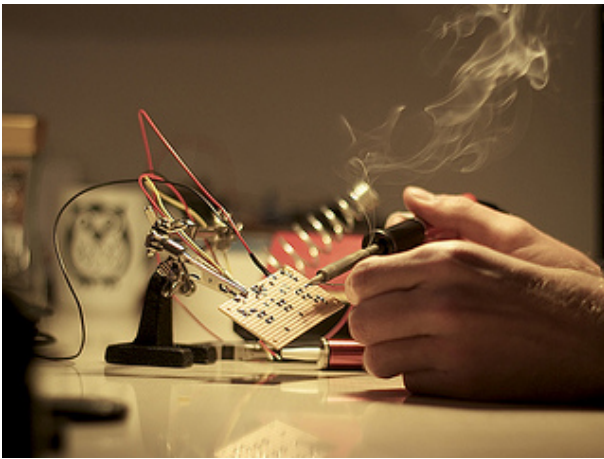


Figure 3: Circuit soldering activities later to be used in the final experiment PhotoTwin.

At this point, it is important for us to highlight that the event driven process is in UA & Us is then formed into three more specific experiments. This setup entails, as further described in a below section, an open invitation to the residents and employees of Grønnehaven to participate in the experiments where we collaboratively unfold and make sense out of the speculative prototypes and the potential new interspecies relations. As design researchers, we have set up a loose structure for the gatherings but left the program open to evolve along the way. Furthermore we have applied a micro-material perspective (Agger 2009). Following Agger, this perspective helps broaden the understanding of the role of things and tangible working materials in co-design, but also to provides practical concepts for engagement. Design materials is here described both in terms of what is brought into a co-design situation to be explored collaboratively as well as what comes out for the continuous design process. Importantly, the design materials need to be situated and appropriated to the specific situation to allow for a collaborative exploration.

THREE DESIGN EXPERIMENTS

The three different experiments all bridge the concern of taking the nonhuman worlds seriously. Compared to hunting technologies, where the relationship is made up of humans using tools to act upon non-humans as a top down relation, UA & Us aims to construct technologies of reciprocity. Each of the three experiments explores a specific notion of reciprocity that we further describe below.



Figure 4: The digital illustrations as shown to Grønnehaven to explain the concept of 1) the BirdCam. 2) the BirdFlute and 3) the PhotoTwin.

We finally continue to give one more in depth example in relation to the first experiment of what emerges and unfolds during one of the several workshops held.

1. The first experiment, *A Birds View Perspective* is exploring the notion of exchanges between the different actors in our shared urban space. For the experiment, our Bogostian carpentry skills where used to develop 'the Birdcam', meant to allow the birds themselves to film and be in control of a video camera with the intension to literally give a birds view perspective of the local area.



Figure 5: The BirdCam attached to a piece of bread in the grass in front of Grønnehaven retirement home. Haraway (2008: 17) observantly reminds us, that the word companion comes from the Latin *cum panis*, or with bread.

The BirdCam is a small device made out of off-the-shelves components, including an inexpensive spy video camera that one can attach bird food to. The weight of the object means that not any animal can pick it up. Instead it is meant to be used by the strong large local black back gulls outside Grønnehaven. Set up as an exchange, the gulls might film the local milieu from their perspective, but only if the seniors set up the exchange (the Birdcams) with the food. Put simply, the Birdcam can only work its wonder if both actors put their effort in. Without attaching the food, it offers little in exchange for the gulls, and without the gulls the Birdcam is nothing more than a small and strange-looking device to the seniors. Its agency depends on joint effort.

2. The second experiment *Talk-in-to* deals with communication as translations between species. We know that (some) animals can understand us, and follow our demands. In the bird-human history this is typically recognizable through the parrot that learns to mimic human speech. Parrots are social creatures, so it may seem advantageous from a survival standpoint to learn the language of their new flock – the humans in their home. However, it might be more rare that we can orally communicate with other species, rather than straining demand upon them. In the Talk-in-to experiment, instead of letting the parrot mimic us, the sound conducted by humans become translated into non-human message through the 'BirdFlute'.

The BirdFlute uses similar technology as hunters for calling in pray, with obvious the difference that a conventional duck call is used for the purpose to lure in the bird and kill it. When blowing into the flute-like

instrument the outgoing sound mimics a sound from another species, like a crow.

By switching a knob on the instrument one can change the sound-scape from crow, to a magpie or blackbird. The sound created by the flute is then transmitted via a digital network to a small speaker placed outside the retirement home Grønnehaven. By pressing one of the three different keys down causes a change of animal call allowing the seniors to enact and intervene in unexplored spaces of interspecies communication.



Figure 6: The BirdFlute is designed to blend in with the Grønnehaven deco where it is placed in one of the shared spaces over-looking the outdoor speaker at Grønnehaven.

The sounds are a selection of different birdcalls that have been recorded and interpreted into different functional signals on a shared Internet community used by ornithologists. Since no 'bird call-experts' have been involved in the experiment, the translated digital sounds are far from stabile translations. Instead we have to rely on Grønnehaven's residents to consent to explore other ways of communicating, and perhaps to make beginners 'zoo-grammar' mistakes.

3. The final experiment *InterFed* explores power relationships. Through the device 'PhotoTwin' the experiment speculates on how to establish more equal interspecies relationships. Its closest resemblance might be that of a camera trap, often used to scout for game or for capturing wild animals on film when researchers are not present. Instead of being disguised and camouflaged to capture an animal in the midst of the forest, the PhotoTwin traps both animal and human everyday practices via photographs on attempted equal grounds.

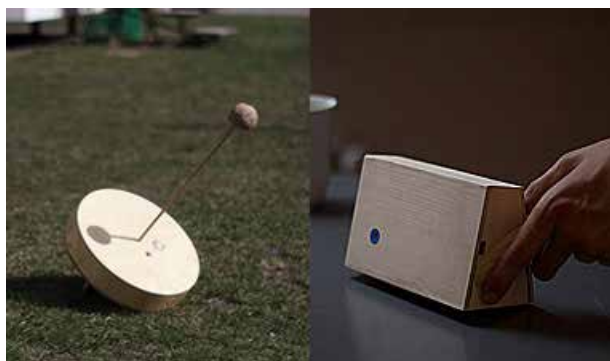


Figure 7: The PhotoTwins outdoor and indoor camera devices.

The PhotoTwin consists of two digital camera devices, one being located outdoors and one inside the retirement home. The outdoor camera device is triggered when birds are pecking on the replaceable shutter releaser made out of bird-food. Simultaneously, two different photos are taken, one photo of the birds' outdoor practices and one of the seniors' indoor practices. The two photos are then displayed side by side on a portable screen in the retirement home. The fact that it is the action of the bird - as true nature photographers - that triggers the shutter releaser is a way to intentionally give active agency that allow the birds to intervene and affect the 'great' indoors.

A FORAY: THE UNFOLDING OF THE EXPERIMENT

Before we further unfold what came into being during the first experiment we'd briefly like to mention that Talk-in-to and InterFed are deployed over a longer time at Grønnehaven, leaving the residents able to explore the instruments in a slower manner. Comparably, the workshop approach adopted for the first experiment, which we describe below, is very compressed in terms of time and dependent on both human and non-humans to show up.

We are in total 12 people that have gathered around the table, eight residences and two employees from Grønnehaven, the two authors and one participant from the local Volunteer centre. The participants have been invited to a workshop for making bird food for the vaguely describe 'bird-cams'. During the three hour-long workshop we make a selection of bird food with included ingredients such as raw fish, seeds and food-waste from the retirement home.



Figure 8: The different materials are kneaded together and shaped to fit the BirdCams.

While kneading together materials like fish, flour, coconut oil and bacon to tempt the carnivores and scavenging birds there is no direct questions of why we want to make bird food for the less favoured birds. However, the animals are discussed as "rather opportunistic" and ever present. One of the residents shares her memories, "- I never forget the summer when we were grilling, and a huge gull landed right on the grill, and stole a beefsteak." While one of the staff raises

her issues, “ - I cannot believe I am here making bird food. I cannot stand birds!” She continues and explains how she barely dares to venture outside the retirement home when there are too many birds gathered on the lawn. Still, some of the participants are keener on birds. “- I live on the ground floor, and I feed the birds every day.” To which someone quickly airs worries of other scavenging animals “- How about rats then?”

It is hardly a symbiotic relationship towards the species we are now trying to create a food feast for. During the session the slightly troublesome relationship with the birds seems to be overshadowed by the making of the bird food. Getting our hands greasy together and making the bird food takes up the most of the rest of the conversation. If we take a micro-material perspective by paying attention to the physical material they functioned as a communication device of inclusion both for the seniors and also later for the urban birds enrolled in the experiment.



Figure 9: The BirdCams have been placed outdoors during our first attempts to get a birds view perspective and are curiously followed by some of the participating seniors.

However, it is first towards the end of the day, when five bird-cams are released into the urban surroundings that we end up getting closer to our, not-quite companion species. Due to the stormy weather, the senior participants watch the spectacle of releasing the cameras from the safe indoors. There is a nervous anticipation in the room since we cannot rely on the birds to show up, or even less that they will actually pick up them up. The Birdcams are placed on the lawn outside the common area at Grønnehaven, where lots of terns are circling around. Since the Birdcams are too heavy for them, we are all instead awaiting the larger black backed gull that can carry the weight of them. After about 20 minutes the lawn has gathered as large selection of birds. During the wait, some of the participants of the event are spending their time guessing what birds that have arrived. “- What is the black one. It is not a seagull. Maybe it is a blackbird.” “- Yes, or maybe it is a crow, I see them here. Or a magpie?”

Among around fifteen terns, two of the anticipated black backed gulls finally show up. “- Look, look! Now they are here. Yes, it is one of the big sea gulls.” After a

short while one of the members of staff shouts out enthusiastically, “- It has picked up one of the birdcams!” leading to spontaneous applause in the room. “- Oh no, it dropped it. It lifted it over the pathway. Did you see that? - Oh, it is there again. It got it. Yeah!”

When the whole event ends, two out of the five bird-cams have been taken on a small flight. Outside, light has become dark, we gather our things and finish the workshop with the advice from some of the participants to make the BirdCams a little bit lighter in terms of weight for our next session.

REFLECTIONS & DISCUSSION

In some senses the experiment (A Birds View Perspective) failed with regards to the intension of getting a bird to fly off with the camera and film the local area. The film made by the birds only contains seconds depicting a blurry film of snow. However, we are not evaluating a prototype – but we are ‘assembled in a foray’. So allow us to linger for a moment upon the notion <of interspecies exchanges during the experiment: as we, the seniors, and the opportunistic animals where brought into contact through the event of the experiment, mutual surprises occurred. After the experiment the opportunistic birds where not perceived as quite the same animals as before, either by the seniors or us.

Even though we only got a blurry film to show - or what Bogost might refer to as a *carpentry result*: an outcome of the things that explain how things make their world - they have in the language of Bruno Latour become ‘things’. By becoming a thing, we mean a gathering, or a matter of debate (Latour 2008: 119). Things, as explained by Latour, are unfairly accused of being static and stable (ibid.). However, the gulls are showing us precisely this, they are as unstable as can be, doing things we cannot expect.

At the same time, the birds are as much part of the event as anyone else. We have to rely on them turning up, as we have to rely on the cheap cameras to work, as to the seniors to engage in making the bird food. Importantly, our attempt to speculate, referencing Uexküll, on the subjective notion of a gull’s *umwelt* pluralizes the perspective. It is neither a gull’s perspective, nor our perspective – it is another, a new perspective. And under these conditions, we all take risks, and through the experiment we allow others, of all shapes and sizes, to object to the stories we tell, to intervene in our processes as we intervene in theirs – in hope to learn what matters to humans and non- humans alike.

Related to a larger set of discussions, such as environmental issues and ecological changes, it is argued that we need to take account of ozone holes, coral reefs, garbage heaps, and all the rest (Bryant 2010, Latour 2004). This requires us to question not just arrangements between humans, but to open up to an entirely different universe – a multiverse - of actors. UA & Us is obviously a first small step, a micro

exploration, into the almost incomprehensibly large issue of how species can co-exist under the strain of increased ecological pressure. Urban spaces, as the areas of Helsingør surrounding Grønnehaven, constitutes a scale and level of multispecies complexity, that has enabled us to explore the potentiality of new relations.

At the level of disciplinary discourse, the experiments in UA & Us gives an example of how we can reframe the hegemonic centrality of the human in the midst, i.e. the overriding and pervasive anthropocentricity of design and design research. The design experiments are not designing *for* animals, but neither are they designed *for* the seniors. Instead, it is weaving things and practices around us together, to allow for a slippage in perspectives from a designing *for* to designing *as* a means to becoming *with* that is the central aim of this project. If it is 'about' anything it is about finding ways of engaging and enacting worlds, of making room for the *re-enchantment of reality* (Bennett 2001). Easy to say, of course, but so much harder to do, to enact, to make real.

The experiments are neither an attempt to denigrate humans or human collectives, in fact far from it. It is rather, an experimental setting for the exploration of a foray into an *anthro-de-centrifuging*¹¹ stance in design research, that places humans, animals, institutions, technologies, design artefacts, etc., on equal ontological footing. The underlying hypothesis here is this: The de-centering of human mastery opens a space, a potentiality, or in deleuzian terms, the possible *actualisation* of a multiplicity of perspectives (Deleuze 1987). By creating opportunities to experience new relations, in this case primarily between birds and humans, can allow us to cautiously sketch out different modes of being in a shared world. That is not only sketching relations between humans and non-humans, but rather the ecology between things and beings.

CONCLUSION

In this paper we have argued for a design experimentation premised on a decentring of the human perspective as an approach that seeks to place multiplicity of actors on equally capable of action. Our focus has been on animals – more specifically birds with which we share the urban context.

While birds - and other urban animals - already have partial relations with humans, we have argued that Donna Haraway's notion of companion species is too narrow or unspecific to accommodating the kind of interspecies relations we *might* share. To remedy this we have introduced the notion of not-quite companion species.

We began by giving an account of other contemporary design research projects, with a specific interest in animals as companion species. While they maintain

different objectives, we conclude that they also share a great deal in terms of their approach to explorations of relations between humans and animals. None of them, however, share the explicit interest in the de-centring of the human position, that we are interested in here.

Informed by our ongoing research project UA & Us, taking place in the city of Helsingør, we have provided a theoretical foundation for a methodological approach with the notion of 'foray'. Inspired by biologist Jacob von Uexküll's use of foray we have adapted the notion to combine elements from two otherwise different approaches, respectively co-design and speculation prototypes, to form speculative co-design. We have furthermore argued for the necessity of providing a provisional framework that combine co-design tools and speculation to accommodate the new challenges raised by insisting on the univocal focus on potential relations between disparate entities such as humans and birds.

Finally, the tentative conceptual renderings in this paper need to be further assessed, as the project progresses. It is important to stress that the paper is written from a quite early point in the development of the project, and thus merits the explorative qualities of testing a theoretical framework against the first accounts from the design experiments. As the project progress we will have to further investigate and clarify what actualised relations of not-quite companion species look like, and to what extent they might affect each other's life-worlds.

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‘DESIGNERLY’ ANALYSIS OF PARTICIPATION STRUCTURES

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ABSTRACT

With the inclusion of not only users but stakeholders of many different kinds, design processes turn into complex collaborative challenges. Thus, improving design practices requires research into how people participate and contribute in social interaction. But research methods for understanding such activities tend to be highly analytical and hence difficult for design researchers to engage with, if results are meant to be actionable. Through a series of experiments we develop tangible support for a ‘designerly’ interaction analysis of one important aspect of collaborative design activities: the *participatory structures*.

INTRODUCTION

Interaction analysis draws increasing attention as a powerful research method for understanding the social processes in design. With its origin in ethnomethodology and conversation analysis this method focuses on making sense ‘from within’, i.e. by relying on how members themselves categorise actions, rather than by imposing external theories on what can be observed. Jordan and Henderson in their seminal 1995 paper turned interaction analysis into a concrete, collaborative format centred on *Interaction Analysis Labs* as a way to bring multiple perspectives into the analysis while at the same time avoiding distortions given by possible preconceptions (Jordan & Henderson 1995). Besides arguing what makes video valuable for understanding interaction, they provide a set of foci that help researchers finding entry points for analysis. We will take one of these foci, *participation structures*, as a starting point for developing tangible support for the analysis of participatory design practices.

PARTICIPATION STRUCTURES IN DESIGN

Jordan and Henderson (1995) use the term *participation structures* to describe how participants interact with each other and how they co-create patterns of participation in a group as seen in the face-to-face communication (e.g. a group brainstorming in contrast to independent reflective work, or the exclusion of a person from an activity). In the physical actions it is visible how the social structures in a group are maintained, and how artifacts and space support or distract these structural frameworks. Participation structures are important to understand what happens in participatory meetings where groups design collaboratively by interacting with each other and with design objects. Participation structures describe the interrelations between facilitation strategies, participants, and artifacts.

In design, video analysis has been introduced successfully to learn about ‘users’ with a view to designing products that fit better, or to innovating new solutions with a focus on ‘user practices’. For this purpose, it has been argued that video can be regarded as a ‘design material’ with which designers collaboratively ‘build meaning’, rather than as ‘hard data’ that supports design decisions through appropriate analysis (Buur et al. 2000). A range of authors have since expanded this notion of ‘design material’ and proposed exciting practices for turning analysis into collaborative sense-making activities with tangible materials, games etc. (Brandt et al. 2008).

When focusing on research into the design activity itself, however, the goal is to establish understanding, rather than creating new products or technologies. Ultimately the goal may be to suggest improved collaborative design practices, but here is a legitimate place for ‘analysis’ that leads to description.

DESIGNERLY APPROACHES TO ANALYSIS

Conversation analysis looks at naturally occurring social situations and explains what happens by asking how people interact (Sacks, H., Schegloff, E. & Jefferson, G. 1974; Heritage, J. & Clayman, S. E. 2010). Conversation analysts prefer to work from detailed transcripts of what people say, and how they say it. Such transcripts do not sit well with design researchers for several reasons. For one, transcripts, while recording

well how people talk, are very difficult to expand to the broader interaction patterns so typical for collaborative design: the handling of objects, the pointing, gesturing, moving in space. For two, the analysis activity itself tends to turn into an abstract, cognitive effort when working from transcripts and video observation – with little room for physical manipulatory skills, handling of objects etc.

In this paper we present our experiments of bringing the ‘design material thinking’ into interaction analysis and providing supportive tangible techniques that help researchers set a focus for their analysis and employ their bodily skills to complete it. We aim to establish a ‘designerly’ practice of interaction analysis. By a ‘designerly’ approach we understand an alternative to both the analytical, objective means of natural science, and the subjective, imaginative ones of the human sciences (Cross 1982). ‘Designerly’ processes involve reflective investigation, hypotheses formulation, and a focus on the details of specific, contextualized situations rather than abstract, universal theories (Stolterman 2008). Designers utilise tools that do not rely on verbal formulation: sketches, models, and objects. They help bringing knowledge that is less language-based into play, and facilitating exploration of diverse perspectives and patterns of relationships. In relation to this, Cross (*ibid.*) refers to objects as supportive of human reasoning and cognition, both as containers of knowledge, tools for thinking and for communicating.

We suggest that a ‘designerly approach’ can be of help in approaching the analysis of design process video for two reasons. Firstly, an analysis supported by materials engages our bodily skills in reconstructing the situation under study and empathizing with the participants, thus bridging the gap between a highly embodied, physical activity such as collaborative design, and a verbal one such as interaction analysis. Secondly, transforming an exclusively analytical activity into a dialogue with the data (Schön 1983) provides a starting point for finding key elements and patterns of interaction for later, more detailed analysis. Again, objects play a role here providing a frame through which, coherently with Jordan and Henderson’s idea of ‘foci’ of interaction, we can find ‘entry points’ to approach our data. Expanding a predominantly verbal analysis with tools that help focus on the material, physical, and tacit interactions typical for collaborative design, could support our thinking and reasoning during the analysis.

OBJECTS AS RESOURCES

Lucy Suchman (1987, 2000) introduced the notion that the interaction with objects and their surroundings defines the activities of people. The influence of objects on people’s actions has been recognized as valuable in workshops in which tangible material is used and has an impact of the outcomes. Interaction analysts studied how objects are referred to during discussion and idea generation (Fasulo and Monzoni 2009), and documented how they act as drivers for creative processes and



Figure 1. Three researchers analyse video recordings from the Value Chain project using wooden figurines and role cards in an Interaction Analysis Lab session.

innovation (Neville 2011). In participatory design, it is a common objective to establish a shared workspace, in which all participants have an equal chance to participate and collaboratively find opportunities to explore: the use of material supports this issue by offering an accessible platform on which everyone can participate – even silently (Heinemann et al. 2011).

Physical things stimulate hand and body movements (Hornecker 2005), the thinking and communication process of participants and more generally the entire creativity flow of a group (Giaccardi & Candy 2009; Harrison & Minneman 1996). When talking about things collaboratively, participants tend to connect thoughts and develop complex concepts around them (Hindmarsh and Heath, 2000), support group dynamics and help to ‘coordinate’ innovative workshops (Luck 2007). Especially because objects can carry information (Ishii & Ullmer 1997) and people create this meaning collaboratively, objects can act as information sources for discussions. Such objects can be of different sizes and can have different features depending on the purpose of the activity. Tangible objects tend to ‘address human perceptual-motor skills’ (Djajadiningrat et al. 2004) and consequently trigger workshop participants to include them into their thoughts and discussions in different ways. The features of the objects influence how participants use and involve the objects (Atelier 2011). It seems as if objects “talk to us” (Hunt et al. 2011) in a way and engage us in the process. The objects we are talking about here can be seen as ‘things’, ‘materials’, ‘artifacts’, ‘tangibles’ (Heinemann et al. 2011), ‘material objects’ (Luck 2007), or ‘intermediary objects’, that carry information given by the participants and advance the process (Boujut and Blanco 2003). ‘Boundary objects’ (Star and Griesmer 1989) help participants from different backgrounds share knowledge and thus activate thoughts concerning different attitudes and perceptions towards an object. This provokes and promotes the innovation process (Luck 2007). Recently, an interesting perspective has been offered by Eriksen (2012). He demonstrated how ‘non-human’ materials can act and participate in ways similar to humans in co-design events. Objects do so not just by being present in processes of negotiation and



Figure 2. Project participants discuss future plans at the end of a design workshop in the Value Chain project. Left to right: R&D director, company employees 1 and 2, consultant, project manager, company employee 3, marketing director, technology consultant, assistant, user innovation expert 2 (user innovation expert 1 is behind camera).

meaning making, but also by acting as ‘mediators’ and encouraging actions of different kinds. Drawing on Latour, Eriksen further explores this idea of participating ‘mediating’ materials as ‘delegates’ fulfilling various roles. An interesting set is what she defines as the *Content Material* that, whether or not designed, can for example act as *delegated playmates* “participating in exploring, framing and reframing the topic/issues/problems in the specific situation.” (p. 213). To use physical material for video analysis has previously been explored in the ‘Video Card Game’ (Buur & Soendergaard, 2000) that employed cardboard cards as representations of video clips to allow participants to physically cluster groups of similar video clips on a table top.

RESEARCH APPROACH

This paper is based on experiments with tangible objects in interaction analysis lab sessions with design researchers. In particular we will report on a simple set of tools that help researchers focus on the *participation structures* when analysing collaborative design sessions. We have run about 10 lab sessions with these tools, each of those have been video taped for interaction analysis, Figure 1. So, a slightly incestuous method of interaction analysis of video recordings of researchers, who do interaction analysis of video recordings of real life design...

We focus our analysis both on how participants interact with the objects, and on what happens before and after interactions. The passive movements and positioning of the objects play also a major role in the analysis, how participants use them in conversation and what kind of emotions, gestures and other actions they release. All in all it is an emic approach that focuses on the participants’ “actions produced in interaction” (Luck, 2007) to find out how the objects are being used and treated in such situations. We have selected two instances of interaction analysis labs that help expand how these tangible tools work. The video data that the researchers analysed in the interaction analysis labs were recordings of design workshops in a project titled ‘User-Driven Innovation in Value Chains’ (in short the

Value Chain project). It was a 2-year project with the goal of strengthening innovation in an entire company value chain through the involvement of users. Value chain here understood as a string of companies that trade with each other to produce customer value. The partners were the Danish ventilation systems manufacturer Novenco (500 employees), several of its suppliers (of electronic controls, motors), and customers (building contractors). The responsibility of SPIRE colleagues in the project was to study and involve users, and to organize participatory workshops between the partners. Novenco’s main product is a ventilation unit that combines ventilator, filters, heat exchanger, and electronic control in one enclosure. Ventilation units are sold via building constructors to be installed in plants, schools, office buildings etc. The project was organised as a Participatory Innovation effort (Buur & Matthews 2008) with emphasis on participation of not just users but stakeholders in a broad sense and with a focus on the business side of innovation.

Our analysis ‘tools’ devised to help the researchers focus on the roles people take and how they participate when analysing video from the project workshops are very simple: We offer a non-descript wooden figurine for each person visible in the video segment, and a ‘role card’ that inspires the researchers to name and briefly describe the roles and participation patterns they observe. We ask the researchers to pick a person each and concentrate on what they are doing, while moving around the figurine to mirror how the person acts on the video screen, Figure 1.

DATA 1: WORKSHOP PLANNING

In the first instance, we analysed planning discussions across a range of design workshops. Planning often comes on the agenda towards the end of design workshops, when all the ‘exciting’ activities with user material, design scenarios, mock-ups etc. are over. Participants sit back, reflect on the outcome of the day and make arrangements for what to do next and when to meet again. In the Value Chain project, the segment we focus on here happened at the end of the third project workshop, organised in a large company meeting hall.

The participants – five company representatives, two consultants (of which one is the project manager), a technology consultant, an assistant, and two user innovation experts (from now on called ‘participants’) – have gone through a programme of watching user studies videos, working with ‘issue cards’, brainstorming opportunities, and discussing which of them to prioritize. Now the project manager takes the floor after the user innovation specialists and opens the discussion about what to do next, Figure 2.

INTERACTION ANALYSIS LAB 1

The group of six researchers in the Interaction Analysis Lab session – 2 years after the event – combine different disciplines: Interaction design, interaction analysis, management (from now called ‘researchers’ R1, R2 etc.). We have chosen two 15 min video segments, one from this project, one from another, and act as facilitators (F1, F2). The researchers split two group, who each work with one case, then switch videos. At the end the researchers present to one another what they have seen. The facilitators have placed wooden figurines on the table in front of each video screen in a configuration roughly similar to the way participants are seated in the video. When watching the video clip, the researchers are encouraged to fill in a ‘role card’ for each person they observe, describing their character and way of interacting with the group.

FACILITATING CAMERA

In the Value Chain video group, the researchers fill in the cards, then suddenly realize that there is one figurine too many. After a bit of discussion they realize this must be the cameraman. As they start focusing on this role, they observe that the camera plays a much more active role than at first noted. The person behind the camera is actively both attending the workshop and apparently directing some of the discussion. They replace the figurine with a larger one, probably because they identify with this particular role: The cameraman is also the facilitator, the design colleague, who does the kind of things ‘we’ do: studying users and organizing workshops in the project. Every now and then he asks questions to all participants and also turns the camera to the person who speaks or a person he challenges to answer or comment. Traditionally, camera recorders take a passive role and do not participate actively in discussions whereas this one even leads the conversation by turning the camera onto the next person to speak. It seems as if the camera has a role by itself and joins the conversation as it turns its ‘eye’ back and forth in the group like a participant and more specifically like a facilitator. This is what Blauhut & Buur (2009) called *‘The Engaging Camera’*. Like every other participant, the cameraman shows his attention by looking directly at the current speaker, but as this is also where he points the lens, everyone in the circle will know that his ‘attention’ means they are now recorded on video.



Figure 3. A researcher swaps a small figurine for a bigger one to indicate the special status of the cameraman/ facilitator.

As they discuss, one of the researchers grabs the ‘cameraman figurine’ and swaps it with a bigger one, indicating that this role is more dominant than others, Figure 3:

R1: “What about this big one?” (touching the only big object on the table)

R2 takes it and places it on the other end of the table;

R1: “The cameraman?”

R2: “Ya.”

The different sizes of objects on the table help the researchers to think about structural hierarchies.

Later, when the other researcher team comes to work with the same video sequence, they have problems identifying which figurine represents whom in the video. After some discussion of who is who, they ask the facilitators for help:

R1: “This represents this one, right? It’s a direct representation, right?”

F1: “Yes, it is a direct representation, but I am not sure if this is the camera? So, one, two...” (counting from the biggest figurine while pointing).

F2: “This is the camera position. (touching the biggest object) and this is him. (video-object connection)”

R1: “Okay. Yeah.”

R2: “Ya.”

The facilitators refer first to the biggest object to show its role in the video. The big figurine is easy to connect to the video as the previous researcher team placed it right in front of the screen to provide the same viewpoint as the video watcher. So, with the help of the simple figurines, the researchers have established the *facilitating camera* as on participation structure in collaborative workshops. The figurines become reference objects to present analysts’ points of view and to explain the dynamics observed in the video.

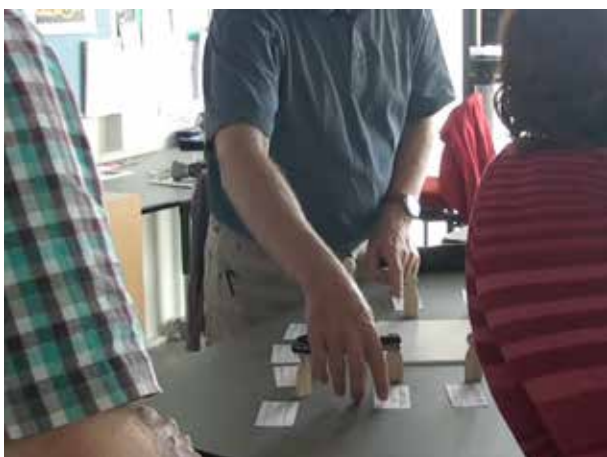


Figure 4. One researcher uses the figurines to point out a conflict between two company managers and the project manager.

CENTRIFUGAL PARTICIPATION

When the researchers present their observations to each other, one researcher uses the figurines to clarify the roles of the characters in the video, and to summarize their position. In the example shown in Figure 4, he points at two of the figurines (A and B), noting how how their personal positions are aligned, but in conflict with that of the project manager (figurine C). In this Value Chain workshop, the project manager (C) seems keen on inviting both users and more company partners to the next event, but both the R&D director and the marketing director of Novenco are concerned that the project doesn't have enough results to ensure they will be able to motivate their business partners to come. Researcher 1 directly re-enacts the dynamics, using the figurines as actors:

R1: "They (figurine A and B) want to involve people from workshops, and he is into planning (points to figurine C, the 'planner') so 'how much time' and 'how would they come'..."



Figure 5. A researcher points both at a figurine and at the video to draw attention to a particular pattern of interaction.



Figure 6. A researcher moves figurines to present a hypothesis and opportunity for further research.

Pointing at figurine A, R1 then enacts the quote from the related character:

R1: 'yes, but there is a conflict!'

Pointing back at the 'planner' figurine, R1 answers:

R1: "'no no, we just need to plan!'"

Following this, all researchers focus their attention on the interaction between the characters represented by figurines A, B and C. They constitute a focus point for the conversation, in which the researchers continue comparing their observations of the three characters' interactions. Even when reviewing the video, the researchers continue to use the figurines as reference points, while pointing also to the screen to explicate the interactions in which the characters are involved, Figure 5. For example, R4 explains an episode while pointing both at figurine C and at the screen:

R4: "He says something at that moment, and the mediating camera (points at the corresponding figurine) goes into a discussion with him..."

The researchers come to talk about the participation structure in this group as *centrifugal*, as opposed to a *gravitational*. In the video one can observe how workshop participants gradually disengage from the conflictual discussion. This is visible not only in the direct interactions, but also in body postures and spatial positions. While the conversation (troubled by the difficulty of two poles negotiating consensus) goes on, less active participants physically move further away from the table. One of the researchers calls this the '*I'm not here expression*'.

TRIANGULAR PARTICIPATION

Towards the end of the interaction analysis lab session, one of the researchers uses the figurines to suggest a possible future line of research. In this case, figurines are not just pointed at, but are directly manipulated to formulate hypotheses. R2 is interested in the apparent formation of 'triangles' of conversation that are established during the discussions in the video. She rearranges the figurines to show her idea, Figure 6. She first gathers a set of three figurines in a corner.

R2: "Yes, and if you had a triangle here, right... so everyone else would be..." (moves the other figurines away from the corner with the triangle, gathers them on the opposite side)

R2: "Why is it this triangle? Why is it this triangle?" (points at another cluster of figurines), and it could be something stupid as 'who says something first' and who then..." (moves the figurines closer to another).

R2: "It could be interesting."

The figurines provide a space that can be filled with imaginary lines. R1 picks up the idea of hypothetical triangles:

R1: "In a sense is as if we have it [a triangle] here between the consultant and this guy, and this one here (points at the figurines when naming the characters). And the others there are, sort of around" (draws invisible lines connecting various figurines)

The physical objects help to imagine and create structures they observed earlier –*triangular participation structures*. The tangible material visualises these shapes and integrates them in the discussion, Figure 7.

DATA 2: BUSINESS MODELING

In the second instance, we analysed the use of tangible design materials for initiating business model discussions. The video recording stems from a workshop held a year later in the Value Chain project. At this point the project participants are concerned with what business potential an increased user focus and collaboration across the value chain might yield. The circle of participants has now widened to also include representatives of Novenco's customers (building contractors) and suppliers (electronic controller

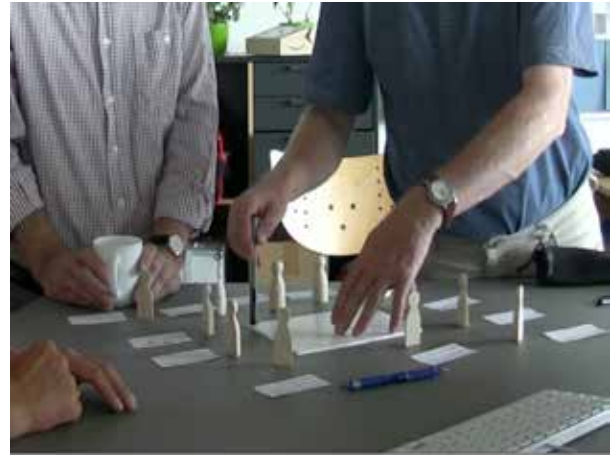


Figure 7. A researcher draws invisible lines between figurines to show power relations.

manufacturer). The activity we analyse here included five participants building a 'tangible business model' for how they could utilize the coordinated force of the companies in the value chain. For this they were given a box with a wooden toy train set, Figure 8. The building took 14 min. plus additional 6 min. for presentation of the result to the rest of the workshop participants. The members of this team are the marketing director of Novenco, the project manager, two business consultants, and a process consultant. SPIRE members acted facilitator and observers.

INTERACTION ANALYSIS LAB 2

This video has entered several interaction analysis labs, where researchers themselves have tried to recreate the train structure while discussing roles and filling in role cards, Figure 9. When analyzing the video material we observe that the participants pick quite distinct patterns in the building process. They use their hands and utilize



Figure 8. Through building a model train five workshop participants discuss a new business model for selling ventilation units through a coordinated value chain. Left to right: Business consultant 1, project manager, marketing director, business consultant 2, and process consultant.



Figure 9. Researchers analyze the video recording using role cards and the original train set materials.

material in different ways; and first and foremost they add meaning and make sense of elements in various ways (Heinemann et. al 2011). We will try to describe the activity through characterizing the specific roles they take when building the business model.

The *Builder* is the first one to start building. She assembles pieces into sub-assemblies like the “standard solution segment” with a “decision-making junction”.. She readily cooperates with others and shares material, but she also builds quietly by herself without explaining what she is building. In real life she is a process consultant engaged in this project to report on collaboration between the companies. In an activity just prior to this she – along with the Organizer next to her – acted the role of supplier in a value chain.

The *Organizer* groups material into well-sorted piles on the table. He listens attentively to the plans others suggest while helping out with his pieces from his storage. He also steals pieces if they fit into his collection. In real life he is a business consultant.

The *Director* plans for everyone and ‘owns’ a lot of material. She draws others into the building process and is herself actively constructing what at the end of the activity will be called the ‘requirement specification loop’. She is the marketing director of Novenco and obviously used to directing people.

The *Space Keeper* is more or less inactive, tries to overcome different physical barriers and keeps things inside his space. He also creates new barriers, attracts and collects other material. He is an industry consultant recently employed with the project manager’s organization.

The *Box Owner* hands out material from the box and seems in control of distributing who gets which parts to work with. He is the only one standing (with both hands on the box) and starts many discussions on how to make sense of the construction. He is the consultant in charge as project manager.

SILENT PARTICIPATION

Depending on their personalities participants interact differently with the tangibles. Some construct silently whereas others talk more than they build. One can

observe different roles in the use of material. Participants for example look at stuff, construct individually with concentration, while others point and discuss, Figure 10. As the tracks lend themselves to being connectd, the material seems to keep the hands busy throughout the workshop. Some participants ‘defend’ the space around them and sort objects while thinking. Aside from that there are participants who apparently dislike touching the material and show that demonstratively through their body language. Participants mostly pick discussing themes that relate to the objects they are handling. The option of not attending discussions verbally shifts the importance of the conversation towards the material (Hornecker, 2005), in the way that also shy participants can contribute to the results achieved in the end. The Builder in particular touches, plays and interacts with objects even when not talking about them and in that way contributes to the group process silently. We have come to see this participation structure as *silent participation*.

CONCLUSIONS

In collaborative design objects have been recognized as playing important roles in human activities, and not just as inert material. The figurines in our Interaction Analysis Labs facilitate an exploratory, but focused study of videos and provides access to the data for deeper analysis. The figurines encourage researchers to concentrate on one character a time, whilst also considering all participants: they start with the relevant figurines, and continue locating the remaining characters even if not directly engaged in the conversation. As demonstrated in the case of the *facilitating camera*, the figurines’ physical characteristics such as size make the researchers think about differences between the people represented, the interactions with the other characters, and the hierarchical differences underlying these interactions. It is interesting to note how finding a place for the ‘big figurine’ helped highlighting the camera as an object that, through participating, has an influence in framing discussion by supporting the person behind the camera itself. The figurines’ spatial configurations play a role too: managing and organizing the figurines in



Figure 10. One participant contributes by building silently.

accordance with the video helps the researchers understand the relations between participants, but also what is important when attending such sessions and how to facilitate them. “It visualizes the energy of meetings and makes them comparable” said a researchers when reflecting on an analysis session: “It makes one co-create a language to describe interactions and group dynamics.”

While naming figurines might be seen as a gross simplification, the challenge to define which role a particular actor plays in a situation can become a tool for encouraging debate and exchange of opinions in the Interaction Analysis Lab. This resonates with the idea of ‘designerly’: the application of a ‘code’, or a meta-structure that acts as a temporary theory to understand the relations between elements, individuate possible patterns of interactions and evaluate and discuss them with other researchers. Naming the figurines helps the researchers to focus on key events, while providing a quick overview of the actions in the video and specifically of the roles people take. Once the researchers have organised and named the figurines these serve as a way to explore different hypotheses through moving and manipulating the material, and help to easily convey findings to other researchers. In this way the material challenges the singular attention to verbal interaction in conversation analysis to include other forms of interactions more relevant to design research.

When comparing our Interaction Analysis Labs with figurines to the Video Card Game (Buur & Søndergaard 2000) we can see that the two methods serve different purposes: While the Video Card Game offers a mechanism for grouping rather large numbers of (short) video clips, creating grounded structures for further analysis, the figurines in the Interaction Analysis Labs challenge researchers to investigate a particular foci in their analysis of one (longer) video sequence. The two methods are not mutually exclusive.

In the analysis of the Business Modeling data, reconstructing the movements of the train track pieces around the table and their use while building helped reveal how the same objects triggered very different participation structures with the actors. In this example, a ‘tangible’ approach to analysis helped the researchers uncover patterns and behaviours that would have been impossible to record on transcripts and difficult to analyse with language and verbal descriptions only. Moving objects on the table engages bodily skills, and allows the analysts to understand the challenges relating to reachability of objects, ownership of material, or the material ‘backtalk’ when pieces do not come to fit in the desired configurations.

As we have hopefully demonstrated, the integration of material, objects, figurines, and tools in the analysis process can help make explicit the limitations and opportunities given by spatial configurations, role of artefacts in interaction and in particular the participation

structures as foci of analysis. At the same time, they provide an ‘entry point’, to the analysis of very complex and multi-layered material such as recordings of interactions among people and between people and objects. Focusing on particular characters or configurations provides the possibility to investigate several perspectives through the manipulative character of the material itself. In both these cases, a ‘designerly’ analysis helped uncover several participation structures: The ‘*facilitating camera*’, the ‘*centrifugal*’ vs. ‘*gravitational participation*’, the ‘*triangular participation*’, and the ‘*silent participation*’. They might prove to have important influences on understanding collaborative design activities. One issue to reflect on further, is that the figurines only help set the analysis foci on what the (human) participants do and say, and much less on participation structures of the (non-human) materials in the situations analysed. Here is a point for development of the method.

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The Role of Fiction in Experiments within Design, Art & Architecture

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ABSTRACT

This paper offers a typology for understanding design fiction as a new approach in design research. The typology allows design researchers to explain design fictions according to 5 criteria: (1) “What if scenarios” as the basic construal principle of design fiction; (2) the manifestation of critique; (3) design aims; (4) materializations and forms; and (5) the aesthetic of design fictions. The typology is premised on the idea that fiction may integrate with reality in many different ways in design experiments. The explanatory power of the typology is exemplified through the analyses of 6 case projects.

INTRODUCTION

Within the last couple of years there has been an increased interest in Design Fiction as a new practice or approach within design research (Bleecker, 2009; DiSalvo, 2012; Grand and Wiedmer, 2010). Ever since the advent of modern design, designers have used fiction as a technique for experimenting with alternative models for society or for criticising existing ones. The imaginary urban projects of the Futurists proposed a city where machines enabled radically new forms of architecture and infrastructure, and in the 1920s Norman Bel Geddes envisioned what at that time must have looked like an utopian idea: gargantuan airliners transporting people across the Atlantic. The ability to use design fictions for speculating about alternative presences or possible futures is at the core of design practice. What is new is that it is now claimed also to be a viable road for producing valid

knowledge in design research (Grand & Wiedmer, 2010).

In this paper, we argue that in order to establish design fiction as a promising new approach to design research, there is a need to develop a more detailed understanding of the role of fiction in design experiments. Some attempts have already been made. DiSalvo (2012) thus accounts for two forms of design fiction in terms of what he calls ‘spectacle’ and ‘trope’. While DiSalvo makes a valuable contribution, his treatment is too limited for understanding other forms of design fiction. Grand & Wiedmer (2010) propose a method toolbox for practicing design fiction in design research, but in fact they say very little about the particularities of this approach. Only that it may take the form of ‘criticising existing technologies’ as in critical design, ‘asking unanswerable questions’ or ‘reinterpreting the past’ by transforming what is into what could be.

We offer a typology, which allows us to explain design fictions according to 5 criteria. The typology is premised on the idea that fiction may integrate with reality in many different ways in design experiments. Since design fictions can take many forms and variations, it is simply impossible to cover them all in the stroke of one paper. Our typology is built up from 6 case projects, all of which use fiction in design experiments offering alternative models for designing the urban environment. This typology should be thought of as an initial first step towards building a more exhaustive framework.

We start out by defining design fiction and discussing the role of fiction in relation to experiments in design research. Next, we account for how design fiction is manifested in the 6 case projects. On the basis of our case analyses we present a table offering an overview. Finally, we critically discuss our typology in relation to related work.

DEFINING 'DESIGN FICTION'

It is the sci-fi author Bruce Sterling who originally coined the term Design Fiction. In *Shaping Things* Sterling (2005) makes the observation that designers share many interests with science fiction writers, most importantly a deep engagement with imaginary objects and speculations about the future to come. But there is a core distinction as well between design and science fiction: "Science fiction wants to invoke the grandeur and credibility of science for its own hand-waving hocus-pocus", while design fictions are typically more practical, more hands-on. More precisely, Sterling defines design fiction as "*the deliberate use of diegetic prototypes to suspend disbelief about change...It means you're thinking very seriously about potential objects and services and trying to get people to concentrate on those - rather than entire worlds or political trends or geopolitical strategies. It's not a kind of fiction. It's a kind of design. It tells worlds rather than stories* (Sterling, 2009).

Examples of such diegetic objects would be Auger & Loizeau's proposal for a battery laden with energy made up from acid left in the stomach of deceased family members from their last supper, which relatives are given instead of a urn. Or Eduardo Kac's gene manipulated rabbit Alba that glows up in a green fluorescent colour, because it has been cloned with the GFP gene from deep-sea jellyfish. In the first instance, design fiction speculates on energy being a hollow force and suggests changes to our culturally entrenched rituals. In the second, design fiction is used to question the limits and consequences of gene modification and biotechnology.

Common for all design fictions is that they can usually be described according to a basic rule of fiction, an imaginary, sometimes even impossible "what if"-scenario. These scenarios are fictitious worlds that give utopian or dystopian images of a possible future that we as humans could end up in – or be challenged by. Try to think of sci-fi films and the "What if"-scenarios", they play out: What if we were able to predict crime before they are committed? (*Minority Report*, 2002) What if we can travel into an alternate presence by downloading human consciousness into a computer? (*Avatar*, 2009) What if everything in our world is information? (*Matrix*, 1999) What if women lose the ability to give birth? (*Children of Men*, 2006) What if next generation robots took command on planet Earth (*The Terminator*, 1984) What if robots will look exactly like humans – so much that we can fall in love with them? (*Blade Runner*, 1982) What if the Earth will get too polluted to live on – and we will have to build new cities elsewhere in the universe? (*WALL-E*, 2008).

Design fiction raises the question of how what-if scenarios set up conditions for experimenting with and prototyping of possible futures in design practice as well as in design research. To answer that question it seems fruitful to inquire into the relation between fiction and experiments. How to prototype the future through experimentation?

PROTOTYPING THE FUTURE THROUGH EXPERIMENTS

Experimentation is an essential human skill useful for understanding our images of reality and the validity of scientific theories about the constitution of the world. Experiments played a crucial role in Galileo's rejection of Aristotle's law of gravity. Also the works by for example Newton, Einstein or Leonardo da Vinci were based on experimental approaches. Experiments are central for many sciences, yet, we know very little about the role of fiction in these experiments. Fiction is not restricted to some whimsical ideas of the authors mind. A "wormhole", which is a concept in Einstein's theory of relativity (the correct scientific label is the 'Einstein-Rosen Bridge'), is as fictitious as the notion of "cyberspace" in William Gibson's novel *Neuromancer*.

However, the purpose of using fiction in experiment in natural science is different from design, art and architecture. Here experiments are carried out with the goal of verifying, falsifying, or establishing the validity of a hypothesis (Koskinen et al., 2011; Steffen, 2012). The experiment can thus be seen as a method of testing - with the goal of explaining – a scientific view of how the world *is*.

In design, art and architecture the experiments take on a different role. In these practices the experiment is used primarily to construct images of future realities or opportunities in contrast to present realities. In design practice experimentation can serve a range of functions, for instance (i) trying out ideas about how to shape the future into a preferred state (Simon, 1969); (ii) criticising how capitalist interests, technology or design ideology constrain our everyday life (Dunne and Raby, 2001; Dunne, 1999); (iii) as a central tactic in urban interventions for promoting social change (Markussen, 2013). In design research and artistically inclined research practices, experiments typically serve an additional purpose, namely that of shedding light on specific research questions (Brandt and Binder, 2007; Niedderer and Roworth-Stokes, 2007). For instance, in Auger & Loizeau's *Audio Tooth Implant* experiments were used to explore a post-humanist future where the human body has been augmented through technology. But they were also addressing a design research question: What are the ultimate consequences of shrinking mobile technologies?

It is through the experiment that designers, architects and artists can explore critical questions, or address particular phenomena or aspects of our lives, investigate problems or remove problems. Sometimes these experiments lead to a better world, a higher quality of life. Sometimes they seem to do the opposite: create new problems. This paper will not evaluate this aspect of the experiment. Our aim is instead to increase knowledge of how fiction can be used as part of experimenting in design research. We believe that the best way of gaining this knowledge is to start by analysing how fiction is at stake in 6 selected case projects. By 'fiction' we do not understand that which is non-real. Rather we find it

seems more meaningful to operate with a continuum of fictionality, which design fictions can embed either conceptually or materially. At one end of the scale we would have the purely speculative realm of design proposals that never sees the living daylight. At the other end, design fictions materialized to various degrees in the form of working prototypes, para-functional objects, or even entire cities. Rather than characterizing fiction in terms of existence, we find it more meaningful to understand fiction according to two opposite aims of constructing them: utopia and dystopia.

UTOPIAN AND DYSTOPIAN EXPERIMENTS IN ARCHITECTURE, ART AND DESIGN

Utopias have existed since the beginning of humanity. The first writing known is Plato's book *The Republic* dating back to 380 B.C., and much later Thomas Moore's *Utopia* from 1516. The questions spurring the construction of *utopias* are timeless: How to make the world better? How can we be living differently, with different economics system, scientific progress, human evolution, different political aspect – and perhaps new values?

An utopia can be defined as an ideal community or an imaginary society or place that contains highly desirable or perfect qualities. Qualities that make us feel good and happy. An utopia is therefore often a highly pleasant place, a positive place, a place that makes us feel comfortable. Utopia is also the place of freedom – a place we can fully enjoy, have fun in and relax in. A dystopia is, like utopia, an imaginary society or place – set in a speculative future, characterized by elements that are opposite to those associated with utopia. Dystopias contain qualities that make us feel uncomfortable or bad; that gives us the feeling “that we shouldn't be there”. A dystopia is a place in which people live dehumanized or fearful lives, in which everything seems unpleasant or uncanny (as we know it from many science fiction films). Dystopias contain – directly or indirectly – a critique of our society – as it is today.

The boundary between utopia and dystopia is not clear-cut, as the reader will experience through our pool of examples, many projects includes both utopian and dystopian qualities. That is, they involve utopian qualities – but are at the same time critical. The question is: critical in relation to what? What types of fiction do they represent?

Design Fiction whether in the form of utopian or dystopian experiments deals with the imagination and materialization of possible futures. But what is the role of fiction in these possible futures? We are aiming at developing a more detailed understanding of the role of fiction in design experiments by using the following 5 criteria: (1) “What if”-scenarios as the basic construal principle of design fiction; (2) the manifestation of critique; (3) design aims; (4) materializations and forms; and (5) the aesthetic of design fictions. Below

we will briefly present a series of Design fiction projects – and then from these projects draw a typology based on the above-mentioned criteria's. This typology is by no means exhaustive. It will be elaborated on in future articles

Examples of utopian projects are the capital of Brazil *Brasilia* designed in an attempt to make a perfect, functionalist city (1960); No-Stop City by Archizoom, which manifests a designerly critique of the standardisation implicit in functionalist architecture and modernist urban planning; the free-town of *Christiania* in Copenhagen designed by ordinary people in an attempt to build a “free” city based on do-it-yourself mentality (1971); the artistic, anarchistic state “AVL-Ville” in the port of Rotterdam, designed by artist and designer Joep van Lieshout (2001); the highly experimental buildings by Michael Reynolds, build from recycled materials, operating off the formal electricity grid, requiring little money to build; and the “Protofarm 2050: The Guide to Free Farming” (2009) by 5.5 Designer, which is about how to survive in Paris in year 2050.

CASE 1: BRASILIA (THE PERFECT CITY)

The inauguration of Brasilia – the capital of Brazil - took place on the 22nd of April 1960. Five years before this central area of Brazil was nothing more than a desert. The city plan was developed Oscar Niemeyer as the main architect, Lúcio Costa as the urban planner and Roberto Burle Marx as the landscape designer. This giant project was decided upon by former president of Brazil, Juscelino Kubitschek, who became President in 1956. He invited the best Brazilian architects to present their projects for this new capital, which (like Dubai) rose from the desert in fast tempo. When seen from above, Brasilia resembles an airplane or a butterfly with a combination of straight and rounded shapes. The city is divided into areas where people live, with sporting and leisure area's – as well as strokes of commercial areas; a highly organized, functionalist city with no likeness to the surrounding regions, which is characterized by poverty, disorganization and unstructured urban areas. Brasilia manifests the design rationale inherited from Le Corbusier and perhaps stated most explicitly in the *Athen Charter*. According to this rational the city should be divided into work-zones, living-zones and leisure-zones, combined with highways, public buildings and commercial areas. Everything is planned – nothing is left to coincidence. It demonstrates at that time a complete new architectural form, and calls into question the medieval city.



Figure 1: Brasília, Brazil

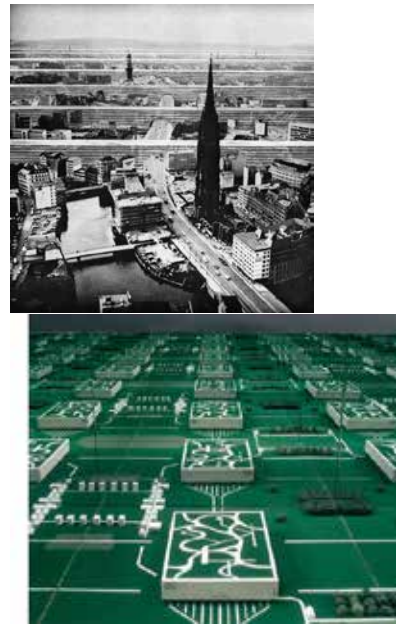


Figure 2: Archizoom, No-stop city

CASE 2: ARCHIZOOM (THE CRITICAL EXPERIMENT)

The Italian design studio Archizoom Association was founded in 1966 by the four architects Branzi, Corretti, Deganello, Morozzi, and two designers: Bartolini and Bartolini. The team produced a rich series of projects in design, architecture and large-scale urban visions.

The project "No-Stop City" (1969) is a vision of a quality-less city, in which the individual can achieve his own housing conditions. It is a model of global urbanization, which is organized the same way as a factory or a supermarket. It presents an iterative pattern with multiple centres and neutral, even and unbroken lines. "No-Stop City" offers itself as a kind of car park filled out with inhabitable furniture whose use can be adapted to the circumstances.

"No-Stop City" criticizes the perfect, ideal, modern city build from economic interest and consumerism only. It asks: What if our cities (and our lives) were organised as if we live in a supermarket or in a car park? What kind of view on human nature does such a city represent? What will we become when living in such places? "No-Stop City" is a post-modern and highly fictional vision that contains a direct critique of the inherent design rationale of modernism (cities such as Brasília and Chandigarh). "No-Stop City" only exists as a model.

CASE 3: CHRISTINIA (THE SOCIAL EXPERIMENT)

In 1971 a group of young people broke down the fences of an old military terrain in Copenhagen. At first just to squat a playground for their children and not as such an organised act, but more like a protest against the lack of affordable housing and playgrounds in Copenhagen. A month later the free city called *Christiania* was born; an self-proclaimed autonomous area of Copenhagen, which with the years contained café's, self-made houses in all kinds of shapes, bakeries, kindergartens, different kinds of shops, yoga-center, theater – and a free trade of cannabis. The city of Copenhagen looks at Christiania as a large commune, and it is regulated by the so-called Christiania Law of 1989. But - since it's beginning, the discussion on the legal status of the community has been on-going.

In it's starting point the young people of Christiania had a dream; they wanted to create a free city with space for everybody. Where you can build your own house, open a workshop if you like, and live in a commune with shared responsibility. They were ready to commit themselves to this utopian project that was not planned (in its beginning), but rose from a local involvement, from the urge for a more progressive and liberated life-style - and affordable housing. Today, around 850 people live in Christiania.



Figure 3: Christiania, Copenhagen

CASE 4: JOEP VAN LIESHOUT (THE ANARCHISTIC EXPERIMENT)

In 2001 the artist Joep van Lieshout (operating under the name Atelier Van Lieshout) realised AVL-Ville – a 'micro state' in the port of Rotterdam with its own constitution, currency and flag. The village contained several workshops, production areas as well as areas where people could live, sleep and eat.

By developing an alternative resource power plant, septic tank and water purification system AVL-Ville was independent from the public energy-grid. The workshops were both functional and fictional, such as the workshop *Alcohol & Medicine* or for the workshop for *Weapons & Bombs*. The last one contained a metal workshop and chemical laboratory where weapons and bombs could be made from simple household chemicals. These weapons and bombs could be used for defence as well as attacks. AVL-Ville was closed down by the Dutch Government after just one year, but Joep van Lieshout transferred his interests in investigating new possibility of urban living into other projects.

AVL-Ville was challenging – through art - the idea that it is the state that control the laws that we live by – and which we organize our daily lives according to. It was an inhabitable experiment, not just to look at, but also to be lived in and lived by. As an experiment it provoked reactions from the Dutch politicians to consider the laws, they themselves have produced; laws about weapon, alcohol, drugs, energy or money.



Figure 4: AVL-Ville, Rotterdam

CASE 5: THE GARBAGE WARRIOR (EXPERIMENTS WITH SUSTAINIBILITY)

Michael E. Reynolds, who was portrayed as *The Garbage Warrior* in a documentary from 2007, is an American architect based in New Mexico and a proponent of "radically sustainable living". The past 40 years he has been developing self-sufficient houses and experimental living concepts that require little or no mortgage payment and no utility bills.

Reynolds, builds material from recycled material, he creates houses that can operate off the formal electricity grid and that requires little money to build. He has a social mission: no one on the planet of earth should be without a home. He wants to empower people who have nothing to build their own house. Reynolds's living concepts represents the idea that even in a polluted world and in poor regions of our world there is room for everybody – and that by helping each other, and by using local materials people can overcome poverty and create a home. He calls his practice *Earthships*. Earthships are type of houses made of natural and recycled materials.

Though many of Reynolds's living concepts have been carried out the last 40 years – the State Architects Board of New Mexico took away Reynolds's credentials in 1990 (saying his constructions were illegal and unsafe). However, his license was reinstated in 2007. He resumed building Earthships around the world – homes that take advances of local resources and which require no mortgage and no bills.



Figure 5: Reynolds, inhabitable prototypes called “Earthships”

CASE 6: PROTOFARM 2050: THE GUIDE TO FREE FARMING (EXPERIMENTING WITH ECO-STRUCTURE)

The project “Protofarm 2050: The Guide to Free Farming” (2009) by 5.5 Designer, is about how to survive in Paris in year 2050.

It is definitely not Paris, as we know it. In Paris in year 2050 the shortage of food is the overall problem; the citizens must hunt their own food (birds, rats, insects), they must take advances of the plants and weed that the city can offer – and they must cook and prepare their food under new (extreme) conditions. The project has the form as a handbook full of techniques for hunting, catching and cooking, set in the unfamiliar urban environment of Paris in year 2050.

Protofarm 2050 generates pre-emptive solutions to a predicted problem of the future: the problem of food shortage. It is critical by suggesting: What if in the future our society will suffer from complete shortage of food and therefore we will have to return to an old social-economical structure: that of a hunter and gather society? It is engaging – in an ironic kind of way - with issues of food security and resourceful environmentalism.

“Protofarm 2050: The Guide to Free Farming” was commissioned by ICSID for the World Design Congress in Singapore 2009.



Figure 6: Protofarm 2050: The Guide to Free Farming

On the basis of these case analyses, we propose the following typology represented in Table 1:

1. Basic Rule of Fiction (What if-scenario?)	<ul style="list-style-type: none"> - What if we turn a desert into a hyper-modern, functionalistic city, divided into work & living zones? - What if our cities (and our lives) were to be organized as if we live in a supermarket - what do we become? - What if we create a freetown where everybody can feel free to work, build their own house and live as they wish? - What if we can build houses that enables us to become independent from the energy-grid? - What if we can build homes that makes use of local resources and require no mortgage and no bills? - What if we in the future will have to return to older social-eco systems or old technologies, in order to survive?
2. The manifestation of critique (How is it critical?)	<ul style="list-style-type: none"> - By propagating Modernism as the universal answer to urban planning, ignoring existing local structures. - By giving an internal critique of the dominating architecture, art and design practice. - By demonstrating experimental forms of living based on social involvement and shared responsibility. - By challenging the idea that it is the state that sets the laws that we live by. - By proposing radically sustainable living based on recycling. - By visualizing the consequences of shortages of food, energy, pollution or other direct threats. - By predicting the impossible.
3. Design aims (What are the possible consequences?)	<ul style="list-style-type: none"> - To demonstrate a complete new design or architectural form. - To encourage do-it-yourself mentality. - To provoke reactions from those in power through art, design or architecture. - To make us independent from the energy-grid. - To make us independent from money & consumer-grid. - To take advances of local resources. - To recycle old technologies & prototype new technologies. - To throw us into a particular time pocket. - To make us believe in the impossible.
4. Materialization & form (How is it visualized?)	<ul style="list-style-type: none"> - As a model or prototype. - As a advanced, inhabitable or usable prototype. - As an entire city or a prototype to be lived in.
5. Aesthetic of Design Fiction	<ul style="list-style-type: none"> - Modernism (functionalism, streamline). - Post-modernism (irony, pop, kitch). - Grassroot-movement (folk-culture, do-it-yourself). - Disruptive aesthetic (activism, anarchism, critical design). - Sustainability (re-cycling, resourceful environmentalism). - Science Fiction (thinking the impossible).

Table 1: Typology of Design Fiction

Table 1 offers a typology of design fiction, according to 5 criterias. The table informs us how fiction might integrate with reality in different ways: (1) “What if scenarios” as the basic construal principle of design fiction; (2) the manifestation of critique; (3) design aims; (4) materializations and forms; and (5) the aesthetic of design fictions. All six cases fulfil the 5 criteria by suggesting one or more examples from the Typology of Design Fiction.

For instance, *Protofarm2050* (case 6) has as its Basic Rule of Fiction: “What if in the future our society will have to return to an old social-economical structure in order to survive”? It is critical by visualizing the consequences of shortages of food. The project wishes to exploit local resources – and place us in a particular time pocket (that of a hunter-gatherer society). *Protofarm2050* is materialized as a prototype (handbook of instructions) using an aesthetic that can be referred to as “post-modernism”, since it uses irony and parody as its main strategy.

In the project *Brasilia* (case 1) fiction integrates with reality in a completely different way: *Brasilia* has as its basic rule: What if we turn a desert into a hyper-modern, functionalistic city, divided into work and living zones? It is critical by ignoring the existing local structures (of architecture in Brazil at that time) by molding new modern mega structures into the landscape. It propagates Modernism as the universal answer to urban planning. As a design aim, it wants to demonstrate a rigid totalitarian design program, materialized as an entire city, using an aesthetic that can be referred to as high ‘modernism’.

By using our typology the role of fiction becomes more particular and it is possible to distinguish and compare one design fiction-project from another.

It is interesting, for instance, to see that both *Garbage Warrior* (case 5) and *AVL-ville* (case 4) share the same design aim in wanting us to be independent from the energy-grid – but uses different aesthetic means (Sustainability versus Disruptive Aesthetics). In the same line of thoughts *Garbage Warrior* (case 5) share the same aesthetic means as the project *Christiania* (case 3), namely Sustainability (re-cycling, resourceful environmentalism) as well as Grassroot-movement (folk-culture, do-it-your-self), but again these two projects has different design aims (*Christiania* does not wish to be independent from the energy-grid).

DISCUSSION

Our typology is not in any way meant to be exhaustive, as the elaboration of its five basic criteria depends on only 6 case analyses, which are even limited to projects and interventions oriented towards urban space. However, what it suffers from in terms of comprehension, it gains from the level of detail acquired in understanding the particularities of design fictions as an approach. This is an improvement compared to existing research literature.

In their proposal for a method toolbox, Grand & Wiedmer (2010) randomly detects some characteristics

of approaches, which engage in design fiction. One is critical design where design fiction is often used to encourage critical reflection upon how technologies influence and constrain our everyday lives. The second is the Dutch architecture bureau MVRDV’s method of posing “unanswerable questions”. The third is described as the technique of projecting outworn societal models into the future. Such a characterization does not provide any coherent or systematic understanding, but points in too many incompatible directions: the effect of design, a mode of asking, and the re-configuration of time. In contrast to Grand & Wiedmer who characterize the approach by individual designers, our typology is based on insights into how fiction may integrate with reality through design experiments.

DiSalvo (2012) defines design fiction as either spectacles or tropes. In so doing, he draws on theoretical concepts external to design practice. By categorization design fiction as a spectacle he equals design fiction with tactics of estrangement so dear to the Situationist art movement. By understanding design fictions as tropes he sees design practice as a verbal ‘figure of speech’, a rhetorical practice as it is defined in literary theory.

Our typology is developed out of a careful analysis of the inherent experimental logic of design fiction as they are constructed in design projects. In so doing, we use principles and criteria from design practice (aesthetics, materializations, design aims) as our main distinctive traits.

CONCLUSION

The typology in this paper is meant to be the first stepping-stone towards building a more comprehensive framework for understanding design fiction as a new approach in design research. In addition to the projects discussed here, we would have liked to examine design projects focusing for instance on the techno-culture through experiments with computational artefacts and body-machine hybrids as well as game-based design. Such an investigation will be the topic of future work.

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UTILIZING THE DESIGNER WITHIN: A HEALTHCARE CASE STUDY

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ABSTRACT

This paper explores the utilization of design skills and approaches by non-designers within the context of rehabilitation in healthcare. The author proposes that within us all is the set of skills, strategies and modes of thinking commonly found in designers that, if recognised, understood and practiced, could potentially be harnessed by non-designers to assist them in everyday situations. Rather than this usurping the designers' role, designers may have the potential to help 'unlock' these capabilities in others and help change the patient-to-healthcare professional relationship. This idea is explored using a pilot study involving spinal cord injuries patients in rehabilitation.

INTRODUCTION

Designers often claim to possess and practice a unique set of skills. However, the author proposes that within us all is a set of skills, strategies and modes of thinking commonly found in designers that, if recognized, understood and enabled, could potentially be practiced by non-designers to assist in helping them in daily living. This is not only an issue of recognizing, separating out and practicing these 'design' skills and approaches, but also recognizing the conditions under which 'design approaches' and 'designing' can occur and indeed flourish. Using a pilot research experiment to explore the potential of using tacit 'design' skills by spinal cord injuries (SCI) survivors as part of a larger project intended to help enhance their own self-reliance and resourcefulness, the author discusses the kinds of skills, thinking and strategies used by SCI survivors to approach a particular set of problems and asks, if ultimately left to their own devices, could non-design individuals design without designers being present.

LITERATURE AND THEORY

The idea of design without designers is hardly new. For example, IDEO's prototype Human Centered Design (HCD) Toolkit (2009) is essentially the knowledge transfer of design-led approaches used originally to innovate in multi-national corporations and then developed for 'the creation of a method for guiding innovation and design for people living under \$2/day'. The HCD Toolkit is a 'self-start manual' describing a broad set of methods that can be used by non-designers without the need for designers.

Kimbell & Miller (1999) revealed that designers were not particularly articulate about the kinds, or mix, of skills they possess. From their research they derived, a 'design skills framework' comprising: i) higher order skills (intentions/purposes), i.e., the ability to plan/order, generate/create, investigate/find out, evaluate/judge, communicate/ present; ii) operational strategies (making thinking explicit), i.e., the ability to unpack wicked tasks, iterative thinking, playing with reality, optimising values, modelling futures, managing complexity and uncertainty, optimised decision-making, collaborating (creative brainstorming), collaborating (evaluating/ planning); research – seeking knowledge, and iii) functional skills, i.e., talking, writing, calculating, drawing, and making. More recently, a separate author, Kimbell (2011), described different kinds of design thinking as either: i) a cognitive style; ii) a general theory of design; and iii) an organisational resource.

In March 2011 the Royal Society for the encouragement of the Arts, Manufactures and Commerce (RSA) reported on a three-day Design & Rehabilitation workshop at the RSA's headquarters in London (Campbell 2011). The RSA's Design & Rehabilitation project was 'a design training initiative for people with spinal cord injuries' and proposed that 'design as a discipline, or structured thought process, can address the dramatic loss of confidence and diminished motivation that may result from a sudden physical impairment, and can contribute to independence' (Campbell 2011). The project was originated and led by Campbell, the then Director of Design at the RSA. She proposed that 'it is possible to share aspects of this technical [i.e. design] education with non-professionals to increase their

resourcefulness, and persuade them that they know more than they think about how problems might be solved' (Campbell 2009). Following this, Campbell identified three spinal injuries centres in the UK to work with 'the best local universities teaching design' for the next stage of this programme. The Queen Elizabeth National Spinal Injuries Unit (QENSIU) at the Glasgow Southern General Hospital, and the School of Design at The Glasgow School of Art (GSA) were selected to work together in one of these three partnerships (Campbell, 2012).

Questions for GSA arose from the RSA's initial work. Although SCI survivors were able to participate in 'designerly' activities and demonstrate certain designerly skills in the presence of designers during the RSA workshop, are they only able to demonstrate certain skills in the proximity of designers and would they still be able to demonstrate these in the absence of designers? If so, how long would these skills endure and would SCI survivors be able to define problems sufficiently well to be able to apply these skills and approaches autonomously? Given the premise implicit in the IDEO HCD Toolkit, the author defined a working proposition to test with the SCI survivors: designers have a describable set of skills they use to tackle problems and develop solutions; everyone might have that set of skills but not be aware of these or how to use these in a structured way. From this arose a set of research questions: i) what is the skills set of designers? ii) what are the innate skills of SCI survivors? iii) what is the match between designers' and SCI survivors' skills? iv) if there was a match could SCI survivors' skills be developed by training or through a toolkit approach to enhance their resourcefulness in tackling the daily life challenges of SCI? v) if so, when, where and how? This set the agenda for a GSA / QENSIU programme of research.

From QENSIU's perspective, as SCI poses very particular challenges for its survivors, there was an interest in how 'design' approaches and methods might be able to help: i) staff and carers in the personalization of SCI survivors' treatment and access to rehabilitation; ii) SCI survivors and their carers in the 1-year post-discharge phase which has been identified as particularly problematic; iii) assist in the socializing, engagement and integration of survivors into the wider community; iv) staff improve the process of rehabilitation and how this is delivered; and v) develop skills in SCI survivors to promote resourcefulness and self-reliance and decreasing the need for dependency on carers and healthcare professionals, i.e. alter the patient-to-healthcare professional relationship.

METHOD

The first stage of this 2011-2012 programme of enquiry was divided into three phases: i) a seminar to facilitate an initial discussion of design methods in healthcare and of issues faced by SCI survivors; ii) a workshop to test the initial proposition that SCI survivors possess (at

least some) innate design skills; and iii) an evaluation phase. The differentiation and categorization of design skills and approaches in Kimbell & Miller (1999) and Kimbell (2009; 2011) were used as the basis for a typology through which research questions (i), (ii) and (iii) above could be explored and discussed.

For the second phase, a number of possible themes and ideas for a workshop were explored. One aspect of daily life identified by QENSIU which appeared to be particularly problematic was the very practical difficulties posed for SCI survivors shopping for clothing; this encompassed a number of problems and a degree of complexity, reflecting many daily life situations. The workshop was structured around the 'shopping journey' to explore i) the range of complex and inter-related issues for SCI survivors and ii) the skills they utilized in tackling various problems and issues arising from this. It comprised three separate but related activities and an evaluation and feedback session. SCI survivors participating were: three outpatients in wheelchairs; one in-bed in-patient; a further wheelchair outpatient joining later for activity 3. A number of QENSIU clinical, ward staff and therapists joined the workshop – but only after activity 3 - to witness the results and to participate in feedback occurring at the conclusion of the activities described below.

As it was important to understand what the SCI participants' own innate skills were, careful briefing of the facilitators was crucial; they were instructed not to 'lead' with their own ideas but to 'enable' the participants to contribute theirs. SCI participants were paired and two facilitators were assigned to each SCI pair both to capture comments (on sticky notes) and issues and ideas (through sketch visualization).

EVALUATION OF DATA

Phase 1: Seminar

Feedback from the SCI survivors during discussion after each section in the afore-mentioned phase 1 seminar was typified by SCI survivors' 'autobiographic' narratives, i.e. an individual's recounting of his/her own history of their injuries and attempts to come to terms and adjust to their new lives with SCI.

Phase 2 Activity 1: role-playing the personal shopper

As one key ability, not unique to but certainly well-exercised within user-centred design and co-design approaches, is to be able to think of another's needs, the first workshop activity used role-playing of 'the personal shopper' for their workshop partner with the brief to identify clothing for a special occasion, where looking good and a projection of their partner's individual preferences and personality were important. The interesting observation emerging from this activity was that, in contrast to the 'auto-biographical' mode used when discussing their own personal experiences and difficulties in the previous seminar, SCI survivors could begin to think and act from the perspective of another's needs. In this type of activity the SCI survivor

became a 'carer', as distinct from 'one who was cared for' and was not one that QENSIU staff were used to hearing, the autobiographical account being the norm.



Figure 1. Healthcare staff at QENSIU viewing SCI survivors' critiques of the shopping experience status quo. Still from film, 'Design and Rehabilitation', Dir. Claire Levy © 2012.

Phase 2 Activity 2: the shopping 'status quo'

The second activity explored the 'shopping journey' scenario to understand how well SCI survivors were able to identify and define problems with the *status quo*. Such a shopping journey would normally involve travelling to and arriving at a store or shopping centre by some form of transport, finding one's way to the chosen department, looking at and handling clothes and fabrics, and trying on clothing to assess fit, look and feel and so on as part of the experience and decision-making process. For the purposes of the workshop, the shopping journey was deconstructed into a series of distinct stages and, after being prompted by visual cues for each stage, SCI survivors were asked to think about and rapidly describe their own shopping experiences and to identify problems and issues they had with current store-based expeditions for shopping for clothes, describing what happened, how this made them feel and issues they thought needed to be addressed.

To facilitate this activity, a large format printed matrix 'The shopping experience: the status quo' was provided onto which their comments and issues were located. This resulted in a rudimentary 'experience' map or 'shopping-journey' map creating a visually annotated critique of the *status quo*, identifying some key issues or problems for potential improvement of the shopping experience. This revealed a range of tangible interaction and service 'touch-points' issues, as well as more intangible (de)motivating, and emotionally frustrating issues, such as parking issues, clearly seeing and feeling garments, seeking assistance and storing bags of shopping. Results indicated that SCI survivors were well able to identify and specify problems, another declared design attribute. These kinds of thinking by SCI survivors were unfamiliar to and surprising for healthcare staff (figure 1).

Phase 2 Activity 3: What if...?

Having discussed the problems and issues with the shopping status quo and identified a number of key issues and problems, SCI survivors were given the

opportunity to imagine and design improved 'store-based' shopping experiences using the problematic issues they had identified in Activity 2 as their starting point. Activity 3 used the kinds of 'what if...?' approaches familiar to designers during brainstorming- and workshop-type activities. Facilitators provoked discussion (importantly without adding ideas of their own), recording and helping visualize ideas that SCI survivors volunteered. Many ideas, such as a shopping centre collection service for wheelchair shoppers, centralizing and storing all bags bought in different shops until ready to leave the car park, were generated.

DISCUSSION

Due to the limitations of time and resources only some of the full spectrum of thinking modes, strategies and skills that designers utilize during the process of designing were explored in this workshop, i.e. none of the ideas were prototyped, tested or refined. However, the author has explored these later stages in the design process, also involving non-designers in previous work (Macdonald et al. 2012) and found similar results; under certain conditions non-designers are capable and sometimes adept at, e.g., prototyping experiences and products.

In the three activities in this workshop the SCI survivors demonstrated that, to a greater or lesser extent, they could clearly: i) think of others' needs; ii) identify and detail problems with current service provision (i.e. the shopping experience); and iii) imagine improved scenarios/designs, all skills locatable within Kimbell and Miller's (1999) framework, thereby revealing that SCI survivors possess at least some of the same skills as designers, although perhaps not used so intuitively, consciously or as in as practiced or structured a manner as designers.

An early emerging question in the author's mind was whether a toolkit of such design approaches and methods together with exemplary case study material would be useful to help SCI survivors unpack and approach some of the 'wicked problems' that face them in daily living?

The research described here has its limitations. For Activity 1, there remains the question of whether the SCI survivors would have tended to do this of their own volition without being facilitated. However, the simple brief changed the mode of SCI survivor narrative from 'self' to 'other', perhaps of value in its own right for use within rehabilitation healthcare. For Activity 2 the shopping journey had to be preconceived and deconstructed by the researcher, not only into the distinct phases, but also structured to allow for the capture of the more emotive issues as well as practical difficulties. The envisioning of the participants' comments and issues by the workshop facilitators no doubt helped participants begin to specify and 'see' the issues in ways that they would not have been done so before. So although these problem-identification skills are apparent in the SCI survivors, the approach to

unpacking the problems and separating out the issues was facilitated in a designerly way. Activity 3 was, initially, the most difficult of the three activities for the SCI survivors to engage with. One interpretation of this might be that the *status quo* was so problematic that they had become habituated to this to the extent that it was difficult for them to imagine how the experience could be improved and also perhaps because the idea of exploring improved or 'ideal' scenarios was not one familiar to them. However, with appropriate encouragement, assisted using envisioning techniques by the facilitators, some interesting ideas began to emerge demonstrating that, once enabled, the SCI survivors demonstrated an innate ability in some of the kinds of speculative and imaginative skills which designers are fond of citing as part of their own skill-set. Activity 3 created a bank of ideas that could potentially and subsequently be prototyped, tested and refined.

However, although a toolkit-type resource might be useful to SCI survivors and worth exploring, would this be sufficient in itself? In workshops such as these, although we can demonstrate that 'designing' occurs using recognizable and categorizable sets of designerly skills and approaches, it is not only a matter of SCI survivors developing or acquiring the designer's particular set of skills. Throughout this enquiry, questions emerged such as: 1) How much exposure might SCI survivors require through design activities for them to begin to develop sufficient skills without having to undertake the normal kind of training a designer would undertake? 2) How enduring would these learnt skills be, i.e. once the immediacy and novelty of workshop-type experiences had receded, for how long could they continue to apply these (i.e. would any effect be time-limited)? 3) At what point could SCI survivors begin to autonomously address some of the 'wicked problems' of daily living they face, through the practice and application of design approaches? We have no data to answer these questions; a longitudinal study of the durable impact of the initial RSA pilot has not been made, and indeed it was only intended as an exploratory experiment which is described more fully in Macdonald (2103). One of the challenges of this kind of project is not only understanding if non-designers can 'design' as such and to what extent, but under what conditions can designing be best fostered and flourish.

CONCLUSION

If self-reliance and resourcefulness are to be assisted and developed by SCI survivors through designerly approaches either whilst within a SCI unit such as QENSIU or post-discharge, the challenge would not only be to develop, within the individual, designerly skills and methods *per se* but also how the requisite conditions or environments for designing as such could be created for - or by - the SCI survivors either within a rehabilitation unit (in this case QENSIU) which has (understandably) a predominantly medical/clinical ethos

with a certain kind of professional-survivor hierarchy, or in the relatively more isolated and less supported environment of the community or home, two very different kinds of environments. This suggests that training in design approaches could be developed and practiced as an element within an in-unit rehabilitation programme to better prepare SCI survivors prior to their discharge from the unit, an experiment which will be explored in the next phase of the GSA/QENSIU research.

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EXPLORING REFLECTIVE DESIGN: AN APPROACH TO DIGITAL ARCHIVES

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ABSTRACT

In this short paper we discuss our explorations with adopting *reflective design* as an approach to designing a digital archive for the performing arts.

The stakeholders in this project are diverse, comprised of members of the partner organisation, the public, the design team and government funding agencies. Each stakeholder has different expectations and skills to bring to the project. It is proposed that *reflective design* with its mix of critical reflection with a human centred design and prototyping approach provides a methodological framework that enables the complexities of the project to be integrated into an action orientated design exploration.

INTRODUCTION

From across the fields of design, technology and cultural studies there has been increasing interest in the role of both formal and informal digital archives in contemporary culture. Internationally cultural institutions are digitising their collections and moving them online. Whilst at the same time, much new information is only being manifest in digital form. Consequently our engagement with cultural heritage and contemporary cultural production is becoming increasingly digitally mediated.

There are many challenges regarding the design of digital archives, and not all of the challenges are technical. This is a time where there are many interesting possibilities for new perspectives on digital archives, in our research project we have explored how *Reflective Design* (Sengers et al. 2005) could provide a useful frame through which to rethink the role of interaction in digital archive design, that will enable the

development of new ideas regarding future digital archives.

PROJECT CONTEXT

The Circus Oz Living Archive Project (hereafter The Living Archive Project) is an interdisciplinary research project working to design, develop and analyse a prototype of a participatory digital video archive. Funded under the Australian Research Council Linkage program, the research brings together researchers and academic and industry partners from across the fields of science, humanities, new media, performing arts and design. The research team is working closely with Circus Oz, building prototypes using the Circus Oz collection of performance and rehearsal video documentation. The project aims to drive innovations in performance development, performance research, and audience interaction with cultural institutions (Carlin and Mullet, 2010).

The potential of archives as cultural entities is an area of research and debate across a range of fields including archive theory, Human Computer Interaction (HCI), information design, cultural heritage and knowledge management. While there are many interesting technical challenges in the context of a move from analogue to digital media, as interaction designers we are interested in how we can utilise the possibilities of technology to enable different ideas of what an archive *could be*. As such, questions framing the project are centered around the future of archives and our role in designing them: What could digital archives be used for, and what could make digital archives more useful? In what ways, and by whom, can digital archives be accessed? What role can interaction, play in contemporary digital archives?

In response to this line of inquiry, our research is exploring the ways in which *Reflective Design* (Sengers et al. 2005) could be a useful methodology for overcoming some of the challenges in digital archive design. Reflective approaches are not new to fields of art and design, but design approaches that encourage critical reflection are still gaining traction in the HCI community. The general shift towards valuing reflection could be considered part of HCI's 'third wave', encompassing such approaches as Critical Design, Ludic Design, Value Sensitive Design and Value Centred Design amongst others (Fallman 2011).

Reflective Design draws on many of the threads present in third wave HCI to form a set of principles and strategies to assist HCI practitioners in supporting ‘critical reflection’, defined as ‘bringing unconscious aspects of experience to conscious awareness, thereby making them available for conscious choice’, as enabling more critical reflection could serve to help ‘designers [to] become more aware of the blind spots in the structure of HCI,’ and to ‘help users be more reflective about the role of technology in their lives’ (Sengers et al. 2005, p.50).

Reflective Design has provided the project team with principles for enabling critical reflection both in the project and in the archive design. A set of strategies presented by Sengers et al.—including ‘build technology as a probe, provide for interpretive flexibility, give users licence to participate, inspire rich feedback, and invert metaphors and cross boundaries’ (2005, p.65)—is a useful set of tools to begin to examine the role of IxD in digital archives. Sengers *et al.*’s argument for ‘reflection on the unconscious values embedded in computing and the practices it supports’ (2005, p.49) could be a useful frame through which to begin to examine some of the ‘unconscious values’ present in the HCI community relating to digital archive design, in order to explore potential new uses of digital archives.

THE ARCHIVE AS INFORMATION: UNCONSCIOUS VALUES IN THE DESIGN OF DIGITAL ARCHIVES

Digital archive research in HCI often takes an approach that could largely be classified as *informational*. The ‘informational’ model can be traced to HCI’s historical and intellectual roots in cognitive science, treating ‘information’ as something that can be ‘transmitted’ through some sort of information channel or conduit (Boehner et al. 2005). Conceiving the digital archive through the informational model frames it as being a repository of ‘information’, whose meaning can be ‘transmitted’ to a user via accessing the archive.

There are many examples of this ‘informational’ frame regarding HCI research in the field of archives. Many researchers approach the digital archive as a systems-design problem that focuses on metadata models and database architectures (Davies 2011). Others focus on interoperability (through metadata schema or other structures) (Hunter 2003), data mining (Wu et al. 2008), or machine indexing (Wong & Leung 2008), along with recent attention on user participation through ‘Web 2.0’ technology (O’Reilly 2005). There are benefits to this ‘informational’ frame: treating the archive—its records, its users, and their behaviour—as aggregates of ‘information’ can be extremely useful, as it encourages the development of efficient methods for storing, indexing, searching, organising and analysing information.

This predominant focus on storage, metadata, interoperability, systems-design and social analysis suggests unconscious values and assumptions in the

HCI community. One assumption is that digital archives should be treated as a problem of data indexing, data access and data analysis. More deeply embedded is the assumption that what people *want* from archives is predictability, efficiency, repeatability, ‘related’ data sets, and information that aligns with an algorithmic picture of social relations. Informational approaches can be restrictive in that they assume some level of knowing what you want from the archive: there is little room in the ‘information access’ paradigm for the addition or construction of multiple interpretations and/or multiple meanings, nor is there room for much ambiguity, serendipity or unexpected discovery. In fact, it is well acknowledged in the archive community that archives do not just ‘contain’ meaning, rather, they are socially constructed (Featherstone 2000) and are layered with existing and potential meaning(s) (Nesmith 2006). It is in this context that we believe *Reflective Design* could be an effective methodology for overcoming the limitations of an information dominant schema that permeates digital archive design.

REFLECTING ON THE ROLE OF INTERACTION DESIGN IN CONTEMPORARY DIGITAL ARCHIVES

In a 2002 paper, archivist and digital preservation pioneer Margaret Hedstrom asked some important—and as-yet unresolved—questions:

‘To whom does society grant the power to select archives? From what stores of recorded documentation are archives legitimately constituted? Who gets to decide what constitutes value?’ (Hedstrom 2002, p.34)

Hedstrom’s questions provide us with a useful starting point for a reflective discussion regarding digital archive design. The shift towards digitisation of archival records, combined with a move towards participatory digital environments and ‘cultures of participation’ (Fischer 2011) is a cause of many problems for contemporary archivists and archive theorists. Alongside a postmodern shift in the discourse around archives, digitisation has served to break down the traditional ‘authority’ of the archive and the archivist (Ketelaar 2001; Millar 2010), causing debate around the role of the archivist in managing the archive, and the role of the user in their relationship with the archive. In response to this debate archivists have argued for for more ‘traces’ and ‘imprints’ of people in archives, in order to better reflect the postmodern nature of the contemporary archive and a more open-ended use of digital archives (Ketelaar 2001; Manoff 2006; Huvila 2008). The transition of the archive from analogue to digital raises with it many issues that are beyond the simple act of digitising, data access, and data storage.

Often when archivists consider the role of technology, their focus is on ‘the creation of records, their capture and storage, and the standards, processes, and procedures necessary to attain immutability, integrity, authenticity, and permanence’ (Hedstrom 2002, p.23). As such it could be argued that the archivist also adopts an ‘informational’ approach to the connections between

the archive and technology. Just as a designer may not understand the complexities of archival law, methods and traditions of care; an archivist may see technology as a tool that has certain capacities, and not all its 'material' possibilities.

This has raised important questions for the research team: What does it mean to design an archive that affords challenges to 'archival authority'? How might we design a digital archive that affords the messiness and multiplicity of the contemporary archive, especially one as open to interpretation as an archive of circus performance?

In response, we have adopted the stance that it is in the user's *interactions* with the archive that authority is challenged and meaning is constructed. Using this view we can begin to move away from the 'informational' paradigm and into the 'interactional' (Boehner et al. 2005). It is here that the role of the interaction designer becomes valuable, as the interaction designer controls the *realm of possibility*: every interface-design choice that we make has profound effects on the relative accessibility, importance, legitimacy and usefulness of archival records. When we think 'interactionally' instead of 'informationally', it is *the range of possible interactions with the archive* that determine the archive's subsequent use and value.

REFLECTIVE DESIGN IN THE LIVING ARCHIVE PROJECT

In the *Living Archive Project*, we are examining the design and use of the archive from the perspective of user interaction. Using a *Reflective Design* frame, we are experimenting with ways that might break down the predominant 'informational' view of the archive. The following examples refer to some of the strategies offered by *Reflective Design*, detailing how we are applying them in our research:

Build technology as a probe. The Living Archive (<http://archive.circusoz.com>) is a prototype designed for learning about the archive in use and to engage with Circus Oz about potential new uses and applications of the digital archive in practice. But it is also the 'real' archive that Circus Oz uses in its everyday practice of archiving of performance video and engaging with audiences. In this way the archive performs two parallel functions: a useful tool for Circus Oz (which encourages adoption and situational use), and a technology 'probe' that is a research tool for learning about digital archives.

Provide for interpretive flexibility. We are treating the archive as being layered with multiple levels of meaning, rather than being comprised of a single, archivist-controlled set of records and metadata. This conceptual model embraces multiple interpretations that can be added and modified without breaking the underlying 'canonical' data in the archive. This concept has been implemented through a database design that allows multiple parallel annotations of time-based media, and interfaces that can present both controlled

hierarchies of data, or 'flat' context-free data depending on the task at hand.

Give users licence to participate; inspire rich feedback. We are exploring opportunities for users of the archive to leave traces of their activity throughout the archive. We are framing much of the interaction with the archive as a form of storytelling and 'construction of meaning', which is informing the design choices that we make. One example is the naming of time-based annotations on videos 'stories' rather than 'comments' to encourage a narrative frame of mind when adding annotations. Another example is the ability for users to reorganise the archive into their own 'collections' with interstitial annotations to describe the new relationships that they are creating.

Invert metaphors and cross boundaries. By empowering users to curate and collect we are inverting the traditional authority of 'the collection', enabling the digital archive to present multiple 'collections' in the same digital space. To support these behaviours, we designed the archive as an 'API' (*Application Programming Interface*) to archive content, which refocuses our own design actions on figuring ways of designing *with* and *through* the archive, producing multiple, parallel 'archives', as opposed to designing one particular interface to 'an archive'. Returning to Hedstrom's questions regarding 'what constitutes value' in digital archives: if we can design open architectures, frameworks and interactions for digital archives that invite participation, perhaps *users* can decide what constitutes value, in 'their' archive

DISCUSSION: EXPERIMENTING WITH REFLECTIVE DESIGN AS A FRAME-SHIFTING APPROACH

Over the past 2 years the interdisciplinary research team involved in the design and manifestation of the *Living Archive* has identified some strengths of adopting a *Reflective Design* methodology for the research and design of this particular digital archive. These include the following:

Encouraging the rethinking of unconscious values. The information processing frame is 'deeply engrained in the practice of HCI' (Boehner et al. 2005, p.60), and we would argue that stepping away from this default 'informational' approach to the archive is the first step in enabling new possibilities regarding digital archives.

Turning attention to participation and interaction instead of information. Reflective design could break the 'either/or' paradigm of information structures, shifting our focus to the potential multifaceted use of archives rather than just how information is stored and accessed.

Reflective Design could shift design focus to tacit knowledge. Tacit knowledge is considered by many contemporary archivists to be an important element of meaning construction in archives (Ketelaar 2001; Millar 2010), above and beyond the 'information' stored in the archive. Using critical reflection about the role of

archives could help the design of archives that facilitate the creation of these other types of meaning.

CONCLUSION

In response to the growing importance of digital archives in our society, there is a pressing need to develop new and innovative approaches to digital archive design. While the HCI community continues to push the boundaries of ‘informational’ approaches to digital archives, we believe that these approaches do not necessarily address some of the problematic issues raised by the archive community in the transition from analogue to digital archives, especially when we begin to frame archives as ‘living’.

We have begun to explore how digital archive design could benefit from ‘third wave’ HCI approaches that encourage us to reflect on underlying assumptions in our designs, and we have considered *Reflective Design* as one approach that could offer much to contemporary digital archive design. This strategy helped our project team embrace the open-ended nature of the contemporary archive and think about the archive in new ways to produce tangible design outcomes that may not have been otherwise considered. *Reflective Design* can be a useful strategy for rethinking the role of interaction with archives in order to move away from the predominant ‘informational’ paradigm, it could also serve to direct attention to potential new uses of archives in society.

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AN EXPERIMENT WITH THE VOICE TO DESIGN CERAMICS

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ABSTRACT

This article is about how experiential knowledge that the craftsmen gains in a direct physical interaction with a responding material can be transformed and utilized in the use of digital technologies. The article presents an experiment with a 3D interactive and dynamic system to create ceramics from the human voice and thus how digital technology makes new possibilities in ceramic craft. 3D digital shape is created using simple geometric rules and is output to a 3D printer to make ceramic objects. The system demonstrates the close connection between digital technology and craft practice.

INTRODUCTION

The overall field of this research is about integration of digital technology in the field of 3D design, especially in fields rooted in arts and craft. In this case it is about how experiential knowledge of crafts rooted in ceramics is transformed and utilized in the use of digital technologies. Thus experiential knowledge represents the idea of an intuitive and humanistic crafting and tacit knowledge according to Dormer (1994).

The approach in this study is driven by a desire to humanize the use of digital technology in the field of 3D design. By humanizing is meant that the involvement of the body is being exploited. It can be hand gestures, body movement, or as in this experiment, the voice, forming the basis for an interaction through digital technology. This is seen as in contrast to the predominantly use of mouse clicks and typing numbers, which does not utilize the body as a tool to accentuate the design with digital technology.

As the voice is among the main communicative and expressive parts of the human, a part of the overall project is made to investigate what the voice is capable of creating in 3D ceramics. Specifically, this paper focuses on one experiment in the exploration of a digital interactive design tool that uses voice as input and 3D physical form as output by rapid prototyping. However, the main idea is to explore the human voice as a tool for interaction rather than e.g. to express audio as an artistic expression.

LITERATURE AND THEORY

The project builds on McCullough's (1996) idea about a close connection between digital work and a crafts practice, and that the hand- and brain activities related to computer technology may be analogous to practical activities where tacit knowledge, according to Polanyi (1966) is involved. McCullough's research is based on studies of crafts; design processes and tools related to fundamental human activities. McCullough suggests that computer systems should be developed much more from the user's perspective.

In this study the overall aim is to support the designer to utilize tacit knowledge within the use of computer technology in the experimental and creative stage of sketching in the design process.

The approach for exploring this is based on an idea of material as an inspiring partner in the design process. By exploratory and playful interventions and by being attentive to the response of the material an understanding is obtained and thus the material works as a partner in the design process. Manuel de Landa (2002) describes such interplay as ...a form that we tease out of those materials as we allow them to have their say in the structures we create. The ceramicist Bernard Leach (1940) describes it asa living embodiment of the intention... and crafting and execution as a unity that is intuitive and humanistic - One Hand, One Brain (Bernard Leach 1940).

This approach is based on a craft based design approach that Hansen (2010) calls interactive material-driven

designing. The approach is characterized by two levels, forming a whole. A first level is to identify and develop a potential of a material, e.g. the potential of liquid clay to create patterns by gravity. A second level is to explore and realize the potential by producing a number of representative 3D examples of what can be done and how. This is about an intimate interplay or we can in this case call it *interaction* between the designer and the responding material at the very moment in the process of giving form by physical interventions. The two levels are coherent and interrelated and developed over time through experiments, and reflected as a unique artistic fingerprint in the final artefact.

Hansen's conclusion is that such an approach to designing is utilized with digital technology when the designer develops his/her own digital interactive and generative system, or we can in this case call it *responding digital material*. This study constitutes such an approach exploring a digital interactive design tool that uses voice as input.

The aspect of interaction within digital technologies with such a generative potential regarding audio is well known in the field of event-based productions such as computer games, interactive art installations, performances etc. Such use employs digital technology as part of its own medium and makes up a clear distinction when compared to a digital design tool for making independent works of art (Paul, 2003); the purpose of this project.

Nevertheless experiments with audio based digital systems have also headed in the direction of independent works of art. *Reflection* by A. Fischer and B. Maus (2008) is a data sculpture based on a FFT frequency spectrum analysis, which was performed on audio clips and arranged in a 3D coordinate system consisting of frequency and time. Their final sculpture was created with a CNC Milling Machine. Another example is Jan Henrik Hansen's (2012) sculptural work, which focuses on the interpretation of music into space and form with a digital technique, dealing with the wide spectrum of music, from single sounds to whole arrangements. A third example is *Sound Surface* - 3D printed pots by Jonathan Keep (2012) which represents a series of pots generated from sound data based on musical pieces, and computer code using the *processing* programming language to create 3D digital surface texture. The captured digital files are following 3D printed in clay.

On one hand these examples deal with an experimental development of the designers own generative digital material based on an audio input, and an output to a 3D Rapid Prototyping techniques to make 3D result. That is quite related to present project. On the other hand these related examples make up a clear distinction to present project by using already composed musical pieces compared to this study's idea of using the human voice as a tool in the very moment of form-giving. Present study distinguishes itself exactly by the real time interaction between the designer's voice and the digital

material and thus by an intimate interplay according to the idea of interactive material-driven designing. Furthermore present study distinguishes itself by solely being a tool for 3D designing rather to express audio as an artistic expression.

DATA AND METHODS

In this research the research through design methodology (Frayling, 1993) is employed which for this purpose is defined as an experimental design practice that is part of the design research and contributes empirical data. The method is explorative and experimental, which in this study means that the research questions and empirical series of experiments are produced and developed in the process of research. This approach is seen as a reflection on action similar to Schön's ideas (1983). The method begins with a definition of a frame for carrying out experiments, which reflect the overall research question. In this case it reflects how the ceramic craftsmen utilize experiential knowledge within the use of digital technologies specifically with voice interaction. This approach is inspired by Binder and Redström's (2006) notion of exemplary design research.

... by creating examples of what could be done and how, i.e. examples that both express the possibilities of the design program as well as more general suggestions about a (change to) design practice.

The intention with this paper is to give an insight into an experiment in this frame and the potential it exhibits

AN OVERVIEW OF THE DIGITAL INTERACTIVE SYSTEM

In this study the experiment is about a digital interactive design tool that uses voice as input and 3D physical form as output.

An overview of the system can be seen in figure 1. It consists of an audio feature estimation module, a shape creation module, and a 3D print module.



Figure 1: The overview of the digital interactive system

AUDIO FEATURES

It is necessary to know which audio features that are used for the system. This will provide understanding of the complexity and dynamic utilized in the generative system and in the 3D geometry that the system produces.

To extract the wanted audio features from the voice the software Max msp has been utilized. In this case three bands of frequencies; Low, Mid and High are extracted. Furthermore Loudness, which in this case is defined as the average of the amplitude on the number of samples,

entered every 33 milliseconds. Examples of the extracted values from Max msp can be seen in figure 2.

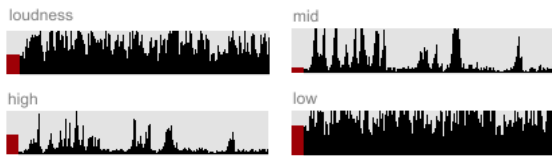


Figure 2: Extracted values from Max msp

SHAPE CREATION

By the use of the computer engine, *Unity 3D* (see figure 3) the different audio features was utilized for a parametric setup, and input to several coherent and interrelated geometries forming a whole using simple rules.

The overall shape consists of two spirals defined by two kinds of geometries. Furthermore the two spirals are connected by cylinders (see example at figure 3) to make a whole. Spiral 1 is defined by forms of spheres (see figure 4, left) and Spiral 2 is defined by crosses (see figure 4, right) The spirals have been chosen to investigate the complex relationship between two curved lines in a 3d space with the purpose of discovering new unforeseeable shapes. Furthermore this is clarified and emphasized by the contrast of spheres and crosses respectively.

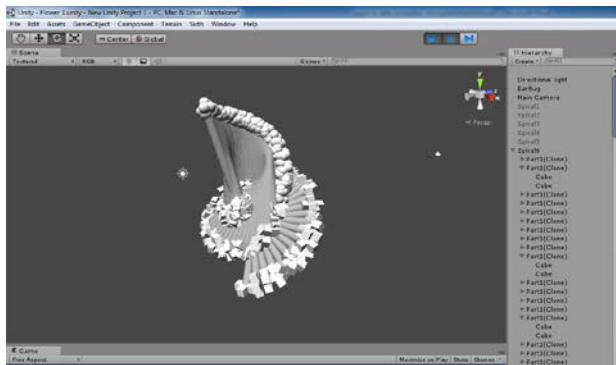


Figure 3: The interface of the computer engine, Unity 3D with an example of the overall shape.



Figure 4: Geometries on the spirals. Forms of spheres and crosses respectively.

The height, radius and number of rotations are based on different audio features as a parametric input. Also the size of the geometries at figure 4 and the distance between the spirals (thus also the cylinders) are

dependent on different audio features' input. If there are no inputs the shape will appear as a dense mass.

The relation between audio features and geometries in present experiment is as follows:

Spiral 1, defined by forms of spheres: height=High, radius=High, number of rotations=Low and the size of the forms of spheres=Loudness.

Spiral 2, defined by crosses: height=High, radius=High, number of rotations=Low and the size of the crosses=constant.

Furthermore the distance between the spirals and thus the size of the cylinders are defined by Loudness.

This generative system is reflecting the first level of interactive material driven designing; the identified and developed potential of a digital material.

Intervention makes it possible to obtain an understanding of the responding material. This is going on in real time, which means the response is immediately, and if there is no intervention the shape will return to its initial shape as a dense mass. This exploratory and playful intervention is referring to the second level of interactive material driven designing; an intimate interplay between the designer and the material and being attentive to the response. Furthermore the overall shape can be frozen any moment and exported as a 3D printable file. Thus the potential of the system can be explored and realized. A number of representative 3D examples of what can be done can be viewed in figure 5.

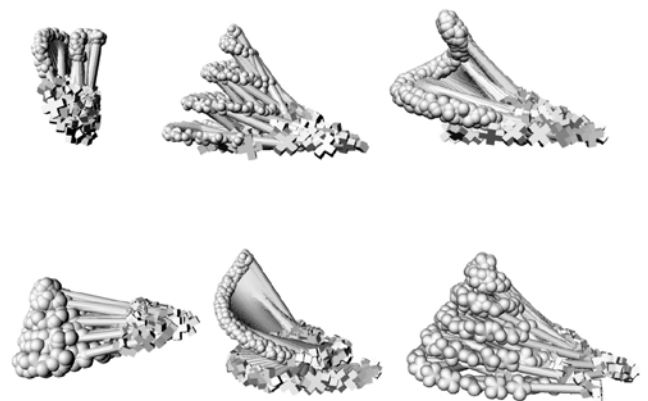


Figure 5: A number of representative 3D examples of what can be done with the responding system.

3D PRINT

In figure 6 a digital shape is shown as created in ceramics by the use of a 3D powder printer from ZCorp. The recipe for utilizing ceramics powder in this 3D printer is based on the research by University of Washington Department of Mechanical Engineering in Seattle, Washington (Ganter, Storti, & Utela, 2009).



Figure 6: The digital shape is shown as created in ceramics by the use of a 3D powder printer from ZCorp

EVALUATION OF DATA

A digital interactive design tool that uses voice as input and 3D physical form as output has in this experiment been explored. The main idea has been to explore the human voice as a tool for interaction rather than e.g. to express audio as an artistic expression.

Firstly a 3d interactive and dynamic real time system based on a number of audio features has been successfully developed. Secondly it has been explored by interventions and a diverse number of representative 3D examples of what can be done have been realized. Furthermore the digital shape has been realized in ceramics by the use of a 3D powder printer from ZCorp.

RESULTS AND DISCUSSION

The number of representative 3D examples has shown a high degree of diversity and thus how the high amount of audio features in interplay with the interrelated geometries contributes dynamic and complex results.

Thus the voice is an exceptional tool for interaction because it contributes with high amount of audio features at a time. In this case it places the performer between having control and not having control. That is about unpredictability, - and surprising and useful results. A certain control is needed and can only be obtained by interventions and experience. This is about an intimate interplay between the designer and the material and by being attentive to the response, according to the idea of interactive material-driven designing. This is also what links crafting and execution as a unity that is intuitive according to Dormer (1994) and Leach (1940) and thus how experiential knowledge will be obtained. In this process it will be possible to grasp and capture dynamic and unique moments for 3D printing, which will reflect an individual artistic fingerprint. Thus the craft-based designer can utilize his/her experience about experiential knowledge in the use of digital technologies.

CONCLUSION

The experiment has successfully shown how a craft-based design approach based on experiential knowledge

can be transformed and utilized in the use of digital technologies.

Furthermore the experiment has shown how digital technology with voice interaction makes new possibilities in ceramic craft. A main finding is how the high amount of audio features provided by the human voice at a time in interplay with interrelated geometries contributes with a high degree of complexity.

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ARTIFICE, THE SEMIOSPHERE, AND COUNTER-CONSCIOUSNESS (OR) A MODEL FOR A COUNTER-DESIGN AND DESIGN RESEARCH

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ABSTRACT

If we are to find a future in the practice of design (this paper limits itself to graphic design and design research) which aims to assist in the evolution of culture (as opposed to perpetuating the “closed” stabilizing system of culture and language, the persistent heterogeneity, conventions and givens), design might pivot (a designerly thing, as simple as to turn as a slight of hand or as a playful manipulation as in *Détournement*) to a critical and discursive practice of counter-design. Abandoning the territory of commercial practice for an experimental counter-practice, design becomes an active agent in the “open” system of culture and facilitates the adaptation and evolution of culture to new forms.

While the call for new critical practices of design is nothing new, (Margolin 2003) there is a scarcity of models. This exploratory paper postulates a model, one of counter-graphic design constructed by theories of semiotic space, graphic design as a language of artifice, and transformative counter-consciousness.

INTRODUCTION

The very compact synthesis of theories just articulated could also be listed as an integrated set of models:

- A. Within the semiosphere (Yuri Lotman’s model of the complex of semantic space by which language structures and thereby creates culture), the language of graphic design (one of many languages), by way of its syntax and its artifacts (or as semiotics would term, its “texts”), structures cultural forms. Graphic design is a diecasting mechanism (Lotman 1978) either supporting culture’s homeostatic functions and preserving stasis and unity (a “closed” system) or creating difference and structuring new forms that facilitate cultural adaptation and evolution (an “open” system.)
- B. Vilém Flusser proposes that design is a craft of cunning and artifice (Flusser 1995). For example, within Lotman’s semiosphere, graphic design is a semantic craft articulating and shaping the “real” to text/image and making it artificial – an act of artifice. Without conjuring negative connotations, it is deceit.
- C. Graphic design and its products (its texts), by means of its common functions within cultural production¹ and its utilization of conventions to ensure cultural connections with its audience, perpetuates culture’s stabilizing functions. A pivot of graphic design’s practice away from this function to a destabilizing (or critical) one, creates what Marcuse terms a counter-consciousness (Marcuse 1978) challenging presumptions, and shaping difference and new realities.
- D. A conscious articulation of a counter-practice is a counter-design, reflective and discursive. To quote

¹ Mainly capital, see marketing, branding, advertising, even the innocuous construction of identity in the forms of typographic styles, styles of way-finding graphics, etc.

Superstudio, the radical Architecture firm that coined the term, it is “the activity of designing understood as philosophical speculation, as a means to knowledge, as critical ²existence” (Ambasz, 1972).

A) GRAPHIC LANGUAGE WITHIN THE SEMIOSPHERE / THE LINGUISTIC STRUCTURING OF CULTURE

Yuri Lotman’s theory of the semiotic continuum, the semiosphere (modeling itself on the biosphere) is a contained, self-regulating ecological system structured by language. Like the biosphere, it can be seen both as a whole and as an interconnected, interdependent, systemic complex; a semiotic organism of nested semiotic organisms.

In Lotman’s theory, the primary task of culture “is in structurally organizing the world around man ...” (Lotman 1978) with language functioning as a “diecasting mechanism” creating an “intuitive sense of structuredness that with its transformation of the “open” world of realia into a “closed” world of names, forces people to treat as structures those phenomena whose structuredness, at best, is not apparent” (Lotman 1978).

I would argue that in the highly mediated landscape of contemporary culture, graphic/visual language (a subset, or semioeme, within the larger and more general semiosphere) plays a significant role as a “diecasting mechanism. It structures the “open” world of reality into a “closed” world of visual “names”. It structures and forms reality.² We design reality. Or as Tony Fry (2003) states “Humans design, but are, in turn, designed by what results from this designing — be it as things, symbolic forms or traditions.”

B) GRAPHIC DESIGN AS ARTICULATION AND ARTIFICE

Vilém Flusser in his essay “About the Word *Design*” (1999) explores the semantic and etymological development of “design” and its function between art and technology. He points out that the Greek word for art, “*techne*”, means to give form and so the “technology” of design is to shape things, to give form to the formless or visibility to the invisible. The Latin equivalent of *techne* is “*ars*” and its diminutive is “*articulum*”, “something twisting around something else; a wristjoint, for instance” (Flusser, 1999). Design is not simply to give form but to turn and twist so we can “see properly” (Flusser 1999).

Lotman’s structural diecasting mechanism of culture functions similarly. The cultural and semiotic mechanism of graphic/visual design “casts” forms. It also “articulates” but not by the common meaning of

putting to words a specific idea, but rather to Flusser’s more complex meaning of turning, maneuverability, and artifice. It articulates the “real” into text/image and makes it artificial. It is by artifice then that graphic/visual language structures the world of reality into a world of visual/textual “names”.

C) COUNTER-CONSCIOUSNESS AND CULTURAL RENEWAL

“The reform of consciousness consists solely in... the awakening of the world from its dream about itself” (Marx 1932).

It is not hard to argue, or simply imagine, that contemporary consciousness is in a dream state, absorbed by the apparitions constructed by culture.

Herbert Marcuse, contends that art does not produce illusion (an argument against a Marxist social realism) but rather postulates alternatives to an accepted reality creating a counter-consciousness, a “negation of the realistic-conformist mind.” (Marcuse 1979)³ He states that “Art’s separation from the process of material production has enabled it to demystify the reality produced in this process. Art challenges the monopoly of the established reality to determine what is ‘real,’ and it does so by creating a fictitious world which is nevertheless ‘more real than reality itself’” (Marcuse 1979). Distinguished from “the given” reality, it functions as a remedy to the prevailing dream state.

Lotman posits that the “long-term memory of the community” of society functions as a “closed” system stabilizing culture. (Lotman 1978). Placed within Marcuse’s model, this functions as a mechanism for the continuation of the prevailing realistic-conformist mind or “the given”. Within the semiosphere, culture generates and sends coded semantic signals constructed by cultural memory. These coded signals structure cultural activity and generate behavior (the future). Behavior, though, is an “open” system and, by way of additional inputs, generates adaptability and change and a “self renewal” of culture. (Lotman, 1978)

Within the semiosphere exists a tension between the “closed” and “open” systems balancing the static “given” with “self renewal”. (Lotman 1978) Graphic design typically works with these tensions balancing the “givens” in order to find connections and relevance, and difference/change to create engagement and uniqueness. Its job is to understand, navigate, and express these domains and their boundaries. In this way, graphic design as a structuring agent – a diecasting mechanism within the semiosphere – is well suited to change behavior, to add information into the “open” system of culture.

D) ABANDONING THE TERRITORY AND SELF RENEWAL: COUNTER DESIGN AND CRITICAL PRACTICE

“The first attitude involves a commitment to design as a problem-solving activity, capable of formulating, in

² Clearly other forms of aesthetic production are at work here. Film, television, literature, art, the multi-variant forms of the Internet all have significant roles. All of these forms, and others, constitute subsets of the semiosphere. For the sake of this work, I am limiting my argument to graphic design. This would include all graphic forms and would cross over various media.

physical terms, solutions to problems encountered in the natural and socio-cultural milieu. The opposite attitude, which we may call one of counter-design, chooses instead to emphasize the need for a renewal of philosophical discourse and for social and political involvement as a way of bringing about structural changes in our society” (Lang, 2005).

As design has a significant role in our unsustainable predicament, and is simultaneously seen as a method out (although we could also argue that NOT designing is a way³), design might explore alternative and even radical roles. If, for example, redirective practices are to be taken seriously, we might want to seriously rethink and challenge the cultural “given”.

A practice of counter design, as framed by Superstudio (as well as others such as Archigram, and in tangent practices, The Situationistes International), offers possibilities. Abandoning the territory of commercial practice (artifice in the service of consumption and cultural stasis) to counter “the given”, design might pivot and align itself to such radical paradigms as *Détournement* (a turn), *Surrealism* (a negation of the realist mind), and *Pataphysics* (a twist), to name a few. By countering the stabilizing tendencies and the persistent heterogeneity of culture, design becomes a catalyst in the “open” system of culture and assists in its self-renewal.

COUNTER-GRAPHIC & EXPERIMENTAL DESIGN RESEARCH PRACTICE: THE AD HOC ATLAS

The author’s ongoing project, titled the Ad-Hoc Atlas, conducts design research resulting in creative works and is a demonstration (mostly) of the model outlined here. Avoiding conventional outcomes of discrete projects and artifacts, it produces instead a continuous series of open and experimental investigations and prototypes. While there may be findings of sorts, there is no intention to do so. The objective is to use the tools of design research and the discipline of designing to develop a continuous and evolving critical discourse by and about design.

Specifically, the project explores the operations of graphic language in the construction of urban space (space as the social and dialectic) viewing semiotic space as an ecology nested within the ecology of the urban landscape.⁴ It proposes that if place construction is as much a matter of the representational and the symbolic as the material activities of the city (Corner 2006), then we might explore and analyze the city through graphic/visual language. The project prompts us

to think differently about urban space and to challenge perceptions about how language influences us.



FIG 1: from the Ad Hoc Atlas of Montréal.

It uses methodological-instrumental research in conjunction with creative exploratory inquiries through design making. It is both experimental-hypothetical research through design and theoretical-conceptual research about design. It is interdisciplinary in its integration of graphic design research and inquiries in the construction of the urban landscape.

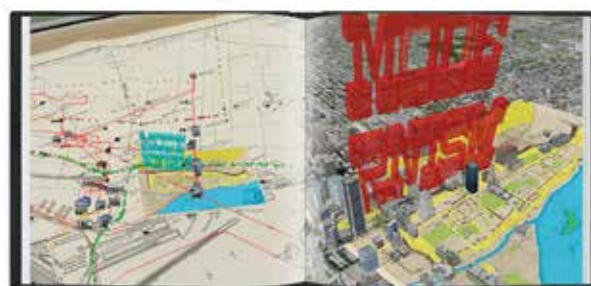


FIG 2-3: from the Ad Hoc Atlas of Montréal.

Field research is conducted using GIS (geographic information systems) to map, track, and geolocate graphic language in the urban environment. Additionally, historical and contemporary records and images are audited and collected. Findings are incorporated into experimental explorations in the studio using design research as making. Hard data is commingled with fictions and fantasies as a means to construct new narratives, and dialogue. For example, theoretical writings are hijacked and repurposed, historical and current maps are annotated visualizing theoretical landscapes and propositional geographies, information graphics render invisible conceptual spheres, and design artifacts of the urban landscape and historical images are constructed into visual narratives,

³ See Calvelli, John. “Design Philosophy Politics » (new) Design Is/Is Not the Problem.” *Design Philosophy Politics* (August 2011). <http://designphilosophypolitics.informatics.indiana.edu/?p=143>.

⁴ Here we might use James Corner’s themes of the Urban Landscape as an ecology and tie it more closely to Lotman; the urban landscape is both an ecology of systems and forms, which include semiosphere(s).

a poetic and often cryptic tableau vivant of the dialectic semantic space of the city.

These ambiguous narratives operate as design by using its forms and methods of persuasion as well as its aura of authority to poetically and purposefully confound, challenge, and critique. It is design as a critical stance processed through a conventional discipline resulting in uncanny forms. The artifice of language is embraced for its ability to leave us untethered and disoriented and open to new vistas.



FIGS 4-6: from the Ad Hoc Atlas of Berlin.

CONCLUSION

Within culture's self-regulating semantic ecology, design articulates "turns", artifice that enables us to see "properly" (Flusser, 1995.) It functions within this ecology as a diecasting mechanism structuring cultural consciousness and the real, either preserving culture's homeostatic tendencies or countering them. If we assume this, then design and design research can be used as a critical tool to stage narratives and provocations as a parry, a contrarian response or action, to challenge these tendencies. As an experimental practice in the creation of new forms that counter "the

given", it shifts our view so we can see differently. The boundaries of research and creation, process and form, and fact and fiction fuse into a discursive counter-design, and an "activity of designing understood as philosophical speculation the, as a means to knowledge, as critical existence." (Ambasz, 1972, p. 2) Design and design research become active agents in the open system of culture and by tipping the balance in the tension of cultural forces it facilitates cultural self-renewal and an awakening of the world from its dream about itself.

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DESIGNING SOCIAL PLAY THROUGH INTERPERSONAL TOUCH: AN ANNOTATED PORTFOLIO

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ABSTRACT

We present five design cases as an annotated portfolio, exploring ways to design for intimate, interpersonal touch and social intimacy in interaction design. Five key qualities are elicited from the cases, including novel connotations sparking curiosity; providing an excuse to interact; unfolding internal complexity; social ambiguity; norm-bending intimacy. The work highlights novel interaction design approaches fostering social play, turning participants into performers of their own narratives.

INTRODUCTION

Within interaction design there has been an increased focus on understanding how to design for embodied interaction. Existing approaches are largely divided into either considering the aesthetics of bodily interaction and sensory experience (e.g., Petersen & Iversen, 1994) or focusing on the notion of embodied interaction as situated in a context (e.g. Dourish, 2004).

We combine these perspectives in the overarching frame of designing for intimacy of interpersonal touch. Our work includes unfolding, through the design cases, the interaction aesthetics of touch between participants, as well as exploring how situating touching others in public spaces can create norm-bending intimacy through social play (Salen & Zimmerman 2003).

The following is a synthesis of five selected cases as an annotated portfolio (see Bowers, 2012; Gaver & Bowers, 2012). Gaver (2012) defines an annotated portfolio as follows: “If a single design occupies a point in design space, a collection of designs by the same or associated designers – a portfolio – establishes an area in that space. Comparing different individual items can make clear a domain of design, its relevant dimensions, and the designer's opinion about the relevant places and configurations to adopt on those dimensions.” Further, “an endless string of design examples is precisely at the

core of how design research should operate, and [that] the role of theory should be to annotate those examples rather than replace them.” Such portfolios serve as actionable guides for other designers exploring intimacy of interpersonal touch in public/social settings. We view the works and annotations as knowledge contributions in and of themselves. The annotations in our case correspond to experiential qualities (Löwgren, 2009).

The projects are examples of *research through explorative design* (Hoby, 2011), which is an extension of *research through design* with an added emphasis on sketching “in the wild” as a way to explore potential use qualities - designing and experimenting in the field is where the qualities emerge. The annotated portfolio then becomes a way to communicate these qualities to a wider audience within design research.

Below, we introduce the five cases and our observations of the designs in use. Each case builds upon previous works and illuminates different qualities. We then combine the cases with key qualities to form an annotated portfolio, which is finally elaborated and related to the interaction design field in general.

FIVE DESIGN CASES

Let us introduce the five cases and the essence of our observations:

SINGING PLANT



Our first foray into using a biological entity as the interface, *Singing Plant* was an installation consisting of a living plant wired up as a sensitive Theremin antenna. Participants could play music by touching or gesturing near the plant, the sensitivity field or “aura” extending several centimetres away from the plant. It has been displayed in various settings, including Roskilde

Festival 2004 and the Botanical Garden at the Natural History Museum of Denmark.

Observations: Participants quickly learned the interface by watching previous participants. They anthropomorphised the plant, ascribing feelings and aura to it. In playful settings such as Roskilde Festival, participants pushed limits and experimented by e.g. hitting the plant to make it scream. In museum-like social practices such as the Botanical Garden, where vision is usually the primary sense and touching is not normally encouraged, the installation challenged the social practice itself and afforded new possibilities in the space. The interactive nature of the *Singing Plant* accentuates it as living and even communicating; hidden technology altering the human-plant relationship in a fundamental, almost mythological way. It enabled emergent storytelling to evolve around the plant.

MEDUSAE NILFISK



Medusae Nilfisk was a large interactive fire and light installation with a focus on social interaction, made for Roskilde Festival 2007. It consisted of three huge jellyfish-like lamps sewn from used wartime parachutes and kept inflated by antique vacuum cleaners. Each sculpture was illuminated from within in all colours of the rainbow and topped with a propane fire cannon.

To enable the audience to trigger the fire cannons in an engaging way that fostered social interaction, we placed two poles in the ground, too far away from each other for one person to reach both at once. The audience could trigger the fire cannons by holding hands and touching

the poles, thereby creating an electrical connection between the two poles.

Observations: We had expected guidance to be necessary to explain the unusual interface, but the installation turned out to be so popular that participants learned all they needed by observing previous participants. Often a participant would go out and “recruit” others to hold hands with. Participants were happy to be given an occasion to approach and engage with others – particularly of the opposite gender. It became an excuse for re-negotiating rules for social contact in a public setting. However, participants rarely spontaneously experimented with more daring possibilities: holding other body parts than hands, kissing, discovering how many people could form the chain.

ELECTROLUMEN



Electrolumen encourages touching other humans in a less predefined way and provides multiple analog input interfaces to simultaneously create music and control light. *Electrolumen* consists of four authentic street lamps and power lines on a telegraph pole, which is however only 1.5 meters tall, bringing an everyday but normally distant and dangerous object easily – disconcertingly – within reach. Participants can play music with each other by connecting the four metal street lamps via touch in various ways. The touch path can be a single person or through multiple people, but as there are more lamps than a person has hands, a collaborative effort gives a richer result.

Observations: As it is not enough to touch one lamp - one has to connect two lamps via touch - participants had trouble working out how to use the installation, unless they had the opportunity to observe previous participants. While how to touch each other was not predefined, almost all participants held hands or at most shoulders, few experimenting with kissing etc. *Electrolumen* enabled open ended exploration; limited intimate play was observed.

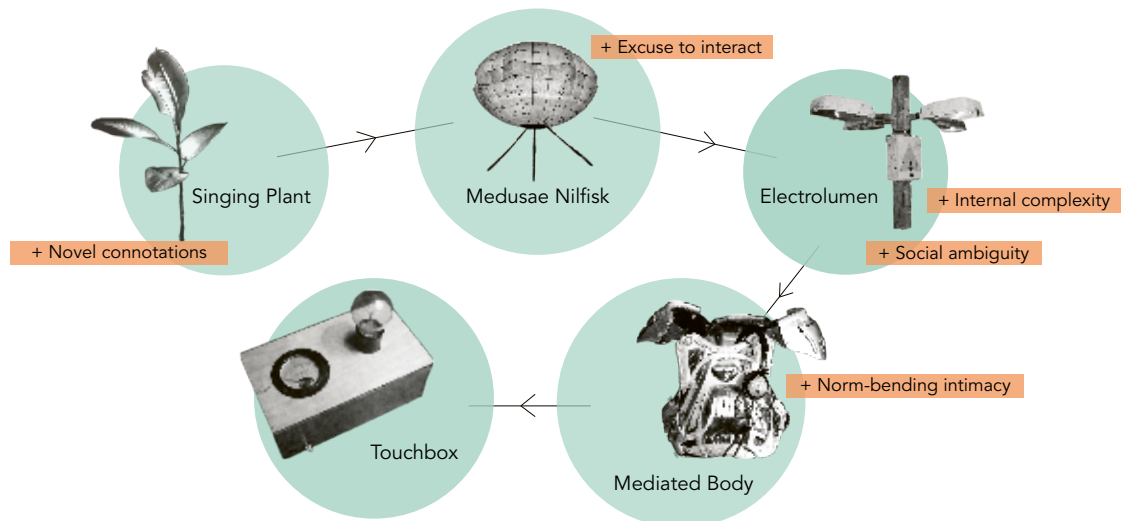


Figure 1: Progression of design cases and key qualities.

MEDIATED BODY



The *Mediated Body* (Hoby & Löwgren, 2011) is an installation consisting of a performer, a participant and a suit that generates sound and light controlled by how the participant touches the performer's bare skin (or vice versa). The sound, a rich soundscape changing according to interpersonal touch, is available only in two pairs of headphones worn by the participant and performer, "socially insulating" them from any audience to the experience.

Observations: *Mediated Body* was very successful and provided an intriguing and novel experience for many participants. It completely altered social norms, making relatively intimate touch between strangers socially acceptable. The performer, an integral part of the installation, was in himself both instigator and guide. The work actively encourages exploration of another human's body, hence transgressing intimate boundaries through innocent play.



TOUCHBOX

Touchbox is a development of *Mediated Body*. We designed *Touchbox* to understand the properties of *Mediated Body* without the performer as a facilitator. It consists of a wooden box with an old-fashioned light bulb and two sets of headphones. It requires two participants to don the headphones and touch each other, creating a rich and varied soundscape in the process.

Observations: Because the interaction consisted of two equally novice participants, it required them to explore the possibilities on their own. Compared to *Mediated Body* with the experienced performer who acted as a guide, the participants had the liberty to find their own meaning in the interaction. Hence we observed more varied interactions, from intimate to goofy. Although the performer in *Mediated Body* enabled more elaborate and more well defined interaction, *Touchbox* enabled what we consider an intimate renegotiation of the interaction space between two participants.

QUALITIES OF INTERPERSONAL TOUCH

The diagram in Figure 1 shows the cases as a conceptual progression, where the designs build upon each other and new key qualities emerge. This notion of progression is not present in previously published annotated portfolios, and we find it to be a strength in terms of academic criticizability and grounding. The diagram serves as a basis for further elaboration; we will in the following develop the key qualities.

NOVEL CONNOTATIONS SPARKING CURIOSITY

The unusual connotation of making a plant sing fostered curiosity among the participants. What emerged was primarily curious, explorative interaction with the plant, but also conversation around the plant about our relationship with biological objects. *Singing plant* marked the starting point for our exploration into designing with novel connotations, for creating play around the interface, not only with the interface. This quality is present in all the subsequent cases.

AN EXCUSE TO INTERACT

The fire cannons in *Medusae Nilfisk* provided an initial, 'external reward' motivation, but in the course of the

interaction holding hands and meeting new people became just as interesting for the participants. Triggering the gas cannons became an excuse for interactions that could not otherwise be articulated. This dual approach of offering an 'excuse' for interaction is present in all the subsequent cases. In *Mediated Body* and *Touchbox* we observed the intertwined interest in exploring the aesthetics of the sounds while exploring each others' boundaries of intimacy at the same time.

UNFOLDING INTERNAL COMPLEXITY

Where *Medusae Nilfisk* was a binary interface (you trigger the gas cannons when the two poles are connected), *Electrolumen* introduced more complex and analog interaction. Here the amount of touch, combinations of different lamps and activity level modulated a complex set of sound patterns. There is not a simple causal relationship between input and output – the interface and internal workings of the system are complex enough to warrant exploration. This is what we call internal complexity. *Electrolumen* as well as *Mediated Body* and *Touchbox*, facilitated curious and explorative interaction, where participants would experiment with different ways of creating sounds.

SOCIAL AMBIGUITY

Electrolumen was our first interpersonal touch installation that utilised an open-ended approach. There was no obvious purpose, only different touch areas that could be used to explore a soundscape. Participants had to socially (re-)negotiate with the others interacting; touch someone, create a collaborative sound or explore the piece. This created what we call social ambiguity, extending upon the notion of Gaver et al. (2003) to provide enough ambiguity to allow for multiple interpretations. The ambiguous dynamic was especially useful for interactions that would not be socially amenable to verbalisation, e.g. wanting to hold hands or touch each other.

NORM BENDING INTIMACY

The full-body touch interface of *Mediated Body* encouraged people to directly explore norm-bending intimacy with the performer. The touching that the piece asks for would normally be deemed socially inappropriate for two people meeting for the first time. Here they would explore how different kinds of touch would create different types of sounds. This would often result in quite intimate engagements. When the two finally took off their headphones they tended to revert to normal protocol of getting to know each other; politely asking for names, etc. In this state of decompression after an intense and emotionally engaging experience, the two people had to reconstruct a "normal" relationship outside the intimate soundscape interaction.

CONCLUSION

This paper demonstrates possibilities to design for intimate interpersonal touch and how this can be utilised to create socially playful interactions between participants. We have described five interrelated design cases and extracted a set of five different key qualities

as abstractions, which can serve as inspiration for other design scenarios within similar fields. We use the format of an annotated portfolio, where the generative knowledge contributions consist of the artifacts themselves, the selection and juxtaposition, as well as the annotations. This approach, representing an alternative to theory-driven work and conventional empirical prototype testing, appears promising for communicating results of constructive design research (Koskinen et al., 2009). Specifically, it preserves some of the complexity, richness and interrelation of the cases and thus yields a knowledge contribution that is more criticizable and appropriable for constructive design research peers.

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Singing Plant, *Medusae Nilfisk* & *Electrolumen* were created in collaboration with the collaborative interactive art studio illutron (www.illutron.dk).

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ARTICULATING MATERIAL CRITERIA

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ABSTRACT

This paper discusses the experiences and potentials with materials teaching at the Institute for Product Design at Kolding School of Design, using materials teaching as experiments in my PhD project. The project intends to create a stronger material awareness among product design students with emphasis on sustainability. The experiments aim to develop an understanding of, how product design students include materials in their design practice and how tools can be developed that further enhance this. Hence experiments are essential for the progress of the PhD project as they help to observe, imitate and articulate the students' inclusion of materials.

This paper particularly discusses the experiences made and ideas generated after the execution of a material science course for second year students, with emphasis on the concept of the *material selection matrix* as an educational tool for material exploration. The course was the first course I was involved in as a PhD student and has served as the first observation case in my project. The purpose of this analysis has been to explore and demonstrate that data from material selection matrices generated during the course, help mature the tool. Furthermore the purpose is to initiate a discussion on, how to create educational tools for material awareness creation in the design education e.g. by applying objective and quantitative methods in an otherwise often subjective design process.

INTRODUCTION

Koskinen et al. (2012) have proposed experiments as being *lab*, *field* or *showroom*. In the experiments I will discuss, I stress that they should try to evade interfering with students' work to give an objective impression of the present situation. This setting has *fieldwork* characteristics. However the extracting and structuring of experimental data with the purpose of re-introducing the tool in a course as well as planning workshops and discussion groups that aim to test the project's hypotheses and analyse results in a set context with *lab* characteristics.

According to Koskinen et al. one of the main differences between the lab experiment and the fieldwork is that the lab experiment stresses to be subjective, whereas fieldwork should emphasize on objectivity (Ibid). As a result I would like to propose the concept of the *field*

experiment (also discussed by e.g. Harrison and List, 2004) that incorporates both subjective and objective analyses. This makes it possible to use the material science course as the frame for the experiment, to test the hypothesis that material evaluation tools are important for creating material awareness, and hence to produce evidence for my further research.

MATERIAL TEACHING IN DESIGN SCHOOLS

Materials are the physical representations of product design and therefore they play a large and essential role in creating the identity of a product. This accounts for technical properties such as mechanical, physical, thermal, electrical and optical properties, but just as much for sensorial properties that are more difficult to define.

The project aims to develop the material education in design schools with introducing tools and teaching methods that strengthen the student's ability to evaluate and select right materials in the design process. An approach is to develop the concept of 'learning through materials' that finds its inspiration in theories from practice-based research with origin in Dewey's definition of learning by doing (1938). It should be acknowledged that design is a highly non-objective discipline with a weight on sensorial sensitivity. This accounts for the sense of vision as aesthetics and for the sense of touch as tactility or haptic experience. It is however difficult to structure sensorial impressions, as they are affected by individual preferences and previous experiences.

The material science teaching is highly practice-oriented with continuous links to theory; therefore the project seeks to communicate and develop the balance between practice and theory. The understanding of practice-based knowledge creation in the design education can be traced back to the 20s and 30s Bauhaus School's foundational courses in material understanding taught by Itten, Moholy-Nagy and Albers and the following specialization courses in practical workshops (Moholy-Nagy, 1947; Fiedler and Feierabend, 1999). At Kolding School of Design the experience is that students reflect upon theoretical knowledge when it is used in practice (Leerberg et al., 2010). As a result a strong correlation between theoretical knowledge and practice-based experience is fundamental for creating an active and progressive material understanding in the design schools. Schön designates this approach with the concept of the 'reflecting practitioner', that builds upon the importance of reflection and subjective knowledge creation as vital factors in creative practices such as architecture and

some of the experiences acquired from discussions with groups during the course and with the attempt to create a structure and construct a taxonomy to help recognizing unidentified material criteria.

HOW CAN MATERIAL CRITERIA BE ARTICULATED? – REFLECTIONS ON THE OUTCOMES OF THE COURSE

It became apparent how difficult it was for many students to set up criteria and compare materials in respect to them. For some it was difficult to identify demands as well as potential useful materials, which partly seemed to be due to an unacquainted technical material vocabulary necessary to understand and discuss properties in material literature and databases and partly because of general insecurity of how strict the material comparison had to be.

The nature of criteria for individual projects varied significantly and ranged from being ‘soft’ and intangible to highly quantifiable. In groups using many qualitative criteria, these were further discussed in the attempt to ‘normalize’ or translate the intended thought to comparable criteria. Not only was the intention to give the students something to work from, but also to take them a step further and make them discuss, what material properties are and why the ones they had identified were important.

The distribution of material criteria of the products’ lifecycle among the groups differentiated. It was not considered possible to require a minimum of criteria for each phase, as criteria depend on the individual project. Furthermore rating the materials seemed complicated and the higher the degree of intangible properties, the more complex it was to make material comparisons and the more subjective the rating became.

Because of the multifarious nature of projects, it was not possible to make general guidelines for neither criteria nor materials. Understanding a product also includes understanding its potentials and drawbacks and the identification of criteria helped the students to strengthen their projects.

A MATERIAL SELECTION TAXONOMY

The use of the material selection matrix is an attempt to apply objective and quantifiable tools to an otherwise often subjective design process. However in practice it is not entirely possible. Many criteria will be identified and included, but some will always be missing, as it is only possible to consider material properties or functions you are aware of exist and these have to be fully understood. Comparing materials is simpler, if the definition of the criteria is clear-cut, which requires a strong material knowledge. Criteria usually vary with concept, but for design students that are untrained in material selection, a guideline with a list of properties could be useful. However the risk is that such a guideline is used uncritically. Additionally too many criteria make a good comparison difficult, especially because not all criteria are valid for all materials, but too few criteria make a

material selection unreliable.

No matter the diversity of student projects the nature of the identified criteria and their distribution in different classes help to understand in which areas the material

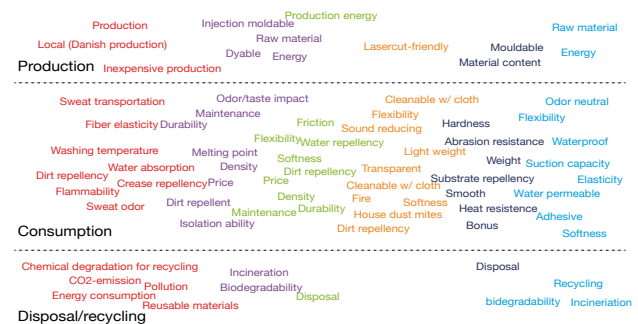


Figure 2: Structuring of material criteria for six groups in the course structured by three main phases in a product lifecycle. Each colour indicates a criterion identified by individual project groups and the horizontal line indicates the differentiation of material criteria in the production, consumption and disposal/recycling respectively.

awareness among the students could be strengthened.

The material criteria identified for six groups in the course were put in a criterion map separated in three main phases of a product lifecycle. As the course were held in Danish, the criteria were translated, which might have caused a ‘standardisation’ of the formulation of the criteria to fit more technical and common-used material criteria.

Even though the students were asked to make criteria for the material’s entire life cycle, criteria identified for the consumption/properties phase account for two thirds of all criteria, which can be seen in figure 2. This could be an indication that these are more tangible and understandable for the students. Both production and disposal are taught and discussed in the course, but the consumption phase is real and less abstract. Nevertheless with an emphasis on sustainable product development both raw materials/production and disposal are essential to consider.

Another interesting point is that products often consist of multiple elements with different functions and as Karana et al. (2010) state, it is important to distinguish between the material itself and the product the material(s) is embodied in. As a result it can make sense to use different materials that each have the properties desired for the product and thereby the material selection process can benefit from defining material criteria for elements rather than for the entire product; especially if the product contains different and separate functions. A group tried this and even though some criteria continued to be identical, the separation of element functions opened up to identification of new material criteria as well as a deeper discussion of other materials, which were relevant to introduce in this stage.

CLUSTERING CRITERIA

The material criteria grouped in the consumption phase were further analysed. The majority of properties here could be related to physical attributes, but also mechan-

ical and thermal properties are represented. The physical properties have been divided into *function* that includes absorption and transportation of media such as water, air and light, *maintenance* that relates to the use of materials in terms of multiple repellences and cleaning, and *hand and touch* that contain properties related to 'direct use' and the senses.

The use of different colours in figure 3 illustrates the distribution of criteria for each project. This uneven distribution can be the result of at least two things: a) projects have different focus and therefore different criteria have been identified, b) people that define criteria have different knowledge and experience which affect their identified criteria.

If a) is the case, a differentiation and clustering of criteria can help illuminate, which areas of criteria that have to be further elaborated. It can be applicable to define primary and secondary criteria, where primary criteria account for essential properties whereas secondary criteria can include relevant criteria that are desirable but not crucial. If b) is the case it can be helpful to have others evaluate criteria with respect to the concept, as this can contribute to an identification of 'tacit' or 'unknown' criteria. In a course situation the quality of criteria can benefit with having groups evaluating each other's criteria and add the ones that have been identified in this step.

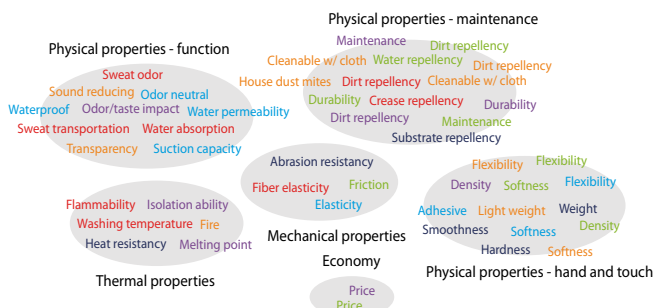


Figure 3: Clustering material criteria identified as being in the consumption phase in categories of properties for six groups in the course. The colours indicate the different groups and as a result some criteria might occur more than one time.

CONCLUSION

This paper has demonstrated that one way to obtain knowledge of students' practice is to regard the material science course as a field experiment, which includes properties from both the traditional experiment and fieldwork defined by Koskinen et al. (2012).

Using the field experiment as a methodological tool helps to break down barriers between subjective and objective observations and experiences and enables in this case the combination of the personal and subjective in the creation of the material selection matrices with the systematic and objective analysis of generated data to create a meta-outcome of the material science course.

The purpose was to mature the concept of the material selection matrix as a tool to enhance the material awareness among students and using the data it generat-

ed to recognize where students might experience difficulties.

An approach is to create a taxonomy where criteria are structured in phase of lifecycle and in clusters in the lifecycle phases that can help illuminate if some areas of the potential criteria space has been left out or could be strengthened. This further introduced the idea of different natures of criteria where the tacit criterion is one. Using this in combination with the taxonomy it is believed that articulation of material properties can be enhanced.

Another kind of taxonomy is to perceive the design concept as the sum of multiple elements or functions that require various material properties and therefore material selection matrices could be made for each of them. This could help students to dissect otherwise complex products. Related to this could be the introduction of separate material selection matrices that handle tangible and intangible properties respectively.

The essence of the study is to make material awareness an integrated part of the design process. The material selection matrix is a tool for this, but the material selection method should become an unconscious part of the practice to create a stronger material integration in the design process. The experiment has shown that there is potential in the tool and further experiments will continue this exploration, e.g. in how earlier introduction to the tool combined with continuous guiding and use of the tool throughout courses affect the material inclusion in the design process.

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STORY OF USE: ANALYSIS OF FILM NARRATIVES TO INFORM THE DESIGN OF OBJECT INTERACTIONS

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ABSTRACT

Not only is using a product an experience, it is an interaction and it is narrative in nature. This work in progress paper describes the narrative theory background for this statement, in particular schemata theory and the concepts of agency, tellability and narrativity, then describes methods that are being used in the project to analyse film narratives and apply these to the design of tellable physical products.

INTRODUCTION

The aim of this project is to analyse an interaction with an object as a narrative, and to analyse the narrative structures and effects of other narrative mediums, for the scope of this project limited to examples from fiction film, and create methods that can apply findings from this comparison to generate designed objects which “direct” *tellable* product experiences.

The premise is that not only is using an object (any object) an experience, it is an interaction and it is narrative in nature. The theoretical framework comes at the intersection of two lines of thinking that can be looked at in parallel – on the one hand there has been research around the idea that experiences are described and remembered as a story (Bruner, 1991; Dewey, 2005; Forlizzi, 1997; Hassenzahl, 2010), and on the other hand the field of narrative theory has been lending itself to wider interpretations of what narrative is, that are less tied to a specific medium, the literary text, and are open to accepting other mediums but also real life experiences, or the on-the-spot or a posteriori recounting of experience, as having narrative qualities (Abbott, 2008; Bal, 2002; Young and Saver, 2001).

The project develops this premise by cross-fertilising the design of objects, in particular non-digital domestic

objects, with narrative techniques, patterns and roles derived from the analysis of specific film examples. In other words, someone using an object will experience a sequence of events (or micro-events) related to this use; in the case of a kettle the user will approach the kettle and see it, then fill it with water, place it on its base, turn it on, wait for it to boil, possibly notice the noise of the boiling water or the steam coming out of the kettle, then the kettle will turn itself off (or is turned off) and the user pours the boiling water and places the kettle back on its base. By manipulating or “directing” what these micro-events are, how and when they happen and what they communicate or represent to the user, and by creating consciously structured sequences of micro-events within this “single-use” experience of a kettle either from the point of view of physical interaction or from the point of view of emotional or cognitive responses, then the designer may be able to increase the *tellability* of this experience. *Tellability* refers to the noteworthiness of the events being related; high *tellability* in an event will then lead to high *narrativity* of the related story (Baroni, 2013).

LITERATURE AND THEORY

Looking at physical domestic products as creating or prompting narratives when they are interacted with suggests an exploration of a few different theoretical fields; material culture anthropology looks at the significance of domestic products in the construction of identity (Miller, 2008); the literature on experience psychology explores how experiences are assimilated and evaluated over time (Bruner, 1991; Hassenzahl, 2010); ideas explored by interaction design about the way people interact with objects, using stories, performances or trajectories (Gaver et al., 2003; Laurel, 2004; Löwgren, 2009; Benford et al., 2009), though the focus tends to be on digital objects; as well as studies of narrative theory which can provide insights on narrative construction and interpretation (Abbott, 2008; Bal, 2002; Bordwell, 1985). Because of the limits of the conference paper format I will focus on those areas of narrative theory that may prove useful in the design process and in structuring design briefs.

Narrative theory is used as a framework for this study because of the relevance of narrative in the forming of identity (Sacks, 1998) as well as the idea that our experience of the world is mediated through a narrative understanding (Bruner, 1991; Young and Saver, 2001), our interpretation of reality through memory or recall is also guided by narrative principles (Abbott, 2008; Bordwell, 1985; Young and Saver, 2001) and our ability to empathise is greater when information is presented in narrative form (Danko, 2006; Wright and McCarthy, 2008). Everyone has probably told a story about an interaction with an object, for example a story about using a particularly “stupid” automatic cash register at the supermarket; these stories become part of how the object is experienced, understood and remembered.

Often, stories told of objects have the effect of humanising these and giving them anthropomorphic characteristics. So the automatic cash register at the supermarket may be “stupid” and “slow”. In this way the story is often retold or recalled as an interaction between two beings which both possess some form of *agency* or will; according to Gell (1998) artefacts (which he groups under the term art) possess agency when they allow things to happen “in their vicinity”, in other words when they are perceived as having a will. Bal (2002) goes one step further and moves the focus of an object’s interpretation from the maker (artist’s intention) to the object (agency of the object) and on to the viewer (or user) through the concept of *narrativity*: this emphasises the relationship between the viewer and the object, seen as a story of viewing and interpreting the object, not predetermined but only fostered by the designer’s intention. This cognitive activity is narrative because it happens through time: “Narrativity is here acknowledged as indispensable, not because all pictures tell a story in the ordinary sense of the word, but because the experience of viewing pictures is itself imbued with process.” (Bal, 2002, p281). This leads on to the hypothesis that objects perceived as possessing *agency* may have more potential for *narrativity*, and to the idea that a narrative is created in the user’s mind when interacting with an object, and it is central to the way the user interprets the object.

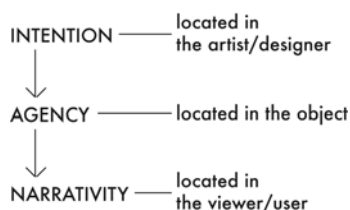


Figure 1 - Conceptual model of three levels of interpretation – Adapted from Bal (2002)

Out of this conceptual model (Figure 1) it is interesting to draw parallels with constructivist conceptions of narrative; In particular Bordwell (1985) talks about the activity of the film viewer as being one of story construction: “the viewer’s comprehension of a story is the principle aim of narration” (p30) and the main

activity of the (narrative fiction) film viewer is that of creating hypothesis about the story and then validating or disproving these hypothesis as the film develops. This is then explained by Bordwell in terms of *schemata theory*: we have a set of learned notions about how the narrative will develop that come from every day experience (including the experience of watching films).

According to Bordwell (1985), we have four types of schemata at work when viewing a film. *Prototype schemata* allow us to identify agents such as characters, props and locales as contributing something to the story, for example a character with a gun will be perceived in a certain way. *Template schemata* represent abstracted narrative structures that allow the viewer to slot information into the right sequence when reconstructing a story. So a story that is told in an order that is different from chronological can be understood in the correct chronology because we have these template schemata to assist us in “filing” the information into the correct place. Incidentally, stories which are told in a way that is close to these template schemata are easier to remember, and, regardless of what order the story was told in the original film, viewers will make the story conform more to the prototype schemata when retelling or recalling. *Procedural schemata* have to do with the viewer’s understanding of the story; these are the relationships between the parts of the story that don’t necessarily relate logically but might be perceived as related because they are typical of a particular genre, or because they are necessary to the construction of an elegant story. *Stylistic schemata* have to do with the style elements of the film medium, such as camera shots, lighting, etc. Schemata aid story recollection and allow viewers to be surprised by a story event which does not conform to the hypothesis they had made, and allow the viewer’s hypothesis to be validated by a story event that does follow the viewer’s expectations.

In particular prototype and template schemata could be applied to the design of objects; prototype schemata play on semiotic understanding and classification of clues, so in an interaction with an object this could be visual clues about the form of the object which makes the user construct an understanding of that object based on prior knowledge or experience, or clues from the way the object behaves which might prompt the user to assign it a personality. Template schemata relate to the way we expect the experience with the object to develop over time, validating or invalidating hypothesis to create patterns of surprise or predictability, and this could have some interesting applications especially to the design of objects which vary their behaviour, or when we can ascribe some form of cause and effect relationship to events that happen in a sequence. So if our broken laptop turned on when the cover was lifted “just so” we tend to ascribe a general cause and effect rule and to repeat the gesture. But also if micro-events within an interaction happen over time in a way similar to a typical story structure it might aid or foster the *narrativity* of the experience and the *tellability* of the

object. So the result of applying these schemata to designing objects might be that the object actively encourages an increase in the gusto that someone might have in retelling the story of their interaction, thus fostering word of mouth and increased recall.

DATA AND METHODS

In light of the theoretical model outlined above the project analyses film examples in which the objects selected for redesign appear in a narrative role and takes elements of how the story is told in the film to apply these to the design of the object. The first step has been to select a number of domestic objects through an online questionnaire and to select a number of films in which these objects appear. The films were selected through the Internet Movie Database Forum, asking the forum participants to identify scenes in which the selected objects play a significant role because they resonated and were memorable, as opposed to films in which the objects simply appeared. Suggestions were then divided by object and for each object four or five films were selected, taking care to have variation in genres for each object and in roles these objects take on.

This project is being piloted with the kettle. The films selected for this pilot were *Vera Drake* (Leigh, 2004) a historical drama in which the kettle helps establish the character of Vera as a caring individual, and helps to frame her activity of providing illegal abortions as a caring act; *Wristcutters: A Love Story* (Dukic, 2007) a comedy in which the kettle's whistle is used as a device to cut from one scene to another; *A Tale of Two Sisters* (Kim, 2003) a psychological horror in which a boiling kettle is used as a weapon; and *Secretary* (Shainberg, 2002) a comedy/drama/romance in which the kettle is used to establish a domestic calm scene but in that same scene is then used as a masochist's tool.



Figure 2 - Scene from Secretary (Shainberg, 2002)

The film scenes were analysed according to McKee's guidelines (1999) focussing on turning points, timing of beats of action, conflicts and goals, but adding some detail about the role of the object in the scene, which relates to the idea of the object having *agency*.

The film examples will be used in different ways as templates or starting points for the design of the object experiences, for example by incorporating narrative devices such as shifts of roles or meaning, timing structures and symbolic uses of objects. In particular the scene described above has led to several briefs; some

examples are to design a kettle which performs a role reversal, from reassuring to threatening, and to design a kettle with a similar time structure of micro-events to the beats of the scene. Other briefs developed so far have to do with the kettle as establishing a caring role (based on *Vera Drake*); comparing different structures and timing of the film sequences, which can be used to organise micro-events within the kettle use; looking at the whistling of the kettle as a film trope or device, such as in *Wristcutters*; and a cross-film brief about the different roles the kettle takes on in different films.

In parallel to the film analysis, participants were recruited to analyse the experience of use of a kettle. For this pilot a convenience sample was used, asking students to participate; after the pilot and for the testing of the objects the participants will be recruited from the respondents to the initial questionnaire to select the objects. The participants were asked to film themselves while using their own kettles, and were then interviewed about this experience. The interview was conducted in two phases; first the participant was asked to describe how they use a kettle, in what circumstances and what they do while they wait for the water to boil. Then the video of the experience was shown and the interviewer asked the participant to "talk me through the video". Interestingly the participants were a lot more open about describing their quirks of use while watching the video: one participant described how she inspects the kettle for limescale before each use, while another talked about the fact that she doesn't "like to let hot water wait, it defeats the point in my opinion".

The final step in the participant involvement was to create a storyboard of their use of the kettle, and to answer a few final questions about whether they enjoyed the storyboard exercise. Because the participants were not necessarily familiar with drawing or with storyboard techniques they were provided with cut outs of faces, bodies, hands and kettles at different sizes and scales which they could collage into the storyboard. An example is shown in Figure 3.



Figure 3 - sample storyboard of kettle use

The data coming from the participant interviews, analysed in terms of sequences of micro-events but also quirks of use, will be useful in conjunction with the briefs coming from the film analysis to formulate new designs, and narrative theory elements such as schemata will be used to frame how micro-events are experienced by the user in time. The participant research will also test the narrativity of the experience of the kettle: once the objects are redesigned these will be tested in the same way as the initial objects were tested with the participants. The final aim is to assess whether the project led to objects with an increased *tellability*, which therefore increased the *narrativity* of the experience.

RESULTS AND DISCUSSION

Though the study is in progress, the work done so far shows the potential of applying elements from narrative theory as well as practical examples of story construction from film to the design of objects as *tellable* interaction experiences, and the parallel analysis of the role of the objects in films (which tends to be more extreme) and the object use experiences provides a comparison platform to start applying these ideas into designed objects. The idea of schemata could be useful to designers in terms of building a recognisable story structure, and the concepts of *agency* and *narrativity* could aid in creating objects that are more *tellable*, fostering or directing events that when retold lead to stories with increased *narrativity*.

The study of narrative theory could therefore lead to a better understanding of how designers can incorporate narrative elements such as logical connections between events, template schemata or agency and perceived agency of objects into the design of objects. This is not in contrast to other approaches such as looking at the creation of meaning in objects or the emotional effects of a design, but it is instead intended as an additional narrative dimension that designers can consider, in addition to those already widely used such as scenarios.

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POSTCARDS FROM A (BETTER) FUTURE: PROCESS AS MAKING

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“How will you go about finding that thing the nature of which is totally unknown to you?”
Meno, from Plato's dialogue (in Solnit 2005)

ABSTRACT

It is hard to imagine a future fundamentally different from what we know, yet increasingly people dream of and agitate for social, cultural and political change. *Postcards From a (Better) Future* is part of an evolving interrogation into how embodied-thinking-through-making might assist in the imagining of (better) futures that might otherwise elude us. It is a bid to empower people to imagine, through making, so that they may effectuate change. This paper describes the theoretical background and structure of the *Postcards From a (Better) Future* process. It provides background on the fundamental conceptual shifts; and discusses how and why the process, in and of itself, might constitute making.

INTRODUCTION

One of the primary difficulties of creating social, cultural and political change lies in our inability to imagine practical, executable steps that can be taken towards complex and overwhelming problems. “What do you really want, if you could have anything?” is an awful question that mostly results in simple, modest answers.

In her book, *On Longing*, Susan Stewart (1993) proposes that objects of desire assist in the formation of continuous personal narratives that connect the present with the past. *Postcards from a (better) future* attempts to turn this connection towards the future. It is a

participatory workshop experience, in the form of a making circle, designed to facilitate the articulation of objects to address changes in imagined futures. Taking participants' personal desires and fears as the point of departure, the process uses embodied making to enable the conception of objects of desire that might affect future change in specific and executable ways. The resulting objects give form to speculative and utopian design fantasies, and form ongoing personal narratives that strengthen connections between the present and imagined futures. They thereby empower participants to imagine how they might effectuate change.

METHODOLOGY

Postcards from a (better) future makes use of three distinct research processes, *embodied thinking-through-making*, *research through design* and *design placebos*, to investigate the role that embodied exploration might play in ensuring the social and personal relevance of design innovation. Drawing on these processes, we have developed structures to support thinking with the body in ways that capture the imagination, stimulate curiosity, and afford multi-sensory experiences.

Embodied thinking-through-making is adapted from Gaver et al's work in *Cultural Probes* (1999). Cultural Probes were originally intended to give designers access to the thinking and desires of a specific set of users in order to inspire design processes. They typically consist of activity prompts sent out to participants, who interpret the activities as they wish and send their responses back to the designers. Our modified version uses a probe-like process as the basis for enabling real-time situated exchange between designer and participant. Through the use of tightly structured instruction sets, designer-facilitators prompt participants to engage in an embodied thinking process that results in exploratory objects. These objects serve as props in physically engaged interviews and activities. With the associated frameworks for action, they assist participants to move from abstract (personal knowledge-based) embodied exploration into a specific articulated

design space in which they are able to explore their idiosyncratic desires in relation to clearly defined futures (Wilde 2011).

Research through Design (RtD) is a hybrid approach that employs methods and processes from art and design as legitimate modes of inquiry (Frayling 1993). RtD is commonly used in technology design research to understand the influence of a new technology on how people think, value, feel, and relate (Zimmerman et al 2010). It makes use of designerly activities (Gaver 2012) as a way of approaching messy situations with unclear or even conflicting agendas. By engaging users in creative play with research ideas and techniques, RtD shifts the research focus toward the future, instead of the present or the past. It provides opportunities for community engagement in a discourse, and allows consideration of the broader ethics of what is proposed, developed or designed. Importantly, by leveraging embodied thinking-through-making and the notion of *Design Placebos*, our approach to RtD generates personal knowledge, as well as knowledge that can contribute to societally relevant design future outcomes.

Design Placebos are physical objects or interfaces that afford the experience of an idea that may not (yet) be feasible (Dunne and Raby 2002). Rather than alter reality in any tangible way, a Design Placebo prompts the development of narratives to explain how the world is different as a direct result of what the placebo is imagined to be doing. Placebos encourage the willing suspension of disbelief and engage people in the active re-imagination of the world, allowing them to transcend the everyday and reach for new possible meanings for situations they encounter. Framing our participants' exploratory objects as Design Placebos affords engaged discussion around imagined futures, including deep consideration of the social, ethical and personal implications of what life would be like if they were real.

The careful interweaving of these three research processes affords the bringing into being of previously unarticulated thoughts and desires for the future, as well as consideration and discussion of concrete and tangible actions an individual might take to affect societal change.

TOWARDS AN IMAGINED FUTURE

Over the last decade design research has proven itself a valuable and powerful approach to ascertaining understandings and concerns regarding the design of the world around us. With the *Postcards from a (better) future* project we are investigating ways of expanding design methods through the use of embodied making processes. Our frameworks for embodied thinking-through-making enable the bringing into being of previously unarticulated thoughts and desires around that which does not yet exist, or has not previously been imagined. Our approach asks: If design research can assist us to imagine specific and detailed design futures, might they not also enable us to open up conversations

about highly idiosyncratic political and cultural concerns? By making manifest that which did not previously exist, our approach constitutes a kind of making, in and of itself.

Postcards from a (better) future is a speculative proposal for reframing methods to scaffold "practising the future". It forms part of a larger body of work aimed at testing the link between investigative objects and the meaning that may reside as potential in and around such objects. Related work by the authors includes participatory methods focusing on: imagining body worn devices (Andersen and Wilde, 2012), future scenarios for specific technologies (Samson and Andersen 2013), creating non-functional models of technological fantasies (Andersen 2013), and embodying imaginative poetic enquiries (Wilde 2011).

THE FORMAT

The *Postcards from a (better) future* project is an instruction set for a making circle designed to empower people to imagine, through making, that they may effectuate social change. Making circles (Andersen, Wilde 2012) are typically conducted with twelve participants and two facilitators in a neutral, utilitarian space that contains a large shared worktable with various tools and lights, and another table, off to the side that holds various recycled materials. The format of the circles has been reduced to the following sequence of conceptual estrangement switches, and short declaratory 'interview' process (Being 'Done'). These activities work to shift the mindset of the group away from the predictable, towards a temporary moment of otherness. According to Judith Butler (2005) we must: "risk ourselves precisely at moments of unknowingness, when what forms us diverges from what lies before us, when our willingness to become undone in relation to others constitutes our chance of becoming human." Our circles are purpose built to facilitate this kind of risk taking, to provide a temporary space in which participants can 'become'.

ESTRANGEMENT SWITCHES

The circle begins with a short introduction that functions as the drawing of the circle, and in a theatrical sense, declares the beginning of the game (Caillois 2001). We introduce the above quote from Meno (Solnit 2005), and briefly explain the broader structure of our enquiry into how embodied thinking-through-making might assist in the imagining of (better) futures. We then take participants through four estrangement switches:

1. Participants are asked to choose from of a limited set of desires, borrowed from the motivational psychology research of Steven Reiss (2000). Reiss' desires are usefully provocative. They reduce a complex emotional field down to someone else's shorthand definition of the world. They also introduce language before the participants know what they might be describing,

and thereby provide an uncommon point of departure for an embodied discovery process.

2. Participants are then invited to pull from a hat one of forty-one methods of nonviolent intervention (a subset of 198 Methods of Nonviolent Action proposed by Gene Sharp (1973)). This action compounds the first estrangement switch. Pulling options from a hat alludes to magic and chance.

In *The Craftsman*, Richard Sennet (2009) asserts that “magic raises the stakes of unforeseen events, gives changes in form a compelling power to command wonder and fear.” We lean heavily on this idea, approaching a difficult subject in an equally difficult or convoluted manner. The underlying assumption is that to ‘free up’ the creative and expressive body to respond to the unanswerable, we must first ‘busy’ the reasoning part of the brain so that it will not interfere (May 1994).

Sparse instructions engage the reasoning part of the brain, freeing participants to be spontaneous, and follow their intuitions and creative whims (Bogart 2001). Leaving elements of choice to chance additionally destabilises, defamiliarises or ‘makes strange’ that which is already beginning to be so (Shklovsky [1917] 1965). The combination and contrast of the chosen desire and the randomly selected method of protest creates a pregnant confusion within each participant. Together they provide a double point of departure that may contain inherent conflicts. The duality prompts focus shifts between the intimate body personal, and a socially engaged, outward-looking perspective. From this point of confusion each participant may begin to engage through an embodied making process, which we ground equally in the body and material.

3. The third estrangement switch facilitates a transfer from, and connection between, desire, fear, power and the body. We ask participants: “Where in your body does your chosen desire reside?” and “How is your body engaged or endangered by your method of protest?” These nonsensical questions draw heavily on surrealist art strategies, liberating in their absurdity (Brotchie 2004).

“If you were a colour, what colour would you be?” Children know this game and have answers for these types of inquiries. The switch between an abstract desire and intention, defined very strictly by someone else, and the feeling that these words and ideas may indeed reside within the body, or reach out in social protest, allows participants to begin to work. The questions move from the abstract to become concrete and physical. A clear concept emerges to guide the subsequent work.

4. “Find the material that works for you.” This prompt allows the physical making and crafting to begin. Participants now find physical form and texture for the body-feeling they have identified, selecting materials from our neatly organised, neutrally coloured, texturally and structurally rich palette of materials. The decisions they make at

this point will not be reasonable, rather they will continue the line of absurdist questioning by asking: “If this feeling had a texture and a shape what would it be?”

The process is designed to expose unexpected and poetic possibilities that may be explored through the sensory potential of material to body, as brought into being through the behaviours, desires, feelings, and anxieties that arise. Dr. Montessori famously used blindfolds in reviewing materials, stating that the eye can interfere with what the hand knows (Lillard 2008). We could add that language can interfere with what the hand knows. For this reason, as the participants choose materials they will make, rather than speak, to support their burgeoning concept.

These four switches occur in less than twenty minutes, allowing no time to reconsider or back out into careful reasoning. In a sense, participants will not be completely committed yet, because they do not know what it is that they are making. Nonetheless, the process engenders tranquility: a focused, efficient, relaxed and also gently energetic state. The work that follows is typically instinctual and effective, the conversation around the table limited to the practical, until at some point each object is “done”.

BEING 'DONE'

Knowing when a device is ‘done’ is an instinctual knowing. By removing verbal reasoning from the imagining and creating process, our process frees participants to trust their ability to recognise what it is they are doing as it emerges, including when it is ‘done’. This knowing ‘when’ is something we all have experienced. Henri Cartier Bresson called it ‘the decisive moment’ the moment when the trigger on the camera is pushed. This moment relies on the photographer’s ability to see and record an event literally taking form in the immediate future (Zichittella 1998). Once ‘done’, participants pose for a self-staged photographic portrait with their artefact, ensuring that the correct pose is captured and retained for posterity.

The making process is completed with these portrait poses. Participants then re-gather for a group discussion, where they formally declare: their name, desire, method of protest, the name of their self-made object and what it does. They then demonstrate their object and portrait-pose to the group. The strictness of this final presentation format allows the hazy decision making process that has come before to crystallise. Excluding language from the central part of our structure allows an intuitive and productive process to emerge. The formalisation of this final declaration process allows verbal reasoning back in.

From previous work (Andersen 2013, Andersen and Wilde, 2012, Samson and Andersen 2013, Wilde 2011), we know that such public and vocal presentations allow the switch between the intuitive and wordless process and a reasoned presentation to happen in the moment,

with many participants only realising what they have built as they name it and present it to their peers. Once all the presentations are complete, the circle is broken and the game is over.

CONCLUSION

Postcards from a (better) future takes participants through a rapid series of formalised conceptual shifts, that each draw on large areas of work in theatre and performance theory, game play and design research. Placing embodied exploration at the centre of our methodology enables us to leverage individual creativity, and draw out unarticulated thoughts and desires. This approach allows us to drive socially relevant, desire-driven innovation by creating openings for new ideas, while explicitly allowing for idiosyncratic concerns, comprehension, and preferences. We can thus ask participants and ourselves: What might the world look like if we fast-track through the technologically feasible adjacent possible (Johnson 2010) to innovations firmly rooted in human desire, imagination and bodily experience?

Significantly, the making circles blot out the most immediate response to such questions, so that we might access more instinctual, and perhaps less plausible responses that challenge and stretch what we consider to be possible. Their format enables us to sneak up on ourselves, to be caught unaware and unselfconscious for a moment so that we dare to begin. By facilitating the turning of matters of concern into physical material, we are able to support a basic process of embodied making and making sense. We imagine results that represent a kind of souvenir from the future. Rather than reminding us “what happened then”, these objects might carry stories about “what happens next...”

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TRANSLATIONS – EXPERIMENTS IN LANDSCAPE DESIGN EDUCATION

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ABSTRACT

How can students be taught an experimental approach to landscape design? New strategic planning tasks require more research-oriented design methods. Using the example of student work for a rural landscape in northern Denmark, this paper discusses landscape design as a process of translation. The landscape project is here essentially understood as spatial interventions aiming at unfolding inherent, place-specific development potential. Comprehending the landscape and dynamics of landscape change and formulating landscape projects thus becomes an integrated, creative process: A translation of an existing into a possible future landscape. Based on actor-network theory the paper outlines, first, a conceptual framework and, second, an educational procedure for landscape translation.

INTRODUCTION

Urban and regional planning deals increasingly with renewal and transformation of existing landscapes for strategic purposes. Planners, politicians and private stakeholders expect landscape projects to affect economic, social and environmental development beyond the specific project purpose and beyond the borders of a given transformation area.

Landscape projects are therefore more and more concerned with unfolding inherent, place-specific development potentials – and doing this across different scales: locally, regionally, and globally. As a consequence landscape architects increasingly ask what landscape projects can *do* rather than how they should look. The general idea is to steer urban or regional

development in a desired direction through strategic physical and programmatic interventions (Braae and Author 2011; Kühn 2010; Sieverts 2011). At the same time, long term urban development processes with many actors and an uncertain outcome require landscape projects to remain open to new interests and insights.

Strategic urban and regional planning confronts landscape architects – and ultimately landscape design education – with new methodological challenges. Landscape analysis becomes central to the design process in new ways: Working alternately with analysis and project development the landscape architect simultaneously formulates local problems and relevant physical and programmatic interventions. In other words, comprehending the landscape and dynamics of landscape change and formulating landscape projects becomes an integrated, creative process. The modifier ‘creative’ is vital. Rather than a comprehensive analysis with regard to formulate ‘correct’ solutions, landscape analysis is here a creative act seeking to uncover and make local development possibilities probable through purposeful design experiments.

How then can students be taught this experimental approach to landscape design?

This paper draws on my teaching experiences from the Aarhus School of Architecture and the University of Copenhagen. Through the last 5-7 years these schools established new hybrid educations that combine landscape architecture with an urban and regional planning perspective. Recognizing that teaching how to design solutions for predefined problems is no longer sufficient, the schools have a strong focus on developing new education methods for landscape projects in a strategic planning context. In this context the teaching of adequate survey and mapping techniques plays an increasing role. However, not even the most advanced mapping techniques do necessarily lead to innovative ideas for landscape development (v Seggern, Werner et al. 2008). The step from inventory to intervention, i.e. the formulation of the design problem, requires therefore particular attention. How to teach this first and maybe most important step of an experimental design process is the focus of this paper.

Using the example of student work for a rural landscape in North Jutland, Denmark, I discuss landscape design

as a process of translation. Based on actor-network theory the paper outlines, first, a conceptual framework and, second, an educational procedure for landscape design experiments.

TRANSLATION: CONCEPTUAL FRAMEWORK

With actor-network theory (ANT) creative landscape analysis can be described as a translation of an existing into a possible future landscape. The ANT-account is a method to describe how complex connections are being constructed for a certain purpose, e.g. the development of a product (Latour 2005). Originally developed in relation to research and technological innovation processes, it shall here be applied to the development of strategic landscape projects through design experiments.

According to ANT human actors (users, stakeholders, professionals, etc.) and non-human actors (infrastructure, soil, climate, natural processes, etc.) gather in interdependent, dynamic actor-networks due to their agency. Agency does here not designate an intentional activity, but the actor's capacity to affect other actors. It is thus crucial that an actor is defined by what it does to other actors. In a landscape project an 'actor' can therefore be any thing, idea or person having an effect on landscape development: from the topography of the landscape, over development plans, to important stakeholders.

ANT thus directs landscape architects' attention to the effects of interaction between human and non-human actors. It is the relations between physical structures and natural and socio-cultural processes and not the physical structures themselves we need to be interested in.

Throughout the design process these effects of interaction are both studied and being translated into an innovated actor-network (Braae and Author 2011). More precisely the 'identity of actors, the possibility of interaction and the margins of manoeuvre' are being negotiated and delimited (Callon 1986).

FOUR MOMENTS OF TRANSLATION

Based on his study of marine biologists' attempt to restock the St. Brieuc Bay, France, to produce more scallops, Michel Callon (1986) defined four decisive 'moments of translation': *problematization*, *interessement*, *enrolment*, and *mobilization of allies*. These four moments can equally be applied to a design process. Here, the first decisive moment is the formulation of a design problem or, as Callon puts it, 'series of negotiable hypotheses' for landscape development.

These first design hypotheses function as the filtering lenses for both landscape analysis and project development. Landscape architects' testing of development possibilities, e.g. in the form of scenarios or interpretative maps, corresponds to what Callon calls *interessement*: Actors who are potentially affected by the formulated design hypotheses are being identified and gathered. The more productive relationships

between the so identified actors one can observe and describe the more valid one's hypotheses become. Inversely it can happen that one must reformulate or even reject a hypothesis because it shows impossible to demonstrate possibilities of interaction.

The so gathered actors are then *enrolled* into the preliminary actor-network of a design project. In the form of physical and programmatic interventions the project introduces new actors, creates new or further articulates existing relationships and connections. The more productive relationships between existing actors and design interventions one can suggest the more probable the desired innovation effect of one's proposal becomes.

The final moment of *mobilization of allies* rarely happens in an academic context. It occurs when the realised project begins to unfold its effects through the landscape and all the gathered actors are made to act as one innovated actor-network.

IMPLICATIONS FOR LANDSCAPE DESIGN EDUCATION

Understanding creative landscape analysis as an experimental translation process has several productive implications for teaching landscape design and, in particular, the formulation of a design problem.

With ANT we can understand a given development site as the dynamic result of interactions taking place between different human and non-human actors.

As a consequence ANT also provides an alternative, relational understanding of context: A site relates to its surroundings due to the reach or extent of present actors' interaction – what Callon (1986) calls the 'margins of manoeuvre'. This process-based understanding of context makes it possible to study and develop a given area across different scales: locally, regionally, and globally.

Finally, ANT provides valuable advice for a design approach that focuses on what a landscape project can *do* for landscape development. Translation links landscape analysis with the formulation of a design proposal by articulating possible relationships between existing and future material conditions, ideas, and practices. According to ANT the key to creative landscape analysis is to follow the actors and carefully map their controversies with other actors, i.e. the differences, traces, and transformations they produce in interaction. Bruno Latour, one of the founders of ANT, calls these traceable effects of interaction the 'figuration of agencies' (Latour 2005:53).

This approach has the advantage to be transparent, i.e. one can retrace and discuss the observations, analyses and hypotheses on which a design proposal is based. In this way it becomes possible to share and further develop the action-oriented knowledge produced by one student together with teachers and other students – or, in professional planning practice, with the many actors in a planning process. It also becomes possible to integrate

new interests or insights in a long-term planning process with an unknown result.

TRANSLATING GÅRDBO LAKE

A student project for a rural landscape in North Jutland, Denmark, shall illustrate the development of a landscape project based on translation with particular focus on the initial design phase and the formulation of the design problem.

The Gårdbø Lake project is the MA thesis of two students in Landscape Architecture and Urbanism at the Aarhus School of Architecture. Kim Møller and Anne Ulrik (2007) set out with the general hypothesis that a unique cultural landscape could provide a development opportunity in a remote, rural region suffering from population decline, lack of work places and a growing vacant building stock. This hypothesis guided both landscape survey and analysis and the formulation of a place-specific design problem.

To begin with the students chose the drained and cultivated Gårdbø Lake area for two reasons: The drained and cultivated Gårdbø Lake area has a striking spiral landform and a characteristic field pattern with intact hedges and copses. At the same time it is situated in an especially problematic location, disconnected from the relatively prospering coastline and thus particularly affected by population decline.

In their landscape analysis Møller and Ulrik then focused on how the existing characteristic landscape structures had come into being, which processes had affected them over time, and which processes were likely to affect them at present and in the near future. The landscape analysis was thus structured around three approaches: First, a traditional survey of characteristic physical structures. Second, a diachronic analysis of how the existing physical structures had developed and changed over time in interaction with natural and socio-cultural processes. Third, a synchronic analysis of present activities and uses in the area, expressed new needs and interests, and existing plans and policies for landscape development.

The historical analysis made it possible to identify long term development tendencies and what physical structures they affected and how. The analysis of current spatial practices and discourses made it possible to identify present usages, development interests and needs in relation to existing physical structures.

Overall the analysis pointed to three distinct landscape structures 'figuring' from the effects of interaction between human and non-human actors: the drained lake bed, the cultivated lake shores and the ridge to the west of the lake. Over time each of these landscape structures had developed its own clearly recognizable aesthetic vocabulary. Furthermore, the analysis pointed to a number of present development tendencies and different, partly conflicting interests that potentially affected the three landscape structures.

For example, the lake drainage system was under progressive erosion and required a costly renovation in the not too distant future. The owner of the lake bed area and the associated manor house wished to maintain agricultural production but also to invite tourists in the area to increase his income. The Danish Society for Nature Conservation on the other hand promoted a restoration of Gårdbø Lake to enhance biodiversity and local bird life. The European Water Framework Directive represented yet another interest, seeking for improved water quality through extensification of agricultural production.

By problematizing these present development tendencies and conflicting interests Møller and Ulrik identified place-specific challenges and development opportunities that became the basis for formulating a place-specific design problem or brief for the Gårdbø Lake area. At the same time, they identified and delimited relevant areas for physical and programmatic intervention with regard to the formulated brief.

On this basis Møller and Ulrik developed a strategic landscape project for the larger lake area where new physical structures and programs will incrementally transform the existing landscape structures and uses. Each intervention is thought to provide opportunities for further development. In this way the proposal is strategic because it seeks to affect landscape development over time while at the same time remaining open to new insights or interests that could emerge in the future.

In a first phase, the landscape project suggests the conversion of the drained lake bed into a planted lagoon and the improvement of accessibility to the area. To control the water level of the lagoon the existing drainage system is being reused. In this way biodiversity and bird life will be enhanced while agricultural production can continue unhindered on the lake shores. In addition, the planted lagoon is expected to attract hikers and bird lovers. Improved connections to the regional road and path system and especially to other tourist destinations will thus be able to enhance the integration of the inland with the beach resorts on the coast. In a second phase, a specialisation of agricultural production into medicinal plants could enable wellness tourism. In a third phase, the ridge to the west of the lake with its impressive windbreak hedges and well-preserved field patterns could become attractive for agro-tourism.

Interestingly, the MA thesis was presented in the form of a storyboard, linking empirical observations to strategic considerations and spatial interventions. Rather than showing plans and drawings of the landscape project as a finished product, Møller and Ulrik chose to present analytical maps and drawings, strategic diagrams, text, and eye-level visualisations of imagined development scenarios. Together these mixed media tell a story of possible landscape development over time and across different scales. At the same time this

presentation form makes it possible to retrace the proposed design interventions to observations, analyses and hypotheses. In this way the strategic effects of the design proposal are made probable.

TRANSLATION: EDUCATIONAL PROCEDURE

What can we learn from the above for setting up teaching of landscape design experiments?

FOCUS ON PROBLEMATISATION

This paper suggests that creative landscape analysis can be compared to a research or technological innovation process. Here, a research question or hypothesis guides the choice of survey and analysis methods, the collection of data and the development of innovative solutions. Formulating the design problem is therefore the first and maybe most important step of the design process. This means that the ability to formulate a relevant design problem needs to be trained.

Inspiration for a conceptual framework and method can be found in ANT and an understanding of creative landscape analysis as a translation of an existing into a possible future landscape. ANT provides us with a relational understanding of site and context as dynamic actor-networks of human and non-human actors. It also provides us with a relational understanding of the landscape project as a strategic intervention rather than a finished product.

The discussed student work demonstrates that studying the 'figuration of agencies', i.e. the effects of interaction between physical structures and natural and socio-cultural processes, can be a way to formulating a place-specific design problem. The student work further suggests that unstable landscape structures – such as the eroding lake drainage system – combined with multiple conflicting interests can point to development challenges and opportunities and to relevant sites for physical and programmatic intervention.

EXPANDED RANGE OF ANALYSIS METHODS

Studying the 'figuration of agencies' requires a combined analysis of physical landscape characteristics, diachronic analysis of the development history of existing landscape structures and synchronic analysis of present spatial practices and discourses in a given area.

This means that the range of survey and analysis methods needs to be expanded from methods for primarily visual analysis of landscape structures to methods for analysing dynamic landscape change over time and methods for analysing present spatial practices and discourses. This broadening of landscape analysis methods mirrors the convergence of the landscape architecture and the urban and regional planning profession.

NEW INSTRUMENTS OF REPRESENTATION

Strategic urban and regional planning requires landscape projects that focus on what spatial interventions can *do*. Furthermore strategic planning

processes with many actors and an uncertain outcome require landscape projects to remain open to new interests and insights. To communicate on the one hand the strategic potential of a landscape project and on the other hand remain open to new insights and interests requires new instruments of representation.

A storyboard that links empirical observations to strategic considerations and spatial interventions could be one possibility. What is decisive is to make design decisions transparent and thus to make proposed design interventions retraceable.

NEW CRITERIA FOR DESIGN QUALITY

Ultimately, understanding creative landscape analysis as a process of translation provides us with new criteria for landscape design quality and thus for the assessment of student work. A good landscape project needs to demonstrate that it is likely to have a desired effect on landscape development. Further it needs to demonstrate that it is capable to incorporate new insights and interests. These new criteria do not devalue aesthetic qualities. Rather they suggest the development of a new, more relational aesthetics that is concerned with how landscape architecture affects landscapes and is being affected by multiple landscape actors.

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A DIFFERENTIATION OF THE NOTION OF RESISTANCE, BASED ON TWO WAYS OF OPERATIONALIZING TEXTILES IN ARCHITECTURE

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ABSTRACT

An emerging field of design research deals with the operationalization of materials. In this paper, we present and analyse two approaches to operationalizing textiles in architecture. In our analysis, we focus on how differences in operational design expose different kinds of resistance in textiles. Anna Vallgård and Cecilie Bendixen define a material's resistance as what gives us access to knowledge about it (2009). We argue that it is fruitful to compare these two approaches in order to shed light on how to produce sufficient and suitable resistance when operationalizing textiles. As a conclusion we suggest four types of resistance: a *material resistance*, a *technique-driven resistance*, a *design space resistance* and a *programmatic resistance*.

INTRODUCTION

Design research methodology is the subject of an on-going academic debate and continuous development. In addition to the outcomes related to its specific content (answering the research questions), another outcome of research projects in design research is thus a

contribution to this methodological debate and development.

An example of such a contribution is a paper from the 2009 NORDES conference where Anna Vallgård and Cecilie Bendixen argue that “there is a material side of design that we cannot address through studies of use and social practice – the properties and potentials of materials, forms, and structures must be explored through another kind of study” (Vallgård & Bendixen 2009). They call this kind of studies *operationalizations* of materials, and as examples of such studies, they use their respective PhD projects. Bendixen's PhD is about how textiles should be formed and placed in a space in order to have an acoustic damping effect on the space, while Vallgård's PhD is about how the computer can be combined with more traditional materials to create what she calls “computational composites” (Ibid.).

Even though they do not refer to the concept of *operationalization*, Mette Ramsgard Thomsen and Martin Tamke argue for “three modes of material evidence” as critical strategy to frame and evaluate material research: “the *design probe*, *material prototype* and the *demonstrator*” (Ramsgard Thomsen & Tamke 2009). These three modes can be seen as three ways of *operationalizing* materials. Ramsgard Thomsen & Tamke explain: “The *design probe* [is] a design-led investigation allowing speculative inquiry and theorisation and setting out of design criteria, the *material prototype* [is] a material-led investigation allowing exploratory testing, of craft and material behaviour, and the *demonstrator* [is] an application-led investigation allowing interfacing with real world problems and constraints” (Ibid.).

How materials (hereunder textiles) are approached depends on the stakeholder (Vallgård 2009); this is

visible in the two presented approaches to operationalizing textiles in architecture. The first case, carried out by a textile engineer, consists of experiments of how textiles can be integrated in architecture students' material repertoire through model making with textiles. The second case, carried out by an architect, proposes textile thinking as an architectural strategy and language to further develop the potentials of media facades.

First, we will each present the two cases, detailing their respective motivation, background and experiments, focusing particularly on the resistance produced by the experiments. We then compare them in terms of how motivation, background and operational design expose different kinds of resistance in textiles. As a conclusion we suggest four types of resistance: *a material resistance, a technique-driven resistance, a design space resistance and a programmatic resistance.*

CASE 1: A TEXTILE ENGINEER'S APPROACH TO OPERATIONALIZING TEXTILES IN ARCHITECTURE

This case is a textile engineer's PhD project, dealing with the material practice of architects: how textiles are currently part of this practice, and how they could be part of it in the future. The motivation for the project comes from an observed tension between on one side the revival of the use of textiles in architecture and on the other side a swinging in the other direction. This tension is also mentioned in literature, for instance by (Krüger 2009) and (Quinn 2010). In the project, material practice means how architects approach materials in their daily work: how they work with, choose and apply materials.

The specific focus in this paper is two experiments, which investigated how textiles' resistance can be exposed to architecture students through model making in order to create new ideas for how textiles can be used. The experiments are examples of *operationalizations* of textiles, and introduce a meta-perspective to the notion of *operationalization* as textiles' resistance is anticipated and staged for exploration to others.

EXPERIMENTS AND RESISTANCE

In the two experiments, spaces were modelled using a three-dimensional sketching kit consisting of textiles, cardboard support and tools for giving form to and joining these materials. In each experiment, which lasted 1,5 - 2 hours, the sketching kit consisted of different textiles, support and tools, and more importantly, the instructions given differed. I will now describe the specificities of the two experiments, which both focused on the light effects (functional and aesthetic) that can be created with textiles.

In Experiment 1, fourteen second-year architecture students at UTS (University of Technology, Sydney) worked in four groups. The point of departure for the experiment was an on-going assignment regarding the

design of a building skin for the UTS tower building. They were introduced to two specific textiles (silicone coated woven glass fibre fabric and coated polyester mesh) for building skins. For inspiration, they were also shown reference projects where these textiles were used. They were then asked to make a sketch model of a textile skin for the UTS tower building using the following materials: a cardboard 'corner' (the two sides each measuring approx. 50 x 70 cm), a piece of woven black polyester fabric (approx. 60 x 90 cm), 2 pairs of scissors (to cut fabric), 1 cutter (to cut cardboard), metal wire (to create structure underneath fabric) and a staple gun (1 for two groups, to attach the textile and possibly the wire to the cardboard) (Figure 1). The polyester fabric had an open plain weave structure, imitating the coated polyester mesh introduced to the students.



Figure 1 Left: Materials available to the students. Right: Model created by one of the four groups.

In Experiment 2, eleven third- and fourth-year spatial design students at UTS worked in four groups. The students were given a cardboard "room" of dimensions approximately 35 x 35 x 35 cm (see Figure 2, left). Three square pieces of translucent textile were also given to each group. As a limitation, they were told that the textile only could be attached to the ceiling, and that the room was an office. The students created spatial configurations with the textiles, and took photographs of these configurations, holding the room up to a light source. After some time, the limitations were loosened and in addition to attaching the textile to the ceiling, the students could cut the textile (Figure 2). Finally, the first textile, woven grey polyester chiffon (non-elastic, 38g/m²) was replaced by meshed lycra chiffon (elastic, 65g/m²) in a darker shade of grey. At this point, the room's scenario was changed to an exhibition space.



Figure 2 Left: A student group taking a photograph of their model. Right: A photograph of a model.

The choice of textiles was based on the three principles of textiles and daylight defined by Boutrup and Riisberg – the importance of density, number of layers and distance between layers of textile (Boutrup & Riisberg 2010). These principles were introduced at the beginning of the workshop.

The two experiments revealed that when seeking to expose textiles' resistance to architecture students, three strategies were used: the textiles are used to materialize,

illustrate, or develop a concept. While the first two strategies use pre-existing ideas – respectively immaterialized (such as an idea) or materialized (such as an existing building or a sketch) – as point of departure, the third strategy uses textiles as a tool to develop new ideas. In this third strategy, the resistance of the textiles seems suitable and sufficient, while in the first two strategies, their resistance is in a certain sense avoided. In the third strategy, textiles provide a *material resistance* as architectural strategy to create new ideas.

The two experiments also show that constraints and clear progression (as in Experiment 2) result in a deeper exploration of the textiles and their effect on daylight. These constraints can also be seen as resistance. Rather than *material resistance*, a *programmatic resistance* is created by the framing of the experiment. While in Experiment 1, the brief or framing was relatively open, in Experiment 2 the brief was more closed, presenting a higher degree of *programmatic resistance* to the students.

CASE 2: AN ARCHITECT'S APPROACH TO OPERATIONALIZING TEXTILES IN ARCHITECTURE

The second case introduces the textile-driven notion of *textilisation of light* as an architectural strategy and language to develop further potentials of media facades.

The concept is motivated by an emergent call for an integration of [media] screens embedded into the architectural material instead of “propel the surface into a sign” (Perrella 1998) and “running the risk of dematerialising the architecture that supports” (Van Berkel 2012). Following on Ito’s idea of a “fabric” (Ito 2001) Haeusler argues for a “sort of media-clothing” (Haeusler 2009). This material-driven approach to architecture is backed up by Spuybroek, who argues: “Architectural design is not about having ideas but about having techniques: techniques that operate on a material level” (Spuybroek 2008). Spuybroek builds on Semper’s *Principle of Dressing* and *Order of the Four Elements* (Semper 1860). However the concern of Spuybroek is “Semper’s materiality, not his materials” (2008) and he states that “it is not interesting what materials are”, but “much more how certain materials act” (Ibid.). How textiles can be operationalized is also of interest for Garcia who identifies how textile reasoning has encouraged the “thinking and doing” (Garcia 2006) of architects in various ways.

The question remains, however, how textile thinking can be operationalized or framed in design experiments to seek resistance from the actual subject matter, its techniques, tectonics and from the possibilities rendered by this new design space?

EXPERIMENTS AND RESISTANCE

In the experiment the *design probe* links programmatic considerations (24H-potential, using the potential of light not “only” at night, but also during the day) with the development of tectonic solutions embedding the

media screen into the architectural material. Textile loops are transformed into digital bricks, providing a *programmatic resistance* to this specific “idea, which [is] materialized” (Vallgård & Bendixen 2009).

According to Ramsgard & Tamke the *material prototype* “answers and develops the design criteria of the design probe and allows exploratory testing of craft and material behaviour” (2009). In *textilisation of light* the *material prototype* focuses on how to integrate LEDs (light-emitting diodes) into a woven construction, testing and evaluating the conductivity of the material. Weaving as a technique defines the premise or *technique-driven resistance* for the organisation of the LEDs. Following this premise the construction is woven, interlacing the textile’s conductive side with its non-conductive side and placing LEDs at the intersections (see also conceptual sketch, figure 3: *Design probe*). The *material prototype* argues for the development of a new weaving technique, which is magnified and horizontally layered to provide applicability on an architectural scale, at day and at night. At daytime the metal-coated side of the textile reflects sunlight, while its other side absorbs the light and the structure as a whole provides shade. At night it “materializes” the light and “only” reveals the LEDs from the periphery. Architectural criteria are linked with technological and textile-led ones, suggesting new possibilities for the integration of LEDs in architecture. This new connection frames the *design space resistance*.

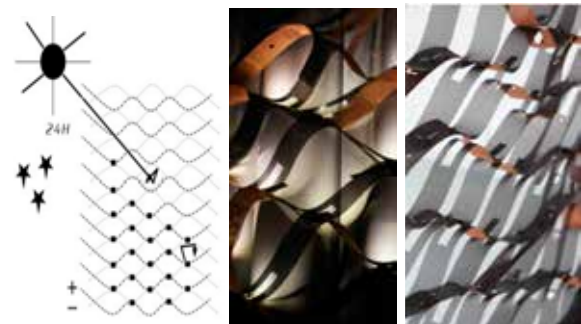


Figure 3 Left: Concept sketch of *Design probe*. Middle: *Material prototype*, night condition: Textile loops are transformed into digital bricks. Right: *Material prototype*, day condition.

A DIFFERENTIATION OF THE NOTION OF RESISTANCE

As previously mentioned, Vallgård & Bendixen define a material’s resistance as what gives us access to knowledge about it (2009). They use the example of a ruler used to measure a table as an example to illustrate this: the edges of the table provided the necessary resistance to measure its length. This raises the following question: What is the resistance that gives us access to knowledge about textiles, and how they can be used in architecture, in the two described cases?

While in the first case described here, the resistance is linked to how textiles can be made accessible to textile novices, the second case deals with the resistance that

occurs as textile thinking is linked to another technology, namely LEDs. We agree with Vallgård & Bendixen that textiles have a low immediate resistance, but we also suggest that when they are operationalized in a new practice (as in the first case) or with another technology (as in the second case), different types of resistance are exposed, which all give us access to knowledge about textiles and how they can be used in architecture.

Based on the two presented cases, we suggest a differentiation into four types of resistance: a *material resistance*, a *technique-driven resistance*, a *design space resistance* and a *programmatic resistance*. *Material resistance* is the resistance created by the subject matter, in both cases the textiles themselves. The *technique-driven resistance* evolves from the choice of specific techniques, and is exposed in the second case by the choice of weaving as a way of organizing the LEDs. The *design space resistance* is developed when the goal of the experiment is to expand the design space, as in the second case. The *programmatic resistance* frames of the experiment. In the first case, this resistance is defined by the instructions given to the participating students, and in the second case, this resistance is established by the programmatic choice of embedding the media screen in a material while also exploring the 24-hour potential of the facade.

CONCLUSION

In this paper, we have presented and analysed two ways of operationalizing textiles in architecture in order to shed more light on how to produce sufficient and suitable resistance when operationalizing textiles.

We have argued that the operational design depends on the researcher's background and motivation, providing different kinds of resistance.

We suggest that there is a multitude of ways in which materials can be operationalized and that two of them are presented in the two cases discussed here: Operationalization through the researcher's own experiments with a material, and through the researcher's staging of a material with others.

Finally we propose a differentiation of the term resistance into four types of resistance: a *material resistance*, a *technique-driven resistance*, a *design space resistance* and a *programmatic resistance*.

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DOUBLE VISION - RESEARCHING FASHION DESIGN PRACTICE BY USE OF QUALITATIVE TECHNIQUES

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ABSTRACT

Present short paper concerns itself with the question of how new ways of understanding the work methods of professional fashion designers can be uncovered. The paper presents two different but interconnected discussions, one relating to the use of interview and video when researching studio practice, the other addressing the practice of analysing through sketching and metaphorical imaging.

INTRODUCTION

This paper concerns itself with the question of how new ways of understanding the working methods of professional fashion designers can be uncovered through the use of qualitative techniques. In the paper I wish to show and discuss how I have produced empirical material. Furthermore, to explore a research methodological observation, showing that the visual data, produced by video ethnography, and the audio and text data, produced by qualitative interview, not only present themselves in different material forms, they also seem to invite different analytical approaches. The paper sets out from an ongoing Ph.D. study on fashion design methodology

LITERATURE AND THEORY

To outline the background and motivation driving present Ph.D. inquiry this section gives a short summary on the theoretical foundation. This theory has helped identify the lacuna and has given theoretical substance and argument to what otherwise could be described as gut feeling and assumption on behalf of the author. The

theoretical design methodological backdrop comprises classic texts from architecture and industrial design (Schön, 2001; Cross, 2006; Lawson 2006). Included are more artistic method studies from dance, film and sculpture, such as choreographer Twyla Tharp's *The Creative Habit* (2006) for her descriptions on muscle memory. In addition, I lean on some of the few texts available on fashion design and method; Lars Hallnäs' *The all-important difference...concepts of creativity in the fashion design process* (2007); Julia Gaimster's *Visual Research Methods in Fashion* (2011), looking broadly at visual methods in industry and education; Nixon & Blakeley's *Fashion Thinking* (2012), a recent article which points towards distinct features of the fashion design practice involving temporal, spatial and social dimensions, articulated taste and the balance between commercial goals and artistic necessity.

The core motivation that fashion designers will benefit from gaining access to formal methodological knowledge has been fuelled from several sources. Central is Skov's report on the work lives and careers of Danish fashion designers (2012) where some of her conclusive recommendations lead to formal knowledge building, implementation of fashion designers at strategic levels and the birth of an actual fashion designer organisation setting an agenda of its own. Thea Mikkelsen's recommendation of an explicit methodological language in creative fields (2009) sustains this view. Further theoretical grounding is provided by Vangkilde (2012), Melchior (2008), Entwistle (2000) and Kawamura (2005).

When entering the process of analysis and inference in the Ph.D. project, I intend to include an eclectic selection of concepts from phenomenology, process philosophy and pragmatism. In this paper, this is exemplified by de Certeau's text *The Practice of Everyday Life - Spatial Stories* (1984) and the tropes of *Place and Space, Maps and Tours*.

DATA AND METHODS

The inquiry is built as a qualitative case based study of professional fashion designers working in-situ. The

overall approach is phenomenographic, in the sense that it obtains descriptions of phenomena (Dall 'Alba & Hasselgren 1996) with a pragmatic (Rylander 2012) and reflexive (Pink 2006) stance, focusing on experience and experiential knowledge. It has been important to ensure a methodological opening towards the bodily aspects of designing fashion, hence to find a way to produce and obtain data on actions and embodied knowledge as well as descriptions. For this purpose the chosen qualitative techniques are visual ethnography (Pink 2006) and semi-structured qualitative interview (Brinkmann & Tanggaard 2010). Video film is appropriate when aiming at obtaining bodily actions, embodied knowledge as well as non-linear processes, whereby the qualitative interviews allow the informants to describe their own experiences related to the work methods they use when designing.

EVALUATION OF DATA

The paper builds on empirical data from two Danish case studies undertaken between May and December 2012. They are the first two cases out of a scheduled five in total. The last three will be in London and Copenhagen in the spring 2013. The objective for selecting the cases has been to create maximum variety of both educational background and type of company, but all with Scandinavian roots. The framing is set up to allow for a broad range of design methods to emerge but also to ensure a certain compatibility in the empirical data. In the process of data production, I conduct interviews with the designers, which is later transcribed. Through the following iterative data processing it has been possible to categorize the fashion designers own descriptions of how they work as design methodological actions related to various areas of the design work. In the process I have colour coded all method descriptions and design areas (fig.1), cut up the texts and begun the work of forming a phenomenographic outcome space. (fig.2)

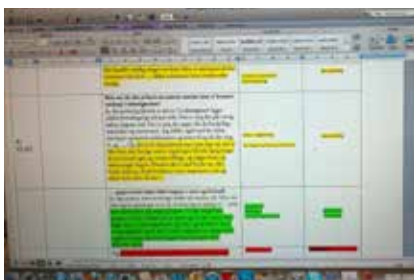


Figure 1: Colour coding descriptions

The video observations were conducted in the studios of the designers. In both cases I was allowed to follow and to video film the process of developing a fashion collection. This meant being present in workshops, at design meetings and fittings, in run throughs and at evaluations (fig. 3 -5)



Figure 2: Categorising descriptions



Figure 3: Video footage



Figure 4: Design meeting at Part Two



Figure 5: Studio space at Barbara I Gongini

I was allowed to observe the designers in their studios at any time and also received briefings from them specific to the progress of their collections. Video filming fashion designers at work creates a certain distance to an otherwise familiar subject (author being trained as a fashion designer) and it has become a methodological practice for me to note down daily observations and reflections to supplement the video footage, in order to remember fleeting thoughts and notions.

RESULTS

When choosing the qualitative techniques, the object was to create a possibility for different types of design knowledge to be captured. Video filming and interviewing obviously produce two very different types of empirical data but before entering the empirical work, it was not clear how this difference would appear in relation to the knowledge each method would portray or represent. What transpires at this stage, half way through the study, is that each method seems to formulate in its own individual way. Perhaps 'materialise' is a better word than formulate, because the empirical data emerges as two different forms of material, both on a concrete level in the transcriptions, mappings, film clips and captured actions, but also, more abstractly, in how both sets of data communicate and begin to have 'wills' of their own.

One set of data appears linear, orderly and map-able, as the interview descriptions work their way through the processes of creating a collection. This makes it possible to form a design methodological fashion related language by separating passages of text in to sound bites that become detailed containers of specific fashion design knowledge. In the interviews the more analytical structuring of the fashion design work and the building of a fashion collection emerges very clearly but there is little or almost no descriptions of knowledge in relation to bodily skills and practices, which is surprising, considering the field.

The other set of data, video observations, seems to have a different tempo. Its mode is more like a submersion in matter. The data reflects the multiple temporal and spatial shifts throughout the day, as the designers move from ideating one collection to fitting the previous, evaluating sales samples on the one before that and looking at sales statistics from even earlier, constantly shifting back and forth in time. The visual data produced and the process of being within the data as it happens, has begun to create metaphorical images. As opposed to the interview data, knowledge doesn't seem to be enclosed in the detail but in a three-dimensional and somehow 'whole' experience.

By constantly observing the designers as they undertake their tasks, the processes observed slowly mould themselves into what transpires as possible general approaches specific to fashion designers involving body, time and space. These have presented themselves in a metaphorical language partly developed via the use of sketching. I will give an example of this process.

WATER RIPPLES – AN EXAMPLE

In observing the fashion designers two things stood out early on in the process. They were as preoccupied with the notion of continuity as they were with the notion of 'the new' and were working in many different modes of the future simultaneously, represented by the multiple collections in various stages of progress present in the daily work. Throughout the fieldwork these notions kept

challenging me, to try and find a way by which they could be visually understood. A strictly linear model was not appropriate for the temporal aspect and for some time I sketched different spiral forms that were also to be discarded. Then I began to see the process as rings inside each other, each ring representing a collection, and the designer moving from one to another. The image still didn't do the right thing. It was too static until it suddenly came across as water ripples (Fig 6 & 7). The metaphor of water ripples suggests a way of understanding how the above notions of time, collections and continuity are not only interlinked but also in a state of constant movement.



Figure 6: Water ripples



Figure 7: Water drop

If the water represents the matter itself, the total work of the designer, one could see the water drop as the tiny added ingredient or 'difference', as Hallnäs refers to it (Hallnäs, 2007), in each new collection. This small addition affects what already exists without drastically changing it. The notion of continuity is preserved. Each drop is the basis of a collection that pushes the previous further and further out until it disappears and no longer has any significance on the daily work.

In working with the data, the visual material has called for analysis via sketching and metaphorical imaging, whereas the interviews have called for condensing meaning, mapping and categorization. The different impact of the two qualitative techniques, as described and exemplified in this section, needs to be closely addressed in the thesis. But how can it be understood? Looking at the data outcome through the 'spatial lens' of de Certeau could offer a possible interpretation.

DE CERTEAU AND THE CONCEPTS OF *PLACE AND SPACE (MAPS AND TOURS)*.

de Certeau sets out to discuss the difference and connection between the concepts of place and space. He describes place as (...) *the order (of whatever kind) in accord with which elements are distributed in relationships of co-existence. It thus excludes the*

possibility of two things being in the same location (...) the elements taken into consideration are beside one another, each situated in its own 'proper' and distinct location (de Certeau, 1984, p.117)

He then goes out to state that space (...) *exists when one takes into consideration vectors of direction, velocities, and time variables. Thus space is composed of intersections of mobile elements. Space occurs as the effect produced by the operations that orient it, situate it, temporalize (...) in relation to place, space is like the word when it is spoken (...) In contradiction to the place, it has thus none of the univocity or stability of a "proper"* (Ibid).

de Certeau interlinks the two concepts by concluding that (...) *space is a practised place* (Ibid.)

This description aligns well with the data experience described earlier. The interview data can be seen as a representation of a design 'place' and the video footage as a representation of a design 'space'. de Certeau also offers a metaphor of 'place' being similar to a map, the floor plan of an apartment, as opposed to 'space', a guided tour of the rooms (Ibid. p.119). de Certeau uses a word for the practice of the place, namely that of a map, that is a frequent practice in design and which this inquiry also intends to use via the presence of phenomenography. By relating place and map it is clear why the design 'place' represented in the interviews presents data well in a mapping analysis. Actions and design methods are *beside one another, each situated in its own 'proper' and distinct location*. Contrary to this is the 'tour', giving the image of walking the walk, being physically emerged and engaged in the surroundings. The experience is being *composed of intersections of mobile elements*, creating narratives without univocity or stability but using the language of metaphors to transport inlaid knowledge.

CONCLUSION

In the paper I have shown how two qualitative research techniques generate different types of data material, which call for different analytical grips. The visual data invites metaphorical imaging and the interviews invite mapping and categorising, a double vision that can provide new knowledge on how fashion designers ideate, develop and organise their work. The metaphor of the water ripple might potentially challenge the image of fashion designers working in a blind search for the ever changing 'new'. It suggests a different driving motivation altogether, where the fashion designer reflects the present in a softer mode of continuity, although still structured round the seasons of the fashion industry. This is something that will be interesting to look at more closely in the future, along with other emerging tropes related to different understandings of bodily knowledge as well as the building of collections.

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THE IN-BETWEEN: AN EXPERIMENTAL VENTURE INTO THE POSITION OF THE DESIGNER.

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ABSTRACT

Increasing interdisciplinary collaborations between art, design and science, draw attention to the need of elucidating the position of the designer. Here this stance is identified as an in-between position, characterised by its exploratory nature, which contributes to the experimental practice of design as a whole. This interstitial position for design, is furthermore identified as an empowering one, which can open up doors to novel opportunities and outcomes, by enabling designers to engage within the processes that construct meaning.

INTRODUCTION

In this paper we will try to address the in-between position of the designer as an empowering one, which can open new avenues for research and lead to novel outcomes. Such opportunities might remain closed or distant for those remaining within practices firmly grounded in one discipline or field. Addressing the practice of design as a generative one, we will extract insights from design writers such as Lucy Kimbell and futurist Stuart Candy, but also expand on these views by including filmmaker and writer Trinh T. Minh-Ha's views on liminality.

The reflections contained within this paper derive from personal experiences encountered in recent multidisciplinary projects, such as G-Motiv, which investigates game elements as motivational triggers for behavioural change, within the Creative Industry Scientific Programme (CRISP) in the Netherlands. By

presenting examples from such interdisciplinary collaborations, we will explore how working from the in-between, means designers take on different roles within multidisciplinary projects. Such roles vary from intermediaries between the different partners to interventionists in changing situations, as well as knowledge facilitators. We hope to illustrate the possibilities and implications such an in-between position of the designer might pose, contributing to the ongoing discussion on the experimental practice of design.

EMBRACING UNCERTAINTY

Interdisciplinary ventures between designers, artists and scientists inevitably lead to a crossover of work methodologies and ideas. This exchange often begins with set roles and goals for collaborators. Design, more often than not, will redefine its initial question (Kimbell 2012), changing the nature of the debate. This reframing of the initial brief, brought forth by a generative practice, will extend beyond the pre-defined boundaries of any collaboration.

Designers play with boundaries, an exploratory practice which is experimental as it entails a questioning of meaning and set definitions. An example can be found in EVASIA, a design fictions proposal currently under development within the G-Motiv project, as part of a Research Associateship at Design Academy Eindhoven. EVASIA addresses the use of smell as a storytelling tool to explore experience in the context of drug addiction, by integrating the scent expertise from the Olfactive Design Studio (ODS) of International Flavours and Fragrances (IFF). In this manner, EVASIA expands upon G-Motiv's list of collaborators and knowledge, enhancing the project's focus area by highlighting the relevance of sensory and subjective insights.

Similar approaches situate designers as instigators or generators of situations. They imply a wider scope for

design, through an expansion which takes place in more than one direction at a time. These deviations to the official storyline, contribute to a level of ambiguity and uncertainty, which designers must often cope with throughout a project's development. Nevertheless, it is through such side exercises or accidents that meaning is created, essentially informing the design process (see Figures 1 and 2).



Figure 1: Design process-flow diagram.



Figure 2: Deviations or accidents inform the design process.

THE POSITION OF THE DESIGNER

This inquisitive approach is understood through a shift from focus on the process of design, to focus on the position of the designer. Trinh T. Minh-Ha is a filmmaker and theorist whose philosophical writings explore liminal stances, serving as inspiration to validate the in-between position of the designer. Design's explorative nature, requires an understanding of the interdependencies between the different categories at play, which means working within the spaces where these merge and coexist.

This is the space in-between, described by Trinh T. Minh-Ha as "the interval to which established rules of boundaries never quite apply" (T. Minh-Ha 1992). Within the G-Motiv project, it results from the crossovers between the scientific partners (Delft University of Technology, University of Amsterdam, Vrije Universiteit, Erasmus University and the Technical University Eindhoven), the creative partners (Design Academy Eindhoven, Monobanda, IJsfontein, RANJ and Novay) and the service or healthcare providers (Berenschot, Careyn and Brijder).

Exchanges within these liminal spaces constantly challenge set structures, shifting focus from seeking a solution to a pre-defined problem, to that of

interventions on behalf of the designer. From an in-between position, designers can actively influence knowledge generation processes and validate these by facilitating an exchange of information between the different collaborators. This exchange comes from embracing those "elements that escape the structure", which often lead to "accidents that are created by letting go of things while you are in full control of them" (T. Minh-Ha 1992). Designers engage in the co-evolution of a multidisciplinary project from different angles, by understanding the different aims and needs of its collaborators. The designer becomes an interventionist, as these exchanges lead to "blueprints and artefacts along the way [which are] designs towards the final design" (Kimbell 2012).

The expansive character of design creates and explores new options, rather than limiting itself to pre-existing avenues. An example can be found within EVASIA's Play the Future! workshop, which brought together G-Motiv's creative partners to speculate upon the future of games. The workshop looked beyond the frames of G-Motiv, applying game theorist Leigh Alexander's (Alexander 2012) three postulates on the future of games (games will never end, games won't be perfect, games will be played everywhere) to the three focus areas of G-Motiv: physical stimulation (Alzheimer patients), mental stimulation (addiction patients) and stimulation of pro-social behaviour (workplace environment). Extending beyond the project's immediate goals, the workshop led to outcomes which explored alternative possibilities of collaboration between the creative partners, resulting in three game concepts: tools to catalyse social group behaviour, crowdsourcing emotions through smell, and ringtones for mindsets (see Figure 3).

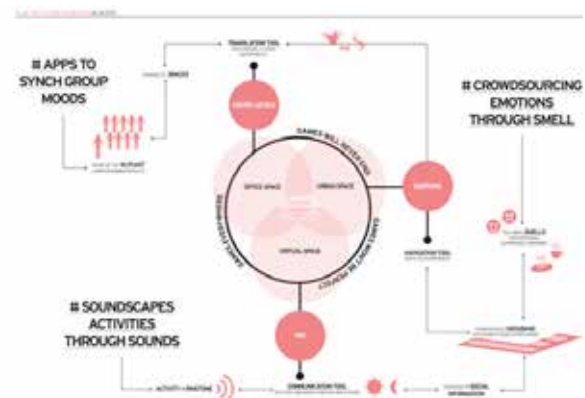


Figure 3: Play the Future! workshop results extended beyond G-Motiv's immediate goals, exploring the future possibilities of games.

MEANING, NOT TRUTH

Working within such liminality means design does not own anything. Designers become intermediaries, which explore and question relationships between science and society. The parallel stories they conjure from such activities bring forth real desires and anxieties, "creating meaning, not truth" (T. Minh-Ha 1992), as they extend beyond sums of facts. This knowledge does not aim to

be scientific, as it is not based on objective facts. In the case of EVASIA, it stems from a discussion which becomes more precise over time, as the projects, designs and exchanges with G-Motiv's collaborators evolve.

This often requires the need to speak various 'languages' in order to facilitate the necessary exchanges between healthcare providers, patients, scientific, creative and industrial partners. Design artefacts can serve to materialise "the possibility space" (Candy 2010) from such interactions. Operating as interstices between "the world that is and the world that could be" (Candy 2010), they point towards alternative processes for the construction of meaning.

Within G-Motiv's framework, EVASIA considers this merge between fictions and reality, exploring the possibilities of alternative stories. (see Figure 4).

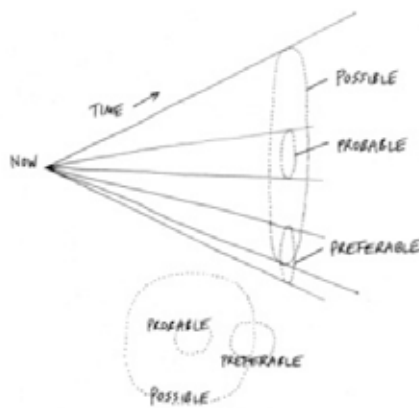


Figure 4: Stuart Candy's diagram of "possible, probable, and preferable futures as subsets of possibility space" (Candy 2010).

Fantasy is a motivating game element, which often addresses the emotional needs of learners, allowing players to experiment with new constructs in low-risk environments (Malone, Lepper 1987). For this reason, an optimum learning environment might be one in which individuals can create their own fantasies. Design fictions can provide conversational platforms (Candy 2010), through which parallel stories can be told, addressing human needs and desires. Acting as testimonies of contemporary culture, these stories can provide contexts to investigate further play's frames, between reality and the game world, and its paradoxes for therapy (Bateson 1955/1972).

To explore personal stories and experience, a series of sensory interviews were conducted at healthcare provider Brijder's drug rehabilitation clinic Mistral, in Den Haag. The patients, aged between 14-22 years old, were asked to draw a free map of the clinic, including those places they wished to talk about during the interview. They were asked to consider what spaces they liked the most or least, as sounds and smells were recorded or sampled, whilst visiting these locations. The outcomes revealed a different perception and categorisation of the clinic, based on experience. The communal living and eating room for example, a place

where the patients spend most of their time throughout the day, proved to be one of the most anxiously perceived spaces, identified as excessively noisy and chaotic.



Figure 5: The sensory interviews revealed how the clinic is perceived by the patients, based on experience of each space.

TO SPEAK NEARBY

Design can create platforms, working from a human-scale, to explore alternative ways of expression. This approach involves a constant play between different narratives, engaging with fact and fiction. In this manner "the narratives shift back and forth between being informational, reflective or analytical, and being emotional, trivial, absurd or anecdotal" (T. Minh-Ha 1992). In the context of EVASIA, this suggests a direct engagement with the reality of the patients, where design provides the necessary tools and voice for the construction of their own definitions and meanings.

This is intrinsic to design's concern with the "human or micro-scale" (Kimbell 2012). Such co-creation devices and processes differ from data gathering exercises. Instead, they generate awareness, by drawing attention to the politics of health and its social manipulations, actively contributing to the construction of personal identity.

Taking an in-between position is therefore also an act of resistance, as from such a position one does not intend to "speak about", but to "speak nearby" (T. Minh-Ha 1992). The in-between position of the designer, empowers an experimental and critical practice for design, as it refuses to reduce its role "to that of a mere device to authenticate the message advanced [by others]" (T. Minh-Ha 1992). Speaking nearby, design will provoke new ideas, awareness and reflections, by pointing to the processes that construct new meanings. Furthermore, by adopting such an in-between position, design is no longer subject to the regulations of those well-defined boundaries, therefore gaining the necessary freedom to explore the possibility space (See Figure 6).



Figure 6: To "speak nearby" means designers operate within the possibility space (coloured areas), from an in-between position.

FUTURE WORK

EVASIA will explore the in-between position by designing the relationship between now and the future, working between the patients and the other G-Motiv partners. This will be done by developing two complementary lines of work, comprising speculative and more immediate designs. The speculative work will consist of a series of 'companion species', working as provocations or rovers of emotional experience. These will be built into the context and routines of Mistral, to avoid decontextualisation.

The more immediate line of work will consist of experience prototypes, of elements of the companion species. These will build upon the insights previously obtained in Mistral. They will be a first step towards the speculative designs, and a tool for understanding their meaning. The overall outcomes will aim to reveal new narratives and behaviours, valuable to the different collaborators within the G-Motiv project.

FINAL CONSIDERATIONS

In this paper we looked to integrate insights from outside experts to design research, such as filmmaker and theorist Trinh T. Minh-Ha and futurist Stuart Candy. Combining their 'liminal' views with those offered by known voices within the design profession such as Lucy Kimbell, we hoped to further expand on the notion of the in-between, likewise alluding to ways in which the design practice can be informed from such external perspectives. This is in no means intended as another definition for design. Instead, it stands as an ode to its experimental nature, as such resistance to categorisation is what perhaps allows it to continuously expand its frontiers.

CONCLUSIONS

Design's experimental nature is intrinsic to its exploratory character. This often leads to deviations or side exercises that account for the ambiguity and openness of its practice. Such an approach, requires a

shift from focus on the process of design to focus on the position of the designer as an in-between position, which operates within an interstitial, or possibility space. Interventions originating from that space enable designers to explore processes at the micro, or human scale whilst embarking on speculations beyond the limits of the individual entities it navigates between. In this manner, design does not speak about, but nearby, as it provokes the construction of new meanings.

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AGEING AS DESIGN CULTURE

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ABSTRACT

This paper discusses emerging themes related to *design culture of ageing* or in other words *ageing as design culture*. By looking into existing experiment and exploration practices from different countries on ageing and design, this paper summarizes outcomes from a full day international expert's workshop. The main outcome is a need for a broader understanding of ageing that goes beyond the definition of ageing by means of age, deficits and needs. We introduce four main issues that emerged from our discussions in our workshop on how to deal with ageing as a subject of design experiments. These four themes can be considered as initial steps for building a framework for design culture of ageing. A theoretical framework of design and ageing could help designers to better understand the dynamic interrelations and different states of ageing. This discussion further can open up new creative spaces related to ageing as design culture.

INTRODUCTION

With the demographic change, ageing has been a topic of interest for various disciplines in the last decade. Various models point to different perspectives on ageing studies. Among others, designers were also involved in ageing related design works. The interdisciplinary tradition of "designing for ageing society" starts from late 80's with work on tele-medicine. In recent years with the introduction of assistive design to the area, it gained more emphasis. We concentrate on interdisciplinary framing of design

theoretical perspectives on ageing and design. "Design culture of ageing" or in other words "Ageing as design culture" is the output of some years of practical work on the area. We looked into existing experiment and exploration practices from different countries on ageing and design based on self-reporting of the individuals involved in collaborative projects. The main outcome here is to point to a broader understanding of ageing (from a design perspective) that goes beyond the definition of ageing by means of age, deficits and needs. In this short paper we introduce four main issues that emerged from our discussions in an experts' workshop on how to deal with ageing as a subject of design experiments. We introduce these four themes as initial steps for building a framework for design culture of ageing. A theoretical framework of design and ageing could help designers to better understand their standing and its relations to other disciplines in relation to ageing). This discussion further can open up new creative spaces based on design-led approaches related to ageing as design culture.

LITERATURE AND THEORY

More than a decade designers were part of projects on ageing and design (e.g.: designing for ageing well). Until recently, the strong focus of such design explorations on ageing was on technology and service design. As an example European Commission funded program of Ambient Assisted Living (AAL) (Anon. 2012) includes more than hundred collaborative design and technology projects on ageing and design. In a closer look, most of these projects follow a "problem oriented" approach based on biological age definition, e.g.: see a recent report from European Commission (European Commission – DG ECFIN. 2012). There are actually many design research examples that indicate to parallel issues and offer solutions (e.g.: Scandinavian participatory design approach and design techniques or work of Helen Hamlyn Center, Age and Ability Research Lab). Design plays a role on almost every project from well-known problem solving oriented assistive design models to successful inclusive design examples. Our aim is to discuss some of the important points from existing examples in order to define most important themes for a design perspective on ageing.

Critical gerontology defines the process of *ageing successfully* as being the end product and *the*

normatively desirable state (Holstein and Minkler 2003). They point to possible harms of this understanding to older people (ibid.). In their critique to this approach they define a “needed complexity in thinking about the relationships among individual biography, social and cultural norms, and public policy” (ibid.). Essen and Östlund (2011) discuss the potentials of such a complexity for design and innovation. They point to the importance of a broader understanding of ageing that is beyond definitions of biological age (ibid.). One way of dealing with this for designers would be looking into situations. Situated understanding of elderliness (Brandt et al, 2010) is an approach that aims to go beyond the stigmatizing understanding on ageing. ‘*Situated elderliness*’ as a notion aims to define ageing and old age not with biological age, nor with institutional categories, but rather by looking into everyday practices (Brandt et al, 2010). If we try to understand particular situations that make people “feel old”, we can also set dynamic design explorations for non-stigmatizing design solutions. But how?

Ageing is not an easy domain for designers. Everyday of an “ageing” person is not just out there in full detail. However, there are numerous communities with whom designers can collaborate. By looking into everyday practices of established communities, it is possible for a designer to gain some insight to particular issues. Borrowing from Lave and Wenger’s notion of *communities of practice* (Lave and Wenger 1991), this approach is called *communities of everyday practice*, and it aims helping designers to use “elderly’s existing everyday practices as frame and starting point” (Brandt et al, 2010).

We introduced couple of strategies for designers to deal with the complexity of ageing as a design exploration area. The introduced topics above are not new. However, until now the relations of situated elderliness, broader needs for definitions and further aspects of design and ageing have not yet been theoretically related to each other for design. The relations of innovation research theory and practice (Essen and Östlund 2011, Kohlbacher and Herstatt 2011) to ageing, everyday routines of ageing people, aesthetic and design choices are all interesting questions that can relate to our introduced work. Roles of “diversity”, “heterogeneity” and “abilities” are the core themes, based on an ability-based understanding of aging (Wobbrock et al 2011) and situated elderliness (Brandt et al 2010) for future research on the topic. A discussion of the relations and meanings of such issues to design and to each other can help us set up a new design perspective on the issue. For design, we call our early understanding “*ageing as design culture/design culture of ageing*”.

METHOD AND EVALUATION

This paper is based on the experts’ discussion from an international design workshop on ageing, namely “Elderly’s Everyday Practices as a Design Approach”.

The workshop was held as a part of the NordiCHI 2012 Conference, Copenhagen. The call for papers to this workshop was distributed through well-known digital channels, such as email lists with more than 2000 members. As a result 8 papers were accepted from 6 different countries (Austria, Sweden, Denmark, Finland Hong Kong, and UK). The participants were from different fields with a common interest on “designing and elderly”. Examples of different disciplines involved in this workshop are: Design, design sciences, human computer interaction, inclusive design, occupational therapy, rehabilitation engineering. All the participants had collaborative research, experiments and explorations practice, and all workshop participants worked together with elderly in everyday situations.

The full day workshop was divided into three parts. In a first round participants gave examples to their practices from design and elderly, introduced their experiment and exploration strategies and findings. Here is the short summary from position papers:

Eva Eriksson discussed results from an EC funded project on established practices of design communication with vulnerable generations, children and elderly. The main consideration of this paper was on modernizing and developing educational programs. *Marie Ertner* introduced representations of elderly and current approach of fragmenting them into countless sub categories. She gave concrete examples from the field about the complexity on how the elderly is performed. *Özge Subasi* gave examples from EC-AAL funded Stimulate Project on lack of clear guidelines that support communication between designers and older people. She introduced a co-creation tool for capturing design inspirations. *Thomas Binder* and *Lone Malmborg* introduced their previous work on everyday practices of older people, notion of communities. The importance of communities and fieldwork were discussed. *Paul Sugarhood* introduced the ATHENE (Assistive Technologies for Healthy Living in Elders: Needs Assessment by Ethnography) project and gave examples to challenges and most important barriers (physical, sensory and psychological) for involving people in the design process. *Susanne Frennert* talked about the adoption of robots by older adults. By concentrating on social meanings of robots in the life of old adults, her paper looked into possible future everyday practices of senior’s homes and robots. *Kirsikka Vaajakallio* introduced a case study from the city of Kauniainen on how design students rethink the future of senior services in a co-design process. *Yanki Lee* introduced examples from a study with a community of 6,000 retired academics living on campus of Tsinghua University, Beijing. She discussed the shift of mindset to design for the ingenuity of ageing. *Britt Östlund* discussed the new potentials that are brought by older people and presented a way on how we can conceptualize modern ageing by making use of theories and concepts from technology studies in social science.

During this part of workshop, several overlaps were detected across the fields and from different countries. In the end of first round several questions indicated similar issues. Examples to questions that were mentioned more than one were on:

- How can we define and protect a respectful language both for academy and daily conversation on the issue?
- How can we bring deep insights from the field to the design space? (language, equal participation, democracy)
- What are the potentials of “being old” for creative space? (older people as innovators, urban participation, ...)
- What kind of tools, infrastructures are needed for educating better designer generations for this particular topic? (design education)
- How can design and technology be better integrated to real life issues of particular ageing situations? (bottom up, communities, everyday).

Second round was set as a discussion platform for defining strategies for dealing with given problems and issues. Here these questions were discussed and categorized into four working themes (with further sub-themes).

In a third round an overriding theme of “ageing as culture” was further discussed as an umbrella term for the topic. A general view on ageing and design has been created for future research and experimentation agenda based on this discussion

RESULTS

As a result of the workshop, four working themes are defined based on individual’s (cross cultural) practices in collaborative work with elderly. These are:

- Definition of “notion of elderly”
- Situated Elderliness
- Communities of Practices
- Role of the designer

In the last round “aging as design culture” has been defined as overriding theme and the relations of these four themes to “ageing as design culture” has been discussed. Here is a short overview of the four themes:

Definition of “notion of elderly”: Today’s experimentation and exploration practices have a wide variety of definitions on the elderly. Most of these definitions unfortunately are based on practical categories, driven from technical experiments. They are top down sets of categories (e.g.: age based user groups). Here, it is important to develop a language and set of definitions that are dynamically related to each other but that avoid a generalisation and “otherisation” of “elderly” as a specific group. Topics like: Bottom up research on ageing notion, insights from the field,

defining heterogeneity in “ageing well” would all belong to this theme.

Situated Elderliness: Situated elderliness is a new paradigm that aim to point situational aspects of environments, objects and changes in life courses that might affect the perception of the self as “elderly” or “not”. This dynamic understanding can help us to define particular situations, services... etc. as more important to consider in particular. This theme includes specific problems related to ageing. Situated elderliness such as practices of “feeling old” vs. “being old”, case studies and examples of real-world seniors’ related to new future technology design solutions and their expected results, broader understanding of access and exclusion can all belong to this theme.

Communities of Everyday Practices: Communities of everyday practices is another important theme that can help us collect and relate practices of seniors in their local environments and daily settings. This theme here is selected for understanding practices of a group with similar interests independent from their age or deficiencies. This approach helps us explore more broadly and better grounded to real life situations. Looking into community based practices in relation to ageing (senior associations, clubs) in local settings, finding new models for developing relations with local communities can all belong to this theme.

Role of the designer: Lastly, in this process the designer and design researcher have multiple roles that are to be defined as a part of the process. This theme therefore includes both the practices of design (e.g.: ethics, user vs. vision driven) and possible pitfalls and further design research paradigms (e.g.: co design, emphatic design). Considerations such as broader understanding of ethics, including design ethics, giving-back mechanisms, visual language and sustainable processes, considerations in arts and design education can be discussed under this theme. This theme can further include issues such as defining relevant design process for supporting continuous involvement of senior participants, exploring life experiences as sources of innovations or creative space of life-span changes.

The workshop identified and discussed four emerging themes related to ageing and design explorations. In the third round an umbrella theme was created, namely “ageing as design culture”.

Ageing as design culture as overriding theme aims to define a sustainable design space for ageing related issues. It is the mutual production of both parties involved and it is the sum of the dynamic relations that are explained above. Ageing as design culture avoids categorising people by age or deficits, but consider possible constraints of environments or changes in the life course in the design process. It further is based on a bottom up understanding of the notion of elderly and is

bounded with everyday practices shaping senior communities. The role of the designer here is to build the related infrastructure that allows future collaborations with communities. The designer is responsible for creating the best democratic communications, reflect and sustain her practices in close collaboration with existing communities of practices.

DISCUSSION

This paper focused on the existing practices in design experiments on ageing and design. The introduced themes and the conclusion on “ageing as design culture” aim to define a dynamic design space for the future of ageing related design explorations and experiments.

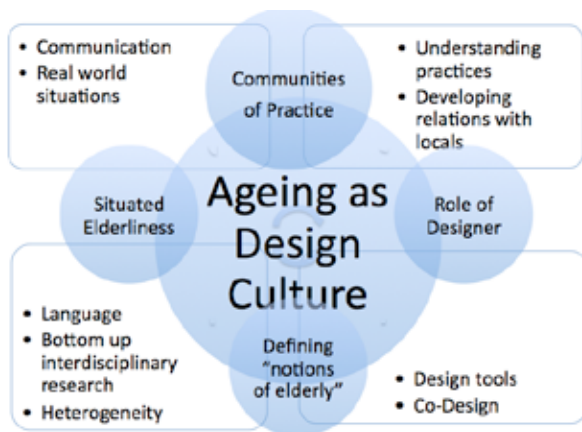


Figure 1: Sphere of “Ageing as Design Culture”

Ageing and its relations to design is a complex sphere of mutual relations (Figure 1). It is important to give equal emphasis on those relations in order to succeed in this specific area of design explorations. As summarized in Figure 1, the interrelations between four themes can offer us numerous ways of looking into this rich topic.

To exemplify Figure 1, let’s imagine a scenario of a young designer, named Lucy. Lucy wants to design a new product on ageing & design. She can use her existing skills such as creating co-design concepts together with local seniors (role of designer) for researching a particular notion (notions of elderly). Here, she can benefit from existing communities and years of everyday practices from these people (communities of everyday practice) via observing them and working with them. It might be important for her to consider, planning and building sustainable ways of working together with communities, using a proper language and communication materials. She can define and work out particular situations that she detected during her research in ageing area (e.g. Situated

Elderliness) via usage of specific creative techniques. By this way, she would not only produce a new idea but also establish sustainable design process. We call this approach *Ageing as Design Culture/ Design Culture of Ageing*.

With this point of view, our goal is to go beyond a disability-support assistive lens or a one-size fits all inclusive design solution. On this paper we aimed to explore an initial framework for design and ageing to search the interrelations of existing perspectives and their relations to design explorations.

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DESIGN EXPERIMENTS FOR SUSTAINABLE EATING IN FINLAND

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ABSTRACT

This paper presents two design experiment opportunities on sustainable eating in Finland. First, clarification of scientific concepts is urgent because misconceptions lead consumers to focus on minor issues, or to develop negative perceptions on sustainability. Second, a socio-cultural approach to sustainable eating is proposed, by investigating Finnish consumers' perceptions on food origins, how their social identities are shaped/expressed with food, and the sustainability of popular Finnish recipes. Future design experiments on consumers' knowledge, attitudes, or behaviours with public installations and commercial data collection systems are proposed.

INTRODUCTION

According to Freibauer et al. (2011), global food demand will increase by 70 % between 2011 and 2050, thanks to 9.2 billion of world population and changing diets in developing countries. Inevitable food insecurity will follow, from natural resource depletion and climate changes that adversely affect food production. The bidirectional relation between climate changes and food production calls for our immediate actions to mitigate anthropogenic greenhouse gas (GHG hereafter) emissions from food.

Among all activities involved in the food supply chain, the primary production of food—agricultural activities to grow crops or rear livestock before processing, packaging and distribution of food products—and how it affects the environment deserve more attention: Seppälä et al. (in Roininen, 2012: 33) have evaluated that primary food production accounts for about 60 % of

all environmental impacts from food in Finland. Virtanen et al. (2011: 1852) also estimates that agricultural production accounts for 69 % of domestic climate change impacts in Finland, among which meat (25 %) and dairy (20 %) have bigger impacts than grain (11 %).

Considering consumers' dietary choices significantly shape a country's agricultural planning and land use, Finnish consumers have the power to drive Finnish agricultural practices in a more sustainable direction. For instance, Saarinen et al. (in Roininen, 2012: 34) suggests that the climate change impacts from household food consumption can be decreased by 75 % by simply switching to "a vegetable rich, but still nutritious, seasonal diet". Such a change will be beneficial to both environment and consumers. Currently Finns' daily meat consumption is 198.7 g per capita, and it is much higher than world average of 127.6 g. Finns' daily dairy consumption was 98.9 g per capita, and it is the highest in the world. According to *Dietary Guidelines for Americans* (2010), adults generally need 10 to 35 % (50 to 175 g) of protein, based on a 2000 kcal/day diet. Excessive dairy consumption is linked to prostate cancer, and eating too much meat can increase the risk of heart disease.

Reducing meat and dairy from Finnish diet is a logical step to take. Finnish consumers, however, do not see the urgency and gravity of the issue. Latvala et al. (2012: 75) found that 48 % of Finnish participants eat beef and pork over three times a week, and they do not intend to change their current eating habits.

This study assumes that *lack of communication and understanding* between scientists and consumers is at the bottom of this phenomenon: consumers do not understand what scientists are talking about and how it is relevant to their grocery shopping or dinner. Scientists do not know why consumers cannot adjust their behaviours according to their recommendations. This paper will clarify the assumption, and proposes design experiments on the same ground, for (1) clarifying scientific information for general audience, for improved awareness of food production—environmental impact linkage, and (2) understanding Finns' eating habits from a socio-cultural perspective, as

consumers' perceptions on food origins, social identities shaped/expressed with food, and traditional-contemporary recipes factor in Finns' dietary choices. Directions of future research are suggested in the conclusion.

NEED FOR SCIENTIFIC CONCEPT CLARIFICATION

Despite the aforementioned projection of food insecurity, recent studies show not many Finnish consumers recognize food production as a major cause of GHG emissions (measured in carbon equivalents) and climate changes due to the following reasons.

CONFUSIONS IN KEY CONCEPT DEFINITIONS

Wiedmann and Minx (2007) call attention to the lack of a common definition for *carbon footprint* among both scientists and the public, despite the ubiquitous use of the term. Current definitions range from the 'total measurement of all green house gases in carbon equivalents' to 'the amount of only carbon dioxide emitted through the combustion of fossil fuels'.

Roininen (2012: 73)'s recent qualitative study with 33 Finnish participants reports that the concept of carbon footprint is poorly understood. Some defined it as "all the *pollution* and environmental load" or "all the energy and *pollution*", and keywords that Roininen was looking for, "carbon dioxide emission", were missing in their definitions. Later, Roininen provided a short description of the term for the participants but even with it, "many seemed struggle what it really means". Limited understanding of the concept led to limited attribution of its sources to "[food] transportation, processing and waste from packaging".

In short, the term *carbon footprint* is not clearly defined by scientists, and the public vaguely understand it as something that comes out when you use energy and pollutes the environment. The term was not linked to food production as a major cause, or to climate changes as a consequence.

CONSUMERS ARE DISTRACTED BY MINOR ISSUES

The limited understanding of carbon footprint as *pollution* explains why consumers link it to other negative concepts such as *transportation* (because of car emissions) or *waste*, while it is hardly related to positive concepts such as food production.

In Owen et al. (2007: 11-12)'s focus group study with British participants, food-sustainability linkage was made only after being prompted by the researcher. Most participants paid more attention to consumption (reducing packaging and waste, composting food scraps, e.g.), while not much was mentioned on how national production of food affects the environment in a bigger picture.

Roininen (2012) also reports that the participants immediately cited *housing*, *transportation*, and *waste* as major sources of environmental impacts, while *food* was

mentioned by only one person in relation to waste and transportation. Later, when participants were asked to talk about food as an environmental issue, some participants struggled in explaining the relationship. The majority named food packaging, energy consumed for processing and transportation, while at least some mentioned meat as a source of food-related environmental impacts. Roininen points out that such low awareness might be pretty common among Finns.

NEGATIVE PERCEPTIONS ON SUSTAINABILITY

Also in Roininen (2012: 70)'s study, sustainable behaviours ("eco-thing" in the participant's own word) are perceived as something related to "hippie" culture, and understood as "give up so many things", and too much of it can be unhealthy. This simple comment exemplifies how many ungrounded beliefs and wrongful associations are out there to be fought. The vegetable-rich diet recommended by researchers may sound similar to Hippie food, it is recommended on scientific, not spiritual or moral, grounds. Adjusting your diet is not "giving up" or "sacrifice" if it is your voluntary choice for your own good: healthier body and safer environment.

Negative perceptions on third-party certified eco-labels are reported in Järvi (2010)'s study conducted with 100 Finnish participants. Three organic food labels are pretty well recognized (3.3/5 on average) by the participants, but organic products are considered just "expensive" because participants do not see the advantages of organic food over regular food clearly. Järvi recommends displaying comparison information for consumers in the future.

In summary, the first part of this paper reviews how consumers' misconceptions of sustainability lead them to focus on minor issues or develop negative perceptions. Interdisciplinary efforts from scientists, designers, and public communication experts are called for, for more effective sustainability communication and education.

APPROACHING SUSTAINABLE EATING FROM A SOCIO-CULTURAL PERSPECTIVE

In addition to educating people, researchers have been trying to understand consumers' food buying/eating behaviours. McCarthy et al. (2003) shows that Irish consumers consider *health*, *eating enjoyment* and *safety* when they choose beef, more than *price*, *environment*, or *animal welfare*. Latvala et al. (2012) found that Finnish consumers change their diets mostly for *health* and *weight management*, but *environmental concerns* and *animal welfare* are also significant factors. While these studies see buying/eating food as economic activities based on consumers' rational considerations of benefit and loss, food behaviours are also socio-cultural activities. What people think of a vegetarian male, for example, is partially rooted in the dominant gender role/behaviour discourse in the community. Changing a person's eating habit is not a matter of personal

preference; the community defines what is appropriate to eat. In that regard, this research argues for three research themes on the socio-cultural aspect of food behaviours.

POSITIVE/NEGATIVE PERCEPTIONS ON FOOD ORIGIN

Food origin information matters as it hints on the quality, safety and freshness of the food, as well as locality. What is *local* is much disputed; In Roininen (2012)'s study, participants used the word in places of *rural*, *domestic*, or *organic*. Locality is a relative concept, and food mileage alone does not guarantee less GHG emissions, but buying local food is widely believed as a sustainable behaviour. Some Finnish consumers favour Finnish-origin food items on that ground. In general, displaying Finnish food origin in Finnish market is assumed to boost sales as Finnish products are trusted by consumers.

In fact, consumer attitudes towards food origin changes depending on how the information is presented. Pouta et al. (2010) discovered that Finnish-origin broiler meat is very positively received when the information is presented in plain text, but presenting it with organic product symbols (consumers were not familiar with them in this study) adversely affected. Luomala (2007)'s study with Finnish consumers, on the other hand, reports that only 8.7 % of them chose Finnish-origin Edam-cheese when they were primed with a cognitive approach, while 70 % of them chose it with an affective approach.

The findings from these studies show that displaying food origin information may not always encourage consumers to buy that product because (i) each person's definition of what is *local* varies, (ii) from origin information, consumers not only read food mileage, but positive/negative reputations of the food item from that region from their cultural knowledge, and (iii) consumers' collective belief, trust, patriotism, prejudice or other psychological factors make their purchase behaviours rather unpredictable.

SOCIAL IDENTITY AND FOOD

People are cultured to eat certain food items, and they choose what to eat considering how they want to be seen by others in different social settings. Some food items have strong associations with gender, for example, "Meat is masculine food, powerful food; to be a 'real man' in our culture is to eat meat — lots of it, and the redder the better" (Fox 1999: 27). A *New York Times* article also wrote, "meat-eating persists as a badge of masculinity, as if muscle contained a generous helping of testosterone" (Brubach 2008). Not much was written about food-gender association in Finland, but in Latvala et al. (2012)'s study, meat-eater group was described as male-dominated.

Another aspect of Finnish males' eating habits is observable in grocery stores. In Järvi (2010)'s study of eco-labels, Finnish male shoppers' spontaneous buying behaviour, without much consideration of product labels

or attributes, was reported and such a tendency is a strong obstacle in communicating sustainability messages to them. The gender and other socio-demographic differences in eating and grocery shopping behaviours deserve more attention in the future, in relation to a broad range of consumer attitudes. One message would not work for all; sustainability messages should be customized for each group.

CONTEMPORARY FINNISH RECIPES

The social identity shaped/expressed with food is also related to how Finnish society has changed and its impacts on traditional-contemporary Finnish recipes, because a person's food preference is developed at a very early age, and it is partially shaped by the national culinary tradition. A country's traditional recipes reflect climate conditions, arable land use, and economic development. The traditional recipes evolve into contemporary ones, reflecting economic and social changes such as affordability and availability of food items, changes in life styles (increased urban population, single living and single parenthood, longer working hours, etc.) Researchers can focus on unsustainable but popular Finnish recipes and find reasons behind them. Finnish nutritionists already started calculating environmental impacts from popular recipes and the data will be made public soon.

Societal changes also bring about different perceptions on food items. For example, in many countries with records of economic hardship in the past, meat-eating has a very positive perception because meat used to be a pricey commodity. The authors suspect this is the case in Finland. Now meat is affordable for everyone but still meat may be favoured over vegetables thanks to this historical background. A study of Finnish consumers' food language, how food items are talked about in various contexts, their metaphorical and symbolic meanings, may shed more insights on this topic.

To sum up, the second part of this paper suggests looking into the socio-cultural dimension of food behaviours, because much of what consumers do in relation to food is done out of norms, habits and beliefs, as well as based on rational thinking. To uncover in-depth qualitative data in this area, artistic and experimental approaches are suggested to encourage consumers' voluntary and focused participation.

CONCLUSION: FUTURE RESEARCH ENDEAVOURS

This paper is written to bring design research community's attention to two design experiment opportunities: parting knowledge for the public on food-induced environmental impacts, and understanding consumers' food perceptions and behaviours from the socio-cultural perspective. Design experiments are particularly called for, because the problem of sustainability is ill-structured—the elements are unknown, multiple solutions exist, multiple evaluation criteria apply, and stakeholders' different judgments and

beliefs should be resolved with interpersonal activities. Often sustainability problems are combinations of *Rule-Using, Story, Decision-Making, Diagnosis-Solution, Case Analysis, Dilemma, Design* and more types of problems as they are defined in Jonassen (2000: 66-67).

For such problems, design experiments can work for generating shared knowledge among stakeholders, understanding current consumer perceptions and behaviours, finding appropriate ways to represent the problems for different audiences, and finally producing original solutions. Problem representation, as Jonassen emphasized in the same paper (2000: 69), is deciding what to “provide or withhold” among many clues and contexts to define the problem space, and it is also deciding how the problem would look; design experiments can encourage the audiences see the problem from key perspectives and focus on major issues first and foremost. The experiments can be also designed as aesthetic, multi-modal communication platforms with which emotional and sensitive aspects of food consumption can be addressed.

For future studies, the authors suggest three directions of research endeavours: First, to identify current misunderstanding of sustainability related scientific concepts and socio-cultural elements of food consumption, build interactive public installations to collect quantitative and qualitative data on Finnish consumers’ own definitions of the scientific concepts/sustainable behaviours, what Finns eat in various occasions and social settings, and connotative meanings of food items in Finnish language. Recurring patterns in the collected data will point to common misconceptions and ungrounded perceptions as starting points for improvement.

Second, to identify current problem behaviours, data collection systems for individuals’ food behaviours are called for, but the systems should work without the hassle of typing in what you buy/eat all the time. Such tools can be developed either on wearable or mobile platforms, or at grocery store checkout stands, if Finnish food providers and consumers agree to collect consumers’ grocery shopping data. Consumers can receive feedbacks based on their weekly, monthly, and yearly history, and they will see the tangibility of environmental impacts they have caused.

Third, to approach audiences with different knowledge, perspectives and understandings as mentioned in the first part of this paper, exploring original ways to represent food sustainability issues are called for. Consumers with different priorities should be presented with different opportunities/benefits. The authors are looking forward to suggestions and collaboration opportunities from design research community on future studies.

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DISCURSIVE DESIGN BASICS: MODE AND AUDIENCE

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ABSTRACT

Presented within are four categories of product/industrial design practice, one of which, Discursive Design, is problematized regarding basic operational mode and audience. Two dimensions will be offered that provide fundamental structure for future theorization. Having emerged over the last two decades, increasingly critical practice is being developed within design's art-based, exhibitivistic model, and also within the field of design research. Here the dimension of Terminal/Instrumental is posited as an operational modality, while the audience along this dimension is posited in terms of Internal/External participation.

INTRODUCTION

In an attempt to help make sense of the expansion and maturation of industrial/product design research and practice, especially in the 21st Century, a basic framework is offered—a four-field approach to broadly categorizing design practice (commercial-, responsible-, experimental-, and discursive-design) previously articulated by the authors. In addition, two dimensions thereof are posited to aid in understanding discursive design, which is the least familiar of these four fields. Sharing much in common with notions of critical design, here discursive design is presented as an overarching rubric that encompasses critical design and more appropriately accounts for the varied forms of current and emerging “critical” practice. The binary dimensions (Terminal/Instrumental and Internal/External) while basic, help provide a theoretical foundation for future articulation of existing practice, as well as a fundamental vocabulary for practitioners to better understand what may be possible as they venture into this newfound design territory.

FOUR FIELDS

The first of the four fields is **commercial design**, representing what is the most common understanding of industrial/product design practice. This not only represents the overwhelming majority of current professional activity, but also acknowledges its historical roots. This is design work oriented toward, and driven by, the market. Success is largely defined in economic terms: profitability or sufficient return on investment. The primary intent of the designer is to create useful, useable, and desirable products capable of generating adequate financial return.

Responsible design encompasses what is largely understood as socially responsible design, driven by a more humanitarian notion of service. Here the designer works to provide a useful, useable, and desirable product to those who are largely ignored by the market. Issues such as compassion, altruism, morality, and philanthropy surround the work, be it for users in developing or developed countries. While responsible design can and often does have a relation to the market—being offered for sale to individuals or institutions—its primary intent is not a maximization of profit, but instead to serve the underserved.

Experimental design represents a fairly narrow swath within the broad field of design, and its primary intention is exploration, experimentation, and discovery. Experimental design is defined perhaps more by its process than its outcome. In its purest form it is not driven by an overly specific end-goal of application, but instead is motivated by inquiry—investigating the design implications of, for example: a scientific innovation, a manufacturing technique, a material, a concept, or an aesthetic issue. Just as with responsible design, a marketable object may eventually result from an experimental project, especially after specific refinements and deliberate commercialization efforts. However, the primary intent of experimental design is to explore possibilities with less regard for serving the market.

Discursive design refers to the creation of utilitarian objects/services/interactions whose primary purpose is to communicate ideas—artifacts embedded with

discourse. These are tools for thinking; they raise awareness and perhaps understanding of substantive and often debatable issues of psychological, sociological, and ideological consequence. Discursive design is the type of work that is generally less visible in the marketplace (though it can certainly exist there), but rather is most often seen in exhibition, print, film, and in the research process. Importantly however, these are understood as design—objects of utility, yet ones designed to carry ideas. They function (or could function) in the everyday world offering utility, but their discursive voice is what is most important and ultimately their reason for being.

It is important to note that work in one of the four domains does not entirely exclude other intentions or effects—a designer may predominantly wish to make a commercially successful product, but may also wish to do so with a more experimental design, for example. While multiple motivations and results (hybrids) are almost always present, the scheme extends from the idea that one is likely dominant—this often becomes evident as the designer makes decisions among competing issues. For example, the designer might choose a component material that is very reliable but prosaic, over one that is novel and exciting, but is ultimately less dependable. Both would offer a particular design advantage, but one is chosen/rejected.

It should be understood that precise categorization within the framework is not of ultimate concern. Instead its primary aim is a helpful starting point for design planning, which helps keep the designer on course amid the vagaries of the design process. The framework also provides a basic vocabulary that can aid professionals and the public in understanding and discussing design.

DISCURSIVE DESIGN

The discussion of the four-field approach helps to contextualize the focus of this paper—discursive design and the fundamental categories of operational mode and audience. While present to some degree (however small) throughout most of the history of industrial/product design, critical practice has gained purchase in the 21st Century, and the notion of critical design has become a rallying point and a loose, organizing rubric. The establishment of the term “critical architecture” began taking root in the late 1970s, but is largely attributed to Michael Hays’ 1984 article, “Critical Architecture: Between culture and form.” Following suit, critical design has been greatly promulgated by the work of Anthony Dunne and Fiona Raby, and that of their Design Interactions program students at the Royal College of Art. The most widely referenced notions of critical design have proliferated through *Hertzian Tales* (Dunne, 1999) and *Design Noir* (Dunne and Raby, 2001), yet their initial definition has increasingly become distorted. Originally, critical design described specifically electronic objects and also ones that could not exist in the marketplace. Further, Dunne and Raby associate criticality with the Frankfurt School theorists

and critical theory’s goals of enlightenment and emancipation, which is a high (and elitist) bar that is seemingly lost upon so many other’s work that is being called “critical design.”

The field of discursive design shares the same sense that the product-form can be primarily a vehicle for the expression of substantive ideas, with active discourse, discussion, and social debate usually as desirable outcomes. Discursive design is intended as an umbrella category that includes critical design (be it around the Dunne and Raby’s initial conception of non-commercial electronica) or instantiations that engage other forms of speculation, research, or commerce.

TERMINAL AND INSTRUMENTAL

Most typically discursive design is understood as a specific breed of objects that a designer plans and instantiates in some physical or digital form. These are then publicly released in hopes of adding to the discourse of a topic, while perhaps engendering reflection and transforming thought and action in the world. In this sense, once the designer completes and distributes the object, their job is basically finished; the hope of reflection and transformation is fundamentally beyond their control (i.e. “message in a bottle”). This is what is referred to as a *terminal* form of discursive design; the object is the terminus of the designer’s direct effort and control. Certainly the designer may subsequently alter the design or its context of user/viewer engagement in order to better affect communication of their message, however these are still efforts aimed at refining the object’s terminality.

An example is Julia Lohmann’s 2004 cow-benches, which are a “bovine memento mori” that raise concern of human utilization of animals as raw material. She makes her statement through her full-sized cow-shaped benches upholstered with a single cowhide, adding to the discourse surrounding “animal rights.” While receiving a great deal of press and inclusion in museum collections like the MoMA, most often however, such discursive projects speak to a much smaller audience through, for example, gallery exhibitions, student exhibitions, design publications, design blogs, designers’ websites, or small commercial niches. Because the objects are most often speculative and not intended to physically enter into mass consumers’ utilitarian lives, an art-based model of engagement is dominant.

Around the turn of the 21st Century a newer mode of discursive design emerged wherein the discursive object comprises a commercial research methodology. Discursive designing is included within a larger project—the discursive object is a means to some other end. This *instrumental* form of discursive design behaves similarly to myriad research tools that engage potential users and hopefully produce insight into their hopes, dreams, values, concerns, behaviours, etc. For example, the method of “collaging” has been a common design researcher tool over at least the last two decades. Here a

research subject is asked to create a collage of images (and words), whether of their own making or clipped from magazines or other curated lists. The scope can be general, such as, “What are your worries about the future?” to more specific questions, such as “What’s it like driving your car?” Here the research value is not the object itself—the collage—but instead the subsequent conversation that it engenders. The collage becomes a “discussion tool” in the sense that it opens up a dialogue between designer/researcher and stakeholders. Through the use of imagery and some text, users enter into a less-familiar expressive process—they often communicate differently, more broadly and more introspectively than perhaps when taking a survey or asked to articulate a verbal response to a question.

Instrumental discursive design involves the creation of discursive objects that operate much in the same way as these collages, though they normally are not created by, or co-created with, the user. Instrumental discursive designs are the outcome of the researcher’s efforts to design objects that elicit responses; users are invited to speak broadly, to reflect on the objects’ possible meanings. The discursive designer/researcher is looking to communicate ideas through their objects that are provocative on psychological-, sociological-, and ideological-levels. The goal is a substantive, values-based exchange. The instrumental discursive object is used differently than a typical prototype; they are more of a probe used to evoke user responses that may be difficult to assess otherwise. They may be presented as a prototype, but intentionally provocative. Ambiguity is also often intentionally leveraged with these discursive instruments. As Gaver et. al. discuss, ambiguity allows designers to “suggest issues and perspectives for consideration without imposing solutions... to raise topics or ask questions while renouncing the possibility of dictating [users’] answers.”

It is important to note that Terminal and Instrumental represent two ends of a continuum, rather than neat and distinct classifications. While much work is presently done at both ends, designers wishing to make an impact with their Terminal work should consider ways to engender a dialogical relationship with the audience. Rather than the message in the bottle, how can the designer keep the exchange going? How can they design for a more engaged discourse? A growing possibility for such interaction may be use of the Internet and forums or feedback devices on sites such as YouTube. And designers/researchers creating discursive objects that normally remain inside research projects can search for subsequent uses. Rather than being ignored or discarded after achieving their primary function of advancing a project, what other useful lives might these prototypes have?

INTERNAL AUDIENCE

There are varying degrees of engagement between user/viewer and the idea(s) embedded in the discursive

designer’s object. At the most basic level the designer disseminates her product/ideas that then become a part of a general notion of discourse around a certain topic. However, these become effective, valuable discursive objects when their message actually gets contemplated and is understood by others. Going further, the ideas may become internalized and reflected upon, after which they may cause a change in thinking. Ultimately these new perspectives may result in changes in behaviour and action, changing the world even in the smallest ways at the level of one individual, but also perhaps with collectives and with ripple effects even influencing societal structures.

Fundamentally discursive design can communicate to any group; the targeted audience, however, usually depends on a number of factors determined by the designer. The reflective designer, based upon their chosen message, may already know who the best audience is, or they may need to define and research how and with whom to communicate. Then, they plan the encounter with the audience, which of course may or may not go as intended. As ideas spread, the designer loses control, which can be both powerful and limiting. For many, the broader reach of the message, the better. In some instances a limited audience may be desirable, and if so, the designer may consider particular ways to limit others’ engagements with the objects, as well as how the objects communicate the ideas. But it should be clear that designers have both intended audiences and actual audiences, no different than product/ industrial design in general.

Two major audience categories have emerged over the decades through design’s discursive practice and are posited as Internal and External. As aforementioned, architecture has had a strong impact within this mode of ideas-based designing. If its history begins, as often cited, with Italian Radical Design of the 1960s, critical practice was largely focused inwardly. Critical architecture was employed to criticize architecture, and as such, this design practice operated similarly to the text-based field of architectural criticism. It can be considered a hybrid form of architecture and criticism. This development is not surprising given their long histories, and that practicing architects often engage in the production of theory and write critically about the discipline in the same professional publications as critics. This Internal focus/audience is a somewhat broad category and usually includes, for example, the political, technical, and professional systems that support the production of architecture. Today an internal focus still predominates the field of critical architecture.

Memphis may be the first significant product-design-related movement towards discursive design. Furniture was the medium used to challenge the cold rationality of a prevailing modernist aesthetic, along with the status quo of manufacturers, media, curators, and critics—those that play a role in the construction and dissemination of designs and design ideas.

INTERNAL	TERMINAL		EXTERNAL
	Object is terminus of design activity. Audience is design & related disciplines. Example: <i>A product designed for an exhibition that criticizes "green-washing" of products by marketers and complicit designers.</i>	Object is terminus of design activity. Audience is those outside of design. Example: <i>A product designed for an exhibition that questions societal norms of beauty and the objectification of women.</i>	
	Object is a part of other design activity. Audience is design & related disciplines. Example: <i>A provocative prototype to help elicit values of a design team regarding the meaning & importance of sustainability for upcoming project.</i>	Object is a part of other design activity. Audience is those outside of design. Example: <i>A provocative prototype used to elicit women's values regarding body image for the initial research phase of client project to design exercise equipment.</i>	
	INSTRUMENTAL		

Memphis, was an “anti-“ movement, reactive much in the same way that critical architecture today still has its back to, and faces “projectively” (Somol and Whiting 2002) away from modernism. While Memphis claimed concern for, and significance within, broader culture, the first-order focus of their work was the design profession itself. Affecting culture was a second-order consequence of their internal focus.

Today, while internally-focused discursive design indeed produces objects of discourse, it (like Memphis) aims for hearty self-reflection and changes within the discipline. To this end, while discourse has been defined here as the exchange of ideas that are of psychological, sociological, and ideological import, the Internal focus largely deals with the ideology of design, which in turn ultimately affects the individual and the social. But the first-order emphasis is upon design ideology.

EXTERNAL AUDIENCE

While self-reflection and -criticism are important components of healthy, mature disciplines, they of course ultimately strive for impact beyond their own walls. With a concern for how design practice can extend its influence deeper and differently into the social, the novel opportunity for discursive design lies with an External audience as a first-order emphasis. This is the most common understanding of discursive designing—communicating substantive ideas of some topical complexity that are relevant to other individuals and collectives. The goal here is not to use design to communicate and criticize design itself, although that may occur. The intention is to use design, the products of design and the strengths that such stuff affords, to communicate in a different and hopefully effective manner; design provides a more intellectual service.

The discussion so far of Internal/External has been geared toward Terminal forms of discursive design: the object is released into the public sphere. When the discursive object is nested within a larger design/research project, this is an Instrumental mode—a research methodology. Therefore Internal and External foci for Instrumental projects have different audiences than for Terminal ones. In the case of a discursive object employed as a research tool (like the collage

analogy), an Internal audience would involve the stakeholders themselves. Just as with Terminal+Internal projects, the message of the audience is aimed within, and geared toward those that are involved on the production side of the project. For example, a discursive object is used to help elicit reaction from other designers, engineers, marketers, executives, etc.; the Instrumental+Internal object is not meant to be viewed or consumed by the public or the user group. On the other hand, Instrumental+External objects are meant to elicit response from users. Specific members of the target audience are brought into the research process, and exposed to the discursive objects in hopes of gaining insight from their response. The insight is used to design something else, be it commercial, responsible, experimental, or even another discursive product. Yet, as aforementioned, the Instrumental+External object is not a prototype but somehow ancillary or peripheral in the sense of a genotype (Dunne 1999).

Researchers, design researchers, and corporate and independent practitioners all currently use discursive design to their own ends. From the most basic perspective, the notion of Terminal and Instrumental operational modes, as well as the respective Internal and External audiences both help to express the breadth of the value that discursive design can offer to individuals, the profession, and society. This structure is intended to help undergird further theorization that this burgeoning discipline needs to help legitimize and popularize itself within the broader community of academic and professional practice.

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COMPLICATING MACHINES: A CALL TO INFECT ARCHITECTURE WITH THE MECHANISM OF ‘POLITICS’

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ABSTRACT

This paper ventures from architecture's possible and much needed capacity to provoke through its material manifestation a difference of thought.

First, an argumentation is constructed pleading for the infection of architecture with the negotiational mechanism of ‘politics’. This is needed if architecture wants to reach its full capacities of acting in this world – practically; ethically; politically.

With this argumentation in mind, the architectural experiment *Complicating Machine CoMa₀₂* is screened as a set-up, following its possibilities – both functional and para-functional – to its user, the flâneur, the passer-by.



Figure 1: Lower part of *Complicating Machine CoMa₀₁* [*Ont-Moetingsmeubel*]¹ 2010

INTRODUCTION

One of (interior) architecture's major trumps is its pervasive presence in our everyday life combined with a unique ability to embody us, to seize us in encounters. This combination makes it possible for architecture to be truly experimental. We often venture through this world guided by fixed ideas. Experimental practices disrupting these ideas then are like volatile salt, awakening us from pre-programmed thoughts. Through their material manifestation, architectural artefacts can raise questions on how we think and act – practically; ethically; politically. They can explore possibilities and instigate new possibilities to come into being. ‘Artefacts people interact with have enormous impact on how we think. Artefacts do not merely occupy a slot in that process, they fundamentally shape the dynamic itself.’ (Robinson 1994) This explorative paper ventures around this affecting dynamic.

In the educational project *Complicating Machines*² (*CoMa_{xx}*), part of the courses of Interior Architecture at the Sint-Lucas School of Architecture, we devise and build with students experimental-experiential architectural machines on a one to one scale, in the real context of the city. To be short, these machines can be seen as provocative architectures, questioning socio-spatial relationships in everyday life. The studio operates on a scale reaching from prostheses to architectural devices. These *Complicating Machines* are encountered. They are not idealized probing situations outside the world. Just as Sophie Calle's *Phone Booth*, they are small estranging alterations in public space. They truly experiment, affecting their user, the flâneur or the contingent passer-by.

ARGUMENTING FOR THE MECHANISM OF ‘POLITICS’ IN ARCHITECTURE

In the architectural machine *CoMa₀₂*³, one can distinguish similarities with artefacts produced by other investigative architectural practices. One can for instance discern formal resemblances with the *Community Table*, one part of Wexler Studio's *Two Too*



Figure 2: Aerial view of Wexler Studio's *Community Table*, part of the work *Two Too Large Tables* 2006

Large Tables in the Hudson River Park, New York. I want to take this *Community Table*, especially interpretations of its being too large, as a venture point from which to construct the central argument of this paper, i.e. the relevance of a complication or infection of architecture with the mechanism of 'politics'. Subsequently, I want to look at the set-up of the experimental device *CoMa₀₂*, an architecture I consider to be infected by the mechanism of 'politics', a designerly mode(l) of inquiry into possibilities.

BRINGING POSSIBILITIES INTO SENSIBLE RELATIONSHIPS

In a first, formal interpretation, Wexler Studio's *Community Table* really is too large compared to every ergonomic standard of what constitutes a 'good' table. Its plane stretches over a distance that hampers normal communication across the table. Furthermore, the orientation of its seating positions is deviant and disturbing. Following the interpretation of Donald Goddard, the table is beyond this physical overscaling, also too large in the sense that it offers 'too many possibilities for interaction and non-interaction, and it is impossible to reconcile so many possibilities, except that they all take place at the same flat, horizontal expanse of the table' (Goddard 2001). The table gathers its users in what Wexler calls unusual pairings. One can try to sit in community, as a form of belonging agreed upon. One can opt to turn the back to that same community preferring splendid isolation. Other, parallel communities might take shape. One may even have no choice whatsoever when some of the available seating positions are already strategically taken. The table ensures not one possibility, it enables or provokes multiple, contingent ones.

Connecting back to Goddard's interpretation, and looking x-ray-wise through the flesh of the *Community Table*, one can thus discern underlying mechanisms. I argue that precisely these mechanisms afforded by the table, are of interest to forms of design such as architecture, if architecture wants to address its full capacities of acting within the world. As touched upon in the above, the mechanisms working through the table are (i) one that affords or provokes multiple possibilities – both action A and non-A –, and (ii) one that brings these different possibilities into sensible forms of relationship – an irreconcilable relationship according to Goddard. So, the mechanisms underlying the design and the design activity are not oriented towards solving



Figure 3: Upper part of *Complicating Machine CoMa₀₂* [Fusion (By) Cooking] 2011

or eradicating the ambiguities and ambivalences raised by the difference of possibilities. Neither the design nor the designers make any such solving effort. Quite contrary, they intentionally seem to advocate remaining within this state of ambiguity and ambivalence, and harvest from its potential.

However, 'opening up' by admitting different possibilities to the table and then, as in Goddard's interpretation, 'closing down' by stating that the nature of their relationship is one of irreconcilability, is passing by too hasty the potential of this table. Before any statement can be made on an irreconcilability or on its antithetical tenet of harmony, a time exists in which these different possibilities appear in parallel and touch or affect one another, within the same horizontal expanse of the table. It is this time of tension that constitutes the fertile ground, enabling the new to come into being. This through adding up possibilities to possibilities forging new possibilities; adding up experiences to experiences forging new experiences; adding up interpretations to interpretations forging new interpretations.

INTRODUCING TO ARCHITECTURE THE NEGOTIATIONAL MECHANISM OF 'POLITICS'

How then to term these mechanisms we are venturing around? The one producing different possibilities (i) and the one relating sensibly these possibilities (ii). Or do both mechanisms in fact form one and the same? At this time, I want to introduce to the argument the terms 'negotiation' and 'politics'.

In a paper presented at a previous *NORDES* conference *Making Design Matter*, we ventured from the question by means of what kind of design attitude we as designers could regain our full capacities of acting within the socio-spatial constellations that relate people and world. A table assembling people is arguably one of the very basic versions of such a constellation. We argued that a 'critical questioning design attitude inducing the dynamics of negotiation' (Lieken & Janssens 2011) is needed. This inducement of the

dynamics of negotiation needs further elaboration.

In his book *Architectures of Time*, Sanford Kwinter touches upon the mechanism of 'politics', positively identifying it in both the social as the subjective realms as being 'nothing more than the production of new possibilities' (Kwinter 2002). Kwinter sees this production of new possibilities as an urgent task for architects and architecture, in fact for society as a whole. He states that 'setting out to think about novelty, or "the new", might provide a way to revive our presently atrophied capacities of acting – practically, ethically and politically – in this world' (Kwinter 2002). Kwinter also exposes the danger lurking in our interpretation of the morphogenetic relationship between the possible and the real, often seen as a relationship in which the possible is (only) a prefiguration of the real, not a negotiation on the real. Following this kind of morphogenesis, as we often do, would reduce the space of possibilities to a 'sad and confining world already formed and given in advance' (Kwinter 2002). There is more to be harvested in the production of possibilities. Beyond translating possibilities into realities, architecture can be 'politics', bringing and maintaining us in experiential positions from which negotiational processes sprawl.

The strong interrelation between 'aesthetics' (I consider architecture to be a part of it) and 'politics' constitutes the leitmotif of Jacques Rancière's philosophy of *Dissensus*. According to Rancière, both these human activities are forms or processes of dissensus. Their interrelation is defined by the fact that both have to do with 'reorienting general perceptual space and disrupting forms of belonging' and that both operate through 'a contingent suspension of the rules governing normal experience' (Rancière 2010). The essence of the 'political' is 'the manifestation of dissensus as the presence of two worlds in one' (Rancière 2010).



Figure 4: Upper part of *Complicating Machine CoMa02* [*Fusion* (By) *Cooking*] 2011

Connecting the above back to the *Community Table*, the processes of negotiation between the different possibilities taking place, maybe even demonstrating, in the same flat, horizontal expanse of the table, are such a form of dissensus, making different worlds present in

one. Forms of belonging – communities – are not left unquestioned and are threatened by claims of other possibilities – deviant forms of belonging, the other. The rules governing normal experience, e.g. the agreement that tables are made to certain standards, serving known phenomena such as normal conversation and hence distribute their users according to these standards and known phenomena without residue, are suspended.

It is noteworthy that Rancière makes a clear distinction between 'politics' and 'police', and this certainly relates to architecture and all other forms of design. Architecture can be a 'policing' activity, or a 'political' activity. 'Police interventions in public spaces consist primarily not in interpellating demonstrators, but in breaking up demonstrations. [...] It consists, before all else, in recalling the obviousness of what there is, or rather of what there is not, and its slogan is: "Move Along! There is nothing to see here!" The police is that which says that here, on this street, there's nothing to see and so nothing to do but move along. It asserts that the space for circulating is nothing but the space for circulation. Politics, by contrast, consist in transforming this space of "moving-along", of circulation, into a space for the appearance of the subject [...]. It consists in re-figuring space, that is in what is to be done, to be seen and to be named in it. It is the instituting of a dispute over the distribution of the sensible' (Rancière 2010). As 'political' activity architecture problematizes and affords the new to come into being, as 'policing' practice architecture affirms the normal state of things.

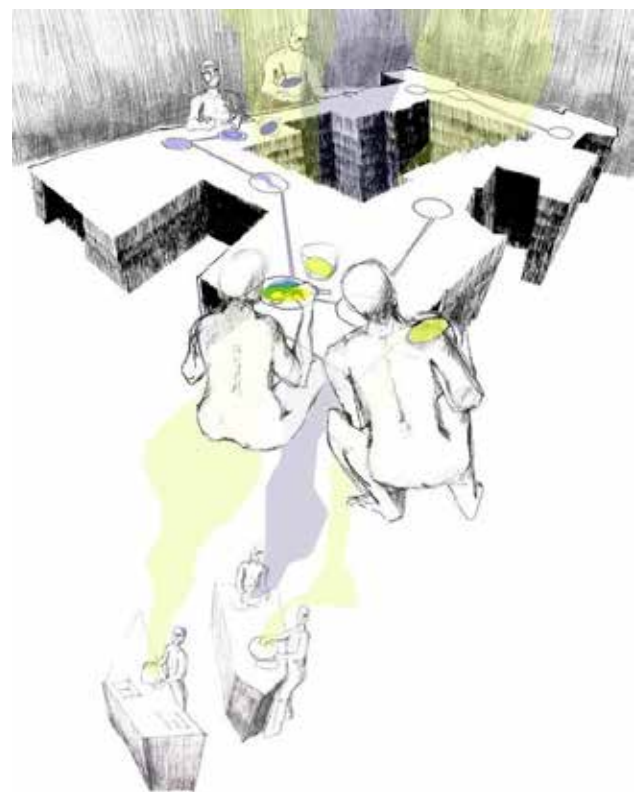


Figure 5: Possibility sketch of *Complicating Machine CoMa02* [*Fusion* (By) *Cooking*] 2011

OUR EXPERIMENTAL DEVICE *CoMa₀₂*: AN
ARCHITECTURE INFECTED BY THE MECHANISM OF
'POLITICS'

The term 'political' in relation to architecture might bring to mind burdened references. As in the above, 'politics' here is rather seen as the production of possibilities, a production situated in the real, connecting to everyday human activities and behaviour. *CoMa₀₂* is about the micropolitical level where our actions, mediated by artefacts, enact specific relations to others, to speak with Martín Ávila.

The basic idea for *CoMa₀₂* rose from combining observations. The observation that the neighbourhood where it is built is coloured by food and food culture(s), but also that these cultures appear separated, in shabby eateries peeled from every ritual or more ritually in the private interiors. The observation of a will to partake in public life. The observation of institutionalized initiatives in the city to fuse by means of cooking. In these initiatives, every friction is avoided: harmonious cooking with minority groups under the sterile neon light of community houses.

CoMa₀₂ introduces asides normal – functional – assets of a table also estranging assets, running in parallel, and mingles these. Anthony Dunne's 'para-functionality' comes to mind. 'The prefix 'para-' suggests that such design is within the realms of utility, but attempts to go beyond conventional definitions of functionalism to include the poetic' (Dunne 2005).

CoMa₀₂ is built in a multicultural and bustling urban neighbourhood. It comprises two floors. The lower floor is a cooking place, or better, it consists of several cooking places: different meals can be prepared at once. The cooking place is not private, yet claimable. The doors of the building enclosing the device are removed, disclosing the interior to the adjacent public space. Over the cooking places, a giant sculptural cooker hood is constructed, segmented because of the protruding beams dividing upper and lower floor, composing tubes through which the sensation of odours and fumes reaches the seated people in the upper floor. These tubes structure the figure of the upper floor table. However, the table is too large and gathers its users in unusual pairings, as described above for the *Community Table*. Moreover, the upper floor has three gradually heightening levels, affording or forcing the people at the table to choose between three different and culturally tinted postures, from cross-legged to more 'Western' postures, with or without chairs. Combining this with ideas of different physical and mental forms of community in the rituals of eating, the table mirrors the composition and working of the neighbourhood itself. From the surface of the

table, dishes are scooped out and the whole surface is varnished with an acid-resistant varnish, which is off course handy in any public space. However, some of these dishes are interconnected by means of scooped-out gutters. The gutters do not coincide with the 'natural' autonomy of the pairings afforded by the table, the gutters disrupt these pairings. There might be an agreement on sharing food, but juices might start to run from unwanted directions.

The 'however-s' in the above show an infection of the encounter with *CoMa₀₂* with noise, deviation, friction, chance, difference even some degree of 'user-unfriendliness' (Dunne 2005). Normally considered uninvited guests at the table and in design processes, these notions instead become valuable elements in the constitution of a main generative dynamic: that of 'politics'. *CoMa₀₂* does not 'police' its uses and users: it provokes uses as forms of dissensual, 'political' activity. What might happen is open, not known or wanted in advance.

CoMa₀₂ is an experimental model or set-up situated in the everyday real, a set-up from which the negotiational dynamics of 'politics' can take off. It sets the table and invites for the feast of difference to commence. I described in the above the constraints set by the table. I'll leave the interpretations of what could happen at this table to the imagination of the reader.

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¹ organized at Sint-Lucas School of Architecture Ghent by Johan Liekens and Karel Deckers, involving students Ellen Fievez, Jens Lippens & Sanne Delecluyse and all other students of the studio, third bacheloryear Interior Architecture 2009-2010.

² 'complicating machines' is coined as a term by John Rajchman in Rajchman, J. The Deleuze Connections. Cambridge MA: MIT Press books.

³ organized at Sint-Lucas School of Architecture Ghent by Johan Liekens, involving students Liselotte Delobelle, Siska D'Hondt & Maxine Morel and all other students of the studio, third bacheloryear Interior Architecture 2010-2011.

WHY HYPOTHETICAL? GROUNDING “THE GUESS” IN EXPERIMENTATION

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ABSTRACT

This exploratory paper discusses the advantages and disadvantages of the use of design experimentation to augment students’ approaches to speculative projects within the context of professional interior design education. By analysing student-based research as integrated into final comprehensive graduate-level design projects at a major North American university, the potential for experimentation to inform design process is articulated. Although the results of such acts are not always easily assessed within the constraints of real-life criteria, it is optimum for generating innovations in design process and hybrid theoretical frameworks that ultimately challenge the profession to define its boundaries in new ways.

INTRODUCTION

Accredited interior design programs in North American frequently utilize comprehensive speculative final projects as vehicles for students to demonstrate their ability to integrate their knowledge of design theory with the conventions of design practice. The processes used in the production of the ultimate conjectural projects vary to the extent that research and experimentation is integrated, however. Undergraduate projects are often described as including “research,” yet whether or not original investigations or experiments are actually included in students’ processes is not treated evenly across institutions, as evidenced by published course descriptions. Using such sources, it has also been determined that students in graduate-level accredited interior design programs are more likely to be expected to conduct more formalized research as part

of their approach to design problem-solving, but the expectation is often simply a more rigorous demonstration of the application of evidence-based solutions to speculative design problems.

The purpose of this paper is to analyze the final projects produced by students in one North American masters-level interior design program in order to better understand the type of research being done within the scope of a comprehensive final project and the nature of its general contribution to projects that are hypothetical. This term is used to distinguish investigations that are rooted in conjecture from those that result in tangible or built solutions. This paper is therefore a consideration of the opportunities and limitations of the comprehensive hypothetical or speculative design project as a vehicle for design experimentation and as a site of student-generated design research. While it focuses on interior design education as the defined arena in which to situate the insights offered, it presents an analysis of project-based exploration that is relevant to studies conducted in other places and in other design disciplines.

LITERATURE AND THEORY

Interest in this topic is grounded in recent considerations of the role of formal research and the design “thesis” in architectural/design education and recent analyses of the scope and execution of the conjectural “capstone” project in North American interior design programs. Salomon argues that North American architectural schools are promoting the replacement of speculative independent studio projects with “faculty-led research studios” in order to apply learning to larger and more publically-relevant topics through modes of study such as design-build projects in order to avoid emerging tendencies for design thesis projects to stray from what might reasonably be considered architectural pursuits that relate to the professional practice of architecture (Salomon 2011). This trend does not seem to be shared in interior design, however, where the emphasis remains on independent comprehensive projects. This may be due to the focus placed on programming in the interior design process (i.e. determining what is needed and whether there is a desirable “fit” between site and project). Interior design educators seem to prefer to provide students with the flexibility to define their own

design problem and to propose solutions from a wide range of options as evidence of their programming skill. Konkel's analysis of students' reflective comments in process books used to document final projects also suggests that students find satisfaction in having the ability to define and meet goals in which they are personally invested (Konkel 2008). Dunn, Ritchie, and Tebbutt reinforce this view by determining that final independent projects allow students to best demonstrate their ability to "synthesize and incorporate" what they have learned in previous educational exercises (Dunn, Ritchie, Tebbutt 2008).

In what ways, then, can the hypothetical project serve as a vehicle for students to heighten their exposure to and experience with research methods and tactics? Jeremy Till's observation that part of academia's role is to help make connections between research conducted within both academic and practice-based settings grounds his assertion that the scope of design-based research might best be understood as impacting three specific areas of investigation: processes (theory, representation, etc.), products (buildings and the systems, materials, construction techniques, etc. associated with them), and performance (social occupation, environmental performance, and the like) (Till 2005). Given that the speculative designs proposed are never physically realised in situ or at full scale, any consideration of their merit and innovation can only be discussed in terms that near the conjectural (i.e. a guess), making their research-based contribution most likely in the realm of exploring the nature and role of process in design.

DATA AND METHODS

This exploration is based on a review of literature on the subject of the role of comprehensive/capstone projects/design theses in North American interior design curricula and a detailed content analysis of twenty-eight hypothetical final projects produced in one North American graduate-level interior design program between 2007-2012. By sorting projects that incorporate original research by design students from those that are largely resolved using evidence-based strategies, it is possible to propose a framework for understanding what is lost and what is gained when research practices are integrated with hypothetical design projects.

EVALUATION OF DATA/RESULTS

Of the twenty-eight "practicum projects" completed by first-professional Masters of Interior Design students in the North American program studied, only 30% specifically incorporated original research into the design processes used by the students. Conventional research tactics such as survey, time diary, photo analysis and interview were employed in 10% of the projects to better inform student designers about the specialized cultural or technical requirements of their fictional clientele. More often, material investigations conducted using fabrication or modelling techniques

and movement or object studies formed the impetus for student research that emerged as sources for their conceptual approaches to the planning of spaces or the design of interior features or details.

DISCUSSION

The term "hypothetical" makes reference to the inference of a guess (often grounded by theory or fact) to frame one's approach to solving a problem. In design education, guesses are inevitably employed by both student and teacher in the consideration of the success of design solutions. Students' hypothetical projects usually respond to conditions that are often presented as real, addressing problems that engage a range of social, economic and cultural conditions; interacting with physical environments that often include an actual building that serves as the proposed hypothetical project site; adopting typological best-practices or invoking environmental, behavioural, and cultural theory; formulating a detailed design programme that acknowledges real-world goals, attributes and constraints; and proposing a spatial solution that includes the documentation of lighting, materiality, furnishing, custom elements, etc. in order to propose a "complete," if fictional, new environment. Yet even the most experienced student unavoidably exceeds her or his knowledge-base when developing a solution for a comprehensive design project, given that most students do not have experiences that allow them to know with certainty the implications of the physical alterations they recommend for the buildings that serve as the sites of their speculative design interventions.

Because the sites and the circumstances that frame each project are unique, instructors who oversee comprehensive student work also base their evaluations of conjectural work on a series of well-grounded guesses; that is, in many instances, the proposed work may or may not meet all structural, functional, legal or other requirements of interior design as it is literally practiced, but it is still often assessed based on some form of pre-established evaluative criteria that approximates reality.

This "stretch" from the realm of what is known to that of conjectural activity is necessary on the part of both students and professors, however, if they are to meet an expectation of being *experimental* in their work. By definition, experiments allow us to test what we know and lead us to discoveries of what we do not yet know (Merriam-Webster's Collegiate Dictionary 1996, 409). Yet without the laboratory setting, a preoccupation with causality, or strictly applied protocols, it is difficult to adapt the language or the mind-set of experimental research to applications such as design solutions that address open-ended questions in only one of what is a seemingly endless set of possible results. The notion of experimental research in relation to the design process is perhaps more effectively tied to the idea of the experiment as "making an attempt at something new or different" or an effort to be original (Collins English

Dictionary - Complete & Unabridged 10th Edition 2009).

The debate about whether or not it is possible to produce originality in design will be left for another discussion. We can assume, however, that attempting to go beyond typical, normal or expected approaches to solving problems is a reasonable expectation for academic activity. Herein resides the inherent advantage of hypotheticality: because all conditions of reality do not have to be applied to a given solution, new possibilities that may or may not be entirely possible are able to be considered. Analysis of student work that has integrated research in the form of creative experimentation linked to theory and tested within rigorous design processes suggests that speculative solutions have the potential to yield ideas that are new or unusual within the context of the problem to be solved.

For instance, for one soeculative project for a new media gallery, “Student A” chose to focus her investigation of haptic experience by creating the “H-Glove,” a tight-fitting zip-closure rubber glove with portions of the fingertips, fingers and palm removed. Worn as a second skin, the glove shifted the student’s attention from a visual focus to the haptic experiences she encountered “in a new digital universe governed by technology and the dependence on the hand-held device” (Johnson, 2011, 157). By limiting one’s ability to feel surfaces to focused targets on the hand, this student discovered techniques for heightening the sensory awareness of occupants that were grounded in her own experience that she then applied to her designed conjectural spaces.



Figure 1: “H-Glove.” Kelli Johnson, University of Manitoba, 2011.

In another example, “Student B,” whose project explored the nature of “pop-up retail” spaces, investigated the notion of “traces” left by objects that no longer remain in environments by casting small containers in plaster to reveal the spaces they occupy when present.

In a second experiment, this student created a pop-up performance by installing tiny battery-operated light units on various external surfaces in a densely populated neighbourhood. She then tracked their removal or repositioning by pedestrians over time as a means of verifying theories about people’s attraction to unexpected elements in the environment. Discoveries made through these two experiences informed this

student’s understanding of how to use scale and material in her speculative “guerrilla” retail environments.



Figure 2: Documentation of object traces in plaster. Andrea Sosa Fontaine, University of Manitoba, 2010.

As a third example, “Student C” designed a hypothetical dance education and performance centre by starting with 1:1 scale experiments with delicately patterned laser-cut felt layers and battery-powered LED lights to generate a concept model of a custom lighted carpet that blinks to represent specific dance steps as a means of encouraging particular types of movements through the hypothetical facility’s corridors. This student brought her exploration of theories of experiential learning to both her creative experimentation with tangible materials and the conceptual foundation of her speculative designed interiors.

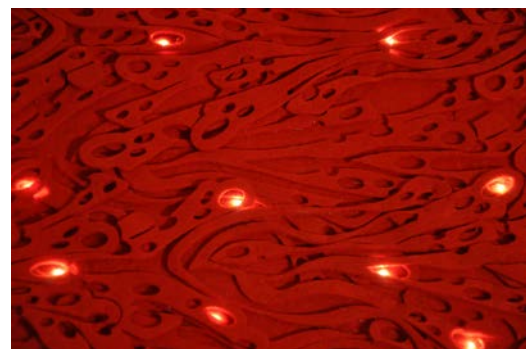


Figure 3: Simulated “carpet” with embedded lighting. Elisa Naesgaard, University of Manitoba, 2011.

In a second series of experiments, this same student also used videography to document movements found in the teachings of historically significant choreographers as lines in space when a fellow student held lights and performed the movements that were studied frame by frame and translated into forms and patterns to be used throughout the interior.

Students A, B, and C all employed qualitative experimental tactics to expand and/or demonstrate their understanding of theories that informed their approaches to their speculative projects. By acting *and* reflecting, tangible experiences helped them draw connections between the known and the suppositional. Without the

limitation of having a real client or similar real-life constraints, each student enjoyed the freedom of following the paths revealed through experimentation to design spaces and surfaces that supported conditions necessary to facilitate experiences for their hypothetical occupants that are grounded in their own research-based discoveries.

CONCLUSION

So what is lost and what is gained through the proposal of speculative solutions to interior design problems as modes of demonstrating students' competency and creativity? One of the deficiencies of this approach is the loss of the ability to evaluate solutions using real-life criteria such as economic constraints. The amount and type of alterations proposed to existing buildings within students' typical comprehensive projects would be profoundly compromised by the application of cost-related limitations. Similarly, the imposition of structural limitations threaten the feasibility of much of what students propose, given that they are not equipped to evaluate the impact of structural alterations to complex architectural sites. Therefore, the removal of "real" limits on what can (or should) be done within the parameters of a comprehensive project creates difficulty for evaluators who wish to measure a student's understanding of such practical concerns.

Likewise, students' ability to build essential problem-solving skills by working within more stringent constraints is also lessened by the use of conjectural propositions. With a broadened range of possible solutions that are not tethered to real limits, developing professionals do not have to seek out the compromises that are so much a part of professional design experiences in order to resolve design ideas that align more clearly with conventional or known approaches.

If we, as educators and researchers, are willing to forego the application of criteria that are strongly rooted in reality, however, there is much to be reaped from the application of experimentation to hypothetical scenarios. The more obvious benefit is that without the imposition of real constraints such as economic limitations, the freedom to explore the potential of relationships evoked by discoveries made when connecting theory to practice exists. And although the designs proposed are not always realistic, many evoke ways of thinking about problems that could be useful models for future applications. This shifting of emphasis from product to process aligns with Till's recommendation to focus design-based research on creating a better understanding of the processes we use, and it offers instructors more tangible grounds for evaluating students' performances. We may sometimes be guessing about the physical or functional success of what is proposed, but we have clear and documentable insights into the ways in which a student arrived at a particular solution.

A more subtle but no less valuable advantage to the use of hypothetical projects is their propensity to result in hybrid conditions that are more difficult to cultivate outside of academia. The hybridity of the ideas that result from design-based research suggests that making interdisciplinary connections is one of the keys to the success of this approach. For instance, students who apply the research tools of other disciplines such as material culture studies or performance studies are presented with opportunities to explore and document objects or movements in ways that yield a new physical and/or graphic understanding of their subject, problem, or source of inspiration. For Student A, the act of wearing the H glove imprints new understandings of haptic experiences as a component of human perception while Student B created the potential for heightened awareness of the ways in which material culture intertwines with human culture by giving tangible form to the spaces and traces that objects impose on their environments. The tacit knowledge presumably acquired by Student C through the manipulation of material and technology raised the potential for her to understand surfaces and finishes in new and more interactive ways. Experiments like these offer students opportunities to give credence to the ways in which they connect theory to practice within the context of conjectural solutions.

Additionally, methodological "balance" in problem solving is generated when experiments result in the physical manifestation of an idea. Such acts provide opportunities for discovery that don't exist when design investigations occur solely using virtual modes of communication. As shown in the examples used here, lessons about materials' properties, the potential of integrating new methods of fabrication, the engagement of the senses, the discovery of new ways of seeing things, the understanding of the body in motion, etc. provide a more tangible articulation of a solution when the "evidence" of such experiments/investigations can be presented alongside a speculative spatial solution.

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MAKING AS USING: DESIGN RESEARCH THAT DECIPHERS VALUE

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ABSTRACT

The cultivation of sustainable fashion praxis is challenging when design activity is implemented through the making of objects. Whilst scrutinising the use value of objects yields solutions, framing making as design research positions this process as research enquiry, with inherent usefulness in its own right. Sited within an emergent fashion practice that integrates professional skills with everyday and domestic customs, transformation is explored, via the method of gleaning, to reframe waste as remnants. This affords comprehension of the embedded life within objects and materials as they move into and out of my hands, post and prior to making. I propose that making is useful as a method for discovery; to nurture deep thinking regarding the use of made objects, to conceive of divergent systems for fashion creation and dissemination, and to critique the originating design practice.

INTRODUCTION

The development of strategies for sustainability, through design, is an exigent concern within practice-led research. One of the key theorists within this sphere, Tony Fry (2009), advocates redirective practice as the principal initiative to incite crucially needed change through design action. Redirection demands systemic change, constructed around the recognition that design has ontological implications. Decision-making must be driven by "...the imperative of taking responsibility for what will be brought into being by 'the designed designing' ..." (Fry 2009, p. 34).

The redirection of my existing fashion design practice is being formed through project based, doctoral research activities. The grounding for this practice is my past employment as a designer for a small fetish-wear business, where I designed and hand-made leather garments and accessories, mostly within the realm of underwear, corsetry and biker apparel. Around the time of the inception of the research, I had set up a home based studio in a converted garage, and dispensed with any intention to continue as a fetish-wear designer; however, my embedded skills and approaches procured through this former mode, provide arable ground from which to cultivate a differently framed practice. One proposed step towards redirection recognises that there is potential in existing states. As described by Fry: "the rematerialization of the culture by making new forms, knowledge and values from the old that...recreate a sustaining social ecology as a foundation of change" (Fry 2009, p. 102). This has been a befitting strategy for shifting the emphasis of my practice, generating a core principle to drive activity - the gleaning of remnants. My working definition of gleaning: *the gathering of the leftovers of production or society, commonly rejected due to non-conformity to mainstream standards*, is expanded to include the gleaning of knowledge and skills, as well as the physical gleaning of materials. Remnants are conceived as redefined waste; it is through gleaning that remnants become useful.

Fry's theories can be limiting for practice based designers and researchers, due to their intrinsic abstraction, therefore seeming incongruous with the quotidian pragmatics of design. Within the fashion design discipline, the movement towards design thinking and systemic change, beyond the LCA (life cycle analysis) of materials used, as approaches towards sustainability, is clearly supported by the recent publication, *Fashion & Sustainability: Design for Change* (Fletcher & Grose 2012). Concepts particularly compatible with my approach towards redirection are:

- Taking a localised approach that "emerges through the skills and resources of a particular region" (ibid., p. 110)
- "Designing business and manufacturing systems to mimic nature" (ibid., p. 118)
- The movement away from "business models based on material consumption" (ibid., p. 137)

- “Restoring the relationship between fashion and social and ecological systems that support it” (ibid., p. 143)
- The expansion of the designer’s role “to support consumers in interrogating the underpinning structures that shape our society” (ibid., p. 157)

Given these goals for the research, it seems discordant that my practice is characterised by making. My knowing is of the type that “is *in* the doing of the designer” (Downton 2003, p. 96). This is knowledge-how, “practical knowledge of ‘how to’ do something” (ibid., p. 62). The outcomes from my activities are objects and the research enquiry is through the making of these objects, prompting a dilemma that I have found personally very challenging. How can I justify the creation of more stuff? Is it possible to use the making of objects, as a method for thinking deeply about the use value of these objects? Can the making of more objects tell us about what we should make?

TO MAKE?

Fletcher & Grose (2012) recognise the difficulty that fashion practitioners face in grappling “with the conundrum of...dependency on business models based on material consumption” (ibid., p. 137). The fashion industry is one where success, and therefore value, is determined by economic growth (ibid., p. 136), simply put, the making and selling of more products. The dubiousness of creation motivated by consumption is echoed by Fry’s basic question to ask of oneself: “if what I am doing is actually useful or needed, and if so to whom and why?” (2009, p. 174). I have at times deemed the prospective and constructed objects emanating from my research activity unworthy of being made, and particularly, as fashion items, somewhat frivolous and superfluous. However, objects can have extraordinary potency, they evoke by “reaching out to us to form active partnerships” (Turkle 2007, p. 308). Those that are fashion relatable specifically shape us and our relationships to the society that we form: they “provide us with a visual language - through a series of signs and codes - that we use to communicate social status, identity, aspirations, and the way we feel about one another” (Fletcher & Grose 2012, p. 138), as well as a sense of belonging. An object’s scope of use therefore moves beyond the most basic utility and, particularly, the allurements afforded by fashion mechanisms can be realised as a positive device for change.

Willis offers assistance for thinking about value, through the concept “horizons of use” (Willis 2006, para. 12), providing insights as to an object’s ontological reach. For example, an object’s influence might be seen as a pervasion, as its reshaping of thoughts and associated behaviours pervades our life. This is comparable to an untended garden being present within you, calling for action, you sense yourself weeding, even when away on holiday (ibid., para. 31).

These insights reconcile object production with

redirective aims, but additionally, it has been through my own trust and persistence in making, even when unconvinced by what I was intending to create, that I have discovered value in the making process. At times, making served as a pragmatic use of gleaned remnants, at other times making has opened into a critique of parts of my practice, and more broadly the fashion discipline. Within the framework of higher degree research, making may simply be a tool of enquiry for design research, and within the tradition of knowledge creation, will proceed to fuel further enquiry.

WHAT TO MAKE?

A number of strategies have been explored to alleviate my concerns that the objects generated by my making, at times seem useless. I have trialled making items that have a specific use, which I personally need; making within a garment genre that has an inherent use value; and making using waste material, which through a process of gleaning is re-interpreted as remnants, and its potential revealed.

Designing for sustained usage demands conceptualisation of what might make an object pervasive (Willis 2006). Chapman (2005) suggests that “objects that evolve slowly over time build up layers of narrative by reflecting traces of the user’s invested care” (ibid., p. 134). Making objects that fulfil personal requirements can test design experiments against this criteria - does the object have the ability to carry my own narrative and convert action into invested care? Gleaning invests care through attentively finding value in remnants that are often scarce and unique, and naturally contain their own narrative. The careful process of gleaning bestows further narrative. It links the leftovers from production and consumption, making as use, and a resulting object imbued with what came before and what is yet to come; iterations that create a continuum of use and will extend towards future potentials.

WHERE TO MAKE?

Taking an approach of “I dig where I stand” (Fry 2009, p. 224), embraces personal “redirective opportunities” (ibid., p. 229), typified by potential that is amenable but untapped in ones immediate environment. With this aim, I have expanded the scope of my fashion practice, by integrating my existing practice of vegetable gardening, alongside everyday craft practices (such as knitting and crochet), emanating from the home setting. These additions are complementary in their inherent thriftiness, but offer a divergence that nurtures cross-pollination. This occurs through what Sennet (2009) describes as “domain shifts” (ibid., p. 127), as the tools for one task are applied to another, or through what Schön (1983) describes as “thinking from exemplars” (Kuhn, cited in Schön 1983, p. 183), where dissimilar is seen as similar as a driver of innovation.

Objects designed and made in this diversified place have narratives intensified through the richness of the

location. While acting as a physical site for design actions, the pervasiveness (Willis 2006) of this place affords imagining that both prefigures and forecasts, separate to the physicality of the object itself. Consequently, “where” describes a philosophical as well as a physical positioning.

HOW TO MAKE?

My making practice has much in common with craft. It emerges from skills reliant on tacit knowing, of which I can only prove my claim to through a demonstration of doing; an at oneness with material, described by Sennett as “focal awareness” (Polanyi, cited in Sennett 2009, p. 174); and “the desire to do a job well for its own sake” (Sennett 2009, p. 9). The material consciousness that all craftsmen possess (ibid., p. 119) is heightened by seeing virtue in the material (ibid., p. 135), a capability that is also essential for gleaning. Gleaning imparts an awareness of the time, life and associated living that supervenes upon the current presence of remnants, as well as a perception of the life that might project outwards from that point.

These approaches demand an obligatory slowness, distancing the practice from fashion systems that are categorised by fast production and consumption (Fletcher & Grose 2012, p. 124). This positions my design activities as serving “goals broader than commerce” (ibid., p. 155), and sees my making as an agent for “systemic innovation” (Macy & Brown, cited by Fletcher & Grose 2012, p. 174).

USE KNOWN

When a gleaner of bygone times in Varda’s *The Gleaners and I* (2003) re-enacts the gleaning from long ago, utility and efficiency are concurrently inherent in her actions and the garment she wears. Nothing is wasted within her movements and the frugal lines of the simply cut apron. The apron supports gleaning, but furthermore, embodies and holds this potentiality within its fabric, both literally, and figuratively. The apron is function made tangible.

I have used the garment genre of the apron as a precedent known to be useful. When imagining a



Figure 1: Some of the many aprons

garment that might be worn and used in the expanded space of the garden, an apron was the obvious choice. Subsequently, I have made many aprons using various gleaned materials and techniques, mostly based on a basic pinafore (1/2 apron) style. I have also used the apron as a starting point to develop other garments that feature elements of the apron, and are therefore permeated with apron like qualities.

This making of many aprons and apron relatable objects calls into question whether something that is inherently useful, loses its efficacy if repeated too often. Could lots of aprons, regardless of how useful they are, or how well crafted, be too much? Would one ultimate apron of the perfect function to meet a desired purpose be ideal? Berry is cited as saying: “You never know what is enough, unless you know what is more than enough” (cited in Fletcher & Grose 2012, p. 136). This experiment enquires, through making, as to what might be more than enough.

USE FORETOLD

My husband has an inclination to wear out jeans on the insides of the legs, rendering them useless and unworthy of repair, since the degraded and stressed area will not easily support mending or patching. The useless jeans are cycled through my practice, whereby they are gleaned and redefined as remnant. As elucidated by Chapman (2005, p. 116), denim jeans are a powerful carrier of narrative, and so are a potent material for further use through supplementary making. I had been intending to make a cover for our BBQ (barbecue) for sometime, for aesthetic purposes, since the BBQ is quite worn and ugly. This was an opportunity to make something that I personally needed, that I would use. The use value in this case, was a predicted use that was anticipated to result from making. This is a use that I could foretell, but with details I could not be sure of due to the process of design through making. The outcome was to be a BBQ cover, and I also envisioned the capacity for this to be worn by a person.

My approach was to maintain the integrity of the remnant jeans, by reconfiguring, but changing them as little as possible. I unpicked the inner leg and side



Figure 2: BBQ cover and apron, worn by BBQ and when barbequing

seams, and through trial and error, arranged the pieces to fit the BBQ. I was fortunate that my husband is of similar proportions to the BBQ; exactly the same height waist down, and half the width, so two pairs of jeans were required. The possibility to wear the cover was preserved by retaining openings for the head and arms, conveniently provided by the voids of the open waistbands. A third pair of jeans was used to fashion an apron, including a pocket for tongs, which both the BBQ and barbecuer can wear. The multifunctional aspect of these objects forms new narratives, but significantly, this experiment demonstrated use that was foretold, but actualised through the making process.

USE UNKNOWN

A form inspired by the garden, the lettuce, is the model for objects made using the traditional craft technique of crochet. The material gleaned for this purpose is waste from my own consumption: everyday plastic shopping bags and bags from other products such as bread and packaged supermarket lettuce. The technique used to achieve the shape is hyperbolic crochet, where the number of stitches is exponentially increased. This repetitive process cultivates a deep understanding of, and affinity with the material, owing to the long time spent in its company.

Making technique drives this inquiry and affects a predictable outcome in terms of shape. However, due to the variability of the gleaned plastic, the end result is not predictable. Each different plastic produces unexpected and sometimes astonishing textures, as the process of stripping and reconfiguring reveals hidden properties.

The use of these lettuce objects is not known; neither at the commencement of making, nor when the making is completed. They have no value related to a clear function, but perhaps an appreciation of the workmanship employed in their creation, and the “strange beauty” (Fuad-Luke, cited in Fletcher & Grose 2012, p. 135) that they possess, may afford an expanded idea of use.



Figure 3: The process of making lettuce from lettuce bag

MAKING CRITIQUE

During the early phases of the research, I felt a constant shadow of unease that I was merely making purposeless stuff. This has been alleviated by persevering with making, but a *making* that is vindicated through mindfulness of what is being truly created; regarding both the objects themselves and their agency.

Besides the usefulness, or uselessness of objects, making, as discussed, is useful as a research tool, regardless of what is made. The making experiments discussed initiate an analysis of: over production (many aprons), design with limited appeal (BBQ cover), and making for the sake of technique (lettuce make). The function of the apron is impaired by making many, however, opportunity exists for: diversification - different kinds of aprons or garment types; or specialisation - aprons with specific purposes. Whilst the BBQ cover solves my personal design problem and satisfies my aesthetic desires, it exemplifies design that interacts with different parts of the product lifecycle, the users life and other products in use; insights that might be applied to broader design challenges. The lettuce making, though it creates objects devoid of use, reveals unique ways of discovering value. When making from a plastic/foil chip packet, the extraordinary, sparkly lettuce generated reminded me so strongly of a friend, that I was compelled to give it to her. Through making, a gift emerged, engendering the notion that value might be founded through status as a gift. Could a gifting economy be a viable, sustainable strategy as an alternative to a fashion system based on monetary exchange?

Making affords a critique of my practice whilst in the process of redirection. The outcomes are a work in progress, giving fuel for continued reflection through further making.

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EXPERIENTIAL DESIGN LANDSCAPES: DESIGN RESEARCH IN THE WILD

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ABSTRACT

Thanks to the emergence of new sensing and behaviour tracking technologies, design research can take place anywhere and anytime in the real world. When doing design research, a trade-off has to be made between experimental control and ecological validity. In this paper, we compare Experiential Design Landscapes (EDLs) with three more traditional research approaches that are frequently used in design research, i.e., Lab Research, Living Lab and design research ‘in the field’, and reflect on this trade-off. By means of an example, we discuss how EDLs deals with issues of ‘generalisability’ to the real world and the potential loss of experimental control.

INTRODUCTION

The size and amount of computing power we carry with us is increasing everyday. More and more products and systems are becoming intelligent, networked and designed to be part of our everyday life and society. Through our smartphones we carry a wealth of sensors (e.g., acceleration, GPS) in our pockets and these are usually ‘always ON’. In addition, our homes as well as public spaces are increasingly being enriched with embedded contextual sensors, including motion detectors, cameras, etc.. The widespread deployment of these technologies have created an unprecedented ability to track people and record behaviours and contextual variables in real-time, over extended periods of time, and within the living and working environments

people inhabit in their everyday life. When design research can take place anywhere and anytime in the real world, this inevitably entails both consequences and opportunities for the nature of design experimentation. Whereas much attention will need to be devoted to the legal and ethical boundary conditions of recording, analysing, and utilising such personal and contextual data, the current paper sets out to explore a particular methodological issue in design research, that is, the trade-off between the level of control we can exert over contextual variables that may impact a particular (design) intervention, versus the ecological validity (or generalisability) of results found.

For designing highly intelligent products, systems and services, Van Gent et al. (2011) propose a method called Experiential Design Landscapes (EDLs) to develop and probe new radically innovative concepts towards societal transformation, with people in environments which are part of society (e.g., designated area in cities, sports parks etc.) and which are, from a user-perspective, not dedicated research spaces, such as university laboratories. EDLs use the ever-increasing intelligence in everyday environments and utilize this as smart sensor agent technology with behaviour recognition algorithms and data mining techniques to allow analysis of new behavioural and usage patterns that (may) emerge as a consequence of a variety of design interventions. EDLs thus allow real-time as well as longitudinal capture of individual, social, and environmental data and this way provide a much richer continuous characterization of (emergent) behaviour than previously possible.

When doing design research involving users, a trade-off is usually made between experimental control and ecological validity (Figure 1). Doing design research in a laboratory often results in lower ecological validity, limiting the extent to which findings can be generalized (or extended) to the real world, due to decontextualization. On the other hand, design research ‘in the field’ often results in a compromise on experimental control and a lack of generalization to theory (Koskinen et al. 2011; see also Black, 1955).

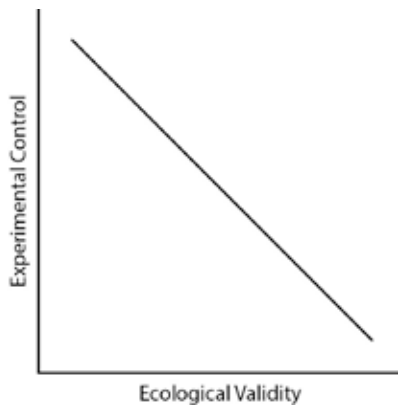


Figure 1: Graph illustrating the theoretical trade-off in design experimentation between experimental control and ecological validity.

In the following, we discuss how other research approaches involving users, i.e., Lab Research, Living Labs, and Design research ‘in the field’, deal with the trade-off. We reflect on each research approach with regard to their contextual control, social, environmental and temporal fidelity. Subsequently, by means of an example design project ‘Social Stairs’ we discuss how EDLs can challenge this trade-off. The paper ends with some concluding reflections and remarks on the ‘Social Stairs’ and a discussion on the generalisability of EDLs and the potential loss of experimental control.

LAB, LIVING LABS AND DESIGN RESEARCH ‘IN THE FIELD’

Laboratory studies in design research (in technical design disciplines) are very common, with its foundations coming from experimental psychology and the natural sciences. An experiment is aimed at testing the validity of a hypothesis, which usually has been formulated based on a theoretical prediction. Experiments provide insight into correlations and possible causal mechanisms (or cause-effect relations) by manipulating a particular factor, and measuring the effects of that manipulation. Experimental control is essential: any factor that may limit the accuracy or repeatability of the experiment or the ability to attribute the results to the experimental manipulation needs to be carefully excluded. Studying design in a laboratory thus means that a phenomenon, system, or artefact is taken from its natural environment and brought into the controlled arena of the lab. Thus, experiments typically abstract away from studying phenomena in their naturalistic context, as these contexts typically contain a large number of variables that are beyond the researcher’s ability to predict or control (Koskinen et al. 2011).

It is partly on account of this belief that ‘Living Labs’ were introduced. Their aim is to study phenomena in their naturalistic context while maintaining experimental control. “The term ‘Living Labs’ often refers to both the methodology and the instrument or agency that is created for its practice. Living Labs are driven by two main ideas: 1) involving users as co-

creators on equal grounds with the rest of participants and 2) experimentation in real-world settings. Living Labs provide structure and governance to user participation in the innovation process.” (Almirall and Wareham 2008). Well known Living Lab examples are PlaceLab at MIT (MIT 2009) and ExperienceLab at Philips Research (Philips International 2013). Recent initiatives in Living Lab research show deployment in everyday life, that is, people’s natural environments and parts of the public space and society (ENoLL 2013).

Design research ‘in the field’ is typically done in a naturalistic setting and aims to inform the early stages of design. Researchers follow to what happens to their design in context; how people and communities understand it, make sense of it, talk about it, and learn to use it (Koskinen et al. 2011). The foundations of design research ‘in the field’ come through social science and are often grounded in sociological theory. Design research ‘in the field’ can include so-called ‘observe and record’ ethnography (like in anthropology and other sister social sciences) and design ethnography with the focus on products and things, the use of mock-ups and prototypes through design action. Examples of design research ‘in the field’ can include contextual inquiry (Holtzblatt and Jones 2009) or cultural probes (Gaver et al. 1999), but also engaging with users and involving them in the product creation process through participatory design (Schuler & Namioka 1993), co-creation (Sanders 2005) and empathic design (Leonard & Rayport 1997).

SOCIAL STAIRS

Social Stairs is an intelligent staircase in an EDL built at the university’s main building that made sounds as you walked up and down. When people walked together on the ‘Social Stairs’, it would burst into a different, more orchestral chime echoing up the stairs (Figure 2). The concept at first aimed at decreasing people’s sedentary lifestyle and increasing their daily activity throughout the day by making the stairs a more appealing place.

Through early probing it was found that people would engage and involve each other. Therefore, altered, louder and more diverse orchestral sounds were designed to address this social aspect. Doing so, the designers wanted to explore how people would behave when at the Social Stairs. Social Stairs was equipped with sensors (e.g., embedded environmental sensors), smart activity recognition algorithms, and data mining techniques. Through pressure sensors the use of each step on the stairs could be measured by the system. Next to this a concealed remotely accessible video camera was placed, allowing the design researchers to observe ‘live’ and in hindsight people’s activities and behaviour in the EDL. Together with the data from the steps this provided the researchers real-time, longitudinal, in-situ recording of behaviour and context, and allowed a very rich continuous characterization of (emergent) behaviour prompting possible new design iterations.



Figure 2: People working together on the Social Stairs, being treated with more diverse orchestral chimes that echoed up the stairwell.

Social Stairs provided the designers with long-term user data of 6 weeks (i.e., log data, interviews and video) that was utilized to continuously do design iterations but also to analyze and test whether the intended effects were actually met, or even new unforeseen behavior emerged. Through data fusion i.e. combining/fusing different types of data (e.g. steps data, observation videos, interviews etc.) they got insight in different types of behaviour. For instance, people invited others to join them at the Social Stairs and create a soundscape together. Other people were actively seeking opportunities to create a joint soundscape, by patiently waiting for a while in the stairwell. Unexpected behaviour also occurred; some people were meeting up in the stairwell on a daily basis, similar to a hangout, and formed groups (2-10 people) to create joint soundscapes of significant complexity. Others got to meet and interact with new people through the Social Stairs (Megens et al. 2013).

DISCUSSION

THE TRADE-OFFS

When we look at the trade-off between ecological validity and contextual control one can argue that lab research often experiences major difficulties in its generalisability to the real world. In short, the lab seems to decontextualize (Koskinen et al. 2011), thus negatively affects both environmental and social fidelity (Figure 3), and limits the ecological validity of results by constraining and altering the very activities and experiences one is interested in capturing (Figure 4).

	Contextual control	Social fidelity	Environmental fidelity	Temporal fidelity
Lab Research	++	-	--	+/-
Living Lab	+	+/-	+	+
Design research 'in the field'	--	+	++	+
Experiential Design Landscape (EDL)	+/-	++	++	++

Figure 3: Grading matrix where Lab Research, Living Lab, Design research 'in the field' and Experiential Design Landscapes are graded on contextual control, social, environmental and temporal fidelity.

Despite the fact that Living Labs, in particular the 'older' Living Lab initiatives, aim to mimic the real world as much as possible they are still a simulated (lab)

environment. For example, the Experiencelab of Philips has a 'home' context where people are asked to make themselves comfortable, pretend it's their home and behave natural. Nevertheless, participants are fully aware that they are in an artificial situation, outside of their own everyday context, with their behaviours being probed and monitored, and with the typical role differentiations between the researchers and the researched (Gaver et al. 1999). Moreover, people are often pre-selected and invited to test pre-defined product functionalities or scenarios in context. The products and systems in such living labs are often 'only' used for a few days to a few weeks maximum. All in all resulting in moderate contextual control, social, environmental and temporal fidelity (Figure 3). However, recent initiatives in Living Lab research are taking place in everyday life, that is, people's natural environments and parts of the public space and society (ENoLL 2013). These developments as such can improve the ecological validity of the research results from Living Labs and their generalisability (Figure 4).

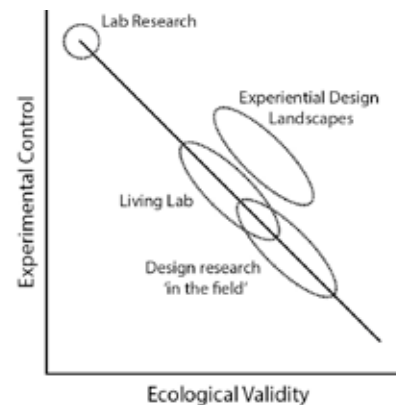


Figure 4: Graph with Lab Research, Living Lab, Design research 'in the field' and Experiential Design Landscapes, positioned in the trade-off between experimental control and ecological validity.

In the field, the control of variables is often problematic as it is a situation that is rich in uncontrollable contextual variables and unpredictable, emergent user behaviour. With respect to ecological validity this approach often performs quite well.

GENERALISABILITY AND EDL

The relevance of experimental methods in the field of product design and development has been contested on the ground that control of variables, essential to experimentation, is problematic in a situation that is rich in uncontrollable contextual variables and unpredictable ("emergent") user behaviour. Whereas the elimination of context (e.g., in the lab) can generate reproducible and generalizable results, it limits the ecological validity of results through constraining and altering the very activities and experiences one is interested in capturing. Current developments in technology allow for new opportunities in measuring behaviour in their naturalistic context. Specifically, sensor-enabled, wearable and mobile devices, sensor-enriched

interactive products, and intelligent environments have become computationally more powerful and are increasingly commonplace. EDLs are specifically instrumented to study user behaviour in context, allowing real-time as well as longitudinal capture of individual, social, and environmental data. Through interacting and working with communities of users in their homes, in the streets, or at their places of work, over longer periods of time, researchers have a unique opportunity to gain an ecologically valid understanding of emergent behaviour prompted by new design propositions (Megens et al. 2013).

In this paper we discussed an example EDL, the Social Stairs, that was able to generate meaningful behavioural data 'in the wild' (i.e., in our everyday life). The Social Stairs, an interactive musical staircase outfitted with pressure sensors and cameras, allowed for the real-time and longitudinal capture of user data. This data, in turn, enabled the designers to continuously monitor the naturalistic use of the Social Stairs in real-time, analysing aggregate patterns of behaviours after only a few days of usage, adapting the Social Stairs (e.g., the type of musical feedback), and re-analysing the effects of such a design intervention. Based on such quick cycles of introducing design interventions and analyzing new behavioural/usage patterns, the designers in this project were able to explore the design space around 'motivating people to increase their daily activity', gaining insights into emergent and unpredictable user behaviours associated with such a novel design proposition (Megens et al. 2013). Hummels & Frens (2008) discuss similar quick design cycles of analysis and synthesis in their Reflective Transformative Design (RTD) process as 'envisioning & exploring' and 'making & thinking' when designing for societal transformation (like EDLs).

The Social Stairs is a natural environment, unscripted and open to experimentation by users and unexpected or emergent behaviour. However, because of the data-mining techniques and activity algorithms, the EDL allowed real-time multimodal tracking of environmental factors that would normally be a threat to experimental control. This way rich continuous characterization of (emergent) behaviour was provided while still preserving a high environmental, social and temporal fidelity.

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DESIGN ARGUMENTATION IN ACADEMIC DESIGN EDUCATION

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ABSTRACT

In this paper we explore design argumentation as a resource when teaching interaction design in a university setting. We propose that design argumentation can help bridge between practice-based design education and theoretical issues from university curricula. Building upon the Toulmin model of argument, we outline the idea of design argumentation and report on initial experiences from interaction design teaching. We discuss how this approach can be instrumental in teaching students how to build up a shared design vocabulary in order to formulate valid claims when arguing for and through their design work based on empirical, theoretical and material grounds.

INTRODUCTION

Our point of departure is experiences from teaching a variety of interaction design courses on BA and MA levels at the faculty of arts at Aarhus University. For many years, our teaching has been inspired by Donald Schön's work on 'learning by doing' in a supervised and reflective design practicum (1987) and the importance of developing students' design judgments (Nelson and Stolterman, 2003). However, challenges arise when integrating this practice-based approach in an academic setting that is governed by outcome-based education taxonomies (Biggs & Tang, 2007) and more traditional academic evaluation criteria. In particular, the issue of training students in working across the span from particular design situations, objects and interventions to more abstract theories and methodologies has proved a salient challenge.

In response to this challenge, we have for the past few years explored how the idea and practice of *design argumentation* can help bridge between practice-based design teaching and more abstract theoretical and methodological issues in an academic setting. We have found inspiration in the Toulmin model of argument (1958) to teach our students both how to make valid arguments *for* and *through* their design process and product, for critiquing their peers, and for presenting their work in academic exam papers. We have found the process of design argumentation promising in terms of creating alignment (Biggs & Tang, 2007) between learning objectives, the actual design work of students, and the evaluation criteria.

Here we present and discuss the notion of design argumentation and share our experiences from design education. We show how design argumentation fuses the practice-based approach of the reflective practicum with the idea of constructive alignment in university teaching. We particularly highlight how data and material experiments from students' design processes can be brought together with reflective and theoretical concerns presented throughout courses in the form of design arguments based on either empirical, material and/or theoretical grounds. This has proven instrumental in supporting and developing a shared design vocabulary and sensitivity to design values and, further, provides a ground for rigorous design discussions.

THE CHALLENGE: TEACHING DESIGN IN A TRADITIONAL ACADEMIC SETTING

The main challenge that motivates the work presented in this paper is this: *How can we integrate a practice-based approach to interaction design teaching in a traditional outcome-based academic education, in our case at the faculty of arts?* As is the case in a number of universities, there are a range of mandatory and optional design courses for students, however there is no full-fledged design education. The design courses must therefore fit into an established system of outcome-based education based on traditional academic evaluation criteria and formats.

The principle of *constructive alignment* (Biggs & Tang, 2007) has been very influential in shaping academic

education at several universities (including ours). Briefly summarised, constructive alignment is a constructivist approach to learning centered on the alignment of students' learning activities and the intended learning outcomes. While this approach is quite amenable to project-based learning in that it emphasizes the students' own learning activities as the most important component in reaching learning outcomes, many of the formal structures, teaching methods and evaluation formats at university are at odds with what we see in the studio-based approach in many design schools. As a consequence, we must consider how approaches and methods for design teaching that stem from design schools can be adopted, appropriated and supplemented to fit into this system.

In addition to systemic disparities between traditional universities and design schools, there are also challenges related to students' prior knowledge, expectations, and intended learning outcomes. When students take our classes, which are seldom at the first semester, they have already adopted certain academic skill-sets and mind-sets to which we must adapt our teaching. In addition, we must consider what the intended learning outcomes are – i.e. which ways of thinking and doing should characterize competent academic interaction designers. A principal challenge in this regard is how we construe the role of theory, and the ways in which design theory and practice can be combined and enrich one another.

RELATED WORK

The Nordes conference has been host to a series of discussions about design education, and there is a well-established discourse on the challenges and potentials of approaching design education in the Scandinavian design community in general. Many previous contributions promote practice-based design teaching, often in studio environments, to a large extent built around the ideas about the reflective practitioner and practicum as developed by Schön (1987). Here it has been re-iterated how in addition to academic training, interaction design requires skills acquired through practical experience (Cross 2001; Nelson & Stolterman 2003; Löwgren & Stolterman 2004; Koskinen et. al. 2011). The aim has been to ground a particular learning space for cultivating what might be termed a designerly way of knowing (Cross, 2001) or the designer's judgment (Nelson & Stolterman, 2003) by building bridge between real-world experiments, the design lab or studio and academic reflection (Löwgren & Stolterman 2004; Koskinen et. al. 2011).

Some of the challenges concerned with this fusion between design as studio-style learning and university teaching are explored by Blevis (2010). Blevis (Ibid.) introduces what he terms Design Challenge Based Learning (DCBL) as a possible values-led and sustainable pedagogical practice related to transdisciplinary design teaching. The goal of DCBL is to construct a confluence of studio-style learning with

rigor and scale. This is facilitated through a variety of teaching activities addressing the pedagogical challenge of ensuring that the analytical work of the students leads to synthesis in a sound way, and, conversely, that synthesis follows from analysis in a sound way (Ibid.).

Moore and Lottridge (2010) deal with the challenges of working with interaction design in university concerned with new production of knowledge in a transdisciplinary setting. Focusing primarily on design research, the authors develop the notion of 'disciplined transdisciplinarity' understood as 'the simultaneous recognition of the value of disciplinary traditions in conducting research while at the same time recognizing the legitimacy of knowledge claims that go beyond disciplinary norms.' (Ibid., p 2740). Although the authors do not explicitly mention teaching design at the university, the paper clearly illustrates the challenges involved when working in a milieu with traditional academic departments and ideas of rigor.

Concerning the relation between design and argumentation more specifically, Buchanan (1985) discusses design as rhetoric, where the product is seen as an argument that wants to communicate with its users. Löwgren and Stolterman (2004) draw on the work of Horst Rittel on wicked problems to present what is termed 'design-as-argumentation', where they show that the use of argumentative notions in the form of questions, options and criteria (QOC) diagrams can be seen as a personal design technique. Finally, Binder and Brandt (2007) propose an agenda for experimental design research revolving around genealogy, intervention and argument. Here, argument relates to the fact that design research must produce statements that are contestable for the external reader.

DESIGN ARGUMENTATION

Inspired by the literature on design teaching, our approach to integrate practice-based design teaching in the university setting has been through the notion of design argumentation. Here, the Toulmin model of argument is in many respects central, in that it presents scaffolding for developing and analyzing design argumentation in a way that can bridge practice-based and theoretical concerns. The Toulmin model of argument was developed by the philosopher Stephen Toulmin, who dedicated much of his work to reasoning, rhetoric and argumentation, in the book 'The Uses of Argument' (1958). The model, which is now arguably the most widespread and accepted model of argument across a number of disciplines, was created to explain and develop practical reasoning; it can be employed to evaluate which argument has more explanatory power through discussion and justification. When we introduce the Toulmin model in this paper, it is in part because it is well developed and widely accepted in academia, and in part because it lends itself well to the process of critique. Developing an idea of practical arguments (as opposed to absolute arguments), Toulmin focuses on the justificatory function of argumentation as a process of

testing different ideas. Basically, for a good argument to succeed, it must provide a good justification for its claim, where the claim must be able to stand up to criticism. Toulmin proposes six interrelated components for making and analyzing arguments: claim, grounds, warrant, backing, rebuttal and qualification (Fig. 1).

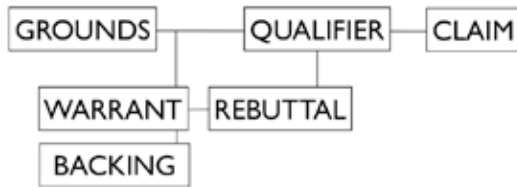


Fig.1: The Toulmin Model of Argument

We draw inspiration from all six components when attempting to develop the notion of design argumentation in order to cultivate a critical and academically rigorous dialogue through a shared vocabulary in our design teaching.

Our basic thesis is that students, by learning how to argue for their designs in an academically rigorous way, develop skills on how to relate theoretical and methodological concerns to design and, in turn, that design and design objects may become a vehicle of exploring theory and method in an academic setting. Hence, the process of argumentation mediates the students in moving back and forth between particular design objects and situations and more abstract theory and methodological issues. In the context of design teaching we both consider the claims made explicitly by the students, through oral and written presentations, as well as the claims made in and through the crafting of the actual design concept or product.

In general, we have found three categories particularly useful in terms of grounding design arguments. First, students may ground arguments in *theoretical* notions (e.g. aesthetics of interaction, situated action, activity theory) showing how their design choices resonate with established principles or models. Second, students may ground their arguments based on *empirical* data such as probes, ethnographically inspired field studies or workshops. Here, students point to particular findings and the methodological principles they employed to back their decisions. Third, students may ground their arguments in the design *material* with which they work. In this case, students may point to the possibilities and constraints inherent in e.g. smart phones, interactive tables or tabletop computers to argue for their choices. In all these cases, argumentation works as a way for students to articulate the qualities and potential shortcomings of their design. Moreover, the explicit use of argumentation opens up the space for critique allowing peers and instructors to engage in focused and precise discussions about the proposed design.

From our experience, the process of design argumentation also goes the other way; from the designed object to theory or methodology. In other

words, where the process described above might be characterized as arguing *for* a design it also seems fruitful to argue *through* the design. In this process, the design object or concept becomes the catalyst for exploring a particular theory, concept or method. The proposed design object becomes a shared point of reference for developing an understanding of more abstract principles. In our experience from critique sessions, design objects have the strength of (sometimes) being very direct interpretations of a theoretical notion. As an example, an interactive table may provide a very clear way of explaining the difference between embodied and distant representation within tangible computing. In other situations, a design object may highlight an intersection between concepts or even challenge a theoretical notion. Again, argumentation becomes the vehicle that bridges the often challenging gap between the particularities of a design situation and the abstractness of theory.

To sum up, we propose design argumentation as a way of creating structured exchanges between particular design objects and theory. This process can potentially go both ways; students may make *arguments for their design* or they make *arguments through their design*. In practice, there are obviously continuous movements back and forth between these two. Drawing upon Schön, Biggs and Tang, and Toulmin, the idea behind design argumentation can thus be formulated as *arguing theoretically, empirically, and materially for and through design in a constructively aligned practicum*. In the following section we report on initial experiences from working with design education in five courses over a period of two years and outline considerations when incorporating design argumentation into teaching.

LESSONS FROM TEACHING

We have explored design argumentation as a central concept in a number of design courses over the past two years. In general, students work on design projects within a reflective practicum as an integrated part of semester-long design courses on both BA and MA levels in a variety of disciplinary settings (Information Studies, Digital Design, Experience Economy). A central component is that students are prompted to continuously reflect on their design choices on blogs, at critique sessions, through supervision, and in written essays. We have experimented with integrating the model of argumentation into these different modes of reflection with two major learning objectives in mind: first, that the students learn to argue for their design (i.e. what are the reasons underlying the current form of the design concept); second, that the students learn to argue through their design (i.e. how the design concept embodies specific considerations or can be used as a vehicle for generating certain types of knowledge). These notions resonate with Frayling's (1993) notions of research into, for, and through design.

When we introduce design argumentation into teaching, it provides a means for us to examine if and how

students have constructed sound arguments for and through design. E.g. in response to a written essay, we may ask students to provide additional types of grounds – empirical, theoretical or material data – to their claims, or ask what grounds their claims. In a supervision session, we may ask students to better warrant the grounds, or we can go even deeper and ask about the backing of the warrants (i.e. by asking about more information about the empirical data, the theoretical foundation of e.g. experience-oriented design or the process and rationale behind the crafting of the object/prototype). In critique sessions, we may use design argumentation as a reference point so that students who present their work can construct and evaluate their arguments, and so that students who offer critique can make clear what aspects of the design presentation they are critiquing. And of higher value still, we may use the ideas underlying design argumentation as a nexus for cultivating a critical way of assessing the design object by encouraging the students to always be reflective about possible exceptions and limitations of the claims they make, fostering attention to rebuttals and qualification.

On a more concrete level, we have identified three main considerations in terms of incorporating design argumentation into our courses. First, critique session have proved a valuable venue for the students to practice their argumentation both in terms of theory and concrete design. However, the format of the critique does mean that the designed object or concept is very present and draws attention. This is obviously a strength of the critique but it also means that e.g. theory tends be less present and it requires some work (from teachers or instructors) to bring theory or methodology into the critique session. One way of doing so involves choosing a theoretical ground from which the students are encouraged to make claims about their design object.

Second, our main focus has been on interaction design courses, even though the idea of arguing *through* a design might extent to other courses. In other words, we might imagine that designerly engagement could be used to scaffold learning activities in other university courses that explore theory or methodology related to arts education. Here, design becomes a vehicle for hands-on learning about theoretical concepts in an increasingly transdisciplinary university setting.

Third, while Toulmin's model of argument can be integrated with all of the aforementioned teaching and learning activities, it must be framed and employed with respect to the specific format at hand. E.g. in a written essay, it may be fairly straightforward for students to analyze their work through systematic reference to the components of an argument; in a critique session where students critique a concept, it is typically harder to pinpoint exactly which components they address, and the teacher can serve as an intermediary between the presenters and critics by facilitating a more structured discussion about the presentation of the arguments.

CONCLUSION AND FUTURE WORK

We argue that the notion of design argumentation is a promising way to combine the concerns of practice-based approaches to teaching interaction design at the arts in a university setting. We have presented design argumentation as an approach, which aims to teach students how to build up a shared design vocabulary in order to formulate valid claims when arguing for and through their design work based on empirical, theoretical and material grounds. We believe that design argumentation can be used both in the planning phase of the design course and as a way to navigate through the different design activities. As a consequence, we are aiming to develop the underlying ideas behind design argumentation into a larger framework practicing and evaluating courses in academic design education.

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PROTO-P EXPERIMENTS: ENTERING A COMMUNITY OF CIRCUS PRACTITIONERS

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ABSTRACT

This paper discusses early experiments in an exploration of how interactive technologies can be designed for circus art performances. The experiments were carried out in environments for training and rehearsal of circus skills and technique. The approach was to introduce circus artists in various disciplines to motion sensors and interactive visualizations. The intention was to create impulses and ideas that later can be explored and shaped in a co-creational process with circus performers.

The outcome of these experiments is discussed in relation to the notion of communities of practice, and the concepts of infrastructuring and proto-performance (proto-p). In conclusion, the experiments became a way to enter into a community of circus practitioners. This led to new design openings, which can be developed with sensitivity to circus aesthetics.

INTRODUCTION

This paper is a part of a larger endeavour as a design-researcher to explore how interactive technologies can be designed for circus art performances. This means to experiment with interactive audio-visual systems together with the physicality and movement material of the circus performers. This to imagine and sketch for artistic development in contemporary circus acts. In

contrast to the traditional circus, where the techniques were handed down from generation to generation, contemporary circus has become an interdisciplinary, experimental practice. In a circus act, the aerialist or the acrobat becomes characters in the intersection between choreography and dramaturgy. The circus artist tells a story with a rich physical vocabulary and props. A performance is structured similar to a dance or theater performance, held together in a narrative or abstract theme (Purovaara 2012). This allows for new experimental ways of working with interactive materials in several dimensions of a circus act.

This is my first experiment involving circus artists in my work. Even though contemporary circus art can be described as an open and explorative art form¹, the community of circus artists still seemed closed and far away from me. Recently, I started to practice acroyoga², a combination of couple acrobatics, yoga and Thai massage. My acroyoga teachers Nina&Boris have a diverse background in martial arts, yoga and gymnastics, dance and last but not least; circus. They sometimes create performances and have connections with other circus artists all over the world. After acroyoga practice, sipping on a warm cup of tea in the studio, I got an impulse to show them videos on my smartphone, of applications that can be used with motion sensors. This triggered a long conversation about circus and technology in performing arts.

In this paper, I will start by introducing the following concepts: communities of practice, infrastructuring, proto-performance (proto-P). I will then explain the application and describe two exploratory experiments conducted together with circus artists in various disciplines. Finally, I will discuss the implications of these experiments to interaction design and circus art.

CIRCUS AS COMMUNITIES OF PRACTICE

My focus is the contemporary circus, and this is what I refer to as “circus” in this paper. Circus has reached academic status in Sweden, and professionals train in circus schools at university level. Meanwhile, circus training is becoming a popular movement organized by

enthusiastic circus teachers all over the country (Björfors & Lind, 2009). Therefore, I believe it is relevant to talk about these knowledge networks as communities of practice, generating and sharing knowledge about contemporary circus.

Communities of practice are networks of people sharing interests, passions and concerns about the same topic (Wenger et al 2002:4f). We are all members of multiple communities of practice, relating to diverse domains in our lives, through the activities and identifications we share with others. These networks are typically informal, and the knowledge they harbour is often tacit (ibid). Therefore, it is valuable to interact within the community, on an ongoing basis, to share knowledge, insights and advice. Ways of sharing information are established and personal relationships develop as a community of practice matures (ibid). In my view, there is clearly a community of practice, involving people who train, perform and share knowledge about circus. This is what I call a community of circus practitioners, which is crucial for me to interact with to inform a design process with the intention of designing interactive materials for circus art. *Infrastructuring* (Björgvinsson et al 2010:3) within interaction design, refers to establishing long-term relationships and conditions for co-creation and collaboration. Infrastructuring is broader than a single design project, referring to the process of ongoing interaction between stakeholders. In this perspective, design is a socio-material practice, intertwining practices and materials (Eriksen 2012). This means, I consider my material everything from communication with stakeholders, motion sensors, code to physical vocabulary and circus skills.

INFRASTRUCTURING AND PROTO-P

Circus is an innovative art form in Sweden and Europe today (Muukkonen 2008). Innovations typically occur through collaboration between different stakeholders. This goes for technological and social innovation, and often for artistic development. My first intention with these experiments was to enter a community of circus practitioners, to infrastructure and inform a potentially longer co-design process. My second intention was to explore the potentials of such an application, as an impulse to start designing for circus performance, rather than treating this as a solution. In addition, I wanted to know how I as an interaction designer could meet the circus aesthetic criteria.

The two experiments was conducted at an acroyoga party and at circus practice at Karavan, Malmö's own circus space. Richard Schechner defines the first phases in a process leading up to a performance as *proto-performance* (proto-P) (Schechner 2006:226). A performance can have many starting points and impulses that lead up to the "final" performance. Proto-P is hidden from the audience, and it can be a group of people planning a performance, improvising interesting movements, or scribbling down ideas as written notes

(ibid). With a broader perspective on design, I view my experiments more of a proto-p than a prototype. There has been significant work done in contemporary dance together with motion sensors and interactive visualizations. In performances such as *Body Navigation* and *Horizontal Vertigo* by Recoll Performance Group, *Surfacing* by Troika Ranch and the research project *DanceDraw*, real-time motion capturing software is combined with interactive visualization. Inspired by this work I chose to bring an application for Kinect, originally written by a developer named Amnon Oved³. It detects the body displays it as a two dimensional silhouette, a polygon blob. Shapes are falling from the top of the screen, which you can catch in polygon world. This made me associate with the juggler's balls and props. I brought this particular application because I thought it was poetic. Most of the time I projected the screen on a wall. I did so to get an idea about how it would look configured with a live performing circus artist.

PROTO-P: BODYWORK AND DESSERT

Acroyoga is as much social and community building practice as physical practice. Practitioners have to communicate and trust each other when practicing together. To cultivate this, Nina and Boris invited the class to bodywork and dessert in their home for Halloween. Halloween, a holiday that in itself is highly performative, with costumes and rituals. At their home, we had space to eat and talk, and practice acroyoga on and thick rubber mats over the floor.



Figure 1: Boris lies on floor and holds Nina on his feet. Nina catches the shapes in the space between her legs and arms.

I installed the projector in one of their rooms, on top of a bunk bed, taped to a stack of banana boxes. Projecting on the opposite wall, there was space to play and do acrobatics in front of the motion sensor. It was running for four hours and people could walk in and out of the room and play with it as much as they desired.

In couple acrobatics and acroyoga alike, you work together as the base and the flyer. The base lies on its back or stands up, and lifts the flyer from the ground with its feet and hands. The flyer can spin, hover and do handstands in the balance of the base's hands. Nina and Boris did some acrobatics in front of the sensor. We immediately saw that the area the Kinect was detecting was not big enough for two people, and with the space we had, we could only see either the base or the flyer.

Working with the conditions we had, we found a few interesting movements that might be interesting for future performance. One of them when Boris was lying on the floor and Nina sat on his feet, catching the shapes as they fell down in the space between her legs and arms. The roughness of the silhouette made it into more than a reflection of her body and she became this blob-like figure, which made her create a connection between herself and the objects falling down as there was gravity (Figure 2).

I asked them explicitly what they thought from an acrobat's perspective I got comments and ideas on how the application could be developed. Couple acrobats communicates a story with the help of music, props, scenography and costumes. The potential they saw in working with Kinect and artistically with gestural interfaces, is to create interactive environments and props. This could for example be an animated flower the acrobat can pick, to create a motivation for its movements. Boris also got suggestions around how to modify and customize the graphics.

Can the shapes bounce, so they can be juggled with?

Can they come from the side, like a wind?

Could there be a bigger scope where both acrobats are detected?

Could it be an animated object, something that you can "hold"?

Can you get special colours to illustrate moods and emotions?

There was one concern that was clear however. Couple acrobats spend a long time perfecting their technique and I also got the impression from Boris, that it is important for him to keep the focus on the technique and the possibilities to enhance or accentuate it. The projection made us focus more on the application itself rather on the performers. The way it was configured, the performers would need to look at it themselves to interact with the visuals. If this was for a stage, the placement of the projection and the sensor would need to be reconfigured, in relation to the performer.

As I hoped, the application created a proto-p moment, to share some knowledge and contacts. Nina gave me contacts to Karavan and thought this would be intriguing to test with an aerialist. This led me to my second experiment at the local circus space in the city.

PROTO-P: KARAVAN AND CIRKUS SAGA

Karavan is a collaborative circus space in Malmö. This is a place to workshop, practice and rehearse (Figure 2). I came on a Friday afternoon when circus artists were practicing various skills: juggling, trapeze and acrobatics. I was invited to come and set up the Kinect application in a corner of the rehearsal hall.

This time, I had tweaked the code a little bit, and modified the sizes of the shapes, the number of shapes and the gravity. I was doing that "live" and customizing it to try different variations. I also adjusted parameters to give the shapes a more bouncy feel. This time, the experimentation became more technical, and the challenges of working with fast movements and several bodies became obvious. Like Boris, they wanted the application to support and amplify their movements, technique and props.



Figure 2: Circus practice at Karavan.

Thanks to the fidelity of working with Kinect, I managed to try it out with aerialists working with suspensions and jugglers trying different props. I still had the same intention, to learn more about circus aesthetics and introduce them to something that might be interesting to use as part of their performance.



Figure 3: Amanda working with rope, making a split detected by the application.

Rope is a two hemp ropes with loops in both ends. A group of circus artists practicing rope that day were keen to test the application. (Figure 3). They did large movements and fast spinning. After trying it out they were concerned around how it displayed the body and followed their movements. If you make large movements, making a split suspended from the floor, the application do not support this and the silhouette disappeared from time to time. I thought that was poetic, but I got the impression they wanted their bodies to be seen and have more accurate detection of their movements.

DISCUSSION

To summarize, this paper has introduced two early experiments with introducing Kinect to participants within the circus community in Malmö. These were made with an application in Processing, to start to

explore the possibilities of working in the intersection of interaction design and circus art. With a broad perspective on design practices and materials, Nina&Boris became the entry point to this community of practice. Entering a community of circus practitioners and learning more about the physical vocabulary and aesthetics in circus art could in return both inform the domain of aesthetics of interaction. Aesthetic concerns in interaction design, aside how something feels or looks, is about how well the interaction flows, which allows the interaction design work with to the whole dynamic context (Fällman 2008). The outcome of such an explorative process involving circus artists would potentially construct artifacts and interactive systems that could be used for play, improvisation and performance.

These experiments became a way to infrastructure for a longer design process. This means that the design-researcher becomes a guest and participant, earning her role with the help of the application. I believe that the application became a vehicle to be introduced as an interaction designer into a community of circus practitioners. Locating my work in the domain of circus art, the aesthetic and artistic development as the desired outcome of the process, it made sense to situate early experiments in places and situation that supports impulses and improvisation for performance (proto-p). Places that are established already, outside of the design studio.

There is a risk that bringing a working application might be perceived as the final solution and cannot be negotiated. Nevertheless, treating this a starting point, working in a community of circus practitioners, I wanted to do my experiments in a way that give them the physical experience of having interacted with a motion sensor like Kinect. With the insights from the circus artists, these experiments led to openings to design interactive applications that would accentuate aerialists' movements, augment couple acrobats and jugglers' movements and props. The application became a way for us to imagine and sketch in a way that we would not have been merely on a conceptual level. However, given the large space the performers move within, the Kinect sensor cannot handle two acrobats on each other, or large vertical movements. This application is design for play, and turns the performer looking towards the projection and ultimately, away from a potential audience. Furthermore, considering the amount of work that already has been done in the domain of contemporary dance with interactive visualizations, there might also be other interactive technologies and configurations that would be more interesting to explore artistically, that could expand and resonate with specificities of circus art.

CONCLUSION

These two experiments could be viewed as a proto-performance (proto-p), by bringing the application to environments for training, play and rehearsal. The

application served as a vehicle to be introduced to this community of circus practitioners. The application became a way for us to imagine and sketch in a way that we would not have been merely on a conceptual level. The experiments became a way to generate knowledge about disciplines in contemporary circus. The experiments led to new design openings for interactive technologies which can be developed further with circus performers.

ACKNOWLEDGEMENTS

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ENDNOTES

¹ Video – What is Circus, The Space
<http://thespace.org/items/e0000rxs?t=xgxb>

² To learn more about Acroyoga, visit
<http://www.acrobhakti.com/>

³ See tutorial on
www.creativeapplications.net/processing/kinect-physics-tutorial-for-processing/

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DESIGNING THE EMERGENT CITY: ASSEMBLAGE, ACTS, PERFORMANCE

EXPLORATIVE PAPER

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ABSTRACT

The paper seeks to define urban design in relation to the specific challenges of emerging cities.

The emergent city is a three month field research project conducted in the winter 2012-13 in Sao Paulo, Rio and Santiago. Through a case study of Mudo Coletivos temporary structure, *Bolha Imobiliaria*, and the making of it, I wish to outline a design approach for urban design in cities lacking public spaces.

Urban design is understood in a broad sense, not as architectural design but also as spatial design and artistic interventions in public space.

Through the paper I will address how the designer can co-create and reassemble existing urban spaces through his/ her situated acts. The approach suggests a situated design methodology but is based on a theoretical understanding. It is my belief that the designer, by looking into the emergent properties of urban spaces, instead of its physical and cartographical outlines, can see her work as a processual intervention in the city rather than durable object design.

THE STRUCTURE OF THE PAPER

The paper proceeds through a theoretical outline of 3 core notions: Assemblage, Acts, Performance. After introducing the notion, I illustrate how they are enacted through a design processes that took place in Sao Paulo in 2012.

LITERATURE AND THEORY

Through the three notions I seek to develop a theoretical framework for the understanding and making of urban design. I work with the assumption that urban designers can profit from a philosophical and ontological understanding of urban space as emergent. Here I do not

consider design as something durable; rather I consider design as co-producing act working with existing resources and qualities in the city. Recent urban studies have emphasized urban assemblages (Farias 2011, Farias & Bender 2010). Supporting the notion of assemblage, I specifically draw on Deleuze and Guattari's notion of assemblage put forth in *A Thousand Plateaus* (1987).

"I will call an assemblage every constellation of singularities, traits deducted from the flow - selected, organized, stratified - in such a way as to converge (consistency) artificially and naturally; an assemblage in this sense, is a veritable invention"...

By that they state how each assemblage must be understood as a singularity, with its own singular attributes, qualities, challenges. The assemblage is useful in analyzing and determining specific situations in urban space.

First, to understanding design as a component in the emergent city, we have to understand existing urban assemblages and their constitutional parts.

Deleuze and Guattari write:

"An assemblage is necessary for the relation between two strata to come about." (Deleuze & Guattari 1987:70). Thus assemblages exist of (re)established relations combining heterogeneous – or not yet assembled – components of space. Through the case study I seek to exemplify how the designers recollect and reassemble urban space.

Second, every urban design is an *act*. Act can establish new relations in the existing urban assemblages as it cuts through urban assemblage in specific, even original ways. In my case study, I will illustrate how design

become an act, intervening in the existing socio-material assemblages in the city.

Third, designing as an act thus have the potential to *perform* new relation relations in the socio-material assemblages. Thus the acts of the designer can be understood in terms of how she by her acts establishes new assemblages by reassembling existing materiality, meanings and qualities. Performance is here understood as the political side of the design act. It implies whether design leads to transformation, whether it enables change the life in the city, whether it reorganizes urban matter in a better way or more human way.

METHODS

As the case study seek to exemplify how the designers recollect and reassemble urban space by means of situated acts in the city and its socio-material assemblages, my own act as a researcher must similarly be situated. My own methods are situated, meaning that ethnographic participant observation has been combined with informal interviews and visual methodologies where I seek to capture emergent situations. . I argue, that a situated in urban space as a researcher is necessary to understand the emergent qualities that takes place in urban space. The place for the structure was not decided before hand. Neither did I as a researcher made decisions on whether to use the case for my research. In both cases, a situated methodology shows that meaning, use and sense often emerge out of the situation: meaning and sense cannot be planned in advance as rationalistic decisions. Rather, urban space is situational and emergent as so many components come together. Thus, to work methodological and empirical with emergent spaces in the city, you must allow yourself to take chance and go into situations when they occur.

CASE STUDY – BOLHA IMOBILIARIA

MUDA_Coletivo and Misterio Basuramas *Bolha Imobiliaria* was set up at the highway Minhocao in Sao Paulo the 16th of December.

It was produced and recollected by found material under another highway in collaboration with the waste collectives, Coletivo Glicério.

The design consists of an inflammable structure that was set up at Minhocao, Sunday the 16th of December 2012 but also the process of making it. From the conception of the idea, the Bolha Imobiliaria was meant to be a collective design intervention. Muda_Coletivo is a young Sao Paulo-based collective. Due to cultural politics in Brazil, most young artists and designers work in loosely organized networks as each project is dependent on network organization and collaboration with the right stakeholders. Thus the identity and people behind Muda Coletivo change according to each project. In this case, Muda Coletivo was part of the urban movement, Preliminares. Their spatial design consisted of an intervention on the highway Minhocao – a highway cutting through Sao Paulo City Centre. For the

young architect and activist, Marcella Arruda, who initiated the process, it was important to question urban gentrification processes and to pose a protest against the market driven exploitation of the city – in other words to claim urban space back by means of a spatial intervention. Thus the intervention was both to be a kind of protest campaign against market driven urban development, and a temporary design illustrating the possibility of other kinds of human-scale spaces in the city. With this background, the idea of the Bolha Imobiliaria was conceived: an inflammable structure made out of reused plastic bags. As most architects in Sao Paulo are developing architecture and design on market driven premises, it was obvious for Muda to break with existing architectural practices. Thus the design had to be developed out of people's own desire and engagement, and with the existing urban condition as a point of departure. With no funding, the intervention was restrained. These constraints initiated the collaboration with Misterio Basurama – a design office working with reuse of urban waste. Though Basurama had the expertise of working with reused material, they did not have access to recycled material. So a third collaborator was introduced: Basurama knew of the recycle collective Coletivo Glicério, in the neighborhood Liberdade. Under a vast network of interconnected highways, a former homeless, Joao Batista had started to collect and re-use urban waste. Due to his organizational talents, JB had succeeded to establish a recycling station where people in the Liberdade neighborhood could exchange objects and materials. To get access to the materials for the design, Muda and Basurama got involved with Coletivo Glicério and its founder, JB. Despite having no professional training as designer, JB had a specialized knowledge of the different sorts of plastic and their potentials for reuse. Thus Muda and Basurama decided to construct the structure in Joao Batista's recycling station under the highway. During the week of construction, people from the Preliminares movement were invited to participate in the design process. However, only a few dared to go as the place was difficult to access and was considered unsafe territory among the middle class, young creatives associated with Preliminares. This meant that Muda and Basurama had to rely on the workforce connected to Coletivo Glicério: homeless and poor people in the Liberdade neighborhood who depended on the gift economy and the exchange of goods in JB's collective. Thus, by collaborating with the people in the Coletivo Glicério, it became obvious for Muda that they were not only designing temporary architecture – they were also designing a political commentary on gentrification and the use of public space. The every day practice of exchanging labor and found materials was a way for the people in the Liberdade neighborhood to survive. Participation in these informal processes for Muda and Basurama became a political act where the design process was both design of a design object but more interesting: a way of doing design directed otherwise.

By the way they assembled the design from the city they drew attention to how the homeless and the poor are generally neglected when market driven interests govern urban planning and design. Likewise they pointed to how urban waste accumulates in megacities due to consumption of the rich.

Thus in several perspectives, Muda's construction of *Bolha Imobiliária* was a design act (re)assembling in the city. It assembled existing socio-material space 1) *in the way it was constructed* through a collective process integrating local people, 2) *in the way it took place* as a site specific intervention in a neglected space assembled material and urban waste, and 3) *in the sense that the process questioned* discursive issues of urban development, meaning that the design process became entangled with the complex social and political issues at stake in Sao Paulo and its lack of planning.

In that regard, the process reassembles the city socially, mentally, methodologically and aesthetically). For instance, the locals enabled the designers to see aesthetical and functional value in otherwise neglected material. In that sense the production of the temporary structure established temporary spaces of collaboration in a city normally governed by economical growth and capital interests. Thus, the process indicates that spatial designs are not strictly about the design of a design object, rather spatial design can be understood as *acts establishing relations between people in the process of making it*.

For instance, the few middle class people who came to Coletivo Glicérios space under the highway were inevitably confronted with another urban reality than their own.

Design here become an act engaging people and materialities in and through the urban spaces it design for: by choosing the recycling station Coletivo Glicerio underneath a highway in Sao Paulo's slum, the designers chose to reuse resources from existing urban spaces. By reusing urban waste for the structure, they transformed the existing urban assemblage in a specific and original way. And they involved different social groups and people along the way. That makes it into an example of co-creation emerging out of specific urban situations: even though the making of the Bolha Imobiliária was initially a collaboration between Misterio Basurama and Muda_Coletivo, out of necessity it became an assembled act not merely involving Coletivo Glicério and the people in Liberdade but also the found materials at hand.

Thus the design practice of Muda_Coletivo can be understood as a *design act* assembling resources from the complex socio-material layout of the city.



1. urban assemblages in downtown Sao Paulo: The socio-material assemblage of downtown Sao Paulo consists of a mixture high-rise buildings from the modernist area in the sixties and old abandoned and decaying houses. Furthermore, downtown is the home for many drug addicts living in the streets and gathering in the area Crackolandia near the old railway station. While the middleclass has moved outside of the city centre and now hides in high-rise condominiums with surveillance cameras, the drug addicts and homeless hang out in the streets. Sao Paulo's urban space are thus highly segregated. Thus, compared to many other cities, there is no sense of public space in Sao Paulo.



2. Assemblage: Existing urban assemblage on Minhocao. Built by the military regime in the 60's as an elevated highway, it cuts right through the center of Sao Paulo. On Sundays however, the place is closed for car traffic. It transforms the road into an amazing public space with strong urban qualities.



3. Assemblage Construction of the Bolha Imobiliária took place by reassembling the existing materiality of the city. The city fabric and the waste form the urban consumers is reused in the temporary structure. In that sense, the design reshape urban materiality. The processes constructed a social temporary space of non-commercial collaboration in a city governed by economical growth and interests.



4. Assemblage and act: Design process as an act of reassembling the city: By choosing the reuse station and boxing academy Coletivo Glicerio under another highway in Sao Paulos slum, the designers choose to act with, within and by use of existing urban assemblages.



5. Design as social and cultural act. By collectively assembling social and cultural resources, the making of the Bolha Imobiliaria was a collective act involving Joao Batista and Coletivo Glicerio and the homeless people of Liberdade neighbourhood.



6. The temporary design acts in existing urban assemblages. Bolha Imobiliaria rises at Minhocao as an alternative and temporary bubble commenting on gentrification processes in downtown Sao Paulo.



7. Design acts in public with the help from the public: Bolha Imobiliaria rises on Minhocao: It proposes alternative spaces for alternative uses and aesthetical sensations in a city of brutal functionality and growth.



8. Performance Initially, the temporary space is empty of people. As the designer, Marcella Arruda points out (interview), since there is no tradition for public space and coming together in public in Sao Paulo, nobody dares to enter the structure. In that sense, the Bolha performs as an aesthetic and alternative space breaking with the socio-cultural habits in the city.



9. Aesthetic performance: The temporary space transforms Minhocao into a temporary space of enjoyment and bodily sensation of the city. Even though the design did not change the physical space of Sao Paulo, it mentally changed the social practices and the conception of Sao Paulo for the visiting guests. In that sense, Bolha Imobiliaria has impact as communication of other values in the city. It shows that it is possible to use public space differently at the same time breaking with the image of down town Sao Paulo as a dangerous and inhabitable space (see illustration 1).

DISCUSSION AND CONCLUSIONS

In a city as Sao Paulo where public space is rare, we can ask what spatialities emerge out of a temporary design like the Bolha Imobiliaria. Even though the design was only temporary and was taken down Sunday night before the highway Minhocao opened for traffic next morning, I find the initiative interesting in terms of how it changes the *sense* of public space. Whereas the intervention does not change the physical layout of the city, it surely changes the mental. Just the fact that it happened and it happened in a place like Minhocao, a brutal piece of infrastructure, illustrate the impact of temporary design. But it also illustrates that urban design is dependent of the urban environment and surroundings. Being set up at, let us say, Sønder Boulevard in Copenhagen, this design may not have the same performance.

To sum of we have to reconsider what impact temporary designs as acts have for a city. In the mentioned case, temporary designs perform specific socio-spatial politics in relation to the city of Sao Paulo and its existing urban spaces, its lack of planning and its brutal economical development. As mentioned above, I use the term performance broadly understood to describe the political side of aesthetics, but also the unforeseen and emergent qualities emerging out of design acts and urban interventions.

As put by McAuley in *Space in Performance* “Being an event rather than an object, performance is radically

unstable in the meanings it generates and in the activities it engages”.

Thus, regarded as a performance act, Bolha Imobiliaria creates an emergent and unstable public space in the city of Sao Paulo. Unstable in the sense, that people are unsecure of the meaning and use of the structure. In a city where public space are minimized or non-existent, where most people go by car and only the homeless use the public spaces, the designed bobble create an emergent space yet without fixed qualities. The performance of the structure must therefore be seen in relation to the existing urban assemblage: as a design act participating in the mental change of the city.

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THE FAT FACTORY: CHEWING THE FAT

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ABSTRACT

In 2005, the global adult biomass hit around 287 million metric tons, 15 million metric tonnes of which being caused by an overweight global population (a body mass of 25 or greater). As the world's population continues to soar (the UN estimates the world population will reach 9.1 billion by 2050) there will be considerably more mouths to feed, and energy needed to sustain this rate of development. Paradoxically then, fat is both a waste of resources and a valuable resource in its own right.

The Fat Factory is a Critical Design Research project investigating the full, untapped potential of fat. Developing a critical approach to this topic, we investigate whether a research based, analytical design process can lead to truly innovative design solutions. What if we stop thinking of fat as abhorrent or waste? What if we learn to love fat?

WORKSHOP INTRODUCTION

FAT. A natural, oily substance occurring in our bodies underneath the skin or around our organs. A form of stored energy (37.8 kilojoules / 9 calories per gram). A vital molecule, serving both structural and metabolic functions and food stuff for both humans and livestock. A vital component in the manufacture of lubricants, biodiesel, paints, soaps, cosmetics and even munitions. A scourge of the sewage system - Thames Water

(London), clears some 55,000 hardened fat blockages from sewers annually to a tune of £12 million. A signature of poor health and nutrition.

Nordes 13 marks the official Kick-Off of *The Fat Factory*, starting with a preliminary exploration into an alternative approach to fat. In the workshop "*Chewing The Fat*", we invite participants to get hands-on with this most decisive of materials. Starting with the group preparation and eating of a high-fat lunch, inspired by the Inuit diet (a high protein, high-fat diet proven to increase cardiovascular health), participants will use this same material (and waste) to experiment in the production of Bacon Soap and Blubber (Fat) Lamps. Following these hands-on experiences with fat, participants will be invited [in groups] to explore the potential risks, challenges and opportunities in reaction to the theme "*Fat As The New Oil*", developing their own speculative scenarios and critical design concepts in response to the key topics and facts (including obesity, waste management, energy production, the meat industry, and the constitution of fat in extreme conditions), discussed throughout the day.

AIMS

We believe it is critical that designers contemplate how to become involved with new scientific, technological and societal developments. Using design as cultural probes, designing prototypes, making comprehensible visualisations, and presenting imaginable scenarios, designers act as the perfect bridge for popularisation, but they can also design tools drawing the public into the process, involving them in defining potential outcomes. We believe this is essential, especially for highly complicated topics where experts define the brief for later exploration with the public.

With the workshop "*Chewing The Fat*" we aim to gain a better understanding of the 'culture' and 'nature' of fat and potentially reframe its current notion as a waste product. By conducting hands-on experiences with fat we hope, together with the participants, to develop innovative ways to approach, discuss and create with fat, generating valuable scenarios and ideas for products that provide us with tools for a sustainable future.

WORKSHOP PROGRAMME



Figure 1: Influenced by the Inuit Diet, fatty meats such as Bacon & Whale Blubber will act as inspiration for the workshop.

Time	Activity
08:00 - 08:15	Meet & Greet.
08:15 - 09:00	Introduction to The Fat Factory & Keynote Presentation.
09:00 - 11:00	Experiment 1: Blubber Lamp.
11:00 - 12:00	Participants join in with the preparation of a "Fatty Lunch" (a high fat meal with factual tutorial).
12:00 - 13:00	Fatty Lunch & Discussion.
13:00 - 15:00	Experiment 2: Bacon Soap.
15:00 - 16:00	Fat As The New Oil - Speculative scenario and concept development.
16:00 - 16:45	Groups present their final concepts / scenarios & discussion on the implications of these concepts.
16:45 - 17:00	Wrap Up.

Table 1: Fat Factory Workshop Programme. Please note the exact timings are still subject to change.

Please be aware there will be no vegetarian option, so if you don't like meat this workshop might not be for you!

HOW TO PARTICIPATE

As there is space for a maximum of 16 participants in the workshop, applicants are asked to provide a short Biography (140 words max) and Letter of Motivation (4-6 sentences max). If you would like to participate please email your Bio and Letter of Motivation along with your contact details before 24th May 2013 to signup@thefatfactory.nl. Successful applicants will be notified by the 31st May 2013.

CONTACT INFO

For further information please contact:

INFO@THEFATFACTORY.NL

WWW.THEFATFACTORY.NL

ABOUT THE INITIATORS

Mike Thompson and Danielle Arets share an interest in Critical Design and its potential to create innovative design solutions for existing industrial and academic problems. Thompson and Arets explore various activities and design projects that aim to stimulate a new way of thinking and designing, bringing in various forms of expertise, tools and methodologies.

Thompson and Arets first met when participating respectively as Research Associate & Associate Reader in the Creative Industry Scientific Programme (CRISP), an ambitious research project funded by the Dutch government, 60 industrial partners and 6 Universities including Design Academy Eindhoven, that explores new methods for collaborative research and finding new ways of doing research through design.



Figure 2: Thompson's Blood Lamp asks, "What if power came at a cost to the individual?"

With Blood Lamp, a lamp powered by blood as an energy source, Mike Thompson (www.miket.co.uk) gained international reputation as a critical designer. The lamp was discussed on many international platforms and exhibitions triggering questions about a more sustainable future and the need to make consumers greater aware of their own energy consumption.

Last year Thompson, together with Cámara Leret, was awarded the Designers and Artists 4 Genomics Awards for Aqua Vita, a project stressing that Urine, commonly approached as a waste product, is in fact a valuable source of biological information. The project brings together experts in medical science, biology and informatics with designers, to investigate the supposed paradigm shift in health care, towards the lifelong monitoring of health and personalised medicine.

Danielle Arets works on the cross section of design, science and industry by publishing books and articles, and organising debates and workshops to create a better understanding in multidisciplinary environments. Together with the Dutch Ministry of Agriculture and Innovation she worked for 2 years on an ambitious design project *Pig Your Own* stressing the fact that consumers are not consciously involved in their massive meat consumption and hardly aware of the associated

costs (both to nature and the economy). With a critical design approach the project stimulated much public discussion and innovative design solutions such as a digital meat- stock market.

Last year, Arets worked with leading experts at the University of Utrecht on a design research project focusing on climate change, bringing in the expertise of climatologists, designers and industrial companies in order to generate a better public understanding of urgent environmental issues. Arets also frequently organises international debate programmes and exhibitions for Design Academy Eindhoven and Utrecht Manifest (social biennale on design) aiming to make designers aware of research potential.

PARTNERS

Participating in the project are several Academic and Industrial partners of outstanding reputation including, Utrecht University (UU), Utrecht School of the Arts (HKU), Hogeschool Utrecht (HU), Science Park Utrecht, Danone, Eindhoven University of Technology (TUE), Design Academy Eindhoven (DAE) and House of Commons (HOC). Together, this interdisciplinary team of scientists (life sciences and public health), designers (with an international scope, including Arne Hendriks) and R&D groups of industrial partners, explore the full, untapped potential of fat.



Figure 3: Mapping potential research directions.

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EXPERIMENTING WITH DESIGN: PLAYING WITH DATA DERIVED FROM UNUSUAL LOCATIONS

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ABSTRACT

The field of design research is in a rapid stage of its evolution. As it does so, the methods for undertaking research, and the contexts that these occur in are also evolving. Situated in the space between critical design and design fiction, participants in this workshop will explore new ways for experimenting within design research.

The facilitators of the workshop come from three different aspects of design research, three markedly different locations and yet intersect in their interest in exploring and manifesting, new iterations of design research in practice. In this workshop, participants will explore methods for undertaking design experiments, methods as experiments, or experimenting with methods.

INTRODUCTION

This workshop is situated in the productive space between critical design and design fiction. This is the experimental space of design research, interrogation, observation and application. It allows for the generation and critique of design outside of the traditions of consumer goods or aesthetic additions. This is design that exists in the new, challenging, and often collaborative spaces, such as placemaking, circus archives, or creative public events. What can be taken up, tried out and revised in such spaces for designing is the possibility of design for experience - experiences of play, performance, forecasting, safety, history and



storytelling. What transpires in such experimentation is design research that produces data in many forms that is used and manipulated, interpreted or applied in previously unknown digital or analogue ways. Through experimental and experimentation-centred modes of inquiry that mix design techniques and research tools we explore an approach to design inquiry that produces and engages with this multimodal data. This is a space of design research that is necessarily hybrid and can also be described as the relational space of practice and inquiry. This is arguably a crucial way to experiment with experimentation in design and in related research that is part of facing challenges and potentials now possible via digital tools and technologies that may be derived from various locations

Underpinning this workshop is the understanding that digital technologies have changed and continue to change every aspect of modern life. This extends to how and where we work, live or play. How we connect, love or disengage from others. It entails how we tell our stories, perform our tasks – and, significantly, how we envisage the new tasks we haven't even encountered yet. Such new dimensions of being, call for new paradigms of disciplinary collaboration and provide the ideal platform for design to position itself as method, form, methodology and technology. This includes interdisciplinary formations of Design + Science, Design + Humanities, Design + Socio-cultural production. These may lead to many new intersections, and these intersections bring with them past practices

and conventions and they pave the way for new kinds of data. Whether it be 'big data' or 'micro data', this new data - in scale and form - opens up many exciting and challenging possibilities for design research.

FOCUS OF WORKSHOP

In this workshop, participants will explore methods for undertaking design experiments, methods as experiments, or experimenting with methods and then representing the data from those methods back to the world. This may include hacking known technologies, adapting the unexpected, or exploring practices from other domains to see what can be produced, considered and used. As we do this, we will move through 4 aspects that need to be considered as we experiment with new methods for knowing in design. These are:

- new locations for designing
- new methods and new data
- new roles for designers and design researchers
- new outcomes and modes of representation and narration.

PARTICIPANTS

This workshop brings together design researchers from 3 locales – Australia, USA and Norway – who through the happenstance of academic work have connected in their shared interest in new methods and contexts for design research. Between them they have had extensive experience in exploring new and interdisciplinary design research methods in a range of applied and hypothetical contexts. The frameworks for this design exploration are: Place, Event & Archive – all considered within the context of 'living'.

The facilitators of the workshop are: Laurene Vaughan who has extensive experience in interdisciplinary design research. She is a Chief Investigator on the Circus Oz Living Archive Project (<http://archive.circusoz.com>), and Research Leader in the RMIT Design Research Institute. Aisling Kelliher works across the fields of HCI, interaction design and multimedia in creating and studying experiential media systems. She is an Associate Professor in the School of Design at Carnegie Mellon University and led the development of the documentation framework at the Emerge 2012 futures [file://localhost/symposium](http://localhost/symposium) <http://emergemedia.asu.edu>. Andrew Morrison leads the YOURban project into social media, performativity and the city (www.yourban.no). He works across art, design and communication and is the Director of the Centre for Design Research at AHO (www.designresearch.no). In addition his colleague Kjetil Nordby leads the Ulstein Bridge Concept project (www.designresearch.no/projects/ulstein-bridge-concept/about) that gathers and generates complex design data in the redesign of a large ship bridge. The workshop call invites access to project websites and related works and publications; images from each of the



conveners' projects from which the experimental methods are drawn are included in this call.

The workshop facilitators will be joined in this event by colleagues from their respective project teams. These colleagues will co-present methods that have been explored in the course of their research. These methods are to be catalysts for workshop activities. So too is collaborative experimentation to be taken up as a resource for further discussing innovative methods and modes of conducting design based research.

Participants in the workshop are required to submit a statement about their interest in the topic – experimentation, data, collation and representation and design research. The workshop will be capped at 12 participants in addition to the representatives from the 3 projects.

APPROACH

The workshop convenors will select 12 participants prior to the workshop based on the submitted statements of interest. The sessions will comprise a combination of the facilitators own project based inquiry and the design experimentation interests of the workshop participants.

Our plan is for the all day workshop to be an immersive experience of design experiments in practice. Although there is a planned series of events, the full details of how this will manifest will be done in discussion with the participants.



The following is a sketch of the day:

In the beginning - Initial presentations by researchers from the three projects facilitating the workshop on their respective projects or methods and how we will use these as the basis for the day's investigations into creating a place and event based living archive, grounded in the locale of Malmö, and drawing on various analogue, digital and open source technologies.

This will be followed by – the workshop participants presenting their projects, data or areas of interest in a Pecha Kucha style presentation.

This will then lead to - participants making, hacking, exploring or designing data or methods based on presentations and associated tools.

Finally – the workshop participants will then discuss, critique and consider what this means for design research, the implications, challenges, etc. for design research. This discussion will focus on the following questions.

- What is the data that such methods manifest, and how do we engage, measure, evaluate or apply it to the contexts that we are designing within?
- How can we collect, collate, narrate and represent such data using innovative and exploratory methods?
- How do such new methods for undertaking design research inform or have the capacity to transform design research and its outcomes?

OUTCOMES

It is anticipated that an exhibition, a special edition of a journal or the like on experimenting with narratives and representation of data in design research will be an additional outcome from the workshop. We invite participants to think about this as part of the wider view of looking together into experimentation in design research.

PARTICIPATING IN THIS WORKSHOP

Whether you are technologically competent or a novice to new methods of undertaking research, we welcome applications from participants who have a passion for exploring what these new methods, data and contexts can and do mean for design research. This is a day of participatory exploration. To help us design the day within the framework of participant interest and expertise we are requesting that people submit a 1-2 page statement of interest. This should include:

- Statement of interest in the topic
- Experience or expertise in this domain
- 3 sentence biographic statement
- Link to any projects that you would like us to know about

This should be emailed to laurene.vaughan@rmit.edu.au

Following the selection process, successful applicants will have the opportunity to do a pechakucha style short presentation on their work and interests at the beginning of the workshop. (Max 10 images in 5 minutes).

ACKNOWLEDGEMENTS & REFERENCES

The facilitators would like to thank the following supporters and co-investigators of the research projects that underpin this workshop.

The Circus Oz research team would like to acknowledge the entire research team and project supporters for making this project possible. In addition to the authors these include: Kim Baston, David Carlin, Mike Finch, Lukman Iwan, Linda Mickleborough, Adrian Miles, Laetitia Shand, Reuben Staton Peta Tait, James Thom & Jeremy Yuille. The Circus Oz Living Archive project is a partnership between RMIT University, Circus Oz, the Australia Council, La Trobe University and The Arts Centre, funded by the Australian Research Council Linkage programme.

The Emerge Documentation team acknowledges the tremendous support of the faculty, students and staff at Arizona State University, and in particular the School of Arts, Media and Engineering and Dr. Daragh Byrne of the Reflective Living Group. Emerge was conceived and developed by Joel Garreau, Thanassis Rikakis and Cynthia Selin, with Bruce Sterling. The Emerge exhibit was co-curated by Aisling Kelliher, Daragh Byrne, Cynthia Selin and Sarah Davies.

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NORDES 2013 WORKSHOP: EXPERIMENTAL SKETCHING

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ABSTRACT

What impact does the act of sketching have on thought processes? How may knowledge through sketching be reflected and lead to new epistemic insights? The workshop addresses these theoretical and methodological questions on the basis of specific drawing experiments. During the workshop the experimental use of sketches as a reflective tool in thinking and design processes is introduced. Experimental sketching is a participatory investigation about how knowledge is gained by drawing and how this process can be methodically, theoretically and practically reflected.

BACKGROUND

This workshop proposal is based on the author's theoretical and practical studies to the genre of hand drawing in the research studio kiii – knowledge through iteration, imagination, irritation.

The research approach is practice-based and combines methods of research laboratories with artistic practices in studios. These spaces enable the production of insights and knowledge mainly through techniques of notation. The project takes into account both the conscious control of manual dexterity and

hand-eye coordination, as well as unconscious acts of physical or tacit knowledge. The process of drawing and the methodical approach are documented as “manual” and “toolbox”. kiii research studio allows interested

parties to explore drawing across disciplines and aesthetically contribute to an professional and contemporary drawing research.

In the NORDES workshop the model of the research studio kiii will be adopted to the conference situation and discussed by means of theories and experienced through experimental drawing methods.

WORKSHOP PURPOSE

The purpose of the workshop is to provoke ideas of new and contemporary expressions through the act of drawing as epistemic process (see Figure 1).

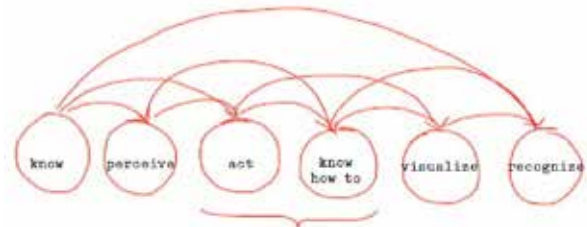


Figure 1: Diagram of experimental sketching as an iterative and epistemic process

The sketch serves hereby as a direct visual expression of thinking. By integrating experimental sketching in the individual design research process, drawing and visualization can become a method that leads at best to gaining new insights.

The participants will be provided with an introduction of sketching techniques and practical applications in order to visualize, notate, and experiment in the field of design research. The aim of the workshop is to enable participants to work with sketching techniques on their own research projects and themes. Therefore, the participants should submit a specific research interest. A short description of a research project serves as a starting point for further visual investigation (see participation).

The individual research questions will be approached through sketching in hands-on sections “research through design”). All drawing experiments shall be

adapted and manipulated in order to fit for specific research purposes. A main focus of the workshop will be the visualizing and communicating of abstract ideas through images to other participants.

THEORETICAL INPUT

By means of short theoretical inputs the scope of the artistic practice of “sketching” is clarified.

Three main fields will be theoretically presented: First, the theory of visual thinking; Second, the strategies and techniques of experimental and method sketching; and third, the ideas of practical reflection.

The theoretical approaches refer to visual thinking theory (Arnheim 2001) and writings about practical reflection (Schön 1983). Influences come also by texts on social collaborations (Sennett 2012; Coles 2012), design and artistic research (Albers 1967; Cross 2007; Gansterer 2011; Martin 1993), as well as history of science (Latour 2006; Rheinberger 2005).

A reader of texts on drawing knowledge will be distributed to the participants beforehand the conference. At the conference workshop, the theoretical approaches can then be experienced experimentally.

METHOD SKETCHING

How could a procedure be designed that provides insights by drawing? “Method Sketching” was developed in order to give this question a framework. It mainly deals with hand drawing as a visual medium of knowledge. Therefore visual design basics are combined with process-orientated sketching methodology. Drawing techniques are the starting point for “Method Sketching”, which is based on the authors own artistic experience as much as working with theoreticians, scientists and professional designer/artists. By means of sketches the theoretical basics of drawing are tested, drawing techniques and technological applications are analyzed and analog or digital practices are developed. The applied method of sketching uses the practical experience while drawing. It makes aware how specific knowledge is gained in an iterative drawing process.

The following methods will be actively experienced by the workshop participants through sketching techniques and experimental settings: Strategies such as speculation, scenarios and improvisation. Visual methods such as mind mapping, information architecture, data visualization, visual brainstorming, graphic writing and visual storytelling. The methodology is based on a process-orientated approach and uses methods of notation in science, art and design, which are combined and newly contextualized.

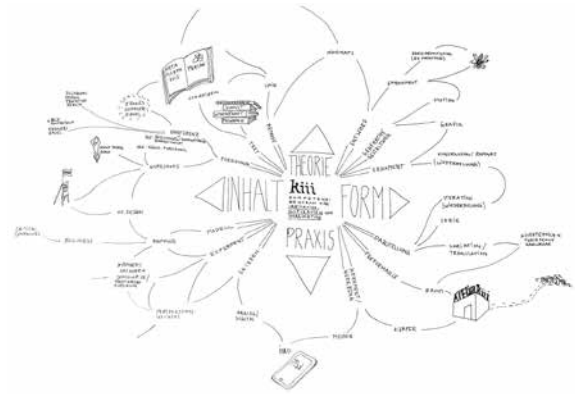


Figure 2: Diagrammatic sketch of kiii – knowledge through iteration, imagination, irritation

WORKSHOP CONTENT

- Lecture on visual thinking and sketching techniques
- Introduction to «method sketching» and experimental approach of sketching
- Theories and terms of reflective practice with writings on drawing by artists, scientists, theoreticians and practitioners
- Application of visual thinking strategies and methods in individual and collaborative settings
- Sketching techniques and tools for specific research purposes
- Visual presentations and discussion (with sketches)

PROGRAM (TENTATIVE)

HALF-DAY (4H) IN TWO SECTIONS:

SECTION I (2H)

- Collaborative drawing experiment (0:20 h)
- Introduction lecture (0:20 h)
 - sketch-notes
- method sketching for individuals (1 h, each experiment 0:20 h)
 - word vs. image
 - strategies for visualizing abstract ideas
 - sketching your research project
- collaborative method sketching (0:20 h)
 - visual discussion about individual research themes and common interests/themes

BREAK (15 MIN)

SECTION II (2H)

- experimental sketching in smaller teams, each team 3–5 participants (0:40 h)
- sketching project poster, individual and group (0:20 h)
- visual presentation of each group and their individuals (0:30 h)
 - visual karaoke
- visual discussion with all participants (0:30 h)

PARTICIPATION

Participants should have a research topic they want to visualize, share and discuss with others. The individual research question (written abstract of 100 words max) is part of the registration. There is no special drawing experience required by the participants. Max 15 participants are accepted.

A reader (PDF) will be distributed to the accepted participants via e-mail beforehand the conference (end of May 2013).

Please sign up with abstract via e-mail:
info@judithdabler.de

REQUIREMENTS

Workshop requirements will be announced to attendees beforehand the conference.

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ELECTRONIC SKETCHING: USING IDEMOBITS AS TOOLS FOR SYNTHESIS IN DESIGN RESEARCH

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ABSTRACT

Throughout the process of design research, synthesis is an important aspect for bringing together past and current knowledge to facilitate new ideas.

In this workshop participants will be challenged to explicitly explore their ideas using IdemoBits. IdemoBits are a tangible tool to be used during the process of design research enabling the designer to explore ideas immediately using electronic materials.

This is a very hands-on, active workshop where attendees are expected to participate, contribute, and play; exploring the IdemoBits as tools, and reflecting on the process of synthesis, in order to contribute to a model of ideation.

INTRODUCTION

Similar to industrial designers who use sketching and models to try their ideas, IdemoLab makes use of physical, functional, interactive Electronic Sketches. Buxton explains, “sketches dominate the early ideation stages, whereas prototypes are more concentrated at the later stages where things are converging within the design funnel”. (Buxton, 2007). Electronic Sketching provides the opportunity to test a specific experience or functionality quickly and independent of a polished technological solution. Testing ideas gives insight and inspiration; and using Electronic Sketching, it’s possible to create a proof of concept in minutes.

Electronic Sketching is sketching using electronics; an expression of an idea, thrown together quickly, tested, adapted, and tested again.

IdemoLab takes it further, elaborating on the idea of sketching by including electronics, yet maintaining the essential elements of sketching. One tool IdemoLab uses to facilitate Sketching is IdemoBits: small sensors and output devices which require no programming knowledge, but are customizable by the inquisitive user. As explained by Thackara, in *In the bubble*, designing in a complex world, “We need to develop “an understanding and sensitivity to the morphology of systems, their dynamics, their “intelligence” - how they work and what stimulates them.” (Thackara, 2005) IdemoBits can help to develop this by exploring how they work through active enactment of situations and stimulations.



Figure 1: IdemoBits with sensors and outputs

Throughout the process of design research, synthesis is an important aspect to bringing together past and current knowledge to facilitate new ideas. Kolko explains: “Because synthesis is frequently relegated to an informal step in the overall process, it is practiced implicitly; a single designer forges connections in the privacy of her own thoughts, and performs only rudimentary sensemaking.” (Kolko, 2010). IdemoBits address this implication; making visual the magic behind synthesis, allowing designers to explore ideas not only in their heads (“what would it be like if it lit up? What if we used bluetooth, oh it would be like that”); and instead of simply imagining possible scenarios which then are analysed, some discarded and some selected to be tested more formally; designers can potentially explore all scenarios. This workshop aims to explore synthesis as a part of the design research

process, and find ways to make parts of synthesis more visible, using IdemoBits as tools for idea exploration.

Kolko concludes by saying that “inferential leaps can systematically drive innovation” and we postulate that IdemoBits fuel these inferential leaps by providing tangible aids - beyond paper and pen - to formulate ideas. (Kolko, 2010).

PURPOSE

The purpose of this workshop is to challenge participants to explicitly explore their ideas using electronics to quickly achieve a proof of concept, and in doing so, evaluate the experience from a design research standpoint. Furthermore, it is hoped that an evaluation could be done on the matter of synthesis, and how IdemoBits help to create ‘inferential leaps’; bypassing the need for imagined technology, and allowing participants to try out their ideas immediately.

In this workshop, participants will explore their ideas using IdemoBits, small sensors and outputs which provide a simple way to bring responsiveness / intelligence and interactivity to ideas. Thackara explains, “interactions are difficult to describe to someone not present” (Thackara, 2005) and it is the hope that participants in the workshop can use IdemoBits to clarify potential interactions by removing the need for excessive explanation.

The organizers of this workshop would like to work with participants to explore the potential interactions, activities, processes, and design research methods, with a specific focus on synthesis, that may arise from the use of IdemoBits, and work together to create an ideation model.

TENTATIVE PROGRAM

30 MINUTES

The workshop begins with an introduction to Electronic Sketching and IdemoBits, and an outline of the workshop, including goals and expected outcomes.

1 HOUR:

Small groups formed

Brainstorming warm-up exercises

Brainstorm about synthesis (mind map on poster paper)

Group discussion about Synthesis Brainstorm - introduction of main thoughts and points.

2 HOURS:

In small groups and pick a topic from a pre-determined set of design problems.

Brainstorm, and develop a concept for this problem - using IdemoBits.

During this process - assign a person to be the ‘documenter’ who takes photos, and notes regarding the happenings of the brainstorm. Rotate person every 15 minutes to make sure everyone is included in the brainstorm.

30 MINUTES

Break

1 HOUR:

Prepare, and present, in groups, the outcome of the brainstorm.

Focus specifically on the topic of synthesis - how did the group synthesize? Did they do in group, or individually? Was there quiet time, or mainly group discussion?

How did the IdemoBits facilitate the ideation process?

How did the IdemoBits affect the synthesis process?

1 HOUR:

Full group discussion on outcomes (presentations).

What is synthesis in terms of the ideation process?

How is it affected by the use of IdemoBits?

How could IdemoBits be used by design researchers in their processes?

Develop an ideation model based on the day’s activities.

/END

VENUE REQUIREMENTS

IdemoLab, DELTA is familiar with the venue and requests the use of:

- I. a room large enough for 10 - 15 people;
- II. long tables and benches or chairs to work on; and,
- III. a projector and wall or screen to project on.
- IV. Electricity, power bars and cables
- V. Access to the internet

IdemoLab, DELTA will provide IdemoBits, posters, paper, writing utensils and paper prototyping materials.

ATTENDEE SELECTION

Attendees will be selected on the basis of a short, half page written document, indicating what they hope to gain from the workshop, and their experience and interest with synthesis in the design research process.

A total of 15 attendees can join the workshop, though the ideal number would be 12.

Attendees should be design researchers, and familiar with the concept of synthesis.

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WORKSHOP: PLAYFUL DESIGN FOR ALZHEIMER'S DISEASE

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ABSTRACT

This workshop aims to bridge the gap between game-, and product design and the theoretical knowledge of the field of neuropsychology. During the workshop we will design playful experiences to stimulate older persons with Alzheimer's disease, in order to delay disease progression. Knowledge concerning the progressive course of neuropathology of the disease can substantially contribute to the design of suitable games, or playful products, for this user group. In view of the increasing population of older persons with Alzheimer's disease, the design of relevant games or playful products by well-informed designers will benefit this group and is urgently needed.

INTRODUCTION

You may well recognize the enthusiasm of nursing home residents playing bingo or a game of chess. As older persons, particularly those with dementia, tend to remain passive most of the day (Bates-Jensen et al. 2004), playing games is an activating and entertaining way of spending time (IJsselsteijn 2007).

In elderly care, games are used for rehabilitation or leisure purposes and contribute to older persons' physical and cognitive functioning as well as their emotional well-being. Enthusiastic engagement while playing is crucial for the potential occurrence of benefits (Bavelier et al. 2011). However, games that are targeted at young age groups are rarely suitable for the older (cognitively impaired) population due to their specific needs concerning their physical and cognitive deficits.

Our aim is to design games, or playful products, for older persons with cognitive impairment, i.e. persons suffering from Alzheimer's disease (AD). AD is the most common form of dementia (Kester & Scheltens 2009) and older persons with AD form an increasingly growing segment of our population. AD is characterized by a progressive deterioration of the brain; so-called 'neuropathology', resulting in specific behaviour and care needs. Designers have the skills to design engaging games and beloved products, and neuropsychologists have the knowledge to understand behaviour of people suffering from AD. Therefore, we as one product designer and one clinical neuropsychologist collaborate to design playful products that meet the specific needs of persons suffering from AD.

In our studies we bridge the gap between disciplines by extracting design relevant information from the field of neuroscience. In this workshop we will introduce this theoretical framework to designers in order to give them the tools to design suitable games, or playful products, for older persons with different severities of Alzheimer's disease. Disease progression highly affects the perception of play and therefore determines which play experiences are most appropriate along the course of the disease. More specifically, play experiences that rely too much on brain structures that are (severely) affected by the disease could be meaningless and frustrating (Lucero 2000). On the other hand, play experiences that are somewhat challenging can be effective in slowing down the development of the disease. This phenomenon has been phrased as 'use it or lose it' (Swaab et al. 2003). Lastly, play experiences that fit the player are considered most enjoyable and motivating (Fang & Zhao 2010).

We have several aims for this workshop: we aim to create awareness for the broad variety of the user group; we aim to provide designers with knowledge from the field of neuroscience; we aim to collect examples of possible playful design concepts for different stages of Alzheimer's disease; and we are curious whether designers experience this hands on knowledge and tools as inspiring.

NEUROLOGIC BASE FOR PLAY EXPERIENCES

Neuropathology in Alzheimer's disease slowly accumulates (Bastos-Leite et al. 2004). Although the behavioral symptoms of individual patients with Alzheimer disease may vary, specific cognitive problems are present from the start en result from neuropathology located in certain brain areas (Kester & Scheltens 2009). Alzheimer neuropathology follows a predetermined course specifically targeting certain areas and relative sparing of others (Bastos-Leite et al. 2004). To stimulate those areas that are not too much affected in the early stages of the disease warrant specific knowledge of the disease course. We are currently working on a paper focusing on which play experiences, elements formulated by Korhonen (2009), could be best triggered in which stage of the disease. We focus on cognitive healthy older adults, older adults with mild (amnesic) cognitive impairment, and persons with Alzheimer's disease in a mild-to-moderate, and a severe stage.

WORKSHOP CONTENT

FOCUS AND STRUCTURE

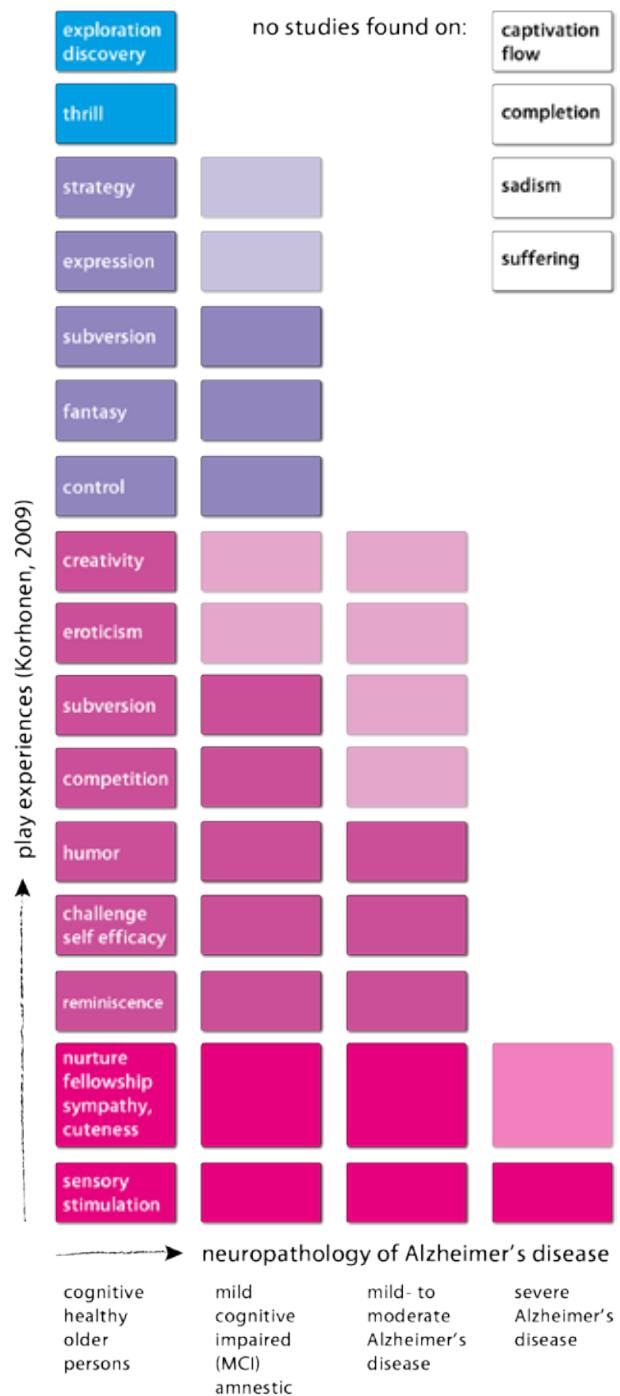
The general idea for the workshop is to provide designers, or design-related professionals, with knowledge from the field of neuroscience and to do a mini-design project. Although the focus is on the theoretical framework of the neurological base of play experiences, we do take into account the general design guidelines for elderly (see the workshop outline for the time distribution). The structure of the design project is based on the basic design cycle (Roozenburg and Eekels 1995) and we will address the first two steps during this workshop; the analysis and synthesis phase.

INTRODUCING THE THEORY

The theoretical framework will be explained by an interactive presentation of both authors representing the two different fields. Currently we are working on a paper about the theoretical framework 'Neurological base for play experiences' which will be finished at the time of the workshop. We will prepare a booklet that is based on this paper, but the framework will be presented to the designers by less written text, more illustrative (info) graphics and rich information of the user group.

SENSITIZING

Besides the theoretical knowledge we will 'meet' the user group in order to be able to design products empathically. We will work in small groups and work for different 'personas' living in a nursing home. The personas differ in stage of Alzheimer's disease, physical deficits, background, and personality. The personas are based on real stories that we collected from field studies in the Netherlands. The groups have time to discuss their persona and share their own experiences.



DESIGN

The aim is to design either a game or a product for everyday use that facilitates a playful interaction. The severity of Alzheimer's disease is determined by the persona and the play experiences that suit your persona best can be inferred by using the theoretical framework. The design phase is divided into several steps. Firstly we will diverge by brainstorming to come up with plenty of ideas. After sharing your ideas with the other groups you and your group will discuss the ideas and select the best ones. You will elaborate on these concepts to make your final design.

PRESENT AND DISCUSS

Every group will present their final concept design in a couple of minutes. By presenting and discussing the concepts the differences in design for patients in other stages of Alzheimer's disease will become visible.

EVALUATE THE DESIGN PROCESS

With a mini-questionnaire we will ask you to evaluate your experience of the workshop. We are interested in how you as designers and design-related professionals experienced the theoretical framework as a design tool.

WORKSHOP OUTCOME

If this theoretical framework turns out to be inspiring and useful while designing for playful experiences of persons suffering from AD we will make this knowledge available to designers worldwide by making the booklet accessible online. The booklet that is used as reference work will be improved by your feedback and enriched with your design concepts as inspirational examples.

WORKSHOP MATERIALS

WE WILL BRING:

- The booklet with the theoretical framework of play experiences for Alzheimer's disease and general design guidelines for elderly
- Personas of future users
- Video camera
- Posters to brainstorm and present ideas
- Pencils, stickers and post-its

WE NEED:

- Wall or flip-overs (to present ideas)

WORKSHOP OUTLINE

This half-day workshop will take approximately four hours. The outline of the workshop is presented in the table below.

Table 1: Workshop schedule

Time	Activity
Start	Welcome and presentation on the Alzheimer's neuropathology and play experiences (30 minutes)
00:30	Presentation: general design guidelines for aging (10 minutes)
00:40	Introductory assignment (5 minutes)
00:45	Step 1: Analysis phase: meeting the user group by reading the personas in small groups (15 minutes).
1:00	Step 2: Synthesis phase: idea generation (40 minutes) and display the ideas on the wall (flip-over)
1:40	Coffee break and possibility to walk around to be inspired by other groups (20 minutes)
2:00	Step 3: Select your best ideas and choose 1 to 3 favourites from your group (30 minutes)
2:30	Step 4: Elaborate on your final concept design (30 minutes)

3:00	Step 5: Mini-presentations & discussion (40 minutes)
3:40	Last step: evaluate your experience with designing from this theoretical starting point (a very short questionnaire: 10 minutes)
3:50	Wrap up

PARTICIPATE

To participate in the workshop you can just sign up by sending an email to the first author. We would like to ask you to mention your profession to have an idea of the composition of the group.

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CREATIVE COMMUNITIES, CREATIVE ASSETS: EXPLORING METHODS OF MAPPING COMMUNITY ASSETS

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ABSTRACT

Asset mapping, a method for unearthing and visually representing an individual's or a community's assets, has been used in the context of planning and creative industries.

The goal of this workshop is to bring together stakeholders from diverse backgrounds and practices to discuss and generate outcomes that make use of different perspectives of asset mapping methodologies.

At the core of activities, facilitators will

demonstrate the ways in which asset mapping has been used with community groups within an area or neighbourhood in the Creative Citizens research project - a project which explores how different types of creativity and civic engagement intersect to add value to communities in the context of a radically changing media landscape.

INTRODUCTION

Asset mapping is a way of unearthing and visually representing the assets of an individual or community. As a methodology, asset mapping emerged out of the principle of Asset-Based Community Development (ABCD): the premise that communities will be better equipped to develop if they can identify and mobilise

the assets they already have. By recognising their assets, a community can then focus on positive development, responding to, building and expanding upon existing capabilities (which often go unrecognized), rather than focusing on what it lacks or needs (Mathie and Cunningham 2002, McKnight and Kretzmann 1996). When discussing ‘community’, ABCD focuses mostly on geographical communities, including communities of interest that exist within a locality.

The Creative Citizens research project has developed asset mapping as a core methodology for use with community groups in the ‘Community-led Design’ strand of research (see <http://creativecitizens.co.uk/>). The project explores how different types of creative citizenship add value to communities, within the context of a radically changing media landscape that enables new forms civic engagement, participation and expression.

In the ‘Community-led Design’ strand, we refer specifically to projects where local people come together to redesign spaces and services in their neighbourhood, such as starting an allotment, providing services for young people, or opening up old buildings as a community hub.

By co-creating digital media interventions with the community groups, Creative Citizens will explore how this technology can be used to creatively engage more people in community-led design. As well as being of benefit to the community group, asset mapping will be used by the researchers to help articulate the value generated by these co-created media interventions, as a way of evaluating impact.

The process for developing the asset-mapping methodology has involved an extensive literature search in order to understand existing and emerging forms of asset mapping, and a series of expert interviews with community leaders, facilitators and public engagement practitioners, as well as pilot workshops with community groups.

The resulting methodology focuses on mapping assets at the level of both the community project and the participating individual using a suite of visual tools to unearth assets such as people’s relationships and skills, and the project’s connections with spaces, organisations and infrastructure. Due to the context of the changing media landscape, the methodology also captures the assets held by the community in terms of their online and offline media use.

The Creative Citizens asset mapping methodology also captures the relative current and potential value of each asset to the community project, the nature of this value (such as social, financial, environmental) and its relationship to other assets. A second level of analysis is achieved through individual asset mapping with each of the participant, to identify the true relationships between participants and the proposed assets, and how this compares with the group’s perspective of the ‘project’.

PURPOSE OF THE WORKSHOP

The purpose of this workshop is twofold: first, to share the asset mapping methodology being developed on the Creative Citizen project and gain advice and peer review about the instruments being used to record assets, the methods to analyse and present to communities and the opportunities and challenges for sustaining creative engagement and participatory curation of outputs, through physical, social and online media and tools. Second, to provide participants with opportunities to interact with stakeholders from diverse backgrounds and practices—researchers, practitioners, designers, programmers, planners and design ethnographers—and together generate tangible outcomes that can utilise the diverse perspectives of asset mapping methodologies.

A draft programme for a half day workshop is presented below.

The programme will be adapted on the basis of participants’ numbers and profiles. Alternative asset mapping methodologies developed by participants are welcomed, and opportunities to share these will be including in the first or second activity, depending on numbers and the nature of the methodology proposed.

HALF DAY PROGRAMME

Introduction to asset mapping and its purposes in the context of the Creative Citizens ‘Community-led design’ project	20 mins
Participatory Activity 1: Participants will divide in groups and work together to create posters in order to ‘make the case for the role of asset mapping in community-led design’	60 mins
Presentation of posters to the group	20 mins
Break	20 mins
Activity 2: Role Play: Participants will divide in groups and assume roles within different types of community groups to engage in mapping group assets and relationships using proposed asset mapping methodology	60 mins
Discussion: Reflecting on the process and feedback	30 mins

HOW ATTENDEES WILL BE ACCEPTED FOR WORKSHOP

Any attendees who wish to participate will be able to sign-up for this event subject to a maximum capacity of 20. Interested participants are invited to submit an one – two page profile that describes: their current / past work and interests related to the workshop’s theme; how the workshop will benefit their work; and what they can contribute to the workshop. Participants who have personal experience of developing asset mapping

methodologies are invited to describe their own approach, so that room can be made in the timetable for comparative discussions.

REQUIREMENTS FOR PHYSICAL SETTING

The workshop will require tables and chairs that can accommodate groups of 4-6 people working together, and a projector.

MATERIALS

All materials (paper, pens, objects, stickers) will be provided by the workshop organisers.

CONTACT DETAILS

To sign up for this workshop, please email Gail Ramster at gail.ramster@network.rca.ac.uk

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WORKSHOP FOR NORDES 2013:

DESIGNING VALUE AND REFRAMING CHALLENGES

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ABSTRACT

Current global challenges need a new way to look at how we design products, services and solutions.

On the one hand these global trends influence innovation but on the other hand the user and his individual needs have to be taken into account.

This leads to the task of reframing requirements based on empathy, multidisciplinary teams and a learning culture in order to design sustainable products that create values for the users.

Participants in this workshop will be guided through a process of designing a new product or service. Special focus will be placed on the experience of how to create empathy for the user as well as for different trends, opinions and ideas.

This includes the experience of learning from mistakes and lays claim to challenging and iterating ideas.

This workshop combines elements from Design Thinking, Change Management, Lean Startup and Leadership principles.

INTRODUCTION

Globalization, as it appears today, presents a universal challenge not only for designers but also for companies and organizations we collaborate with. We have to cope with exchangeable products or solutions which are not really satisfying their users. In addition we have to face increasing challenges due to globalization and to limited resources. When working on new product or solution we often focus on its features to satisfy or even inspire the customers. But who are these customers and who or what exactly lies behind those global questions about sustainable solutions? And what are the real problems and challenges to overcome? How do you know what is useful, appropriate or rewarding for others?

In order to find out about these needs and pain points but also about opportunities, ideas and limits it is crucial to change the perspective and to redefine the requirements for the product, processes or solutions. For this purpose design requires an empathic approach. Moreover current challenges ask for ideas and solutions from multidisciplinary teams.

DESCRIPTION OF THE WORKSHOP

STRUCTURE

The workshop is structured into a short introduction part and a core part where participants will be guided through an iterative design process. During the entire workshop participants will work in small teams.

The first part will start with a short warm up to get introduced how to looking at the challenge and its solutions from a different perspective. It leads to open up the perception and the awareness of the participants to superior aspects.

Starting with the design challenge the first step will be to learn about the problem and - even more important – about the person affected by this problem.

After a short presentation and feedback the groups will start to ideate on the defined problem. Collective thinking and ideation will help to come up with new and even unconventional, crazy or impossible ideas they would not be able to generate by only sitting down with a pen and some paper. The groups will decide on their favorite the ideas and will then present them.

The workshop will end by a presentation of the final results and a feedback on the individual experiences, emotions and moods learned during the design process.

Short time cycles, short presentations and rotation of the ideas are key elements during the whole process.

OUTCOME AND LEARNINGS

- Not the design solution but the experienced process is the outcome of this workshop.
- Creating empathy by changing viewpoints
- Combining global trends with individual needs
- Establishing a learning culture due to short timeframes and iteration.
- Experience of changing the viewpoint from creator to user.
- Challenging the results by feedback during the whole process by iteration and by rotating the ideas.

PARTICIPATION

The workshop is designed for 20 – 25 participants. No preparation beforehand is required. Just curiosity and empathy will be needed.

In order to join the workshop please write a short note to andrea.augsten@hfg-gmuend.de with a short introduction about yourself (max. 200 words).

DURATION

3,5 hours

REFERENCING

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WORKSHOP: EXPERIMENTING WITH DESIGN EXPERIMENTS

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ABSTRACT

This full day workshop intends to explore design experiments to create a deeper understanding of the underpinning mindsets, epistemological assumptions and their implications as well as possibilities within the context of academic research. The participants will contribute with their experiences of conducting design experiments in a variety of settings and contexts. During the workshop the participants will give and get feedback on the experiments presented and explored, and participate in the discussion and development of (new) principles for design experiments in academic research. One aim of the workshop is to develop a conceptual map that categorizes the various design experiments based on their epistemological assumptions and practical implications for design practice as well as academic research.

INTRODUCTION (BACKGROUND)

Design research is inherently paradoxical in that it is both imaginative and empirical (McDaniel Johnson 2003). On the one hand, in design you need to create proposals that should be regarded as meaningful by some people in the future. On the other hand in design research you obviously need to create new knowledge, which often requires some form of empirical evidence.

This paradox poses particular methodological challenges for acquiring as well as analyzing data. Eikeland presents “three ‘ways of accessing data’...: (1) observation, (2) asking questions, and (3) experimentation” (2006:194). This data can be turned

into information, which can be transformed into knowledge by the researcher. Based on Eikeland’s classification it is obvious that designers and design researchers developing proposals experiment for a wide range of purposes, in a variety of contexts, using a wide range of different approaches. Broadly defined, experimentation can be seen as the most frequent method in order to acquire data and knowledge in design research. Schön (1983) “suggests that to experiment, in the most generic sense, is to act in order to see what the action leads to and that the most fundamental question of experimenting is, *What if?*” (Küçüksayraç & Alpay Er 2009: 2809). Schön presents three approaches to experimentation: hypothesis-testing, exploratory and move-testing experimentation (1983:145ff). On an everyday basis though, designers’ activities are seldom called experiments, but rather e.g. sketching, prototyping, mock-ups, scenarios, storyboards, simulation, and user testing (Gedenryd 1998:156).

Historically designers have borrowed methods to conduct experiments from many other disciplines and used them for our own purposes. Rarely have we reflected on the approach originally used for the experiment, and the underlying assumptions it brings along. Many experiments are based on an epistemology where objective facts are assumed to exist, and all problems can have an optimal solution. Design work has a different outlook that implies another epistemological stance according to which the proposed solution(s) and the interpretation(s) of the situation emerge simultaneously. Assessments are the only way to score, because with this approach there is no definite right or wrong, only better and less good proposals depending on particular perspectives. Such a designerly approach may be in stark conflict with the epistemological stance of the original experiment.

Schön claims that “experiment in practice is of a different order than experiment in the context of research (1983:145). Designers and design researchers normally deal with issues that are regarded as complex, messy, unstable, wicked etc. This is often the case as there are no clear borders where a situation ends. This is not always seen as bad and “some complexity is desirable” (Norman 2011:13), especially when looking to develop novel solutions. However, while design tends

to embrace complexity, departing from a human-centered perspective and an open-ended approach, traditional scientific experiments seek to eliminate complexity, removing the influence of the researcher and controlling the research context.

DIMENSIONS OF COMPLEXITY IN DESIGN EXPERIMENTS

If we are to use experiments derived from design practice in academic design research, we need to clarify what we mean by experiment in this context, and how we can understand it in relation to complexity. What are the underpinning assumptions for the experiments employed, and what are the implications for how we assess the output from these experiments?

For the purpose of this workshop all design activities, except observation and asking questions, will be called experimentation. To illustrate, an initial proposal of dimensions is presented below. We use these to trigger discussions of the underpinning assumptions of the experiments as well as their implications for what methods and knowledge they could legitimately produce. The workshop will not be limited to these, but the list will be expanded and developed during the workshop, since this is one of the central activities.

INVOLVEMENT

The kind of involvement and perspective of the people participating in, as well as designing, the experiments are necessary to consider. One scale could be *one – several*, but can include different *kinds* of *stakeholders* in the future situations.

Sole experimenter – several stakeholders

Another important aspect is the extent to which the researcher him/herself is involved in experimenting: the researcher can take the role of the passive bystander, designing the experiment, but not taking part in it herself, or she can be actively involved in facilitating the participation of other stakeholders. On the extreme of this end of the scale is the approach more common in artistic research when the researcher essentially uses her own experience as data/means of experimenting.

Passive – active role

Designers and design researchers also engage in experimentation with different mindsets, sometimes consciously and other times without reflecting on the approach. One example Liz Sanders often brings up is the expert vs. participatory mindsets: experts see ‘users’ as subjects (reactive informers), while people with a participatory mindset see ‘users’ as partners (active co-creators) (2013).

Expert mindset – participatory mindset

CONTROL

The basic premise of an experiment in the natural sciences is that you can control the situation in a laboratory and isolate the dependent variable. This is rarely the case in design experiments.

Design work traditionally takes place in the studio but seems to more and more be done in the context of current or future use (Koskinen et al. 2011).

In the lab/studio – in the field

Levels of complexity thus also increase as experiments are increasingly aimed toward preferred future situations rather than fixing existing problems

Present - future

Many design experiments involve making, creating and changing shapes, colors, surfaces, relationships, interaction, etc. (i.e. design). This can be done by the designers on their own, or in workshops with many people involved. While other experiments do not involve the activity of making or creating.

No making – making

PURPOSE

Design experiments can be conducted to create knowledge in relation the participants’ experience and also interaction during the experiments. The knowledge if interest can be propositional. But perhaps more likely other aspects of knowledge that can be seen as skills, familiarity and judgment knowledge, that are more difficult to inquire into with just observing and asking questions.

There can be many ways of categorizing intentions. Of particular relevance for this conference are the different interests and audiences that design practice and academic design research have. In the social sciences there is an ongoing discussion on the relevance-rigor dilemma, meaning that the researcher often has to balance the relevance of the study for practice and the rigor of the method for academic credibility.

Academic research – Commercial practice

Earlier we mentioned Schön’s distinction between different approaches to experimentation in design. Christiane Floyd discussed prototyping and presented a difference between exploratory approaches, where you want to be surprised, and experimental ones, where you expect more of a yes or no answer/result (1984:6).

Testing - exploration

The desired output can thus be more or less be more specified in advance, which leads to different possibilities for drawing conclusions. Depending on the nature and focus of the experiment, the result can be summarized in words or numbers (an artifact – as in a traditional lab experiment), or sought to capture the experiences of participants (as in human-centred design). The desired output can thus be conceptualized as:

Artifact - experience

RELEVANCE FOR THE CONFERENCE

The workshop is a collaborative exploration of design experiments aiming to produce a deeper understanding of the underpinning mindsets, epistemological assumptions and their implications. Academic research is often assessed on the basis of the *reliability* and

validity of the data and method. We will explore what these overarching qualities could mean in the context of the design experiments in complex contexts.

WORKSHOP FORMAT

PARTICIPANTS

We welcome participants that are design researchers and practitioners that have a range of experiences from different ways of working with design experiments in varying contexts and settings. You should be interested in gaining further understanding of their own and others' ways of working.

To ensure a good climate for discussions the desired number of participants will be between ten and twenty.

BEFORE THE WORKSHOP (I.E. SELECTION OF PARTICIPANTS)

If you are interested in participating in the workshop please submit a max four-page position paper where you present an approach, method, technique or case study that relates to experimentation, that you would like share and explore. The paper should present the experiment in a visual as well as verbal way.

The paper must be sent by e-mail to anna.rylander@gu.se no later than 20 May. Include "Nordes Workshop 113" in the subject. We will respond regarding your involvement in the workshop around 1 June.

The accepted position papers will be shared among the participants before the workshop and we anticipate that the participants get familiar with the other's papers.

SCHEDULE (TENTATIVE)

The workshop extends over a full day, with the following schedule outline:

AM: Mapping experiments

- Introduction to the workshop and the schedule.
- Presentations of experiments/cases brought to the workshop.
- Active exploration in smaller groups of the experiments the participants bring. Mapping and discussions depart from the dimensions presented above, but participants are encouraged to challenge, elaborate and complement these dimensions.
- Presentations by the groups of their conclusions and insights from the mapping exercise.

PM: Exploring assumptions and their consequences

- Mapping and discussion of underlying epistemological assumptions of the presented

experiments and the conceptual maps from the morning.

- Mapping and discussions on criteria for judgment of the mapped experiments as research methods.
- Share experiences and sum up.

AFTER THE WORKSHOP

The organizers will create a summary of the learnings from the workshop and present these as an exhibit or in some other way. Possibilities for publication of results will be sought.

THE ORGANIZERS

We who are organizing and conducting the workshop are involved in development of design research, design education on all levels and design work.

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NEW WAYS OF NETWORKING:

A hands on workshop exploring the workspace:lab and its equipment

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ABSTRACT

Are you interested in designing new ways of networking at the Nordes conference with fellow researchers?

Do you want to explore and discuss the so called “workspacelab” as a platform for user involvement?

This workshop invites participants to explore a particular version of the design:lab called the workspace:lab. With a focus on methods like probekits, design games and experience prototyping the participants will experience what it is like being part of the design:lab as “users” and they will be exposed to the different equipment and tools used in the “laboratory of change”.

Though the main focus of the workshop is to explore the workspace:lab, the actual output of the workshop is also relevant. The participants will be encouraged to codesign examples of new ways of

networking at conferences, which could benefit the Nordes community in the future.

INTRODUCTION

Currently the research team of the Project “Workspace Design II” (WSD II) is developing a methodological toolbox that encourages architects, designers and engineers to involve employees and other stakeholders when initiating major changes at workplaces.

Inspired by previous initiatives in Workspace design project I (for more details see Lundsgaard et al., 2007), the toolbox suggests creating a temporary environment that enables users and other stakeholders to have a design dialogue and jointly explore a future workplace environment. This temporary space is called a workspace:lab - a design:lab focusing on workspaces. Similar to the design:lab, it supports users, designers and other stakeholders to both reflect on their current work environment and explore new workspace designs in an open dialogue.

The backbone of a workspace:lab (or any design:lab) is a series of workshops, that feed into each other (Binder, 2007). Design games are often used in these forums to structure the workshops and ensure a common tangible output (Brandt, 2006). Usually the “gamepieces” are materials generated from field studies or through probekits (Mattelmäki, 2006).

Some of the methods in the book “Rehearsing the future” (Halse et al., 2010) were of interest in the

development of the toolbox. It brings new examples on how roleplaying and experience prototyping can be another way to experiment with and imagine new possible futures in the lab. Prototypes and mock-ups enter the stage as props, evoking new ideas (see Fig.1).



Figure 1: Prototyping ("Rehearsing the Future")

The toolbox is intended to guide architects, designers and engineers in how to establish a workspace:lab and it gives examples on how to do it based on four principles:

1) People at work

Prepare employees and other stakeholders for workshop activities (for example with "homework activities", see Fig.2).

2) Workshop dialogues

Make several of workshops to collaboratively reflect on a future workspace.

3) Design transformation

Transform and translate the material from one activity to another.

4) Beyond the lab

Make sure that the design dialogue continues at the workplace.



Figure 2: Homework done in WSD I

The toolbox (see Fig.3) is seen as a prototype that evolves and develops when using it with potential architects, designers and engineers.



Figure 3: The toolbox prototype in WSD II

FORMAT OF THE WORKSHOP

A prototype of the WSD toolbox will be used to plan the workshop and the Nordes Conference will be seen as a design case and a temporary workplace. At the workshop participants will co-design new ways of networking at the conference.

The planners of the workshop are all architects (some of them part of The WSD project) who wish to create a workspace:lab with the toolbox as a guide and then reconfigure it in the process if necessary. In the process they will experiment with new methods and approaches that could accompany the existing material in the WSD toolbox.

The intention with the workshop is to bring together researchers and design practitioners interested in the design:lab setting (in this case the workspace:lab) and the tools that are used in the lab. The workshop will give the participants the possibility to try out new methods for the toolbox in order to reflect and discuss the experience with each other and the planners of the workshop.

SCHEDULE

Attendees will be sent a page in a "friendsbook" and asked to fill out and return in advance, which will both prepare them for the workshop activities and make them reflect about themselves in relation to a network environment at Nordes. A limited number of submissions will be accepted (12) and the selection will be based on having a mixed group of participants from different research environments. Those intending to participate must send e-mail to Christina Lundsgaard clu@kadm.dk and the "friendsbook-page" will be mailed to them.

After an introduction to the toolbox, the full-day workshop will be divided in two workshop sessions (morning and afternoon) and end with a wrap-up discussion to reflect on the experiences with the workshops.

The morning workshop will be based on "the known" and the identification of challenges with ~~and~~ questions like: *What network facilities already exist in the Nordes Community, what existing space (cyberspace as well as the physical surroundings) are we networking within and what needs do we have as different participants when we enter the network? How do we know who to*

network with, how do we get in contact and what happens beyond the conference?

The “friendsbook-page” that the participants will have worked on prior the workshop will feed into the first session and a design game will be a tool to structure and make sure that the participants thoughts will be tangible and have an output. In the lunch break, the participants will be asked to do different interventions based on the morning session within the conference space. The breaks are one example of how conference participants network and a good time to try out some of the new ideas.

The output from the morning session will feed into the second more explorative session leading to future design solutions. The participants will be exposed to “scenario playing” through active engagement with prototypes. The output of the workshop will be functional prototypes that can support a new way of networking at the conference and following conferences.

To wrap up, the planners and the workshop participants will jointly reflect on their experiences with the workspace:lab and discuss it in plenum.

OUTPUT

The expected outcome of the workshop is ideas and inputs on ways to get to know a workplace environment better, in order to change it or design a new one. This

brings together an awareness for the participants of different possibilities of using/seeing the same (work)space, as they will be part of the process both as users of the space and as designers. As the conference venue will be the “workplace” analysed and discussed during the workshop, possible changes of it will be the more tangible output. Methods and approaches will hopefully inspire the participants if they are engaging in similar projects in the future.

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COLUMNS ON THE FINAL PAGE SHOULD BE OF EQUAL LENGTH

WORKSHOP: AN EXPERIMENT OF REFLECTION ON DESIGN GAME QUALITIES AND CONTROVERSIES

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ABSTRACT

How do various design games format and stage different collaborative inquiry, learning and reflection? At this hands-on workshop, we will collaboratively explore, relate and meta-reflect upon how different design (and learning) games can form part of experimental, co-design (research) processes and practice. Some shared playing of mainly analogue games brought by the workshop organizers and participants will provide the basis for engaging in a game-inspired experiment of collaboratively relating and reflecting upon qualities and controversies of different design games. This reflection experiment will be shaped around predefined and emerging topics.

INTRODUCTION

Games have been played and researched for long (e.g. Caillois 1961, Zimmerman & Salen 2004). ‘Serious games’ and ‘learning games’ are increasingly used in work contexts among various stakeholders (e.g. Susi et al. 2007, Salen 2008), and ‘design games’ have been an integral part of participatory design for various purposes for more than thirty years (e.g. Ehn 1988). Design games have been and still are used as a valuable, playful and/or critical way to work, which opens up the design process for stakeholders outside the traditional design team. Thus design games are a particular genre of

formatting design dialogues among various stakeholders (Brandt et al. 2008). In general the definition of games varies and are often context specific (Zimmermann & Salen 2004). Most descriptions of design games used as part of co-design (research) processes and practices, however, seldom include competing with the other players. Design games are about staging participation through rules and tangible game pieces that guide the design moves (Brandt 2006). According to Vaajakallio (2012) design games for co-design have three main qualities in common. ‘First they create a common design language, second they promote a creative and explorative attitude, and third the games facilitate the players in envisioning and enacting what could be’ (Vaajakallio 2012, p. 100). Further, some advocate for designing and using generic design games (e.g. Habraken et.al. 1987) while others argue for the importance of contextualising part of the game materials (e.g. Vaajakallio 2012, Brandt 2011). This relates to Eriksen’s work (2012) on *material matters in co-designing*, in which she suggests to view some participating materials in a co-design situation as having the role of ‘formats of collaboration’ others as ‘content material’. Yet, generally, design games can be used to highlight the exploratory, imaginative, dialogical and sometimes also the empathic aspects of co-design.

REFLECTING ON DESIGN GAMES

The purpose of this workshop is collaboratively to explore, relate and reflect upon how different kinds of design and learning games can form part of experimental, co-design (research) processes and practice. As an experiment the participants will reflect upon various topics related to design games while playing different games. The aim is to be more knowledgeable about the qualities of various games as well as the controversies that are sought for or (intentionally) hidden for different reasons. The reflection experiment will be shaped around both topics

predefined by the workshop organisers and emerging topics defined by the participants on the day.

REFLECTIVE TOPICS

Based on previous experiences and research by the organizers, predefined topics to be addresses are for instance: How do design games relate to other kind of co-design approaches? What are the game mechanics and qualities of games when exploring possible futures? What controversies and ecologies are favoured by various games? What are the controversies or ecologies that should have more attention when designing future games? What are gained/lost by designing and playing generic games versus contextualised games for specific purposes? How can we get a better understanding of the qualities of various game formats, rules of the game and game materials? How can game players take (more) ownership to both designing games and using the results after game playing? What are the qualities of excellent 'game facilitation'? How can these qualities be taught to students or other people?

THREE OF THE GAMES TO BE PLAYED

GRÖNTSPEL/ GREENGAME (WORKING TITLE)



This analogue 'learning' game is about challenging, relating and developing different ideas/concepts intended to support a more sustainable development in a specific area of a city. What the game does is stage a dialogue of challenging these ideas/concepts with different social, ecological and economically sustainable questions /'issues'. With its triangular shape, the game is modular, and a part of playing is to negotiate and choose for example which 'issues' to focus on. The game includes various 'game mechanics' such as a time glass, personal tokens to bet/argue with, a score-card, etc.

The game is being developed within the Interreg 'Urban Transition' project (2011-2014) and 'GröntSpel' sub-project together with a game design company and various public employees from Danish and Swedish municipalities. A final prototype will be available at the workshop.

EXPLORING CONTINENTS OF CO-DEVELOPMENT

This design or 'learning' game is about creating common understanding in an organisation to build more collaborative and user / stakeholder oriented service development projects and processes.



The game board is inspired by an Atlas world map but with 'continents of co-development' that players explore and reflect according to sets of playing cards and game pieces. The game is still under development and at the workshop, players will also engage in the second round of iteration of game design. The experiences from the workshop will be utilised in the further game design.

The game is developed in 'Atlas: a map for future service co-development' -project (2012-2014) that is collaboration between three research groups from Aalto University in Finland. The project aims at analysing, testing and co-developing a map of collaborative methods for service development, design, and innovation.

REFRAMING WASTE



Reframing Waste is an example of a design game that facilitates participation and dialogue about how to promote better waste sorting in apartment buildings. The game materials in Reframing Waste are based on a research project on recycling and waste handling. The project is presented as part of a design anthropological innovation model in 'Rehearsing the Future' (2010). Parts of the game materials point to future possibilities. In a playful way Reframing Waste opens up for co-analysis of existing practices, and in the end of the game the players will have produced representations of one or more future visions.

PROGRAMME OF THE DAY

The workshop will be full-day and divided into two main parts. The *morning* will primarily be devoted to exploring and reflecting on design games and learning games through playing them. The workshop participants will be divided into groups of 4-6 people. Each group

will play (part of) two games provided by the organisers. Game reflections are evoked for example through reflection cards that are to be drawn and reflected upon in parallel with the game playing. The morning session will end with sharing reflections in plenum, documenting and clustering topics.

In the *afternoon* new groups will be formed based on the interests of the participants. Possibly inspired by the reflective topics listed above, each group will start with formulating questions to be addressed. These questions guide reflections on game playing in the afternoon session. Participants are encouraged to bring games that can be played in the afternoon (see preparations below). Also during the afternoon, intertwined with playing, various co-designed game mechanics will guide reflections. The afternoon session will end with a discussion in plenum including further use of the workshop insights. The meta-reflections on design games are staged as a hands-on experiment of both individual and collaborative reflection.

Except for an initial workshop introduction, the workshop will not include standard paper presentations but consist of hands-on game playing and reflections.

INTENDED PARTICIPANTS

Intended participants are: (co-) design researchers, other researchers studying people and their relations while playing (serious) games, design/learning game developers, others with practical experiences of staging collaboration and involvement e.g. with games and others curious about the topic. We aim for a mixed group of people representing several game approaches, all in order to facilitate multidisciplinary debate.

PREPARATION AND SIGN-UP BY PARTICIPANTS

There are three different ways to prepare and sign up for the workshop. If you want to bring a game to be played you need to submit a 2-page paper presenting the game in both text and images including an example of how it has been used. Include also practicalities of playing (time, number of people, preparations, etc.), why you want the game to be played and which topics you find most relevant to explore during the workshop. As time is short we cannot promise that the games will be played in their full length. Adjustments may be needed. The workshop organisers may need to limit the amount of games that are actually played at the workshop; however, in this case, all the games will be introduced briefly.

If you have experiences with designing and/or playing design games, but do not want to bring a game, we will encourage you to submit a 1-2 page paper presenting previous experiences and reflections on these, thus also revealing what you would find most important to reflect upon during the workshop. Relating to one or more of the reflective topics above is suggested.

The last possibility is to attend the workshop without prior submission, but pre-signup is needed.

Deadline for paper-submissions and signing up without paper: May 21st. Send email to: Mette Agger Eriksen; mette.agger@mah.se. Date of notification: June 1st.. Accepted papers will be shared after notification.

Number of participants: 10-20 persons. If there is a need to limit the number of participants, those with prior submissions will be prioritized. Another criteria is to become a multidisciplinary group of people.

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WORKSHOP - EXPAND YOUR DESIGN SPACE WITH ENERGY HARVESTING

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ABSTRACT

Today design research explores many new ways of interaction, which often requires energy-consuming technology. This limits the design space available and the purpose of this workshop is to open that space and make interaction possible in new scenarios with the possibilities of energy harvesting used as a tool to design in a new field of automated sustainable devices. Energy harvesting can make seamless and almost invisible interaction design possible.

INTRODUCTION

Ambient energy surrounds us – and the potential of powering wireless sensors, mobile devices and interactive sketches with ‘energy harvesting’ is growing. However, the question of how to grasp the solar, thermal and kinetic energy and supply it to electronics is a challenging task.

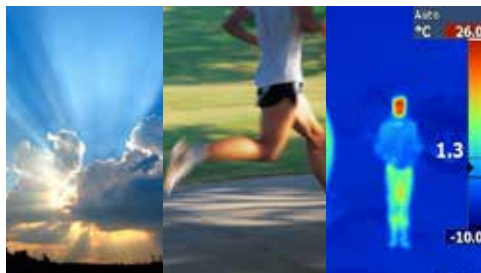


Figure 1: Ambient energy in form of solar, kinetic and thermal

This workshop offers participants the opportunity to expand their design back catalogue, introducing the concept and practical hands-on knowledge of working with energy harvesting devices. For design researchers, this means exemplifying the concept of experience prototyping in their own design process; and working with these new tools - solar, kinetic, and thermal energy harvesters.

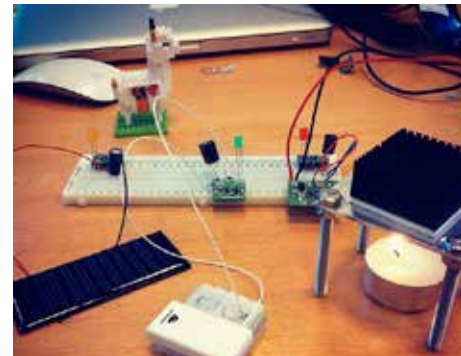


Figure 2: Energy harvesting kits – with solar cell, kinetic push button and thermoelectric generator

Workshop participants will gain a new design space, one that is fundamentally important to future design problems. Battery- and cable-less designs will enable new areas of interaction not previously available due to restrictions in battery change or cable draw. Furthermore, it changes the user interaction with products, which with energy harvesting can be fully sealed while the user newer having to worry about changing batteries / attach power cable.

Interactive embedded technology in the (near) future will require batteryless solutions - able to operate in even the harshest of conditions, and be able to deployed en masse. For a truly ‘everyware’ (Greenfield, A. 2006) world, in which devices surround and interact with us; new solutions in energy provision must be applied.

The authors are experts in the field of Energy Harvesting and Interaction Design and bring a unique insight into this workshop. Having conducted several energy harvesting workshops at universities, the authors would like to engage the workshop participants, and challenge them to reflect on their design process; reframing their design problems with a new domain, that of energy harvesting. Limiting factors like required user interaction at battery change and power cables, and location restrictions are lowered significantly when utilizing energy harvesting.

We offer them the tools to learn this domain hands-on. We will work with three energy harvesting kits, which teach the basic concept of solar, kinetic, and thermal energy harvesting.

As explained in (Buchenau and Suri, 2000) "The role of Experience Prototyping here is to let a client, a design colleague or a user understand the subjective value of a design idea by directly experiencing it." We propose that participants can take on the role of energy harvesters, exploring their design problems through the eyes of the future sustainable designer, and furthermore, give themselves a design constraint - to provoke, challenge, and hopefully grow their ideas into something which encompasses the principles of energy harvesting while remaining true to the design research process. The participants will be taken through the process of rethinking the required user interaction and the energy consumption, briefly evaluating the ambient environment exploring the available energy leading to viable solutions of self powered designs.

The outcome of this workshop will be tri-fold: firstly, to introduce participants to energy harvesting technologies, secondly, to give them a new design space, provide a design constraint, and allow them to reflect on this interaction, and finally, to create a symbiosis between Design Research and Energy Harvesting.

TENTATIVE PROGRAM

1 hour:

Introduction to energy harvesting technologies, and an outline of the workshop, including goals and expected outcomes.

45 min:

Hands-on introduction to energy harvesting and building of one of three energy harvesting kits (thermal, kinetic, solar) in small groups.
(Kits will be available for purchase after the WS)

Brainstorm about new energy harvesting design spaces (mind map on poster paper)

Group discussion about the new design space - introduction of main thoughts and points.

15 min:

Break

30 min:

Each small group picks a topic from the new design space and then creates a functioning model of their concept using the energy harvesting kits.

30 min:

Prepare, and present, in groups, the outcome of the workshop.

/END

VENUE REQUIREMENTS

We are familiar with the venue and requests the use of:

- a room large enough for 10 - 15 people;
- long tables and benches or chairs to work on; and,
- a projector and wall or screen to project on,
- whiteboard or poster paper for drawing illustrations,
- electricity: Extension cords and power bars

We will provide energy harvesting Kits, posters, paper, writing utensils and paper prototyping materials.

ATTENDEE SELECTION

Attendees will be selected on the basis of a short, half page written document, indicating what they hope to gain from the workshop, and their experience and interest with new technologies in the design research process.

A total of 15 attendees can join the workshop, though the ideal number would be 12.

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COLUMNS ON THE FINAL PAGE SHOULD BE OF EQUAL LENGTH

AGEING & INGENUITY: WHAT IS YOUR DESIGN STORY?

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ABSTRACT

This collective design workshop aims to provoke and test new design approaches towards ageing. We are looking for design stories/narratives that show how design thinking and collaborative working can enable the world to respond differently to the challenges of ageing. Can designers change our inherent ageism through the engagement of older people in the design and delivery of services and products with them? Can we change our current strategies towards ageing, turning its potential challenges into opportunities to engage, empower and improve the lives of the elderly? Together, we aim to build a collective design approach with ingenious older people and for our future selves.

INTRODUCTION

The Ageing & Ingenuity design workshop aims to investigate different design approaches that address the full spectrum of challenges around ageing including cognitive impairments to living in elderly care, tools for self-management and coping strategies for chronic diseases. Central to this workshop is the development of design responses to the statement '*Ageing in itself is not a policy problem to be solved*' (Bazalgette, 2011) and instead introduces '*ageing as a culture to inspire social innovation*' (Lee 2012). Knowledge, processes, outcomes and experience will be shared and collectively aims to investigate new services, tools, solutions we can

design together with the elderly, when thinking about our future society.

Our first question is, '**How can design enable a more solution-focused approach to ageing?**' Despite the negativity surrounding the fact that there is now a marked increase in the proportion of our population that is aged, this project wants to explore it from the viewpoint of possibilities. The elderly are important assets, holding previous information and experiences that should be collected and used. From the angle of design for social innovation in ageing, the designer is considered a facilitator when enabling people to understand and interpret their own problems and situations; subsequently coming up with their own solutions.

Thus, our second question is, '**How can design trigger ageing innovation through the ingenuity of ageing?**' According to the United Nations 2009 report, the global population of people aged 60 and over is 680 million, representing 11 per cent of the world's population. It is true that the whole world is ageing. However each country has its own development pattern and ageing reflects the diversity of different cultures. In order for design researchers to rethink the relationship between design, younger designers and older citizens it might be better to start with older people's experiences when dealing with the challenges of ageing. Primarily because they possess an enormous richness of information and experience. This methodological approach explains the link to the theory of ingenuity. Based on the UK's Royal Society of Arts (RSA) recent report that collated studies of ingenuity, this life skill can be defined as a capability with three main attributes: An inclination to work with the resources easily to hand, a knack for combining these resources in a surprising way, an ability to use these resources to solve a practical problem (Young, 2010). Furthermore, ingenuity can be seen as an individual's competence and is the basic element needed for societies to develop collective creativity and social innovation on a larger scale. This explains why it is important to work with individual

ingenious older people when attempting to develop ageing innovation for all. Therefore, identifying individual ingenious older people in different local contexts became the first priority as the rethinking process for ageing and design practice.

HISTORY: DESIGN & AGEING

1. LIFE-COURSE APPROACH TO AGEING

British historian Peter Laslett's famous slogan, '*Live in the presence of all your future selves*,' promoted a life-course approach to address ageing issues and promoted ageing as '*a unique experience for each individual*' (Laslett, 1996). This phrase was later absorbed and extended by the DesignAge Programme - the first formal design movement in ageing within a design school, started at the Royal College of Art (UK) in 1990 with '*Design for Our Future Selves*' becoming their manifesto. A pioneering project it focused on '*bringing older people, designers and industry together to improve the quality of goods and services in general, and the quality of life of older people*' (Crosthwaite, 1997). It was described by Laslett as '*an arranged marriage*' of an art and design school with the University of the Third Age, '*an organisation of autonomous, local, self supporting groups of retired people* [where] ... the general approach is to '*Learn for pleasure and study at leisure*'. As director of the DesignAge project, Professor Roger Coleman explained that it was about '*a new collaboration between older people and young designers, and a new approach that is part of a growing trend towards a more thoughtful and respectful design process*'. This life-course approach has been developed into the notion of inclusive design and extended to different 'extreme users' of design.

2. ELDERLY'S EVERYDAY PRACTICES AS A DESIGN APPROACH

20 years after the DesignAge programme, more diverse forms of ageing research are carried out in design schools. Binder, Brandt & Malmberg conducted a workshop at the NordiCHI2012 conference aimed at introducing a new approach to ageing research through design. Their idea was '*oriented towards experiences in design using communities of everyday practice and situated elderliness as a design approach*'. In particular it focused on 'how we can use the notion of communities of practice as a design approach when working with the elderly.' They started the discussion with a statement, '*Designing for elderly is a growing field of research and practice*' (Riche, Y., and Mackay, W., 2010), but experiences with welfare technologies and service design, oriented towards this group indicate that there are significant gaps between the inscriptions of the elderly in welfare technologies and services and the elderly's own perspectives on ageing' (Ertner, M., Malmberg, L. 2012).

AIM AND EXPECTED OUTCOMES

Through the lens of ageing and ingenuity, the aim of the workshop is to bring together researchers and

practitioners who are working on the theme of ageing and exchanging experiences with the aim of extending development and building original design knowledge together. Its particular focus on cultural diversity means that this workshop will initially include representatives from different countries and represent the different perspective in ageing and design.

PROPOSED WORKSHOP FORMAT AND ACTIVITIES

We propose a full day workshop. Morning session is devoted to an introduction to the workshop and design stories from participants. Each participant needs to prepare a story of an ingenious older people from their project. All these real-world life stories of creative people will be formed into personas in the first part of the afternoon. The result of the workshop is expected to build a collective design approach for designers to design for older people, based on narratives produced by designers on their life. We aim to explore ageing aspects beyond impairment and disease but aspects of being and living as an elder.

We are inviting 10-15 participants. Each body is asked to submit a 2-4 page position paper outlining their story with an ingenious older people, background of the project, analysis of design role(s) and reflections i.e. how they relate their methodology to the history of ageing and design research.

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FUNGUTOPIA WORKSHOP – GROW IT YOURSELF DESIGN

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ABSTRACT

“FUNGUTOPIA is the design of a social and ecological utopia based on urban mushroom cultivation”. The Project FUNGUTOPIA is a design | research in process.

The workshop will work with and about the material of fungal mycelium. We will learn how to cultivate oyster mushrooms with simple kitchen tools and let them grow in self-build forms. To understand how to work with the living material of fungi, we will discuss their properties and characteristics and the potential of mushrooms as building material, recyclers, food and medicine.

Apart from the hands-on-approach the workshops goal is also to discuss questions about “design in process”: How is our understanding of design changing when we start thinking about lifecycles of creation, use and decay? How can we take the material serious as agency in the design process? How could we truly co-design with the “other” – be it human or non-human?

DESCRIPTION

FUNGUTOPIA WORKSHOP



Figure 1: Fungutopia Station, DMY Berlin 2011

WORKSHOP: GROWING MYCELIUM

For the workshop we will use simple kitchen tools like a pressure cooker and work with oyster-mushrooms. First we will build simple shapes from different materials, that can be later filled with the substrate, on which the mycelium will grow. Every participant can take his or her own growing shape at home later on. In a second step we will learn how mushrooms are cultivated in general and how the easiest form of cultivating oyster mushrooms on straw and wood-pallets is working. While we will fill the build shapes we will talk about different uses of the material and concepts that could best adapt the properties of the material. In the end, we will enjoy a simple meal with healthy and delicious mushrooms for lunch together. We will use the lunch

time also to discuss the topics of design in process and designing with living material.

TIMETABLE

9:30h Start – Introduction of the topics.

10:00h Building shapes from different materials.

11:00h Introduction in the cultivation of oyster-mushrooms. Preparing the substrate to fill the shapes.

12:00h Filling the shapes. Preparation of the lunch.

13:00h Lunch with mushrooms. Discussion.

PARTICIPATION

Please bring (clean) material for building shapes and/or found shapes that could be filled with the mycelium.

Sign in for the workshop at: mail@makeandthink.de



Figure 2: Mycelium Form, 2011



Figure 3: Workshop 2012



Figure 4: Workshop 2012

BACKGROUND INFORMATION

FUNGUTOPIA – THE PROJECT

The project FUNGUTOPIA is a design | research in process. It investigates the potential of mushrooms as food, medicine, recycling-system and material.

On a first level, the project is a design-research-experiment that uses the living material of fungal mycelium to grow designs. In this term it is an experiment with (new) modes of working with living, growing materials and the aesthetics they create.

On a second level it is a community-design-experiment that works on the basis of an open source term of design, that involves people on different stages of the design-process and works with the idea of an utopia as a motor for real change.

On a third level it is an educational-design-experiment, that uses design as a tool to explore the field of mycology in an amateur-sense, forming an alternative to the exclusive world of science.

On a fourth level, the project is a design-research-experiment exploring the potential of design in process. The hypothesis is, that the properties of the growing, material of fungal mycelium could serve as role-model for a design in process, as an idea of permeable design term, in which the material as well as the user are taken serious as agencies.

THE THREE ECOLOGIES

“It seems essential to me that we organize new micro-political and micro-social practices, new solidarities, a new gentleness, while at the same time applying new aesthetic and analytical practices to the formations of the unconscious. If social and political practices are to be set back on their feet, we need to work for humanity, rather than simply for a permanent re-equilibration of the capitalist semiotic universe.” (Guattari, 1989)

In his book “The three ecologies” Félix Guattari explores the term of ecology (Guattari, 2008). He explains, that the notion of an ecology understood as pure nature is quite short-sighted and that we should

indeed think of a mental, social and surrounding/natural ecology, that is completely entangled. Following this thought one can not hope to solve any ecological problem without taking all three ecologies into account. Guattari is also quite convinced, that the arts are one of the few fields that are able to think and act in a way that is dealing transversal with the contemporary ecological crisis.

MUSHROOM GROWING KIT

The MUSHroom is a prototype for an open source growing kit for mushrooms. It is a tool to grow mushrooms of different kinds at home and to grow mycelium material.

By building a mushroom growing kit using mostly fablab equipment and open source hardware, an indoor greenhouse for the special needs of mushroom cultivation was created. This should not only serve to control humidity and temperature for different kinds of mushrooms and allow the cultivation of rare species at home for fresh digestion, but should also create a kind of display. It is an attempt to establish an urban “Grow It Yourself” - attitude, working against the general perception of mushrooms as being something somehow awkward, growing only in dark, moldy cellars.

Interested participants of the workshop will get a brief introduction and a step-by-step guide to build their own MUSHroom at home.

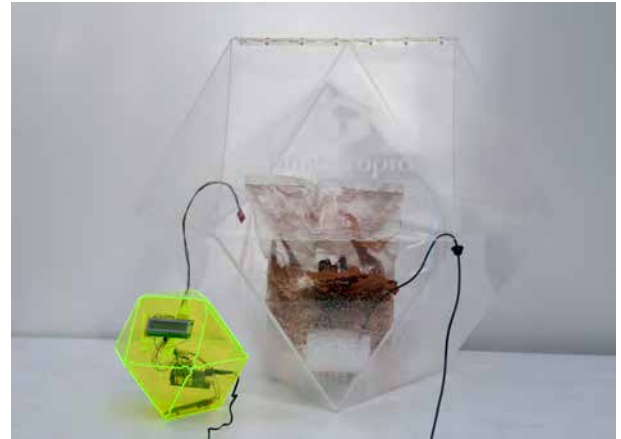


Figure 5: MUSHroom, 2011-2012

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Links:

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ELECTRONIC SKETCHING: USING IDEMOBITS AS TOOLS FOR SYNTHESIS IN DESIGN RESEARCH

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ABSTRACT

Throughout the process of design research, synthesis is an important aspect for bringing together past and current knowledge to facilitate new ideas.

In this workshop participants will be challenged to explicitly explore their ideas using IdemoBits.

IdemoBits are a tangible tool to be used during the process of design research enabling the designer to explore ideas immediately using electronic materials.

This is a very hands-on, active workshop where attendees are expected to participate, contribute, and play; exploring the IdemoBits as tools, and reflecting on the process of synthesis, in order to contribute to a model of ideation.

INTRODUCTION

Similar to industrial designers who use sketching and models to try their ideas, IdemoLab makes use of physical, functional, interactive Electronic Sketches. Buxton explains, “sketches dominate the early ideation stages, whereas prototypes are more concentrated at the later stages where things are converging within the design funnel”. (Buxton, 2007). Electronic Sketching provides the opportunity to test a specific experience or functionality quickly and independent of a polished technological solution. Testing ideas gives insight and inspiration; and using Electronic Sketching, it’s possible to create a proof of concept in minutes.

Electronic Sketching is sketching using electronics; an expression of an idea, thrown together quickly, tested, adapted, and tested again.

IdemoLab takes it further, elaborating on the idea of sketching by including electronics, yet maintaining the essential elements of sketching. One tool IdemoLab uses to facilitate Sketching is IdemoBits: small sensors and output devices which require no programming knowledge, but are customizable by the inquisitive user. As explained by Thackara, in *In the bubble*, designing in a complex world, “We need to develop “an understanding and sensitivity to the morphology of systems, their dynamics, their “intelligence” - how they work and what stimulates them.” (Thackara, 2005) IdemoBits can help to develop this by exploring how they work through active enactment of situations and stimulations.



Figure 1: IdemoBits with sensors and outputs

Throughout the process of design research, synthesis is an important aspect to bringing together past and current knowledge to facilitate new ideas. Kolko explains: “Because synthesis is frequently relegated to an informal step in the overall process, it is practiced implicitly; a single designer forges connections in the privacy of her own thoughts, and performs only rudimentary sensemaking.” (Kolko, 2010). IdemoBits address this implication; making visual the magic behind synthesis, allowing designers to explore ideas not only in their heads (“what would it be like if it lit up? What if we used bluetooth, oh it would be like that”); and instead of simply imagining possible scenarios which then are analysed, some discarded and some selected to be tested more formally; designers can potentially explore all scenarios. This workshop aims to explore synthesis as a part of the design research

process, and find ways to make parts of synthesis more visible, using IdemoBits as tools for idea exploration.

Kolko concludes by saying that “inferential leaps can systematically drive innovation” and we postulate that IdemoBits fuel these inferential leaps by providing tangible aids - beyond paper and pen - to formulate ideas. (Kolko, 2010).

PURPOSE

The purpose of this workshop is to challenge participants to explicitly explore their ideas using electronics to quickly achieve a proof of concept, and in doing so, evaluate the experience from a design research standpoint. Furthermore, it is hoped that an evaluation could be done on the matter of synthesis, and how IdemoBits help to create ‘inferential leaps’; bypassing the need for imagined technology, and allowing participants to try out their ideas immediately.

In this workshop, participants will explore their ideas using IdemoBits, small sensors and outputs which provide a simple way to bring responsiveness / intelligence and interactivity to ideas. Thackara explains, “interactions are difficult to describe to someone not present” (Thackara, 2005) and it is the hope that participants in the workshop can use IdemoBits to clarify potential interactions by removing the need for excessive explanation.

The organizers of this workshop would like to work with participants to explore the potential interactions, activities, processes, and design research methods, with a specific focus on synthesis, that may arise from the use of IdemoBits, and work together to create an ideation model.

TENTATIVE PROGRAM

30 MINUTES

The workshop begins with an introduction to Electronic Sketching and IdemoBits, and an outline of the workshop, including goals and expected outcomes.

1 HOUR:

Small groups formed

Brainstorming warm-up exercises

Brainstorm about synthesis (mind map on poster paper)

Group discussion about Synthesis Brainstorm - introduction of main thoughts and points.

2 HOURS:

In small groups and pick a topic from a pre-determined set of design problems.

Brainstorm, and develop a concept for this problem - using IdemoBits.

During this process - assign a person to be the ‘documenter’ who takes photos, and notes regarding the happenings of the brainstorm. Rotate person every 15 minutes to make sure everyone is included in the brainstorm.

30 MINUTES

Break

1 HOUR:

Prepare, and present, in groups, the outcome of the brainstorm.

Focus specifically on the topic of synthesis - how did the group synthesize? Did they do in group, or individually? Was there quiet time, or mainly group discussion?

How did the IdemoBits facilitate the ideation process?

How did the IdemoBits affect the synthesis process?

1 HOUR:

Full group discussion on outcomes (presentations).

What is synthesis in terms of the ideation process?

How is it affected by the use of IdemoBits?

How could IdemoBits be used by design researchers in their processes?

Develop an ideation model based on the day’s activities.

/END

VENUE REQUIREMENTS

IdemoLab, DELTA is familiar with the venue and requests the use of:

- I. a room large enough for 10 - 15 people;
- II. long tables and benches or chairs to work on; and,
- III. a projector and wall or screen to project on.
- IV. Electricity, power bars and cables
- V. Access to the internet

IdemoLab, DELTA will provide IdemoBits, posters, paper, writing utensils and paper prototyping materials.

ATTENDEE SELECTION

Attendees will be selected on the basis of a short, half page written document, indicating what they hope to gain from the workshop, and their experience and interest with synthesis in the design research process.

A total of 15 attendees can join the workshop, though the ideal number would be 12.

Attendees should be design researchers, and familiar with the concept of synthesis.

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DIGITAL LACE: PROCEDURALLY CREATED DESIGN

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ABSTRACT

Digital Lace is a set of laser-cut paper panels that explores the intersection of intentional decision-making and computer-created randomness. The project uses a set of illustrated symbols, a computer program that randomly places the symbols and rearranges them based on a simple algorithm, and laser cut paper panels that are created from the computer-generated file. The final pieces exemplify the kind of modular design present in digital design while celebrating the materiality and tactile quality of traditional art.

DESCRIPTION

Typically, the practice of design affords the designer almost complete control over the form of a finished piece. For example, a graphic designer determines the size, format, colours, typeface, reading sequence, and reading distance of a printed piece. However in digital media, the designer can make suggestions but no longer has complete control over how the final design is viewed, what information is being presented, or how the user views it on a variety of devices. Many digital designs are composed of modular elements that are remixed on demand based on the user's rather than the creator's desire (Manovich, 2005). Additionally, a large percentage of design is never realized as a physical product – it exists only on a screen for a short time.

The experimental series *Digital Lace* is a group of laser-cut paper panels that explores the tension between designer intent, randomness, and physicality. The project was intended to explore how randomized modular designs can produce cohesive and attractive final products. The project is created from three distinct elements: a set of symbols created using traditional design techniques, a computer program that chooses and

arranges the symbol set into a 38 x 50 centimetre matrix, and a laser cut paper panel that is made using the file created by the computer program. To begin, the 50 individual symbols that compose the lace were created using Adobe Illustrator.

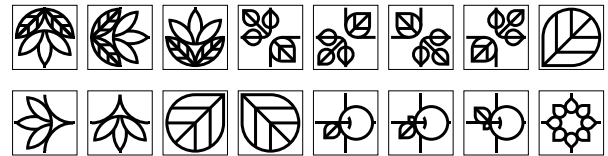


Figure 1: Sample of the symbol set created in Adobe Illustrator

These shape elements are the component of the project that relies most heavily on traditional design and illustration techniques, and employ the most authorial control. Each symbol is based around a circular cell with four connecting points located at each cardinal direction, so as a group they are able to combine into a coherent piece of 'lace'. Early experiments used a set of symbols that were completely random outside of their underlying grid; this produced a less cohesive finished result. To provide a sense of balance the symbols in *figure 1* were designed with a common organic theme.

The finished symbol files were exported as individual SVG (Scalable Vector Graphics) files, named numerically, and made available to a computer program to be arranged into the final composition.

The program that selects and arranges the symbols was created in the open source language *Processing*. The *Digital Lace* program for *Processing* is an evolution of the classic *Game of Life* programming experiment created by James Conway in the 1970s and described by Matt Pearson in the book *Generative Art* (Pearson, 2011).

Game of Life uses cells that are either on (black) or off (white). Each time the program runs the individual cells check on the state of their neighbours. If a cell has two or three neighbours it remains black otherwise it becomes white. If a white cell has exactly three neighbours it reverts back to black. The *Game of Life* and the *Digital Lace* program both use object-oriented programming conventions to create a grid of semi-autonomous cells that can respond to the action of neighbouring cells. Pearson shows how the original *Game of Life* program can be altered to include an infinite number of states beyond just on or off so more complex behaviours can be examined. The *Digital Lace* program builds off this base, starting with a grid of cells is randomly populated with graphics from the symbol set library. When the user clicks, each cell mathematically averages the numbers assigned to the eight cells adjacent to it. Using that value rounded to the closest integer, the program selects the next symbol file to populate that cell with. Over time this creates a grouping effect, because individual cells are working to make themselves more like their neighbours. Homogenization is prevented by randomly reassigning a number to cells whose neighbours have reached the maximum or minimum value.



Figure 2: Screenshot of the Processing environment and the *Generative Lace* program running in the background.

When the program is active, a user can click on the keyboard at any time to output a PDF (Portable Document Format) file of the symbol grid.

Collecting these files over a discrete period of time allows the user to capture a record of change and

evolution over time. Once collected, the PDFs are sent directly to a laser cutter to be produced out of paper.

The finished cut pieces can be viewed individually and aesthetically as discrete artworks, or they can be arranged horizontally in space to visualize the program's progression over time. Using rapid prototyping technology like the laser cutter allows the realization of multiple incremental stages of an artwork that would be expensive, time consuming, or impossible to make with traditional production methods. *Digital Lace* leverages the best of both worlds of 'mass customization': individually unique and unpredictable designs are created using the tools of precision manufacturing.

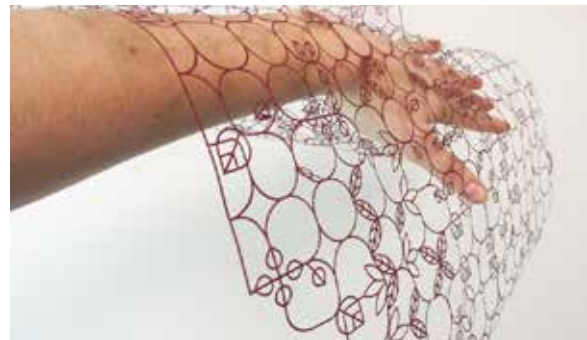


Figure 3: Finished lace panel.

The results of this project are intended to be conventionally aesthetically pleasing while exploring the intersection of intentional decision-making and computer-created randomness. The final pieces exemplify the kind of modular design that is becoming ever-present in the digital realm while celebrating the materiality and tactile quality of physical objects.

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SPERICAL HARMONICS: EXPERIMENTS IN 3D PRINTED CERAMIC FORM

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ABSTRACT

This research is twofold – first it is about exploring the mathematical shape of Spherical Harmonics in computer code to extend the vocabulary of ceramic form. Secondly to develop techniques to 3D print these computers generated forms using DIY 3D ceramic printing techniques.

DESCRIPTION

As self-directed personal research this material is about exploring audience response to a particular set of forms. My interest is in how at a basic evolutionary level we respond to natural forms. We have an inbuilt propensity towards natural forms and patterns, such as curvature, repetition, symmetry because we are part of that same natural world.

In mathematics, spherical harmonics are represented as a system of coordinates on a sphere. Using the latitude and longitude coordinates each point on a closed spherical object can be distorted using the spherical harmonics function creating a variety of organic looking visualisations. The Spherical harmonics function is used in many theoretical and practical applications, such as in the computation of atomic orbital electron configurations, the representation of gravitational fields, and the magnetic fields of planetary bodies and stars.

For some years I have used computer 3D modelling programs as a tool to explore and extend my knowledge of form for producing ceramic objects. This has developed to a point where I now generate 3D forms directly in computer code using the Processing open source programming environment based on the java computing language. Working at the level of code offers a way of creating forms where the systems and patterns

found in the natural world can be simulated through mathematical calculations. Spherical harmonics is an example of this. My programming skills are limited but Processing offers a large community of shared libraries from which to borrow and then edit code. For this project I have relied heavily on the toxiclibs library. Karsten Schmidt of toxiclibs in turn credits Paul Bourkes for his information on the spherical harmonics function.



Figure 1: 3D printed ceramic forms generated from spherical harmonics mathematical function. Average size 7 x 7 x 7 cm.

As described in the abstract there are two parts to this research. The first to generate the three dimensional forms using computer code. The second is to get the forms out of the computer into the material world to be considered as physical objects. For the last two years I have been doing this through 3D printing directly into clay. I make use of a diy RepRap kit 3D printer that has been converted to print with clay. The plastic print head has been replaced with a syringe type print head, filled with soft clay and then pressurised with compressed air that extrudes a continuous vein of clay. This enables the printer to build the ceramic object layer by layer as developed by Belgium based Unfold Design Studios. Refreshingly simple this printing method is good for vertical forms but does not cope very well with the compound forms as generated by the spherical harmonics function.

For these and other complex shapes I have been researching an adaption to the basic RepRap printer to use powder clay to support the form as it is printing. The adaption is such that the usual print base that lowers while the print head remains at a fixed height plotting out each sliced cross section lowers into a box void enabling the supporting dry clay powder to be spooned in around the form as it is printed.



Figure 2: RepRap 3D kit printer converted for printing in ceramic. Top left: printer without powder adaption. Top right: Close up of

spherical harmonic being printed. Bottom left: View of adaption to contain powdered clay support during printing. Bottom right: Finished print ready to be extracted from powder.

The achievement of this experiment in design research is illustrated by the successful production of a large number of glazed porcelain organic forms generated from computer code and directly printed using 3D printing. A problem with using an extrusion type print head in 3D printing is often the lack of physical support under protrusions on a form or element in a design that float above the base or float free from the main body. This technique offers support in the form of the clay powder and therefore over comes the problem. With the support there is also less distortion of the layers under each new extrusion of clay resulting in a much crisper and rounded result. The clay powder helps dry the print enabling it to be handled soon after printing. The powder is easily brushed from the object leaving no marking on the surface. The clay print is fired and glazed in a conventional manner.

This is certainly no plug and play system with the powder needing to be continually offered up by hand. However what it does show is that there is a place for interacting with and adapting these new technologies to be used as creative tools for artists, makers and designers in a very hands on craft based context.

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- <http://www.unfold.be/pages/projects>

NORDES 2013 EXHIBITION: LINES & MODELS. EMBODIED DRAWING ACTS

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ABSTRACT

Lines & Models is a ongoing series of analogue, digital and hybrid drawing experiments. The project explores tacit approaches to sketching and drawing by experiments using the body as a drawing tool. In the research project, theory and practice are closely linked. The experiments serve as drawing artifacts and as material for reflections in design research. In this context, the project evolved into an investigation about the involvement of the body while drawing and sketching, and how the knowledge gained can be visualized.

DESCRIPTION

Drawing is a classical art and design practice that is in recent times both methodologically and theoretically rediscovered. The return is accompanied by a redefinition of what may be drawing in the digital age. What role does the latest technological developments of drawing tools play and how can they be used in practice-based research to achieve knowledge? One focus in my design research about drawing is the transfer of analog culture techniques to new media. The experimental set-ups are including analogue and digital media and the use of hybrid technology. But the technology should only serve as a vehicle or tool, because the main focus is on the manual activity.

DRAWING PROCESS

Often I begin a project by producing drawing series, that is creating material, which I can develop a body of work

from and reflect upon. The drawing series were all executed in a non-linear way during a period of time, with the aim to allow hand and body to take precedent over conscious thought processes. Methods such as repetition, transformation and layering were applied, in order to understand the process of drawing in experimental settings. The different elements of the experiments are: First, the involvement of a performing hand using gestures to create drawn objects. Second, the tools used in order to produce visualizations of these processes. And third, the conventions of software visualization which have a significant influence on aesthetics and the results of creative processes. This shifting from analogue to digital techniques played an important role in the experiments and their formal outcomes.

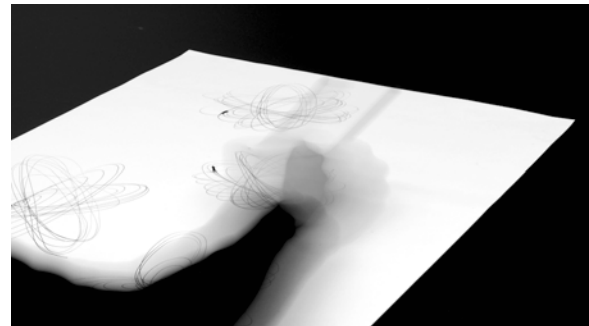


Figure 1: First LINE drawing with the wrist

LINE DRAWINGS

During the process of drawing, the connection between the hand and the drawing tool changes from unconscious action into a very conscious gesture. In these drawings, the body as an instrument for drawing becomes visible, as do its attendant imperfections.

LINES – WRIST, ELBOW, SHOULDER

The conscious and precise use of the joints as drawing tools produces a variety of shapes. These shapes also seem to enclose the movement of the body in space. The images have a dynamic appearance and spatial depth, due to changes in the body movement and resulting differences in the transmission of strength and pressure onto pencil and paper.



Figure 2: LINES Drawing with the shoulder (ink, paper, 1 x 1,3m)

MODELS

The shoulder drawings were scanned and transformed into grid models and three-dimensional shapes using rendering software. The lines of the digitalized drawings were translated into tubes, which define the material thickness in the production process. Stereolithography is a technology used for transforming 3D images into 3D models.

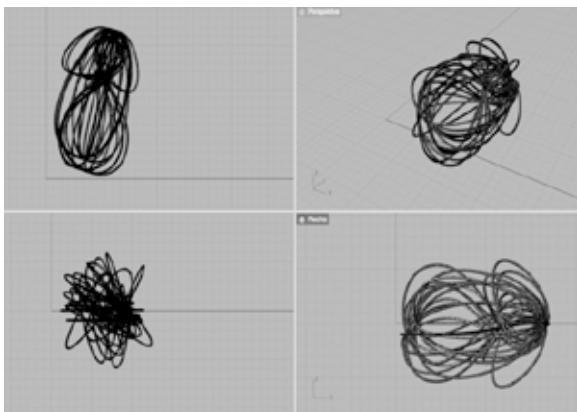


Figure 3: Process of Digitalizing a LINE drawing of the shoulder

The models are based on the drawings and can be understood as spatial interpretations of the movement.

REFLECTION

The act of drawing is performed by the body and accomplished mostly by the hand, which makes a mark

and a trace. In contemporary drawing research this form of involuntary drawing is referred to as graphic trace, which “is a hybrid type of representation: it takes from the index a registration of something unique – an impress of an individual – while incorporating the diagram’s abstraction from what is immediately given in perception.” (Iversen 2012)

Investigating the act of drawing as an embodied design process requires looking at how sketching and thinking are connected. Donald Schön defines “design as a reflective conversation with the situation” (Schön 1983, p. 76). He classifies this conversation in three processes: knowing in action, reflection in action and reflection on action. Knowing in action can be found in the terms of tacit knowledge or know-how. In his book “The Tacit Dimension”, the philosopher Michael Polanyi (Polanyi 1966) points out that there are two kinds of knowledge in the German language: “Wissen” and “Können”. The latter refers to knowledge of how to do something. To act and to know how to do something is a form of embodied knowledge, which Polanyi calls “tacit knowledge”. Schön takes Polanyi’s thoughts further into a professional context and how professionals think in action. Reflection in action can be described as learning by doing. This reflection is taking place during the action itself and is characterized by a flexible and open approach to the problem setting. Methods of repeating and copying – also common in scientific experiments – are important to the process of reflection in action. After the process of doing has taken place, there is space for reflection on action. It means understanding, putting into words and describing the process. This knowledge of reflective practice is helpful in finding solutions and for making the actions fruitful to others. The action performed in the process of drawing is full of twists and turns and is seldom experienced in a linear way. But it is precisely this iterative process, which leads to the acquisition of knowledge. Sketching is a craft, which can and must be repeated constantly in order to learn about how hand, eye and mind are coordinated. The notion of “knowing in action” can thus be applied to hand drawing: The act of drawing, performed by the hand as an embodied process, leads to the acquisition of knowledge, if it is performed and repeated over a certain period of time. The results of this learning process can be perceived as materialized knowledge in graphic traces.

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AESTHETIC EXPERIMENTATIONS ON CERAMIC MATERIALS

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ABSTRACT

Aesthetics like sound of ceramics is common in the context of making but not usually presence when perceiving an object. Most of the material aesthetics are knowledge of the maker and happens during the process of making. These aesthetics are potential material for artistic use. Focusing on the aesthetics of the ceramic materials I try to develop new solutions in the context of art. These experimentations are the beginning of a research where the goal is to bring out new artistic potentials from ceramic materials. The used raw materials are fluxes, feldspar, quartz, colemanite, cobalt oxide and copper oxide. To give an idea of material aesthetics more widely, I exhibit with the test pieces also the sound of crackling flux.

INTRODUCTION

In my practice-led research as a ceramic artist and a post graduate student I am interested in the material research that happens in the context of art making. I experiment with different raw materials searching for artistic potential through aesthetics. Through my own art practice and material research, I try to explore the creative side of the research. I begin with testing different raw materials (see figure 1.) and continue to the direction where I experience potential. Test pieces create points of reflection for the process and material for discussing the aesthetics of ceramics.

In order to have an understanding how the material knowledge influence on the perceiving of aesthetics I gather a focus group to reflect on the test pieces. As a maker and a viewer from the inside of the process I invite persons from different areas of expertise. My own reflection is influenced by the knowledge of the process and the materials, hence the aesthetic potential can be discarded without seeing it with the different point of view. In the exhibition I will provide two commentary books with guiding questions on materiality and aesthetics to have constructive comments to work from.



Figure 1: First test pieces with different raw materials

EXHIBITION ITEMS

The work that will be exhibited in Nordes 13 consist of about 100 different ceramic test pieces and a sound file that is from crackling flux material. With this work I introduce aesthetics of ceramic raw material. The used raw materials are fluxes, feldspar, quartz, cobalt oxide and copper oxide. The raw materials are fired in a porcelain or stoneware cup to hold the melting materials in it and to capture the vaporizing elements of the materials into the walls of the inner side of the test piece. The used raw materials are very basic materials for clays and glazes and most of them are used through out the history of ceramics. These raw materials have their own aesthetics as they are and for this exhibition I have experimented with simple mixing of them to enhance the natural properties that they posses and develop through their aesthetics.



Figure 2: Three groups of different materials

The proximately 100 test pieces I will arrange in three groups in the exhibition. In one group there will be the experimentations of different fluxes, in another group the feldspar and quartz with cobalt and copper oxide and in the third variations of colemanite and quartz experimentations (see figure 2.). The three groups are formed so that the viewer would visually recognize the material use in different compositions. The test pieces are to be experience with touching and not only by looking. Tactility is important to ceramic materials and gives more information of the aesthetics than plain visuality. The possible stains can be removed from the test pieces by firing them again in a kiln.

The sound of crackling flux is a strong aesthetic element that enhances the multisensory aesthetic experience when perceiving the objects. Sound gives the idea of the process that usually is invisible to the audience of ceramic items.

FOCUS GROUP

From the exhibition in Nordes 2013 I seek for constructive experience for designing and steering a focus group. Exhibiting the test pieces that are part of the on-going material research process and gathering comments from the audience I aim for insights of the aesthetical properties that viewers encounter with their knowledge of the world. In this exhibition I will place two books with the exhibition work with two areas of issues: the materiality and the aesthetics. The raised issues from the exhibition viewers are important deciding on what kind of the focus group should be and who would be the best individuals to this focus group and what kind of steering should be conducted.

In my study I focus on the ceramic material research. At it best the process of creative making is an experience where the artist is in a state of flow (Csikszentmihalyi 1997) and the experience have aesthetic quality (Dewey 2005). These experiences in the context of making are the interests of this research. The aim of the use of a focus group is to give more insights on to the subjective process during the research process.

A MEMORY FROM A MOVEMENT IN A STILL FORM

In the craft processes it is difficult to document the experiential dimension and distinguish between the conscious and the intuitive. The process is holistic and movement and senses are in the core of the making and creating. The maker acts as an observer and the experiential knowledge accumulates with active working (e.g.: Mäkelä 2003, Mäkelä & Routarinne 2006). The material movement in the act of making from the starting point to the finished form of an artefact is knowledge of the maker. From the form of the finished object only those who are familiar with similar processes can understand the movement and the process

it required. The essence of the process can be sensed from the final object.

Tarja Pitkänen-Walter writes in her dissertation about the happening of painting and the creation of the image. She emphasizes the understanding of the happening of making art. *"The first part of this happening is between the artist, the art piece and the being in the world. The second part with the art piece, the viewer and the being with the world"* (Pitkänen-Walter 2006, p.16). The experiment of the artefact brings the meaning of art to the wider audience, but the creative process and experiential action inside the process are crucial to the arising form.

The still form of the material is born in the happening of the making process. The process affects the end result, although the outside audience can't retrace it from the object. The character of the process is projected to the artefact. The maker is concentrated on the aesthetic experience while working. Guided by the goals and senses the process proceeds towards the form and the realization of the knowledge. Pentti Määttänen writes: *"The detection and the action are being actualized through physical causal processes. The obvious but less noticed alternative is that this concrete interaction is needed so that the thinking can happen"*. (Määttänen 2009, p.13).

CONCLUSION

The artist's relation to an artefact differs from the experience of the viewer. The maker can experience the process within the artefact. To the viewer the artefact is constructed in relation to the viewer's experiences with the world. Thus by exhibiting my ceramic material experiments, I am seeking for wider perspective of the aesthetic properties.

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INTELLIGENT CLOTHES FOR EVERYDAY FASHION

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ABSTRACT

What are the reasons that wearables have not caught on and why do we hardly see these new aesthetic and functional expressions outside exhibitions, conferences, and stage performances? I propose that one reason is the aesthetic expression of wearables. Prototypes and commercially available wearables tend to be aesthetically and material wise quite far from the aesthetics and the material (fabric) of the clothes we normally wear. Many wearables e.g. use LEDs as an aesthetic expression, which, however beautiful it might look, is quite far from what everyday clothes look and feel like, seeing that everyday clothes are mostly based on fabric. This project explores the question: How can we make wearables that relate to current, mainstream fashion trends, which is, mostly based on fabric, and yet still bring new expressions to the table?

INTRODUCTION

Investigating wearables, I have come across many fantastic ones. Most of them are very elaborate and intriguing designs, most of them are also designed for performance or art exhibitions and not so often for a commercial, mainstream market. I wanted to challenge this through exploring the materials and the aesthetics of the design. In order to do so, I worked with design constraints developed from a review of the wearables that currently make up the commercial, the artistic and the research area of wearables.

Design Constraints:

- The wearable cannot contain LEDs.
- The wearable cannot react to uncontrollable stimuli from inside or outside the body.
- The wearable cannot be targeted for art or performance.
- The wearable should be inspired by current fashion and appeal to fashion- and tech conscious women, age 25-35.

Instead of working with LEDs – which is very common in the field of wearable and intelligent clothing – this exploration focused on thermochromic inks that change color according to temperature. In this case the change occurs at 27°. Thermochromic inks were chosen because I wanted the design to be based on fabrics and because they hold quite a lot of potential in order to comply with current fashion trends, which, among other things, are very focused on textile print. Besides exploring thermochromic inks, the process also included explorations in pigment inks (inks which does not change color), conductive thread, heating pads, transistors, batteries and the LilyPad Arduino – all elements which are included in the final design.

DESIGN METHODOLOGY

The research was mainly practice led and very inspired by Linda Worbin's work described in her dissertation "Designing Dynamic Textile Patterns" (Worbin, 2010). Worbin explores new ways and methods of research and ways of working with new materials such as thermochromic inks (Ibid).

The design methodology for this project was to explore the materials, but with guidance by using methods from fashion such as moodboards and target group. The design goal was thus not clear from the beginning – other than resulting in a wearable fashionable design complying with the above-mentioned constraint. During the material explorations, the properties of the materials became clearer and thus also the boundaries and the possibilities of designing with them. The method used for the design process was iteration between fashion moodboards and material explorations as seen in fig. 1.

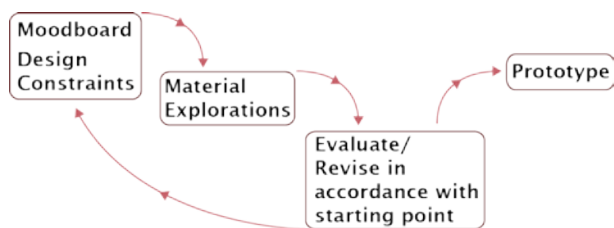


Figure 1 – the design method and process.

MATERIAL EXPLORATIONS

When working with textile design, there are many design variables, which has to be accounted for, i.e. color and shape. But when working with thermochromic inks, an extra variable is the fact that the designer cannot predict the outcome of the colors, which makes working with thermochromic inks a bit like working blind with colors (Worbin, 2010).

I had to develop a test method in order to understand the changes happening in the thermochromic- and pigment inks. I tested three different binders (a binder is a substrate for the ink) on three different colors of fabric; black, white and gray. It was done with the same combinations of pigment and thermochromic colors in order to register the differences and the pros and cons of the different background colors and the properties of the binders (see fig. 2).

	COOL	WARM
Top print, P ink		
Under print, P + TC ink		
Top print, TC ink		
Under print, P + TC ink		
Top print, P ink		
Under print, TC ink		
Top print, TC ink		
Under print, P ink		
Top print, P + TC ink		
Under print, TC ink		
Top print, P ink		
Under print, P ink		
Top print, TC ink		
Under print, P ink		

Fig. 2 – the first row indicates the top and bottom print and the mix of inks. The second row is what the print looks in it's cool state and the third row is what the print looks like in it's warm state. Some inks change a lot, some do not change at all.

The explorations proved, that the design would have to be done on a white/light piece of fabric in order to get a final design which was aesthetically pleasing for a piece of clothing – bright, clear colors and a soft surface

At the same time as testing the inks, I was testing different conductive threads and heating pads. In order to design a suitable match between the thread, the pads,

the inks and fabric, finding out the properties of the different conductive threads and heating pads was crucial.

The properties of the materials and the evaluation with the moodboard, revealed that a simple pattern was a good solution for the final design. Moreover, when the thermochromic colors resemble the pigment colors in their cool state, but change when heated, the most surprising and interesting designs evolved, which seem to hold the most potential for a fashion design (see fig. 4).



Figure 4 – the same colors in their respective cold (left) and warm (right) state.

THE FINAL DESIGN

The final design is a feminine shirt, size 38, in the classic hounds tooth pattern. Since the design is aimed for the fashion market, it was important to make it suitable and believable for this, by keeping it up to date with the current trends, which was done, as explained above, by the use of moodboards during the entire process of exploring the materials. The shirt comes in two versions; one has color changing features on the pocket, the other on the collar. Color changes happen, when the wearer buttons the collar or the pocket. This way, it is up to the wearer whether or not she wants the shirt to change expression.

FUTURE WORK

- 1) Explore materials with color changing properties in aiming at designing a wearable with overall changeable visual expression
- 2) Explore how the wearer can be in complete control of the expression on the wearable even when in a warm environment, maybe by using other color changing inks or inks that change at a warmer temperature than 27° C/ 80.6 Fahrenheit.
- 3) Explorations into power options. Next prototype use Heatit°C, an open-source electronics platform currently being developed, which can precisely output high current.
- 4) Further xplorations into how fashion methods and material explorations can be combined.

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BUILT DRAWINGS

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ABSTRACT

Digital fabrication technologies have the ability to confound ideas of control and indeterminacy. Apt to produce sterile and “perfect” forms, computer-generated constructs are finding their home within art and design communities—perhaps as mediator between concept and product. Although laser cutters are commonly employed to provide precision and controlled outcomes, I experiment with the indeterminate visual and structural potential in material layering and laser cut drawings on/in surfaces in order to better understand the potential of the tool and its tangential applications.

BUILT DRAWINGS: DESIGNING WITH CERTAIN UNCERTAINTIES



Figure 1: *Hive II*, 4'x4'x1", Baltic Birch plywood, wax, gesso, paint, Ash, 2012

Hive I (Catching Fire) and Hive 2 (Sit, Weep and Seep) are a part of a series of drawings that explore compositions that vacillate between determinate and indeterminate images and processes. My laser-cut drawings start with essential imagery and symbols such as the traditional school chair. This provides the determined framework for a composition and a fertile conceptual basis on which to build and test the effects of specific materials and tools. The laser-incised contours become substrates for subsequent surfaces that are mediated through layers of materials that include gesso, wax, paint and graphite. By embedding foreign materials and three-dimensional objects into the voids that sometimes result when parts fall away within the cut surfaces or by removing cut elements of the drawings and reinserting them at varying elevations, the notion of “building” the drawing is explored.

While assemblage as an approach to the generation of art and design is nothing new, it is this notion of technological cutting as mark-making and also its association with construction/architecture (plywood, metal, acrylic, felt) that causes me to view drawing specifically as a building-oriented activity. The tactile nature of this work operates to create drawings that allow me to literally feel the dimension in two-dimensional surfaces—and the intended potential consequence of the conflation of construction methods with image-making.

Although laser cutters are commonly employed to provide precision and controlled outcomes, my objective in this current series of drawings is to engage such tools to generate opportunities with which they are not usually associated: indeterminacy and randomness. The density of the marks and their alignments and misalignments, in combination with the erratic nature of certain materials when exposed to intense heat, result in drawings that behave in unpredictable ways. Artist Siân Bowen describes the inevitable depressions, cut surfaces, and other types of mutilations that occur through drawing processes as “creative damage” and she reminds us of the conceptual and visual richness that this type of impairment can add to the meaning of drawings (Bowen 2009). It is the ability of the laser to draw—the range of the width and depth of its marks and cuts and their inherent three-dimensionality—and the experimentation that its associated technologies contribute to fabrication processes that I explore in my work.



Figure 2: *Hive II*, 4'x4'x1", Baltic Birch plywood, wax, gesso, paint, Ash, 2012 (detail)

In addition to experimenting with the laser cutter's mark-making potential and its use to generate an unstable or unpredictable outcome, my creative work also includes experimentation with mimicking the tool's influence over a range of materials through hand-held methods. In *Hive 2* (*sit, Weep and Seep*), I perform, at least in part, like a laser myself, by passing a torch flame back and forth across the gessoed surface, allowing the melting wax to wick and find areas of weakness in which to pool to create a pointillist composition of black dots that *imply* the presence of the chair images. The insertion of a small-scale hand-crafted three-dimensional chair simultaneously differentiates and mediates the transitional relationship of two- to three-dimensional qualities in the composition; a concept that is essential to the relationship between drawings and building processes.

These works are a part of my current studio practice in which I move between the languages of design, craft and art. Influenced and inspired by traditional approaches to material manipulation, I am interested in how established crafting practices and developing technologies impact art or design productions. Design disciplines embody ideas deeply rooted in the concept of communication, function, aesthetics and the human experience. Since Marcel Duchamp introduced us to art such as *The Fountain* (a urinal exhibited as a sculpture), art practice has taken refuge and found identity in the indeterminate outcome- a place where concept rules; where meaning and intent take precedence over the corporeal product. Years later, David Hockney proposed the idea that "art has to move you and design does not, (unless it's a good design for a bus)" (Thompson 2004, 07). This notion suggests that while the two creative disciplines may share essential resources and influences, the outcomes, based on determined functions and methods, are dynamically different in how they communicate. New technologies and materials have the ability to confound these ideas and I propose that computer-generated forms best find their home within art and design communities as mediators between concept and product. They provide

prime venues for testing established roles for art and design, tool and material, and process and product.

My approach to the three-dimensional nature of a drawing produced through the use of a laser cutter accentuates that understanding and expressing the depth of the base material is critical. In traditional drawings, most if not all, marks reside on the supporting material's surface, but I experiment with and explore the depth of the plane- both implied and real. It is not so much the laser's ability to make its contouring cuts accurately as it is its ability to vary and control the depths of its cuts through or into the base material that makes it an interesting drawing tool. And because in the case of a material like plywood that flexes, swells and shrinks when heat is applied, controlling the depth and intensive of the laser and observing its effect on the material makes what might be thought of as an automated process highly participatory and experimental.

I commit to the idea that the relationship between drawings and three-dimensional forms must extend beyond end product comparisons into the comparative analysis of process and materials. Rethinking dimensionality can help maximize and extend expectations for what a tool like a laser cutter can do- balancing the determinate and indeterminate results that are necessary for innovative design.



Figure 3: *Hive I*, 4'x4'x1", Baltic Birch plywood, beeswax, gesso, 2012

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BEDTIME STORIES: WEAVING TRADITIONS INTO DIGITAL TECHNOLOGIES

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ABSTRACT

Bedtime Stories is a proposal for a long-lasting - environmentally, economically and societally sustainable smart textile service. It is a set of woven bed linen with images that can be recognized by a custom made fairy-tale application. This new way of story creation is an opportunity to share personal experiences and pass that wisdom through generations. Therefore contributing to a better quality of life.

Bedtime Stories is part of a research-through-design project. It involves crafts (methods and values) in the environmental load of textiles and garments production, selling, wearing and disposing area. Multiple iterations of Bedtime Stories gives insight into how we have been "weaving" traditions together with digital technologies.

INTRODUCTION

Bedtime Stories (see figure1) serves as a case study for exploration of how crafts and craftsmanship way of working (Sennett 2008) could contribute to smart textiles growing into a societally sustainable field as an alternative to the fast fashion. It explores how techniques and approaches such as weaving, story

sharing, quality pursuit, local production and design for longer time would make the textile product act naturally in a sustainable service system. How technology can enrich the apparel world by making it possible for textiles to adapt people's desire for constant change. It is carried out using a research-through-design approach: a process in which scientific knowledge is generated through, and fed back in consequent cycles of designing and building (Hengeveld 2011), and that the design act of creating prototypes is in itself a potential generator of knowledge (Stappers 2007). The knowledge on how to create sustainable smart textile services is extracted from the two iterations of the project.



Figure 1: Bedtime Stories by Smart Textile Services: TU/e, Unit040, Johan van den Acker Textielfabriek, Studio Toer.

Bedtime Stories consists of a pillowcase and a blanket made from a durable textile that is designed and woven in the Netherlands and an accompanying iPad to see the augmented reality hidden behind the layer of technology. The technology makes use of image recognition algorithms, which make it possible to recognize certain patterns and images in the textile. When moving over the pattern with the camera of the iPad it recognizes and connects to certain objects in the story that are visualized in an augmented layer. This

creates interaction possibilities between digital and physical worlds. When a woven symbol (for example a flower, a wolf or a grandmother in the setting of the Little Red Riding Hood fairy-tale) on the fabric is scanned and recognized by the tablet computer held by the storyteller, the child can play with the textile to manipulate the digital visual.

A linear way of reading from a book is replaced by customized experiences. The parent can create his own story using inspiration from the fairy-tale but adding his own elements, characters and experiences to it in a digital or physical layer. Personal values get transferred together with the cultural meanings and the product very exquisitely becomes part of a combination of product design with service elements to contribute for a more sustainable smart textiles field.

ITERATIONS

Bedtime Stories is a project developed further from QR-coded traditions (see figure 2), that is a set of pillows embedded with embroidered folkloric Quick Response codes that explore how new ways of communicating can be a way towards sustainability in the fashion field. Cultural information is shared by storytelling in several layers enriching interaction between generations and within families. (Kuusk et al. 2012) While traditional quality-aimed technique, such as embroidery is long lasting and static, the digital layer connected to it provides an opportunity to the textile product to act in a service system to stay updated and remain interesting throughout time - therefore enabling sustainable way of thinking for garment and textile areas.



Figure 2: QR-coded traditions: a pillow carrying a fairy-tale associated to the traditional colours and symbols of a specific place by Kristi Kuusk (Kuusk et al, 2012).

QR-coded traditions started from a traditional background carrying local values about time, details, fairy-tales, family and sustainable living. It was a personal exploration of the author, try-outs without a specific goal in mind that led to the development of the initial prototype.

The second iteration, worked further in collaboration with industry partners - Bedtime Stories - incorporates also values added by the group of partners, such as new weaving technique, augmented reality realization and commercial opportunities. This prototype has been developed to validate the concept of storytelling through image recognition and human interaction with textile. It served as a tool to create a common language between industry partners, academia and creative parties. (Bhömer et al. 2012)

REFLECTIONS

Niinimäki suggests that the most promising sustainable design strategy is the combination of product design with service elements: Product Service Systems strategies are therefore a future path to proactive and sustainable design (Niinimäki, 2012). While the woven cloth can be part of a family for years, the stories can change throughout the children growing, seasons, mood and so forth simply by downloading an update. Or the business model might even support proper care taking of the sheets and provide customers an opportunity to change them in time. It would be a similar approach to lending books from a library. This would force the responsibility and desire for pursuing good quality and careful cleaning of the product back to the producer and service provider.

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THINKING THROUGH DRAWING: SITES OF EXCHANGE

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ABSTRACT

Drawing is like note taking it creates an embodied dialogue between thought, hand and paper, it makes explicit the way we think and view the world from our disciplinary perspective and our human experience; it creates an active engagement between ourselves and the world. This work uses drawing as a site of exchange to document a conversation between a visual artist, a spatial interior designer, and archaeologist. The conversation was notated through diagrams, written notes, photography and drawing. The work opens up practice based methods through the to and fro of conversations to reimagine representations of interior space.

DESCRIPTION

The work will be presented as photographs printed on transparent film and fixed onto 2 no sheets of clear picture glass. The 4 mm picture glass will be held in a hardwood ledge. The images will be presented back to back so they can be viewed from either side, there will be a 20 mm gap between the glass. The work will need to sit on a table top to be read from a sitting position. The total size of artwork: width 550, depth 200 mm, height 450 mm. There will be a 20 mm gap between the glass sheets.

The images were taken in response to the conversations and discussions around an artwork, they were taken by a spatial interior designer with a visual arts practice, the installation, *Things of Value*, was originally created by a visual artist with a background in weaving who is now a curator. The archaeologist is now a curator for City Space Gallery, where the artwork was exhibited. The images create an enmeshment with the site, the viewer and makers, creating an on going narrative.

THINKING THROUGH DRAWING SITES OF EXCHANGE

The 'Value of Things' was an exhibition that took place in The City Gallery, Winchester Discovery Centre in June 2011. The project started with an installation created by the artist. It was made up of a collection of

things; objects, threads, maps, elastic, a teapot, books, they were ordered and reordered in relationship to each other. The work was used as a starting point for an archaeologist, interior designer, and the visual artist to have a conversation of, express their disciplinary views and to make drawings with, it acted as a starting point for discussion. The discourse attributed value to inter-disciplinary exchange and recognized variations in the way we perceive, look and read things.



Figure 1: Entanglements, 'The Value of Things'.

A glass cabinet held the collection and formed a framework through which the work could be interpreted, it transformed the collection of objects into a material landscape creating distance and offering fixed viewpoints through which to engage. The discourse continued with the spatial interior designer making a drawing from her disciplinary perspective through the language of plan and elevation. The archaeologist drew on top of the plan mapping inclines, angles and defining features with a coded syntax of lines and tapered marks. The archaeologist read the site through the process of stratification, examining the soil, and finds in the reverse order within which they were deposited.

For the artist the 'drawing' was an actual method of working, a way of gathering and testing. Arranging the landscape of objects and in drawing with drawing with pen and pencil, the artist drew together and made relationships between components by seeking out visual links, assessing gaps and content. The connections set

up routes, paths, foot ways across the work, moving in the gaps and spaces between objects across fields within and outside of the work.

Common language emerged from of the site such as, field, space and place, time, object, and find. The language of archaeology of unearthing, cuts, digging, marking, became metaphors for thinking through the artwork and the objects within the cabinet, the personal histories, and the sensory memories they contain. The cabinet acted as a domestic interior with objects filling the space, archaeology operated as a way of digging into the work, to bring forgotten material to the surface to make new histories.

During the drawing and the toing and froing of conversation, the soil, the ground line, the plan, section and elevation became key points in the exchange and discussion, the archaeologist wanting to know where the ground line was, the artist wanting to understand the terminology of soil- what did soil represent? What soil existed beneath the surface? The designer looking to put trial holes into the ground to understand the soil beneath. The books became the soil, the archaeologist drew in plan a circular diagram sliced into quadrants to delineate an area to make a cut.

The dialogue opened up fragments of exchange and visual documentation in relation to practice based research, referencing Ingold and Latour. The soil represents the material discussion, the material the archaeologist works with searching for finds, it represents the actual material for the artist and interior designer. We are interested in the *'the gap between words and the world'* (Latour 1999) and how as Latour in his essay 'Circulating Reference, Sampling the Soil in the Amazon Forest' demonstrates that these are not two separate ontological domains but a new phenomenon, the 'circulating reference' (Latour 1999).



FIG 2, Archaeological process, the Harris Matrix,

The discourse questioned how the interior might be re-imagined using archaeological processes as a model for thinking and metaphor to work with. The Harris matrix, an archaeological tool, emerged through the process as a way of thinking through space and time, the mapping of interlocking events offers an exciting potential when thinking through past, present and future. These layers of information are inputted into the Harris matrix, a tool that enables stratification problems to be unified on site as part of an on going process of discussion and reflection during the excavation.

The toing and froing of conversation, the materiality of the work, the actions of doing and making materialized new practice based methods for engaging with the interior. Art practice brings a dialogue of visual and material experimentation opening out conventional representation and drawing practice in interior design. The artwork enabled the interior to move away from its location within architectural representation to shift to a location within art practice and archaeological process. The conversation materialized a method for working with the interior through a material model. The exchange moved between viewpoints forming knots and entanglements both within and between us forming *'a meshwork of interwoven lines of growth and movement.'* (Ingold 2008) where knots have threads that *'trail beyond, only to become caught with other threads in other knots.'* (Ingold 2008)

Drawing is a process that enables us to draw together, to collect, to draw in, the to and fro of the process, the conversation, notes, diagrams, and photographs make visible how we think and experience the world. The artwork acted as a site of exchange to research and make explicit our disciplinary and human experiences, through the discipline of the other. Practice based research offers the possibility to gather together a new economy, a different set of enactments with which to design, to potentially shift methods of practice, perception and representation of interior space.

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ABORT N' GO. DESIGNING FOR WOMEN'S RIGHT TO AN AUTONOMOUS ABORTION.

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ABSTRACT

ABORT 'n GO is a design project within the crossing boundaries of critical design and industrial design. The aim of this project was to investigate and problematise the contemporary discourse on abortion in Sweden by using design as a discussion tool. (Sundbom, 2009) The design concept, a home abortion product, is based upon conducted in-depth interviews and a study by Anneli Kero. (2005) Keros study concludes that 67%, ie. the majority of women felt a relief after the abortion, but that they didn't feel free to express positive feelings. (Kero, 2005) The abortion discourse in Sweden is problematic since it's infected by double norms that may cause feelings of guilt and shame by women having an abortion. The abortion right is built upon conflicting standpoints; one is that women have right to have an abortion, without being questioned. Second is the notion that abortion is something that should be avoided, implying that you've done something wrong if you have had an abortion. (Socialstyrelsen, 2005, Bacchi, 1999)

With the home abortion design concept I wanted to explore and discuss the possibility of women having full autonomy over an abortion, ie. their own bodies. By combing insight from the interviews with the sketching process, a compliant and non threatening form was developed. The user interaction with the form carries haptic qualities, since the procedure position makes it difficult to rely on a visual interface. Since the purpose was to initiate a discussion on abortion, an interactive graffiti wall was included in the concept, encouraging visitors at the Konstfack Spring Exhibition to participate in the discussion. The comments from the wall were later included to the

design concept in a sound installation produced in collaboration with Niklas Sandberg for the Design Biennale in St Etienne.

(http://www.biennale2010.citedudesign.com/download/Pour_les_experts.pdf, p.4)

(<https://soundcloud.com/reclaim-the-tant/abort-n-go-produced-by>)



Figure 1: Abort 'n Go with VETO home abortion product.

DESCRIPTION

BACKGROUND

According to UN's declaration on human rights: "All human beings are born free and equal in dignity and rights.." (Regeringskansliet, 2006) The written formulation born, is important for women's human rights. In Sweden the "free" abortion right has limitations, both by limiting the right with a time limit. Abortions are also controlled by the state. After week 18, the unborn fetus has prioritised rights over women. (SOF, 2004) The idea of the right of the fetus, is inherent in an abortion policy that implies that abortions should be minimised and carried out only in exceptional circumstances. (Bacchi, 1999) What consequences have the time limit restriction have on on women's citizenship? (Poposka, Beti, 2006) Does it affect the view on early abortions?

WE HAVE "FREE ABORTION"-WHAT'S THE PROBLEM?

Abortion is viewed upon as a right, that should be avoided, and only to be used as a last option. (Socialstyrelsen, 2005) (Bacchi, 1999) This view that abortion is wrong, and should be avoided, has subsequent affects on how women experience an abortion. A woman in Kero's study asked: "Am I inhuman to only have felt relief after the abortion?" I conducted two in-depth interviews, and several short interviews/discussions with women. One woman I interviewed felt that the staff wanted to punish her. She also told me that she felt questioned and stigmatised by the doctor about having an abortion. This led to a situation where she didn't dare to tell that the doctor that it was her second abortion. A nurse I spoke to told me about a woman who were having her third abortion at the hospital. When the woman was sedated during the abortion procedure, the staff, glued a condom on her stomach, to punish her, in their view, unacceptable behaviour!



Figure 2: The double norms on abortion.

The women I interviewed expressed that they felt stigmatised by the doctor and other hospital staff. Women take well grounded decisions when having an abortion. (Kero, 2005) (Al  x, 2004) Still, abortion is seen as an anomaly, carried out by young, single, unemployed women, when de facto 40% of women having an abortion are over 30 years old, living in a relationship. Despite that, abortion is portrayed to be an emergency solution for certain "risk groups". (Kero, 2005)

RESULT AND DISCUSSION

The home abortion product was designed with the purpose of giving women full autonomy when having an abortion. The form is designed with a form direction that is not experienced as a threat. The interface is haptical, since the procedure position makes it difficult to use a visual interface. The interface form is inspired by the annual rings of a tree, which symbolises that it's an important decision in most women's lives. It was named Veto, to empower women's bodily rights. The technology is fictive and inspired by a feminist abortion method called menstrual extraction. It is originally a manual aspiration method that has been altered to a fictional high tech method to fit the design concept. It's an alternative to an aspiration abortion. There aren't enough resources in Sweden to provide early abortions for all women. (DN, 2007) This product would make it possible for women to be in charge of the whole procedure. Following the discussion on the wall, there was a great interest in discussing these issues. Some people greeted this product. "Cristine, I would have used it three times!" and "I wish this product existed now!". Statements that were critical on the design concept included: "It's not as easy as it seems, with all the white and designed. It makes me sad." There were also comments suggesting that "Not all women are happy with their abortions!" and someone

else replying with: "Not all women are happy with their children either." Abortion is still seen a controversial topic, especially when it's argued as an autonomous right, without intervention from the state or anyone else. Abortion is seen as a right with restrictions, which creates the double norms and

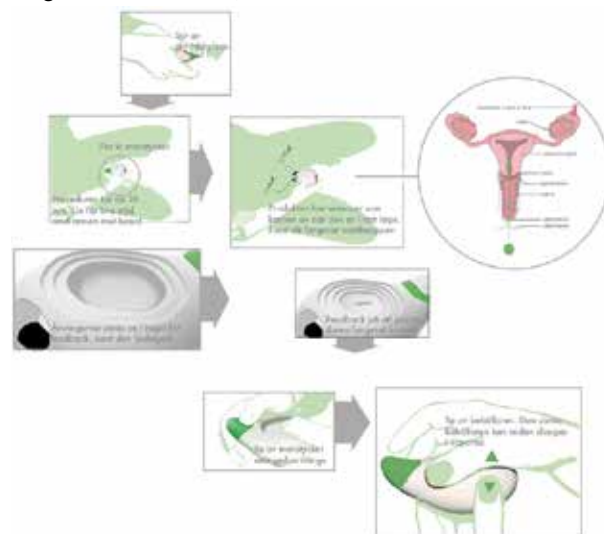


Figure 3: User-scenario.

the risk of putting guilt and shame on women. This was also debated on the wall, one person wrote: "Veto-what a great name! Women should have veto rights over their bodies. Women should have the right to have an abortion when, how and of what reason they choose."



Figure 4: VETO home abortion product in a side-view

The aim of the project was not just to design an alternative product solution, but also to problematise the double norms of the abortion discourse in Sweden. The strength of using an artifact as a discussion tool is that it's tangible. The interactive graffiti wall initiated a discussion on the topic outside of the mass-medial context. With Abort n Go, the design process started from a standpoint, and subsequently resulted in a discussion.

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TYPINGLOT

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ABSTRACT

TypingLot is an ongoing project about urban typography. Project consists of a collection of type photographs showcased online at <http://typinglot.com> and a software which allows its users to typeset by using the letters in this collection. There are more than thousand type photographs in the collection taken in urban environments mostly in the New York and New Jersey area. New Orleans, San Francisco, Helsinki, Istanbul, Ankara and Izmir are some other cities happen to be presented with a small number of types in this collection. TypingLot enrolls amateur type design in a serious manner, thus acknowledging that society's visual and material culture is not solely the product of professional design activity. Also, at an ideological level street is beautiful. What makes the typographic life on the street more beautiful than a designer or typographer's screen are the transformations of type due to material being used, or the texture, or mis-applications, implementations by the crafts man. More specifically about this project, slight bulges caused by the photographic distortions are also added to these imperfections.

ON TYPINGLOT

Typologic and photographic surveys in typography research are very common practices. In fact, often times in design research photography is used as an observation tool to define a problem rather than a

formal documentation or exploration. However in a field like typography which is often 2D and very compositional, photography can be a major tool not only for documentation but also formal investigations and categorizations. One can ask why represent something 2D on a 2D plane and the question would be quite legitimate if the discussion was about publication typography. In the case of TypingLot subject matter is urbanscape and the types documented are rarely on a reproducible surface. The only way to represent those types seems like photographing.

In the history of photography, especially in the U.S. there are inspiring works by William Eggleston, John Margolies and Lee Friedlander which displays types in the photographic medium. Eggleston's mature work is characterized by its ordinary subject-matter. As Eudora Welty noted in her introduction to *The Democratic Forest*, an Eggleston photograph might include "old tyres, Dr Pepper machines, discarded air-conditioners, vending machines, empty and dirty Coca-Cola bottles, torn posters, power poles and power wires, street barricades, one-way signs, detour signs, No Parking signs, parking meters and palm trees crowding the same curb." So, often times even if he did not mean to document solely type, he could not escape the appearance of type in his photographs. Similarly John Margolies' *Roadside America*, road side signs are a very important aspect of his Americana landscape. Still Margolies' focus is very suburban and too wide to isolate type. Urban scale is more reflected in Lee Friedlander's work which includes shop-window reflections, posters and signs, which tend to compress

spatial depth, however he is always very much more interested in the character and this is an overriding factor to recognize type in his work.

In the urban scale, it is hard to find a well rounded collection rather than scattered bits and pieces of photographs of certain types. However Paul Shaw's urban lettering walks which are day tours, dedicated to seeking out beautiful, odd and intriguing examples of lettering in the streetscapes of a single city are the example of this kind of an endeavor one of a kind. In his body of work the traces of his urban research is seen apparently. Also he documents types, color, kerning, texture, composition... almost all typographic concepts can be studied on his photographs. His research areas encompass a wide range of different materials such as gravestones to store signs, from urban way showers to commercial publications. Obviously his work is an important evidence to justify the efforts of TypingLot in the research realm.

TypingLot enrolls amateur type design in a serious manner, thus acknowledging that society's visual and material culture is not solely the product of professional design activity. Also, at an ideological level street is beautiful. What makes the typographic life on the street more beautiful than a designer or typographer's screen are the transformations of type due to material being used, or the texture, or mis-applications, implementations by the crafts man. More specifically about this project, slight bulges caused by the photographic distortions are also added to these imperfections.

TypingLot started in January 2012 on Instagram, a photo sharing platform for mobile media. Visual style of Instagram with its rigid square format and color correction filters which streamlines the light on various photographs implies a typologic depository. This was one of the inspirations for a typologic typographic

survey. In the case of general use of Instagram, the main purpose of this formatting should be about streamlining photographs sent from various different social contexts. However the use of Instagram did not have anything to do with social publicizing of these types which are shot on the streets but it was more about geographically tagging and instantly cropping them to a square format. In TypingLot the type is isolated so not only the context but also even not the kerning can be observed.

In the future, project may evolve into a more participative phase in which TypingLot may serve as a global tag for typophilies around the world and the collection can be opened to participation of masses. Metadata such as time, location , etc., that these digital photographs contain, would be the key strength of this database. Over the time, various other interfaces may be designed in terms of timeline or geographic distribution of the types to serve to typography researchers from all over the world.

NORDES 2013-EXHIBITION: ‘AN ARCHITECTURALLY BRICOLAGED NARRATIVE OF TRANSIT’

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ABSTRACT

Nordes2013-exhibition gives me the opportunity to present a part of my on-going PHD research. The research project ‘Wandering off in the urban: to move towards being moved’ is practice based, experimental and situated on the intersection of architecture and visual art. Through the production of multisensory impressions I wonder how we can set up a dialogue with that spatio-temporal entity, what we call ‘the environment’, that subjects us to an -all too often unnoticed- palimpsest of spheres. For Nordes2013-exhibition I will present part of an artistic/design communication-model that includes the communication of its reflections on: *how to deal in the perception of an urban environment with the silence in the audible, the invisible in the visible, the absence in the presence?*

DESCRIPTION

‘An Architecturally Bricolaged Narrative of Transit’ is a specific artistic/design communication-model developed for my research in order to test and communicate how we can experience, notice and discuss ‘absent aspects’ of the urban environment.

Since ‘the absent’ is not given ‘as such’ it is to be understood as a potential and hard to grasp process of ‘becoming’. This process of becoming is part of the fundamental architectural experience of traversing and moving, wandering through space. The natural pace of wandering allows to perceive the changes in the surroundings and to react upon them. Hence, *walking* in particular seems an appropriate way to study absent, sensory phenomena.

Therefore this communication model starts from a collection of responses (as drawing, notes, video and photo captures...) made while walking through the city of Charleroi (Belgium).

‘An Architecturally Bricolaged Narrative of Transit’ combines and mixes autobiographical, fictional and

documental perspectives on ‘the experience of transit by walking’ in order to bring multiple points of view together.

The model operates different media (i.e. drawing, writing, photo, video, sound, animation, modelling, video performances) and is a form of low-tech assembling and analogue-poetic thinking (see fig.1-2).

Above all the model is elaborated in order to bring more sensuous, tactile, ephemeral and imaginative aspects of the urban environment into account through dialogue with an audience.

For Nordes2013-exhibition I would like to optimize the model and present it in a research context. The model develops a concrete artistic/design event (see fig.3) in the form of video-performance of 20 minutes. During these 20 minutes I’ll invite the public to wander freely through four intertwined parts of my performance:

- **the textual part** is present by the visual projection of written text versus spoken words through speakers. This text is as a dialogue between myself and a critical alter-ego on ‘the experience of transit’ by walking through the urban (see fig.4);

- **the screened-performance** part consists of live made collages and drawings under a video camera. This performance is a visual improvised reaction on the textual part and the ‘here and now’ of the event. In other words this performance is exemplary for ‘acting on the spur of the moment’ which is a key element in responsive walking (see fig.5);

- **the video-fragment part** displayed on a small monitor will show a collection of images made during walks through Charleroi as a search to ‘the invisible in the visible’ (see fig.6);

- **the animation part** also displayed on a small monitor expresses a meta reflection on the communication model as a whole by a new set of drawings (see fig.7)

AFTER THE ACT

This bricolaged environment is based on 'spatial montage' (Huberman, 2010) as: a spatial and knowledgeable form of space. Developing a moving and walking mind-set (for the public) in this spatial montage aims to intensify the experience and consequently understanding of the environment. The public is challenged to enhance an architectural awareness of the possible transit(ions) of space and will be asked to express its impressions after the presentation.

My presentation considers a changed notion of 'experiment' in art and architecture. Experiment is understood as being above all relational. The experiment lies in the perpetual comparison between 'what is created' and what is 'the reflection (reaction) on the created', which the public can acknowledge and sustain during the dialogue after my presentation.

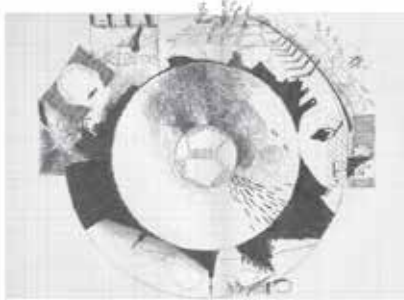


Figure 1



Figure 2



Figure 4: textual part

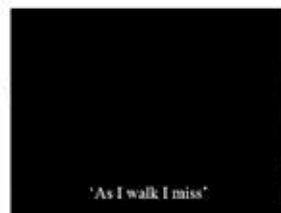


Figure 6: video fragment part

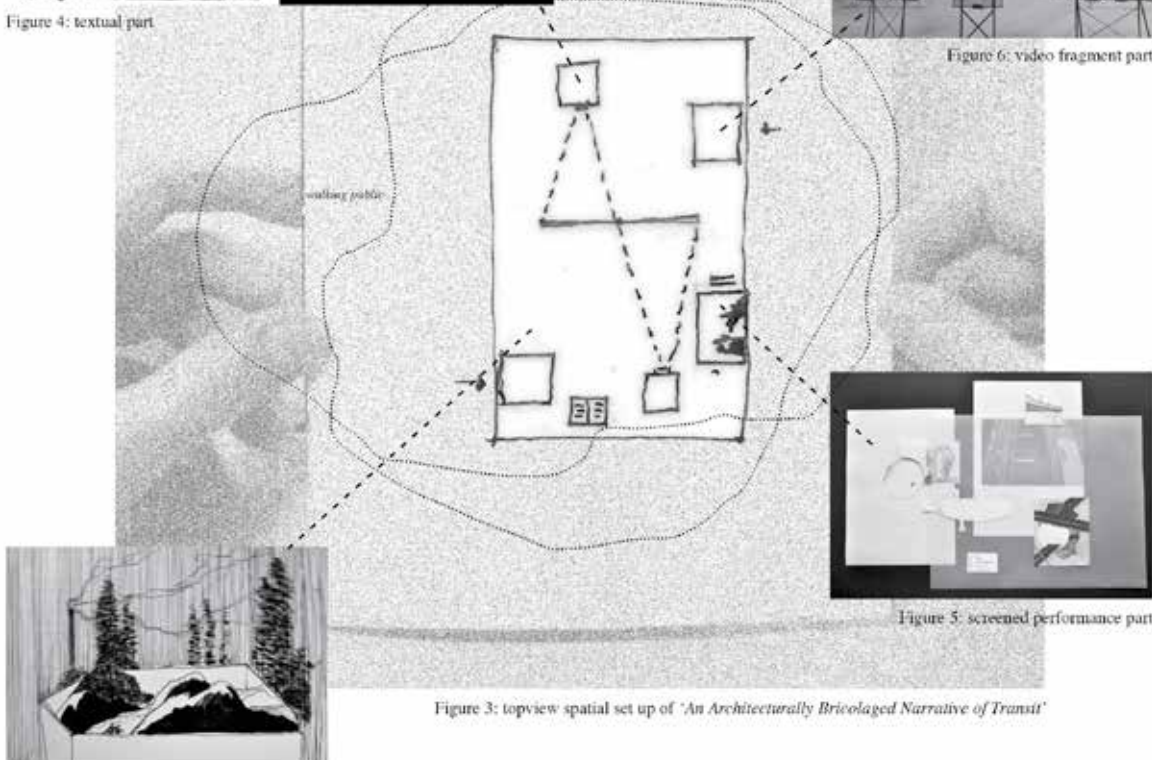


Figure 3: topview spatial set up of 'An Architecturally Bricolaged Narrative of Transit'



Figure 7: animation part



Figure 5: screened performance part

Huberman, D. 2010, 'Atlas. How to Carry the World on One's Back?', MNCARS, Madrid

ENERGY BABBLE

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ABSTRACT

Energy Babble is something like an internet radio appliance, designed for domestic and public spaces and dedicated to the topic of energy demand reduction. The devices are networked, drawing content from online sources and allowing responses using a built-in microphone.

DESCRIPTION

A batch of 30 devices will be installed at domestic and community sites around the UK for a number of months during the spring and summer 2013. Devices will also be installed in galleries and event spaces over shorter periods of time, Nordes 2013 will be the first opportunity to show the design outside of the UK.

Synthesised speech files are published from a server for immediate playback by the devices. These sound files are derived from texts from a range of sources, including twitter accounts and policy and activist news publishers. Speech files are also algorithmically generated by the system drawing on historic utterances, also triggered by energy events, and taken from user contributions via the devices' microphones.

The appliance is designed using mixed materials including glass and rapid prototyped plastic. Along with the speaker and microphone, each device includes a Raspberry Pi mini-computer and a WI-FI dongle for network connectivity. Embedded software enables user interaction, audio behaviour and network tasks, and is written in Python running under a Debian distribution of Linux.

BACKGROUND

Energy Babble is a design outcome of Energy and Co-Designing Communities, a research project based in the Interaction Research Studio at Goldsmiths, University of London. This three-year project is supported by Research Councils UK, whose energy communities call was a response to government support for groups undertaking energy demand reduction measures.

The project has followed a trajectory that includes initial fieldwork with communities in the UK, participant workshops, a cultural probe study, and a series of design workbooks. Finally, following a period of design and

development, the devices will be given to the initial fieldwork subjects and others, for a period of further investigation focusing on the deployment of the platform.

The Nordes exhibition is seen as an opportunity not only to show and discuss the final device, but to show material relating to those phases of development described briefly above. We welcome a conversation with curators about how to shape a format that is sympathetic to other exhibitors, and which helps establish the theme of the event.



Figure 1: Render of the Energy Babble appliance

SUPPORTING DOCUMENTATION

There follows a series of images from the research archive, to provide indicative material related to project phases, which would support the exhibition of the physical device.



Figure 2: Initial fieldwork, a farm in south east England

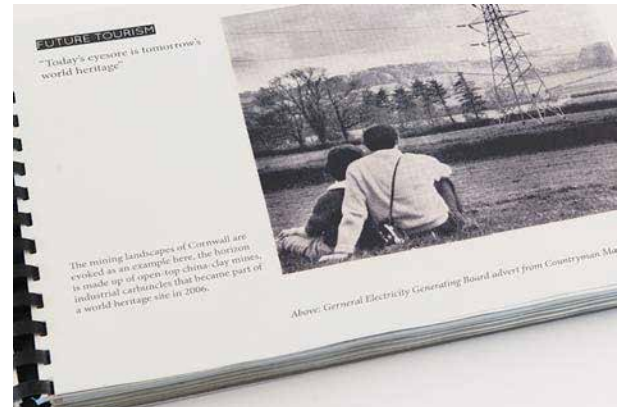


Figure 5: Workbook were used to document design proposals



Figure 3: Participants map imaginary communities at a workshop



Figure 6: A set of prototype devices to test the technology platform



Figure 4: Pack for probe study around energy practices



Figure 7: Series of design tests for the case of the appliance

VIGOUR: SMART TEXTILE SERVICES TO SUPPORT REHABILITATION

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ABSTRACT

“Vigour” is a garment that shows the possibilities of smart textile services for geriatric rehabilitation exercises. It is the result of a collaborative design process between a design researcher, three therapists, an eldercare manager, a textile developer and an embedded systems designer. Vigour embodies the knowledge that was accumulated during the collaborative design process. We contribute to the theme of experimentation in design research by showing the value of experimentation in a participatory setting through the iterations leading to the final garment. Further, we will briefly describe three of the steps that lead to the final prototype.

INTRODUCTION

Ageing of the population is one of the challenges that our society in Europe is facing. One of the strategies to transform this into a more positive outlook is described as active ageing, which aims to increase “opportunities for health, participation and security to enhance the quality of life of aging people” (World Health Organization (WHO) 2002). The design of new services is one of the main means to support this transformation, since they can support the emergence of a more collaborative, sustainable and creative society and economy (Sangiorgi 2010). Framed within this context we focus on services related to smart textiles: the integration of technology, such as computing, sensors and actuators in the textile itself. As the field of smart textiles is maturing, non-technological challenges related to societal and commercial adoption are becoming increasingly important to focus on (Schwarz et al. 2010).

For the combination of smart textile services and the ageing population, McCann, et al. (2011) describe the importance of a shared language, derived through the development of prototypes created in a collaborative design processes with important stakeholders (end-users, industry and designers). Within this paper we will focus on the experimentations to come to these prototypes in a collaborative design process.

Within the Smart Textile Services project of the Dutch Creative Industry Scientific Program (CRISP) we are investigating how to design and develop smart textile services, collaboratively with small and medium enterprises from Dutch textile and technology industries, service partners, creative hubs and universities (ten Bhömer et al. 2012). We emphasize the active role of all these stakeholders in the process. For example, the design researcher takes an entrepreneurial role to drive the design process forward. Our prototype ‘Vigour’ is a garment that can be used by therapists in rehabilitation exercises. What we find valuable for the theme of this conference is the notion that this result was achieved through a series of experiments. In every step (Figure 1) the physical prototype plays an important role to specify the design, open-up the process for involvement of the participants and provides a platform for the discussion.

DESIGNING REHABILITATION SERVICES

Within the field of geriatric rehabilitation it is known that physical training can help people from older age groups with Alzheimer’s disease to show less physical limitations and better motoric skills (Neeper et al. 1995). Besides these measurable improvements, regular exercises also contribute to the subjective health experience: strength is maintained and balance improved, for example the ability to walk or the ability to get into or out from a chair. Physical rehabilitation and exercises are included in the services offered by most eldercare organizations. To be able to design for this particular context a group of three therapists who are specialized in treating people of older age with Alzheimer’s disease, worked together with a design researcher to explore the possibilities of smart textiles to further extend their rehabilitation services.



a) Measuring pressure, feedback with audio b) Measuring stretch & touch, different yarns c) Canvas to determine sensor locations

Figure 1: Different experiments created during the design process

Before explaining the final garment we will briefly introduce three of the experiments that were created in this collaborative process. The first experiment was a piece of fabric with pressure sensors that controlled a mobile phone application playing music samples (Figure 1a). In reaction to this experiment, the therapists organized a day where the design researcher was invited to observe their practice to understand the context better. In a second iteration, the design researcher showed several explorations that contained stretch and touch sensor combinations of different fabrics and yarns, and vibrating elements that can be placed on the body (Figure 1b). Based on these samples it was decided that the service experience of the rehabilitation process could be improved by designing a complete garment that can be worn during the exercises but also in daily life. In a next experiment the locations on the body to measure movements and other improvements (for example an opening on the back to help the caretakers to put on the garment quicker) were marked on a white shirt (Figure 1c).



Figure 2: Prototype of Vigour with the sensor surfaces (in grey)

VIGOUR: A REHABILITATION EXPERIMENT

Vigour is a garment that can be used during physical rehabilitation exercises of elderly. The goal of the garment is to help the therapist to improve the rehabilitation service by keeping the exercises challenging for every different client. On the other hand it aims to help the therapist and other caretakers to lower the workload, monitor physical activity and to make it easier to view the progress of their clients. It is configured with sensor areas on specific parts of the body that can be used to measure movement of the arms and lower back (shown in Figure 2). The fabric with the sensor areas was developed and knitted in collaboration

with a textile developer in the TextielMuseum TextielLab. Based on feedback from the therapists and the earlier experiments the garment was combined with sound feedback. Feedback is given to the wearer with piano sounds from an external computer. The further a particular sensor is stretched, the higher the pitch of the piano. The sensitivity of the sensors and the activation of each sensor surface can be wirelessly controlled using an interface displayed on a laptop (shown in Figure 3). To provide input for a next design experiment the interface includes text-fields that make it possible for the therapists to log their usage of the prototype.

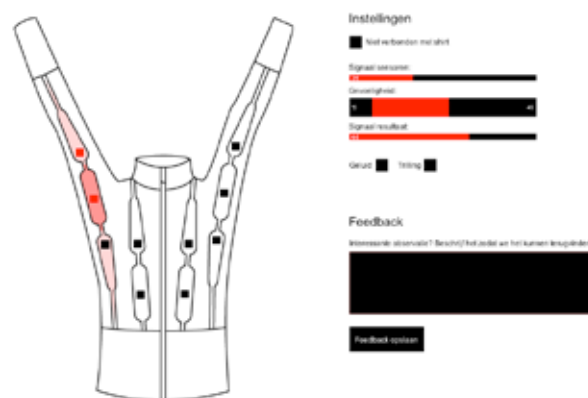


Figure 3: Interface of the application to configure the sensors

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TIME EXPERIMENTS - DESIGNING FOR REFLECTION

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ABSTRACT

By researching through designing the *Supertid* project investigates – in visual and tactile form – the acceleration of Western societies as well as the ephemerality and experience of time. The *Supertid* exhibition installation is a ‘cabinet of curiosity’; displaying various design experiments and a publication - created to render time experientially available, and thus enable reflection and dialogue among the involved designers, researchers, and participants, in order to challenge the contemporary notion of time.

INTRODUCTION

Concurrently with the industrial revolution society in the western world foresaw that technological developments would lead to less work and more time. Instead, time has become one of the scarcest resources (Schjødt 2002). The Western civilization is working overtime - martyred by a nagging feeling of always being behind, and have now reached a point where ASAP isn't fast enough in the digital and mobile world (Grønberg 2012:28). There's status in the fully booked calendar - but flirting with the high pace comes at a price: According to the OECD and WHO, 70% of all diseases in the Western world in 2020 will be related to stress (OECD 2012). This complex set of experiential, philosophical, and societal paradoxes is what we loosely define as ‘the problem of time’.

THE 'SUPERTID' PROJECT

Supertid addresses this problem of time. It is the master thesis project made by the interdisciplinary design duo Baudó & Henning at The Royal Danish Academy of Fine Arts - School of Design (2012). *Supertid* is a Danish expression associated with professional sports,

which means *super time* and refers to the competition of being the fastest. Through interviews with five people (aged from 43 to 83) revolving around their different perceptions of time and decisions of living with time in unusual ways, the project has resulted in a number of visual and tactile studies, all collected in a publication entitled *Supertid*. Parts of the visual and tactile studies of the project as well as the project publication have been exhibited at the Academy's Graduation Show summer 2012.

MAKING TIME BE REDISCOVERED

Time is indeed a very complex and faceted phenomenon, and researching time demanded an equally complex design approach. Treating time as a ‘wicked problem’ (Buchanan 1995), we have worked with an iterative and explorative process, following the approach of ‘design research through practice’ (Koskinen et al 2011; Zimmerman et al 2010), where researching and designing are not separate but works in parallel. Throughout the project we have conducted several experiments in various materials, seeking to make time more experientially accessible and raise discussion by exploring what time would look, feel and smell like if it was more concretely manifested. We will now shortly describe three.

THREE EXPERIMENTS

The nature of time is abstract and difficult to grasp, but the instruments used to measure it, like a clock, are even more so distancing time from an intuitive and personal comprehension. We often attribute ‘time’ features of living organisms, such as ‘time flies’, ‘killing time’ etc. To try and capture this ‘living’ quality of time, we conducted an experiment with ice.

Eight blocks of ice in different colours were arranged to melt on a white piece of paper. The process of the melting ice was put on display, and the development of the colours blending together, made visual patterns and structures on the paper. As a spectator exclaimed: “You get enticed to watch the melting ice cubes, and forget time while they leave traces on the paper” In this way

the ice turns out to be an alternative clock, estranging the way we normally keep track of time, pointing at how relative and subjective the experience of time actually is. Being absorbed in the process of the slowly melting ice, could annul, if only for a short while, what Max Weber calls the Zweckrational, and make the onlooker wonder if drifts and detours are in fact beneficial?

The 'fruit keeping experiment' is a careful documentation of the development of natural decay in fruits and vegetables: photographing the colours, the structures and patterns. The natural decay was also manipulated and attempted delayed by encapsulating the fruit in fluid latex and lacquer, which surprisingly ended up reinforcing the moulding process, making it even more expressive. The reactions from the spectators of the fruit keeping experiment were quite strong – and that of both fascination and repulsion: "When you leave the fruits be, you conjure something beautiful within the disgusting". The aged and wrinkled fruits delight in the sense of displaying attractive colours and complex surfaces – and disgust by showing decomposition and rot. Displaying the decaying fruit shows the sensuous and poetic features in aging, and it becomes a sort of vanitas. It illustrates and concretize the passing of time, pointing out that deterioration and mortality are inevitable basic conditions.

Based on the idea of Western calendars, a third strand of experiments tried to visualize time, an indeterminate and abstract dimension of existence, in a schematic form; e.g. an alternative week calendar. A spectator commented: "I would love for my calendar to look like that. I never use my 'normal' calendar, it's too conservative". The recognisability of the diagram suggests a logical usage, but it's actual lack of logic and level of abstraction creates another function: To make us reflect upon our normal way of managing our time. The nonsensical diagram proposes if it is possible to manage time, in a less limiting manner? It thereby functions as a critique of the controlling role time plays in our lives, and allows the absurdity of our current time management to stand out.

THE 'SUPERTID' EXHIBITION

Both the publication and the exhibitions format is inspired by the 'cabinets of curiosity' that were popular during the European Renaissance, with their collection of strange objects that leaves the viewers to wonder or to be provoked (McDougal 2008). These responses are also what we wish to trigger in the spectator. Athony Dunne and Fiona Raby advocates a complicated pleasure: "[...] in order for conceptual design to be effective, it must provide pleasure" (2001:63), and we've strived to make the 'time experiences' both provocative and enjoyable through humor, insight and surprise. Hence a mixture of a naïve, tactile and colorful expression with a more crude intention behind it, has been inherent in most of our experiments.

TOOLS FOR REFLECTION

Our method of exploration is also highly influenced by a sensitive approach to design, where intuition, design experience, and emotions play an equally important role as analytical reasoning (Koskinen et al 2011:43), and the sensitive approach serves as a way of communicating the very fine nuances in the topic of time and invite to reflection, as well as to set the project apart from the rational way we normally talk, think, deal with time.

"It's a very challenging project - you need time to reflect on the subject and the thoughts behind it" says a spectator. The visual and tactile experiments present a way of trying to grasp time, not rationally, but aesthetically and poetically through sensibility and sensuousness. It is constructive design research, that shows us something about the integration of design and research, because the creation of a product, system, space or media are the key means in constructing new knowledge (Koskinen et al 2011:2). Designing becomes a tool for knowledge production and reflection, by estranging, fascinating and giving access to rediscover the familiar. It is research that creates an interstice, a room for new possibilities and asks 'what if'.

CONCLUSION

Leaving fruit to decay may seem strange. To represent hours in a day with yellow ink dots may seem naïve, and waiting for ice to melt may seem a waste of time. But it is this lack of conventional reason that can create an interstice allowing us to rediscover how we live with time. In contrast to conventional design products, these artefacts do not have any immediate functional use. The project is a continual explorative and reflective design process, where the experiments serves as a catalyst for delving deeper into the matter and posing new questions, rather than a mission of solving the problem of time.

ACKNOWLEDGEMENTS

Thanks to our excellent supervisors; Joachim Halse, Else Kallesøe and Thomas Pålsson.

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FUNGUTOPIA

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ABSTRACT

The Project FUNGUTOPIA is a design | research in process. It explores the living material of fungal mycelium to grow designs, in a way that is situated in a participatory community process. It is inspired by the concept of the three ecologies by Félix Guattari, what means that it tries to combine actions that address a mental, social and natural idea of ecology.

The project is experimenting with modes of working with living, growing materials and the aesthetics they create. It tries to establish a practical understanding how design can change when we think in lifecycles of creation, use and decay. It explores the potential of “design in process”: The hypothesis is, that the properties of the growing, transient material of fungal mycelium could serve as role-model for a design in process, as a permeable design term, in which the material as well as the user are taken serious as agencies.

FUNGUTOPIA is the design of a social and ecological utopia based on urban mushroom cultivation. As a community-experiment it educates and involves people in the cultivation of mushrooms and on different stages of the fungal-design-process. Communicating the many possible applications of fungis to solve man-made, urban problems, FUNGUTOPIA works with the idea of

an utopia as a motor for real change.

DESCRIPTION

THE THREE ECOLOGIES

“It seems essential to me that we organize new micro-political and micro-social practices, new solidarities, a new gentleness, while at the same time applying new aesthetic and analytical practices to the formations of the unconscious. If social and political practices are to be set back on their feet, we need to work for humanity, rather than simply for a permanent re-equilibration of the capitalist semiotic universe.” (Guattari, 1989)

In his book “The three ecologies” Félix Guattari explores the term of ecology (Guattari, 2008). He explains, that the notion of an ecology understood as pure nature is quite short-sighted and that we should indeed think of a mental, social and surrounding/natural ecology, that is completely entangled. Following this thought one can not hope to solve any ecological problem without taking all three ecologies into account. Guattari is also quite convinced, that the arts are one of the few fields that are able to think and act in a way that is dealing transversal with the contemporary ecological crisis.

THE PROJECT DEVELOPMENT

The project Fungutopia was started as a master thesis in 2011 with the idea of undertaking several “experiments in world-making”. These Experiments should all try to work with the idea of the three ecologies, emphasizing in each experiment one of the three. In the end, it turned out, that the topic of mushrooms as growing material, as remediator, as food and medicine was strong enough to be used as a “boundary object”, addressing all three terms of ecology.

The research and the experiments took different stages, from a fictional scenario, to prototype-building, experimental installations, workshops and a community project.

EXHIBITS AT NORDES

At NORDES13, the exhibits of FUNGUTOPIA will focus on the prototype for a MUSHroom Growing Kit that allows to grow mycelium forms at home and on a

documentation of the community process. It will further explore the adaption of Guattari's Three Ecologies in the field of ecological design and the discussion of "design in process".



Figure 1: Mushroom Research Centre Ruhr, 2010

MUSHROOM GROWING KIT

The MUSHroom is a prototype for an open source growing kit for mushrooms. It was the first experiment, that was undertaken in the frame of the world-making experiments, searching possible answers for the question posed by Guattari: "How can we use technology in a way that is supporting our most urgent ecological problems?"

By building a mushroom growing kit using mostly fablab equipment and open source hardware, an indoor greenhouse for the special needs of mushroom cultivation was created. The kit serves to control humidity and temperature for different kinds of mushrooms and allows the cultivation of rare species at home for fresh digestion. It also creates an aesthetic object that undermines the positive potential of mushrooms, displaying how they are grown today with the help of specialized laboratories and works against the notion of mushrooms as being something somehow awkward, growing only in dark, moldy cellars.

The MUSHroom Growing Kit is also a device for growing fungal mycelium in forms. In this sense it is like a 3D-Printer, for "Grow-It-Yourself-Design".



Figure 2: MUSHroom, 2011-2012

FUNGUTOPIA STATIONS & WORKSHOPS

The second step of the whole experiment was to involve the public, designers and other interested groups in the process of mushroom cultivation. Different workshops took place since 2011, the first was offered during the DMY Festival in Berlin, a one month series of workshops in a social housing district in Düsseldorf followed, and in 2012 another Fungutopia Station was build for the PLAN12 Architecture-Festival in Cologne.



Figure 3: Fungutopia Station, DMY Berlin 2011

In these workshops, the participants are not only thought how to grow oystermushroom with simple kitchentools, but also how to let the mycelium grow in forms. Beside these practical techniques the potential of mushrooms as remediators, building material and medicine are discussed. The question how we could co-design with living materials as a broadened idea of ecological design, how to design processes rather than finished objects and how a design by many different agencies could be managed, is raised.

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LIGHT IS HISTORY

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ABSTRACT

Light is History is a collective energy consumption display artifact that was installed in a public square in Helsinki in November 2012. The lamps of the installation, made from old recycled electricity meters were designed to function as bright therapy lights. Sixteen participating families from in and around the Kallio neighbourhood published their daily energy use on a web portal. The difference in their daily energy reading was used to determine the brightness of individual lights that was assigned to each family on the light installation. Each of the lamps brightened if the corresponding family's energy use was lesser than the previous day and otherwise inverted. The participants also provided images and textual narratives of their own electrical artifacts from their homes and this was displayed with their corresponding lamp on the installation, providing a glimpse of contemporary domestic life with electricity. A shared and collaborative energy art space was generated as a place for urban dialogue of private energy use and public well-being.

INTRODUCTION

While the ever-increasing demand for electricity and energy in contemporary living generates a rising hum through news, research reports and policy calls in the public realm, its normalization in contemporary living continues silently. As design and art based measures, methods and modalities continue being employed to study energy use in contemporary living (Maze, 2008) (Peirce, 2008), here we present one such case of public engagement through an art installation that was carried out in Helsinki. Light is History, is part of an experimental design research practice that is engaged in studying domestic energy use by prototyping, building and deploying design objects that publish energy use in the real world contexts (Koskinen, 2011). Through such a methodology of material use publishing, the experimental research practice generates hypothetical inferences of matters concerning energy consumption, from the context of its engagement.

CO-CREATING A PUBLIC ENERGY ART PLACE

Light is History as a community based project engaged with sixteen families, living in apartments in around the Kallio neighborhood of Helsinki. The families were recruited by advertising on social networks, public events and also through the personal networks of researchers through the snow balling technique. The project brief asked the participating families to track their daily domestic energy use through their energy provider's web service (Sävel). Then they were asked to publish this information once a day to a secure portal through a web-based interface that was specially designed for the project. This procedure was carried out over a period of ten days in the last week of November 2012 and was used as the daily data set for the public art installation. The aim was to co-create an outdoor light installation as a public space, as an urban dialogue of private energy use and public well being.

A public square in central Helsinki, the Hakaniemi market place, adjacent to the Kallio neighbourhood was chosen as a site for the light installation. A simple wooden box made from recycled plywood carried lamps that simulated the light intensity of bright therapy light sources. The lamps were made of recycled old analog electricity meters. These were gathered from the trash yard at the metering company of the local energy provider, because of a region wide drive to switch to smart meters. Each of the lamps was fitted with LED lights to simulate the intensity of therapy lamps and suitably wired and controlled with an arduino micro controller inside the wooden box. The data gathered from the participants input was fed manually into the installation daily. The installation was programmed such that the difference in the participants' daily energy use was used to determine the brightness of the individual lights of the light installation. Thus if a family consumed less energy on a day than the previous, then their lamp would be brighter than the previous day, if otherwise it would go dull. This pattern was put into a loop of fifteen minutes over the period of two hours. The installation went live everyday for one full week in the evening from five o'clock till seven o'clock when the pedestrian movement in the square was considerable. Thus the light installation slowly breathed light in a loop, into the public space, some with the brightness of therapy lamps, sometimes not, with the gathered information of daily energy use from the private homes of sixteen families of the neighbourhood.

NARRATIVES THROUGH ELECTRICAL ARTIFACTS

The other element of the light installation was the exhibiting of the images and personal narratives of the participating families of their relationship with an electrical artifact they used in their homes. The participants also provided images of their own electrical artifacts from their homes and this was displayed on the installation corresponding to their lamps. In this fashion the identity of the participating families was anonymized but yet represented through the images and narratives of domestic electrical artifacts rather than through their names. The juxtaposing of the images and text with the lamps also provided an ideal form for engaging with the light installation. As passers by got curious of the installation, they got closer and when got interested with the text and the images and if they glanced and read the text, they also engaged with the simulated therapy lights. Thus the collective exhibit also provided small glimpses and portrayals of peoples' relationships with contemporary domestic electric artifacts.

CRITICAL REGIONAL ENERGY USE FEEDBACK

Light is History as a design intervention while being concerned with the matter of the publics also dealt with

the design of feedback of domestic energy use. In this case the form of energy use feedback through lamps integrates a regional issue into its design. By simulating bright therapy lamps made with LED lights in the Nordic winter context it brings forth the matters of region and presents it within the design of energy use feedback. Whether bright therapy lamps help seasonal affective disorder or not is left to popular debate of its use within the context. But with such a design object, the experimental design research practice of publishing energy use presents design modalities of energy feedback that are not uncritical of the issues of the regional context (Frampton, 1986).

OPEN DIALOGUE

Thus a shared and collaborative context was created as a public energy art space that gave a glimpse of our contemporary life with electricity and also resulting in an urban place that was open and powered by the people. The one-week transient project thus generated a collective public engagement that portrayed concerns of energy use, managing resources and well being as a place of public private dialogue.

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THE ANDRO CHAIR,

DESIGNING THE UNTHINKABLE- MEN'S RIGHT TO WOMEN'S EXPERIENCE IN GYNAECOLOGY.

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ABSTRACT

In this project we have explored how design may be used as a critical and creative tool for discussing how design is gendered in the contemporary gynaecology chair examination in Sweden. The aim of our design concept is to uncover the veiled gender norms in this problem area and discuss its consequences for women. Our method to do so includes swapping the gender context (Ehrnberger, et al. 2012), which is used to make visible the accepted hidden norms in this specific case. By doing so we wanted to explore if the same situation would be accepted if applied to men. We used the results of our conducted interviews together with related previous research (Wijma, 1998a&b), which reveals that the majority of women have traumatic experiences of the gynecology chair. The empirical findings was applied to our design concept, using the connotations of the existing gynaecology chair to design the male counterpart; the Andro Chair. The women we interviewed experienced the gynaecology chair as "cold", "hard", and even as "torture". We designed the Andro-Chair to communicate these experiences and not to solve a problem. The initial reactions on our design concept points towards a great potential in using design to uncover and discuss this particular problem, since the chair for men is not taken for granted and accepted through hidden norms like the gynaecology chair is for women.

INTRODUCTION

The Andro-Chair, is a design concept, that is used as a critical design tool aiming to uncover and discuss gender normative medical design, and how it prevents progress and innovation of the gynaecology chair. Gynaecology is a speciality in medicine, covering medical issues of the female reproductive system, and andrology is the male counterpart, dealing with diseases of the male reproductive system. (Wikipedia, 2012) Our design concept aims to portray a conceptual male equivalent to the contemporary gynecology chair. We wanted to explore what would happen if we design an andrology chair for men, inspired by women's traumatic experiences of an gynaecology examination, and if this could help to look beyond the contemporary normalisation of the gynaecology chair.

GENDER PERSPECTIVE

We have used a gender perspective as basis of our analysis. (Hirdman, 2003; Höjer&Åse,1996) Design plays a significant role in the reproduction of gender, which is well described and developed for example by Ehrnberger, Räsänen and Ilstedt (2012)

RELATED RESEARCH

Design as a critical tool may be approached in many ways. (Mazé, 2007; Redström, 2007 ; Dunne, 1999; Gislén, 2007) Ehrnberger, Räsänen and Ilstedt (2012) discuss the lack of critical design studies that deals with the underlying structures of gender in design. We agree upon that, and with this design concept and paper we aim to contribute to this field. Barbro Wijma has done research studies on power assymetric consultations in gynecology. (Wijma 1998a&b) Other researchers who

have investigated this topic include Mattsson (1993; Westhoff et. al.2011 and Hovellius, 1998). Mattsson's (1993) result show that women feel vulnerable and scared. Karin Johannisson, a historian, has done a research study of the idea-history in gynaecology. Her findings shows that gynaecology was historically based on a male power relation, where women was experimented on, as the "other" gender, as an anomaly. (Johannisson, 1994)



Fig. 1. Contemporary gynaecology chair, photographed at a hospital in Stockholm.

CRITICAL DESIGN CONCEPT - THE ANDRO-CHAIR.

The Andro-Chair was designed using the result of our conducted interviews (In-depth interviews with four women's experiences of the gynecology examination and a short survey with twenty women. Interviews with health care professionals in andrology, gynaecology and urology.). The empirical findings from the interviews were applied to the formgiving process. Women's description of the contemporary gynaecology chair as: "a violation", "cold and harsh", "unstable", "uncomfortable", "feeling vulnerable", "stainless steel", "torture" (Survey, 2012) were communicated through a steelbased construction of the Andro-Chair. (Fig.2) We wanted to let the negative emotional experiences of the women to determine the form. Inspired by a statement of a Midwife: "You should lay in a position, where you almost fall off the chair - that is the perfect position!" (2012), we designed a tipping function of the chair (the chair tips forward when you mount the chair), with a purpose to make the user feel vulnerable. The tipping function makes it easier for the doctor to exam the patient, but ignores the experience of the patient. The leg rests of the chair are designed to keep the patients legs wide apart both to support the examination made by the doctor, but also to design the exam experience to be more vulnerable and unpleasant for the

patient.



Fig. 2 The Andro-Chair.

The stomach position (Fig 3.) was chosen to make the patient feel more vulnerable, since the patient then can't see what is happening. This was inspired by the interviews where a woman expressed that it's a "Defenseless position"(Woman, 36 years, 2012). The Andro-Chair was designed to express something violating, humiliating, cold, and hard, with a purpose to create an awareness on how women and women's bodies are treated in gynaecology. We argue for the importance of making visible this problem area, before it's possible to implement alternatives. By designing an Andro Chair for men, we wanted to unveil that the gynegology chair examination has been accepted and normalised.



Fig. 3 The body position in the Andro-Chair.

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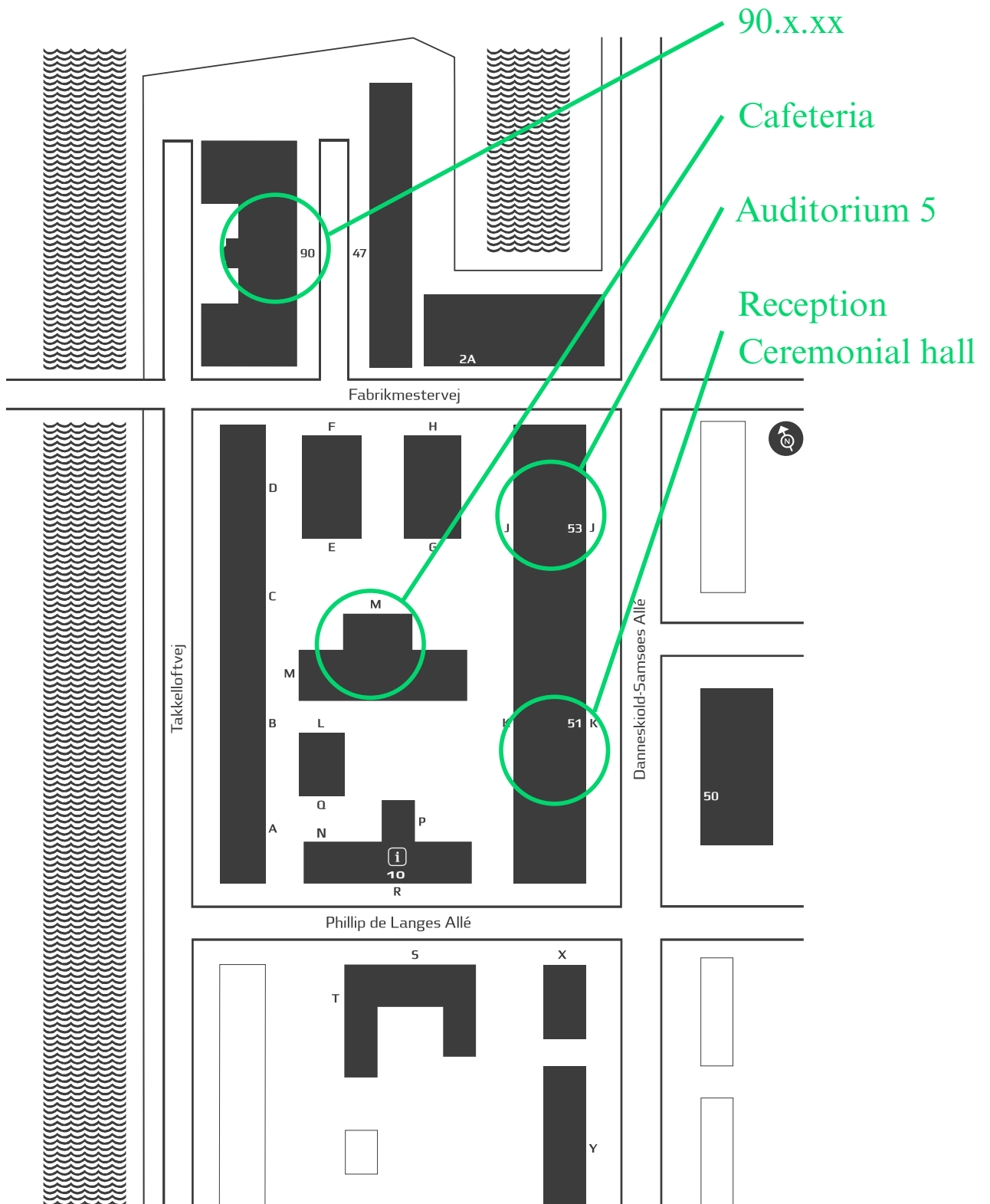
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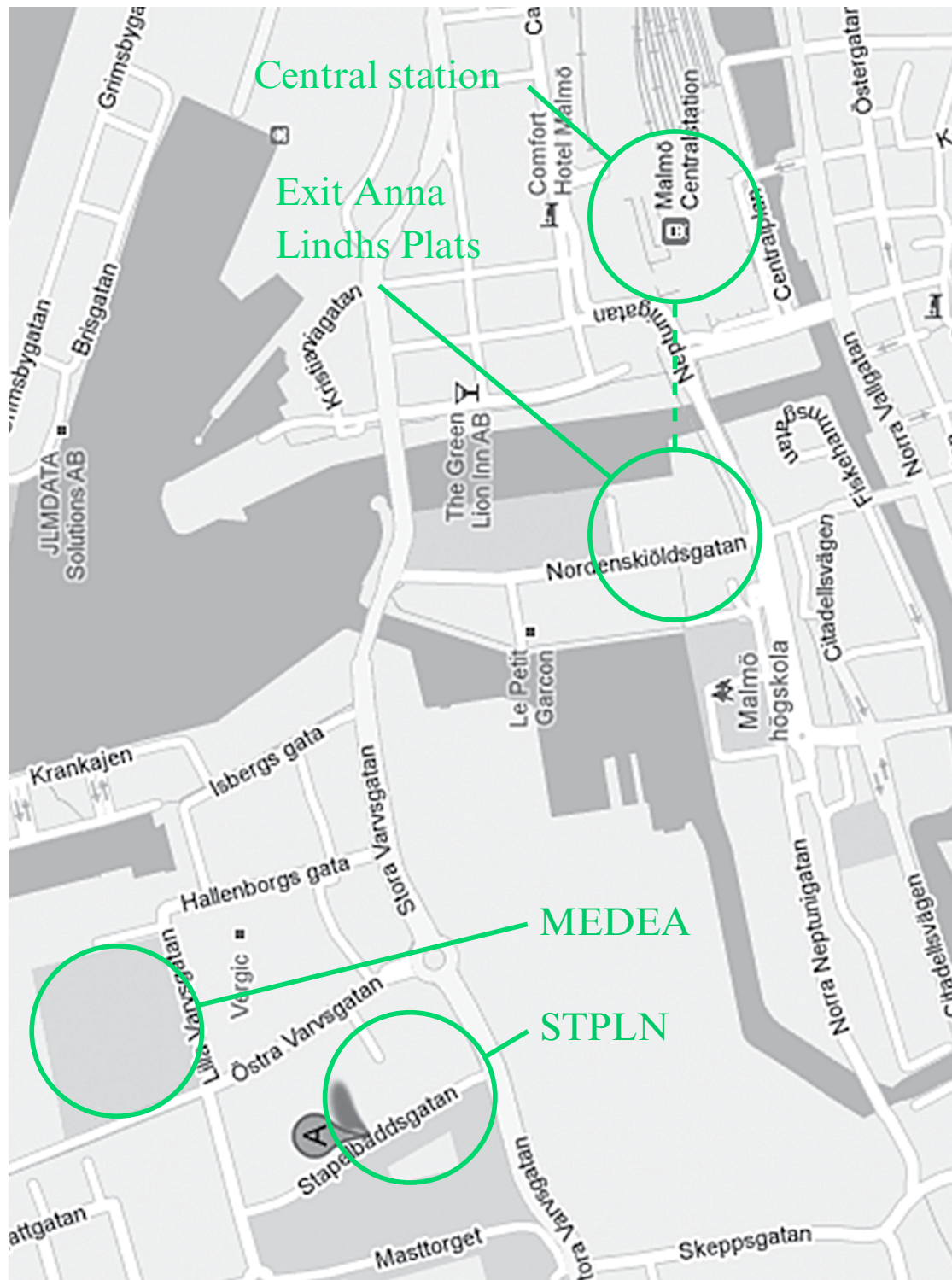
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