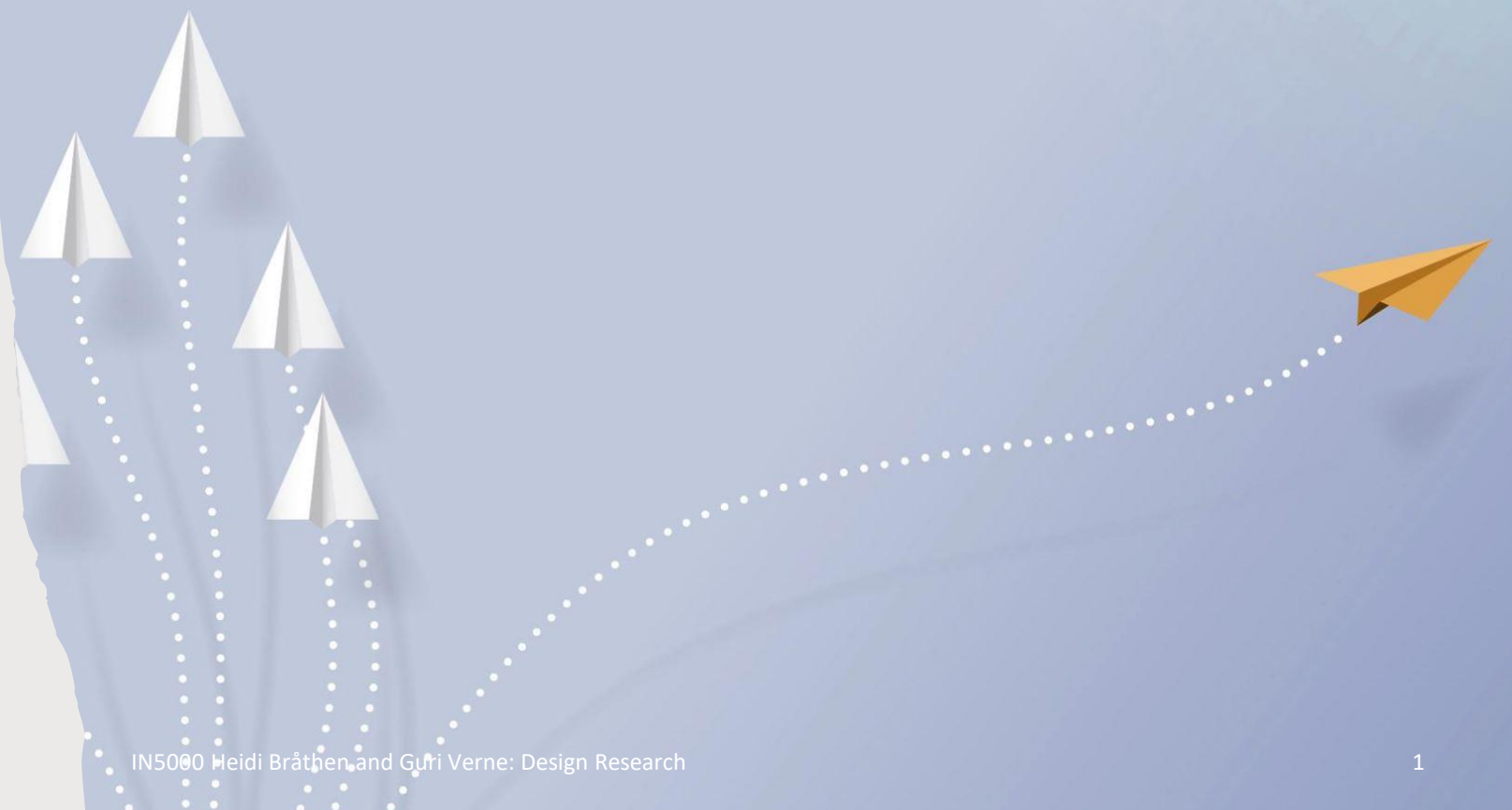


Research through what design?

Relationships between design and
research

03.04.2024

IN5000 Heidi Bråthen and Guri Verne: Design Research



Today:

Context:

Why talk about design research in this course? -Design research in HCI and at IFI

Defining terms:

What is design and what is research?

The prepositions of design research: on, for, through

Research through design

A road-map to interesting routes and practical tips

03.04.2024



Design Research in the Design Group and in HCI

Is it not all Design Research?

Design research has historically not been mainly about *practicing* design

HCI: Informatics + psychology + cognitive science

Design research is an area in HCI research

Design Studies journal 1970's: Research into design, not design practice

1990's: Research through Design

Design Research at Ifi and in the Design group

Focus

Qualitative methods and socio-technical systems

Example: Investigating effects of new technologies to users in context

Human-machine interaction research

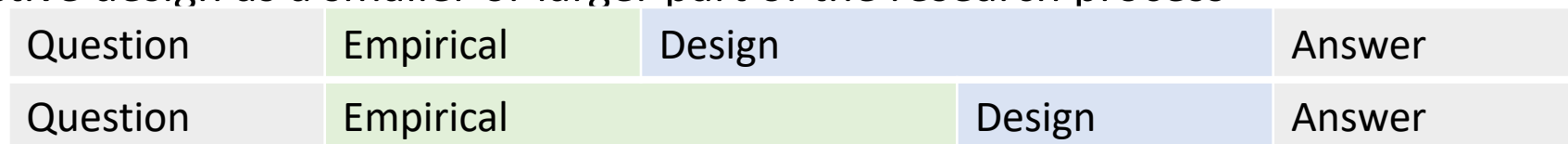
Use and users

Design research can be done in many ways

Research design practices

qualitative methods that are adapted by design researchers and common in design practice outside of the academy, like interviews, observations, “r”esearch to understand the problem

Constructive design as a smaller or larger part of the research process



Three common types of design research

Participatory Design

The end-users of technology should have a say in the development of the technology that will affect them. They should participate from their own position and interests.

User-centred design

Users and their experiences with technology should be the focus of design, not the technical specifications

Research through Design

Research through designing, research to formulate desired futures,

Quick definition of terms

The prepositions of design research: on, into, for, through

What is research and what is design?

The prepositions of design research

Frayling's framework	
Research into art and design:	Historical research, aesthetic and perceptual research, and research into theoretical perspectives on art and design (i.e., traditional art historical and critical-humanist approaches to art and design).
Research through art and design:	Materials research (i.e., “customising a piece of technology to do something no one had considered before”), and the explicit and detailed use of an art/design research diary.
Research for art and design: <i>through</i>	Research “where the end product is an artefact—where the thinking is [...] embodied in the artefact, where the goal is not primarily communicable knowledge in the sense of verbal communication.”
research with “r”	“Research with a minor “r” in the dictionary. The gathering of reference material rather than research proper.”



Frayling asks: why couldn't “r”research be Research?

What is Research?

“Research is about producing knowledge”

(Wearing Two Hats, Verne & Bratteteig, 2018, p. 90)

A collection of practices
for generating new
knowledge (and
understanding?)

Aim to continually
improve reliable and
universal knowledge
(theories)

A profession

What is design?

Constructive

- not primarily because we construct things
- but because we formulate desired futures

Aiming to produce and see the *particular*

A profession

Collection of practices

- that aim to reduce complexity
- work between parts and a whole

Conversations with situations (*Schön*)

Frayling on design and research 1993

A lot of common ground:

- Research is (secretly) creative

- Design and art have a cognitive tradition

- Can generate new knowledge and understanding

A lot of private ground:

- Research and design are not the same

- All art and design are not research

- Some design practices can be applied for research (and vice versa)

- Scepticism towards esoteric research practices

- Research does not produce design artefacts

- Design practice does not typically produce disseminations (but in art schools!)

Research

Design

Aim to produce universal knowledge (theories)
Produces disseminations
Descriptive, normative or constructive

Aim to produce and see the particular
Produces artefacts
Constructive, disruptive

Private ground

Common ground

Are professions and practices
(secretely) creative
Can produce knowledge and understanding
Have a cognitive tradition

Research through Design

Or Constructive design research or Practice-based design research

Definitions of RtD

Research through design is a research approach and practice where design practises applied as an inquiry methodology to generate new knowledge

(Zimmerman & Forlizzi, 2014), (Zimmerman, Stolterman, & Forlizzi, 2010) (Bardzell, Bardzell, & Koefoed Hansen, 2015), ((Zimmerman & Forlizzi, 2014) in (Bardzell et al., 2015)).

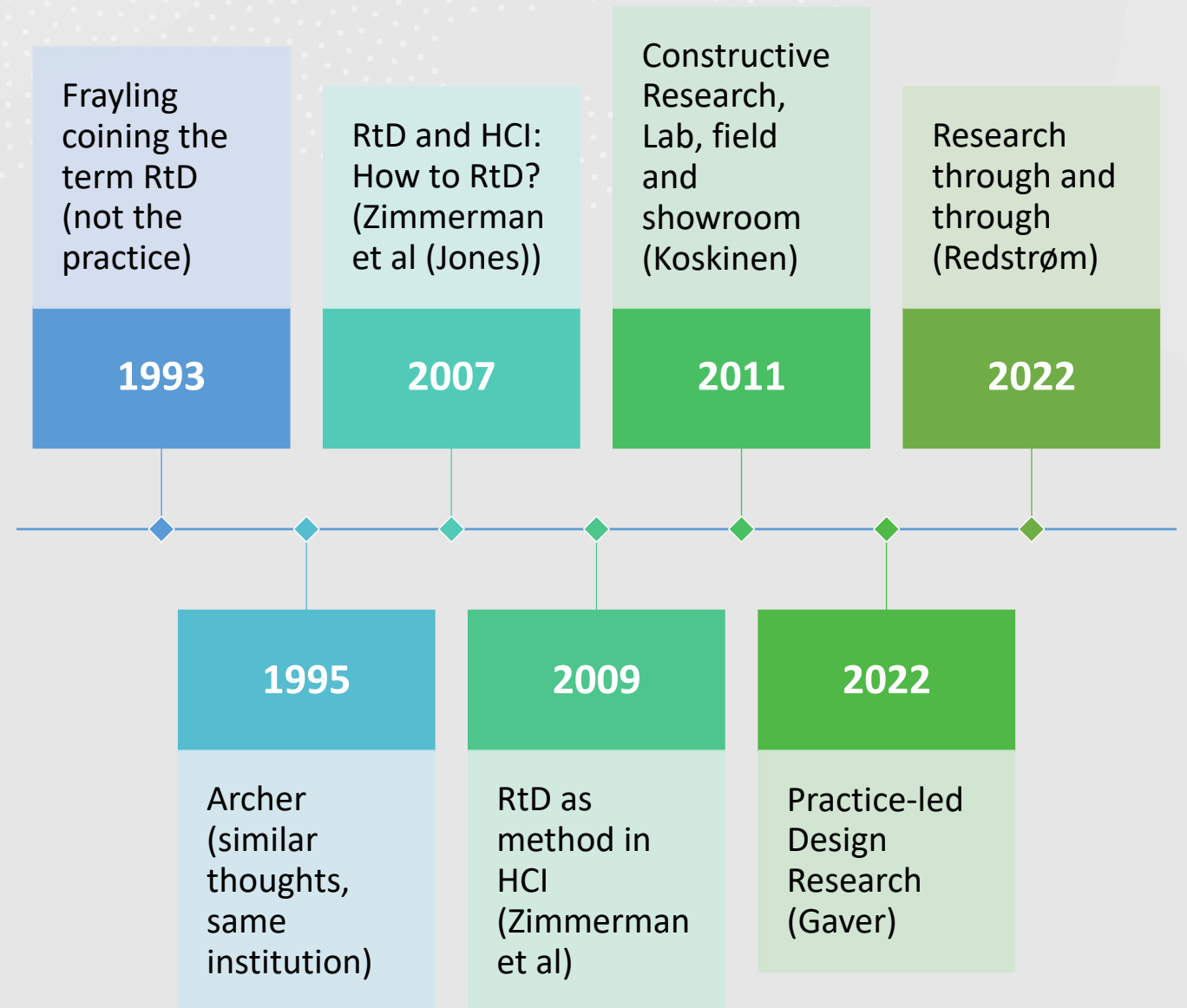
Design practices include design thinking, methods, processes, and products
(Bardzell et al., 2015) (Zimmerman & Forlizzi, 2014).

As a methodology, research through design aims to “improv(e) the world by making new things that disrupt, complicate, or transform the current state of the world”

((Zimmerman & Forlizzi, 2014) in (Bardzell et al., 2015))

Historical development of RtD

RtD in HCI 1993- 2023 roughts on RtD in HCI 1993-2023



Recognizing the development of design as research method prior to Fraylings talk

Rich Interaction from the Netherlands in the 1990's («lab»)

Psychology + design practice, phenomenology, perception

fully engage people's bodies and senses to richly express themselves

Wensveen, Frens, > Still doing RtD today in the Netherlands

Participatory Design («field»)

Scandinavia, Marxist philosophy, understanding work practices in the design of new systems. Interdisciplinary teams, designers, workers, technicians, from the 1960's and -70's>

developed Rapid prototyping techniques, The Maypole Project 1990's in Europe

Art and design («showroom»)

The Royal College of Art, England 1990's, part of a general shift in Design practice from finished artefacts to conceptual design.

Dunne and Raby Critical Design 2001.

Interaction Research, Studio at Goldsmiths University, The Prayer Companion

Koskinen
2011:
Three
areas of
RtD

Field: Fieldwork, **Sociology**,
Participation, User Centred design,
Anthropology

Lab: Controlled experiments,
hypotesis testing, cognitive science,
embodied, phenomenology

Showroom: critical theory, exhibition,
debate, humanities, critique,
speculation

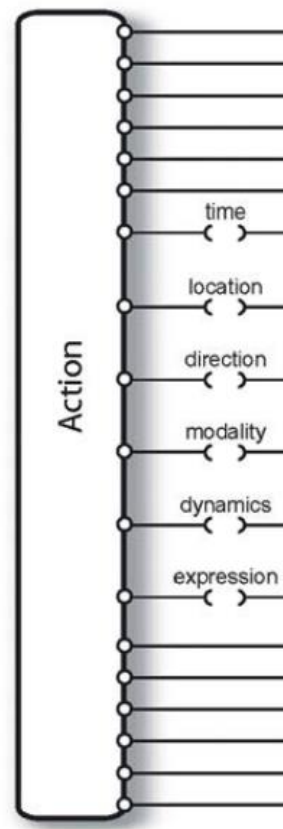
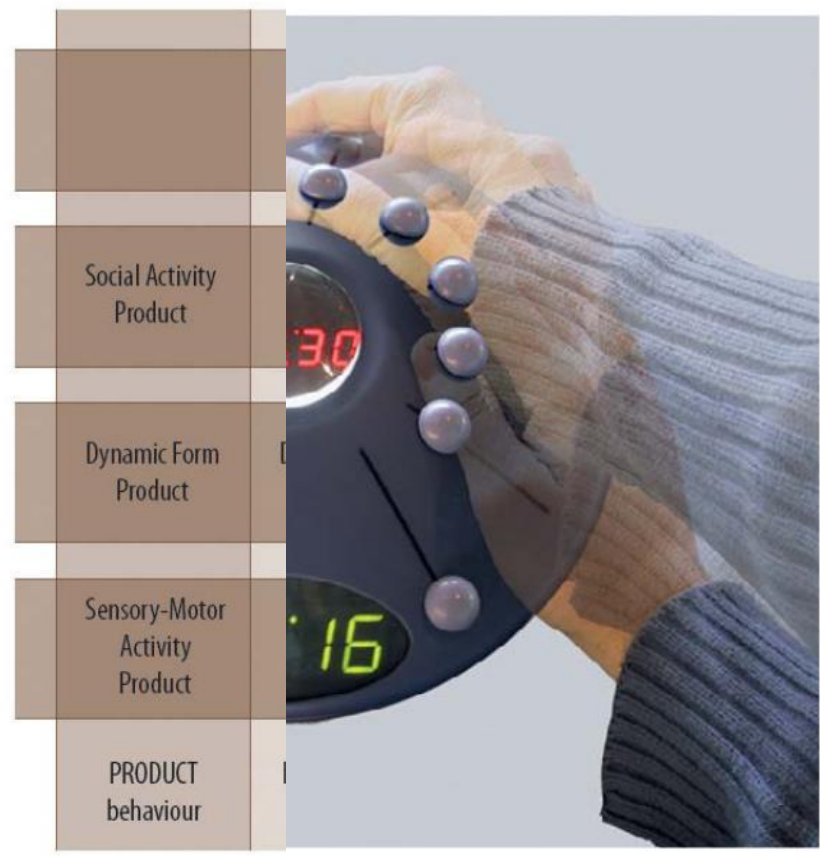


Figure 2. Two contributions of the research of Philip Ross (2008); the interactive light (left) and the research of Wensveen et al. (2002); the interaction, in this case targeted at the Person Value of 'social power' (left) and the Action (left) and the theoretical Interaction Framework (right).

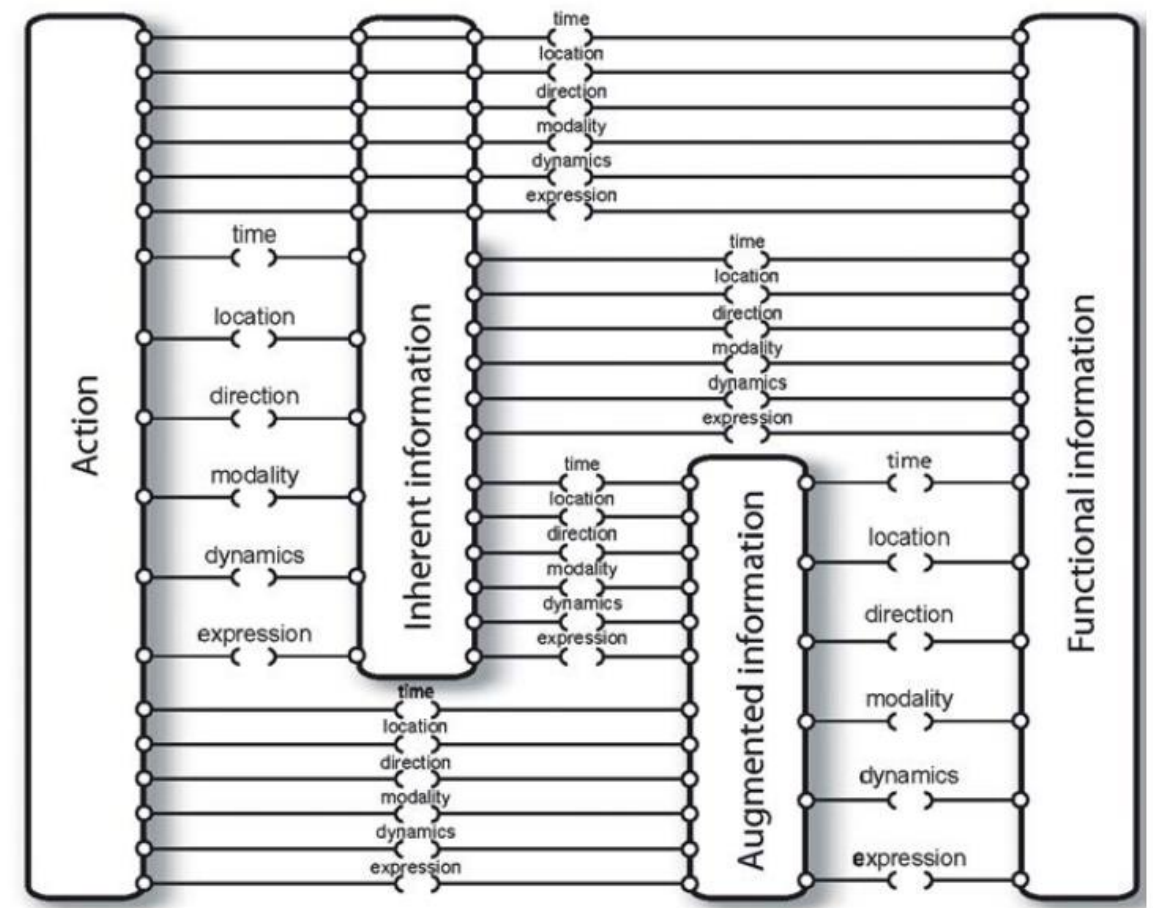


Figure 1. Two contributions of the research of Wensveen et al. (2002); the prototype of the alarm clock that allowed for freedom of interaction (left) and the theoretical Interaction Frogger Framework that resulted from the research (right).

[Wensveen, S. A. G. \(2018\).](#)

Constructive design research. Technische Universiteit Eindhoven.

Designing Menstrual Technologies with Adolescents

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Figure 1: The toolkit Menarche Bits supports embodied ideation of interaction design for menstrual experiences.

ABSTRACT

Starting to menstruate can restrict adolescents' movements due to physiological changes and societal stigma. We present a participatory soma design project advocating for young adolescents to listen to and care for their newly-menstruating bodies, specifically focusing on participation in sport. We designed Menarche Bits, an open-ended prototyping toolkit consisting of shape-changing

ACM Reference Format:

Marie Louise Juul Søndergaard, Marianela Ciolfi Felice, and Madeline Balaam. 2021. Designing Menstrual Technologies with Adolescents. In *CHI Conference on Human Factors in Computing Systems (CHI '21)*, May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA, 14 pages. <https://doi.org/10.1145/3411764.3445471>



Designing with Intimate Materials and Movements: Making “Menarche Bits”

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ABSTRACT

Menarche is the first occurrence of menstrual bleeding and it usually begins between the ages of 9–15. This makes menarche a crucial transition among other social, physiological and behavioural changes during puberty. In this soma-based research-through-design project we design an open-ended prototyping kit: Menarche Bits. The aim of Menarche Bits is to open a design space for young adolescents to create body-worn technologies that support them in making space for their experiences of menarche and trusting their menstruating bodies. Menarche Bits consists of heat elements and shape-changing actuators that can be worn directly on the body by adhering to the skin or being inserted into pockets in a stretchable fabric as part of a garment. We describe the soma design process behind Menarche Bits as an example of how body-worn technologies can intimately interact with the body and its movement, temporality and material changes.

Authors Keywords

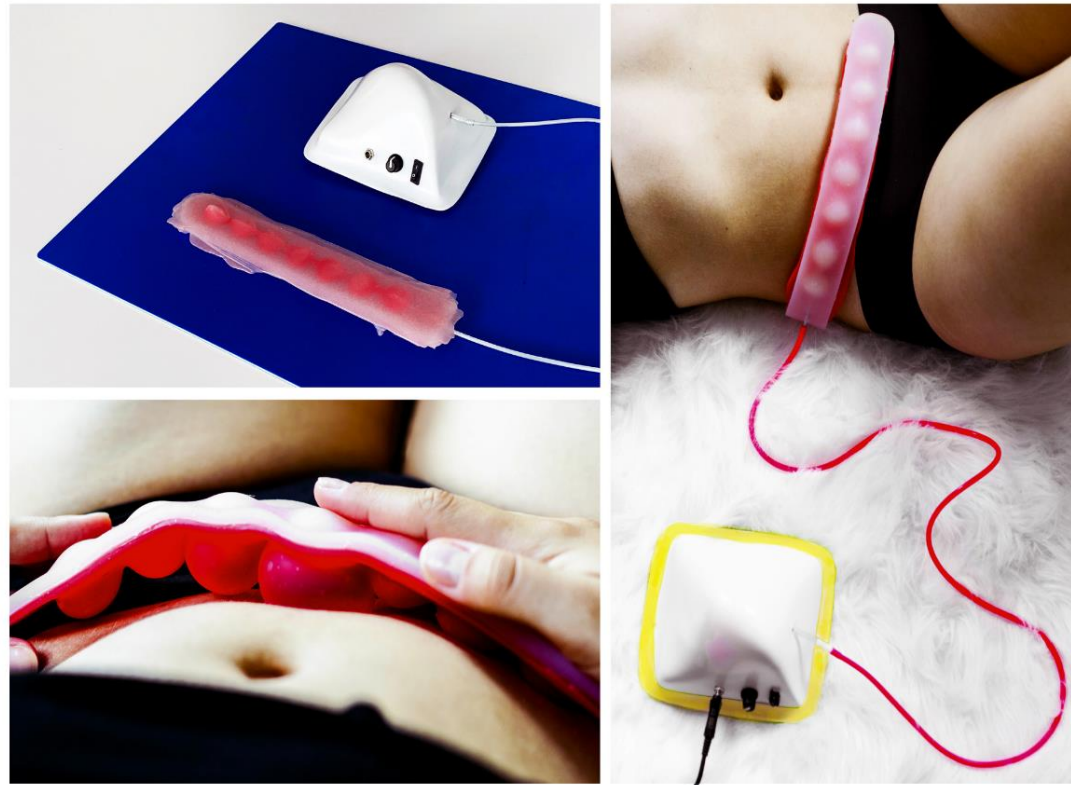
Women’s health; soma design; research through design; menarche; shape-changing technologies; soft robotics.

CSS Concepts

- Human-centered computing~Interaction Design

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DIS '20, July 6–10, 2020, Eindhoven, Netherlands
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<https://dl.acm.org/doi/pdf/10.1145/3357236.3395592>

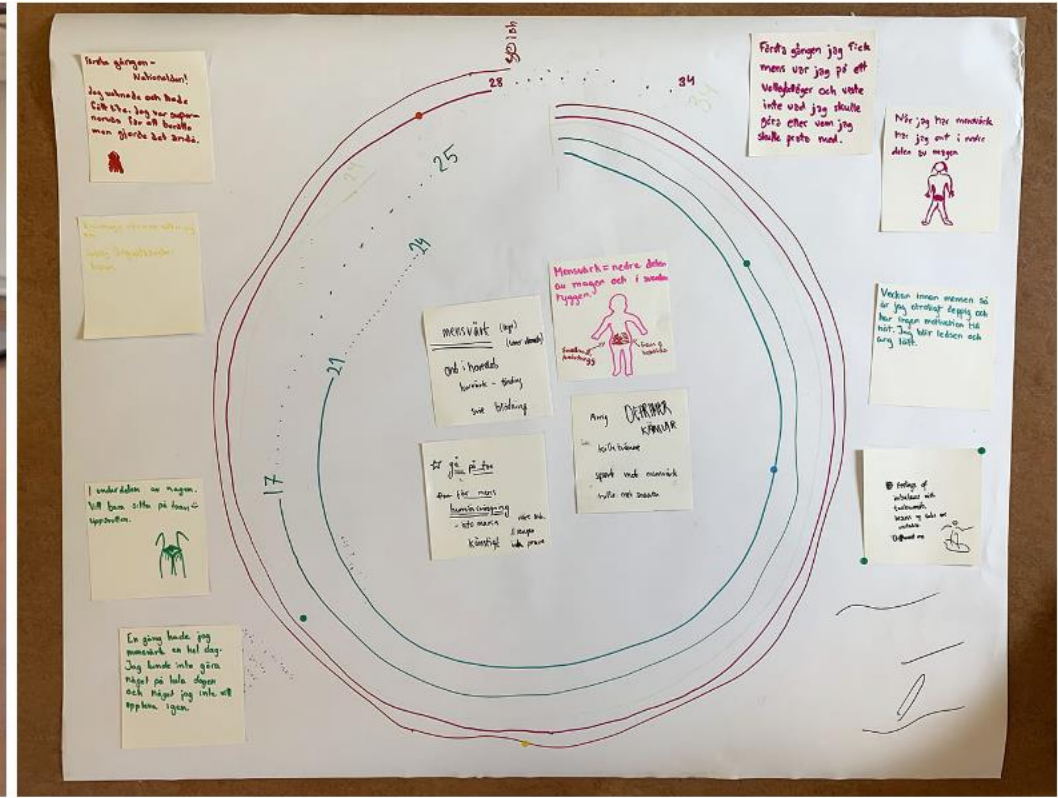


Figure 2: Participants drew their menstrual cycles and shared menstrual experiences (left), which were documented in a menstrual cycle "artwork" (right).

Showroom

examples



Technology Heirlooms? Considerations for Passing Down and Inheriting Digital Materials

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 wodom@cs.cmu.edu david.kirk@ncl.ac.uk

ABSTRACT

Material artifacts are passed down as a way of sustaining relationships and family history. However, new issues are emerging as families are increasingly left with the digital remains of their loved ones. We designed three devices to investigate how digital materials might be passed down, lived with and inherited in the future. We conducted in-home interviews with 8 families using the devices to provoke discussion about how technology might support (or complicate) their existing practices. Sessions revealed families desired to treat their archives in ways not fully supported by technology as well as potential tensions that could emerge. Findings are interpreted to detail design considerations for future work in this emerging space.



Figure 1. The three ‘technology heirloom’ devices: the Time-card (left), BackupBox (center), and the Digital Slide Viewer (right).

Research in the HCI community has illustrated a diverse range of ways people are drawing on digital objects to reflect on and reminisce about the past [e.g., 14]. Very recent work has described new complications that are emerging as

Technology Heirlooms? Considerations for Passing Down and Inheriting Digital Materials

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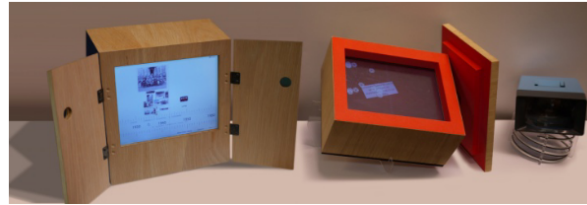


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Research in the HCI community has illustrated a diverse range of ways people are drawing on digital objects to reflect on and reminisce about the past [e.g., 14]. Very recent work has described new complications that are emerging as



Figure 3. From left to right: Children from F4 interact with historical metadata; The timeline UI view; Several families placed Timecard (closed up) on display with other things in the home.

[Odom, William & Banks, Richard & Kirk, David & Harper, Richard & Lindley, Siân & Sellen, Abigail. \(2012\). Technology Heirlooms? Considerations for Passing Down and Inheriting Digital Materials. Conference on Human Factors in Computing Systems - Proceedings. 10.1145/2207676.2207723.](#)

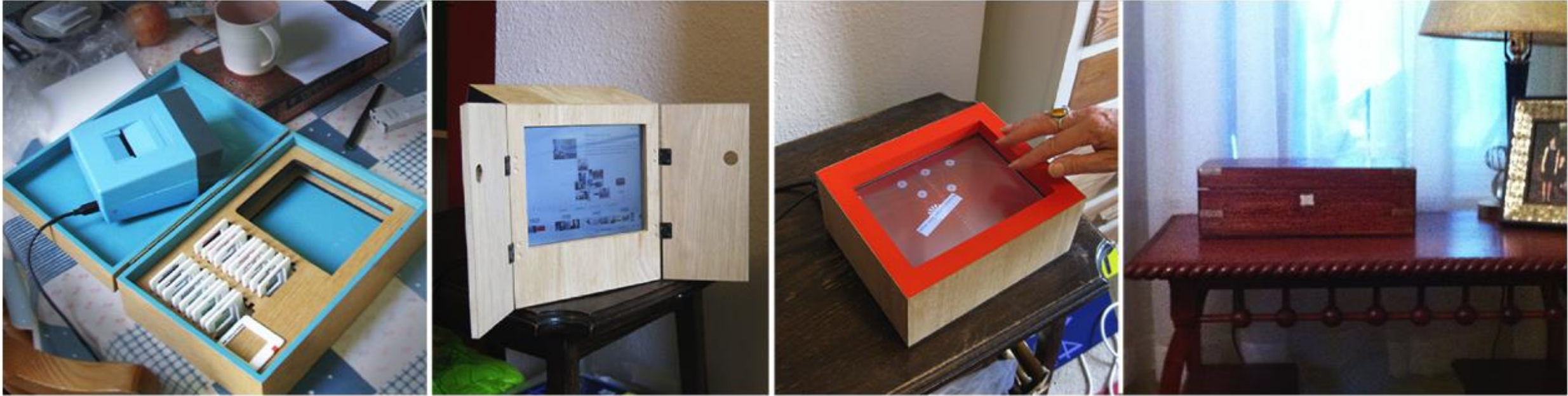


Figure 2. The Technology Heirlooms (from left to right): Digital Slide Viewer, Timecard, and Backup Box. The Photobox.

So how is design research different from design practice?

Engaging with a predefined problem area

Engaging in research community discourse (referencing, applying theoretical perspectives etc)

Aim to produce new knowledge?

Or aim to produce understanding?

Or aim to create the particular artefact?

Research through what?

What does the “through” refer to?

Research through design practices

A different cognitive tradition in art?

- That depends on the skilled practitioner
- Embodied and embedded knowledge

Research through making

Prototyping

The process of making

The result of making

Research through design judgements
(Redstrøm)

The elephant in the design space

Applied sciences into the academy

There was (is?) a hierarchy between theoretical and applied knowledge

The elephant in the room

Can applied knowledge generate new, extensible knowledge?



A third cognitive tradition in design?

- The skilled practitioner sees what others cannot
- Does not mean that the designer possess all knowledge and understanding in their body and does not need to research
- Rather, it means that they are uniquely positioned to do this kind of research, she sees what others do not see
- The success of the research through design process depends on their ability to articulate the knowledge/understanding

When to Research through Design

Three kinds of Research Questions in qualitative research (Kalleberg)

“The types of questions asked as well as the approach to answering them, has deep implications for what kind of knowledge we produce”

Descriptive questions

- descriptions of conditions or situations
- identify something, document a phenomenon, compare cases or explain a phenomenon

Normative questions

- values, evaluation
- basis for posing constructive questions and suggest change

Constructive questions

- research questions aimed at intentional change
- what can X do to improve Y?, intervening in a situation, or imagining (experimenting)

(Kalleberg/Verne and Bratteteig)

What is design research?

We will argue that design research often concerns giving answers to constructive research questions

Verne and Bratteteig, 2018

What kind of research questions are design practice appropriate for?

How to make something (answer to constructive questions)

Design as constructive method:

Investigating new approaches to challenges in design processes

making: new technologies, materials, techniques

people: how to deal with new constellations of stakeholders etc

Investing effects of new technologies to users in context
(ideally both)

+ Wicked problems

Well suited for dealing with “Wicked problems”:

Illformed, under-constrained, many variables, many dependencies

(Rittel and Webber 1978)

In the context of research through design, the mark of a good research problem is that it is a wicked, messy problem that lends itself to the application of design thinking. (Zimmerman & Forlizzi, 2014)

How to do RtD?

Zimmerman and Forlizi: 5 Steps

1: Select

- Choose a problem area. Select a RtD approach: lab, field or showroom, Formulate an understanding of the problem area: Understand current situation, understand what preferred alternatives can be

2: Design

- Make a design: Execute and evaluate iteratively, document. Constantly reevaluate your problem understanding and formulation

3: Discuss

- Evaluate, show (exhibits, presentations, tests), discuss the completed design

4: Disseminate

- write about it, how to use and understand this, extensibility?,

5: Repeat

- not intended for student projects, but funded research projects

The 5 steps is not a method

Research through design propose to do what designers do well, design practices, to generate new knowledge about research problems

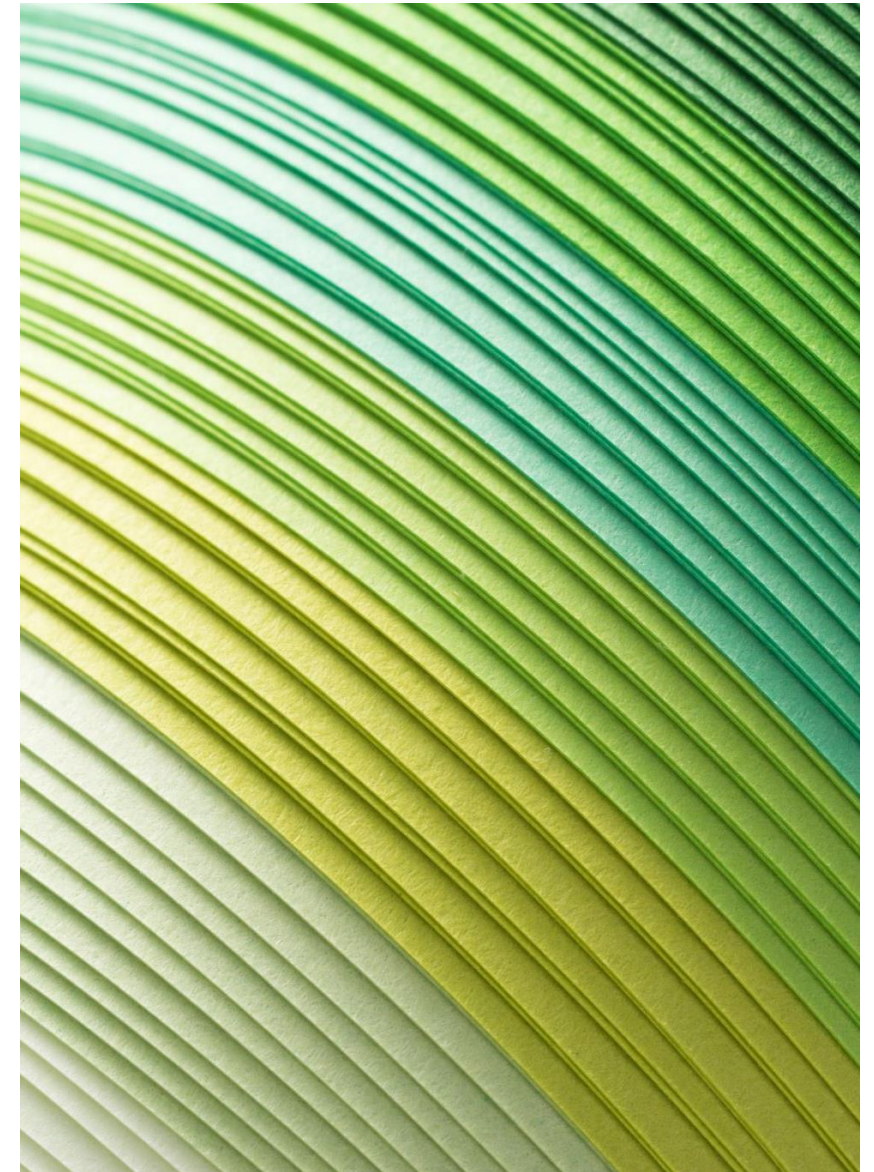
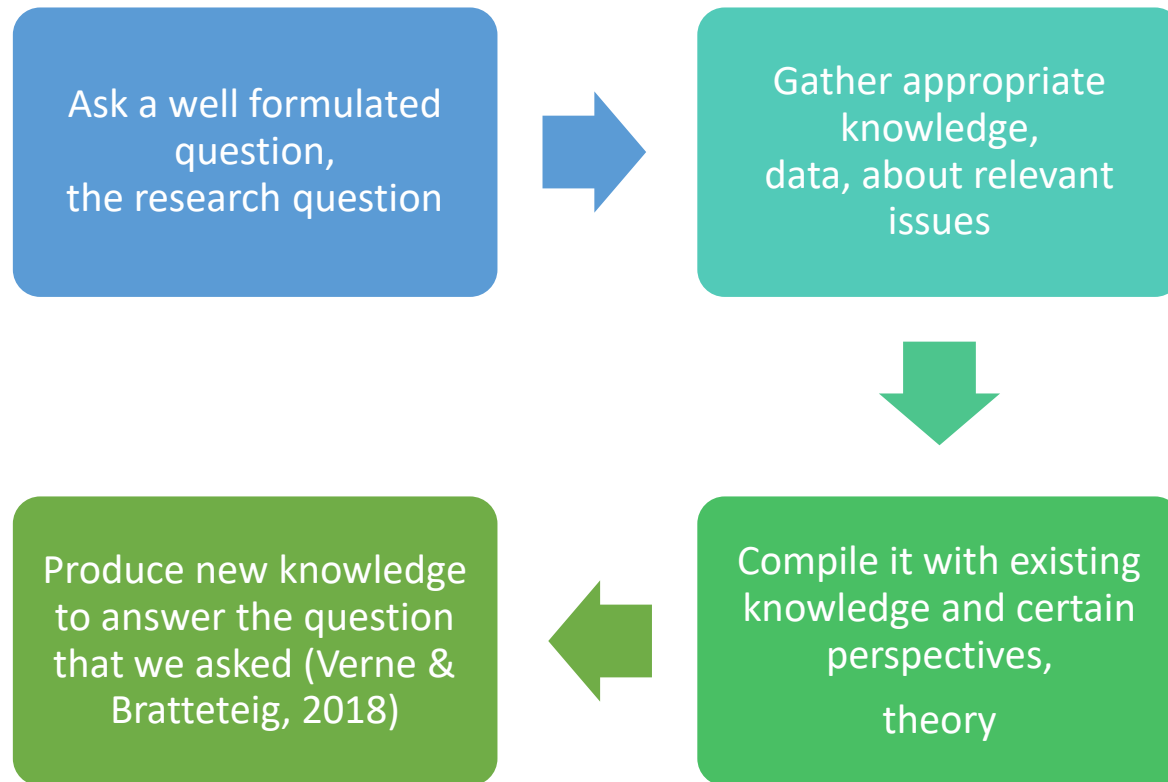
RtD does not prescribe a spesific set of design practice methods

RtD does not have one distinct set of appropriate research methods

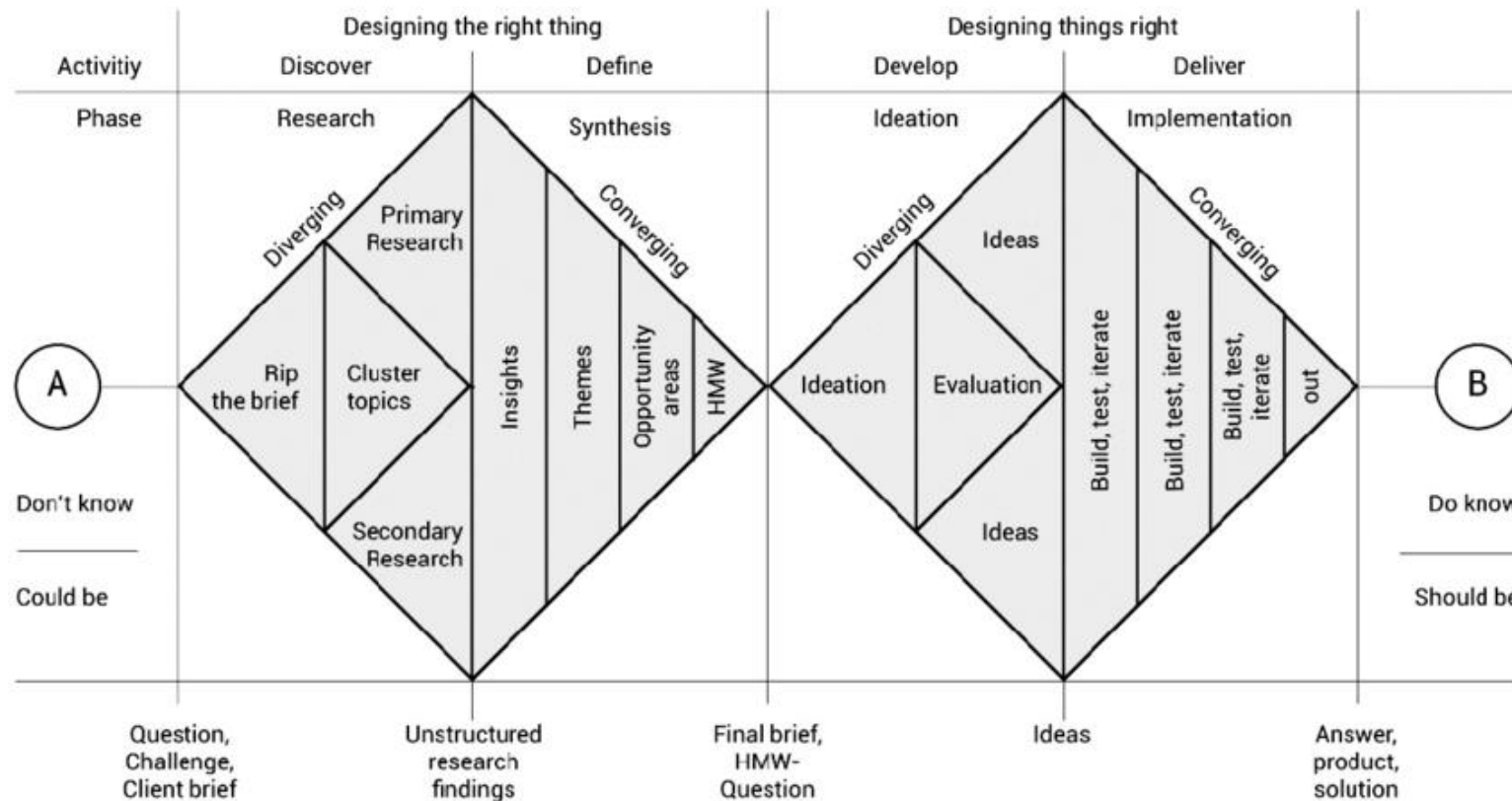
You need to combine your design method(s) with (a) research method(s)

> You need to combine a research method with design

The Qualitative Research Process



Design process (example: double diamond)



What research methods are you good at?

Field

At Ifl, design practices are often combined with qualitative methods from the social sciences (this course), which makes the field approach readily available to us

Participatory Design have developed different distinct methods that can be applied

Showroom

We also have researchers and courses oriented towards critical theory, for instance Research through design and the Ethics course. The Regenerative Technologies Group assume a critical theory perspective, and also many members of the Design group

We have a focus on tangible and embodied interactions, like through the tangible course, cooperations with museums

Lab experiments are less common here, but some like to use, for instance, some controlled user tests combined with fieldwork

(note that we don't have the infrastructure to do extensive lab experiments properly)

What design approaches speaks to you?

Making

Prototyping

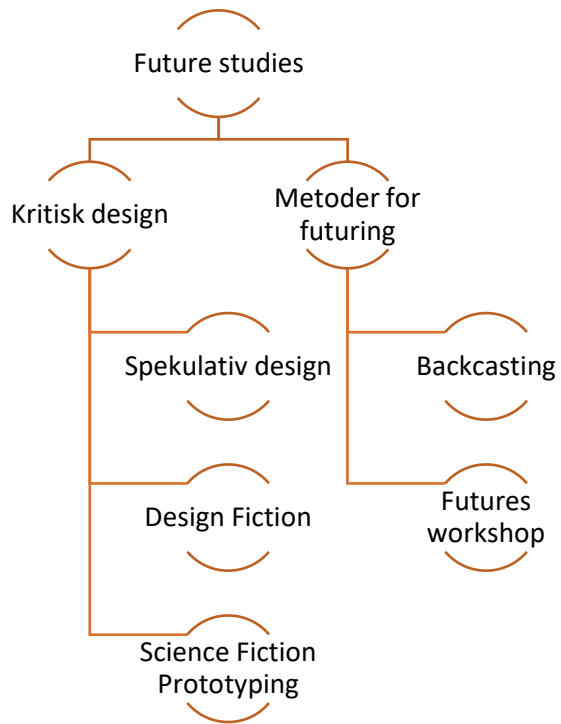
Critical design

Futuring

Speculative design

Design fiction

Futuring i Design



Metode: Kritisk design

Begrep lansert av Dunne og Raby

Gjør fremtiden fysisk tilgjengelig for å fremprovosere reaksjoner

Relatert til kritisk teori

Les mer (anbefalt lesing!):

Bardzell (2013) What is critical about critical design?

<https://www.uio.no/studier/emner/matnat/ifi/INF5591/h15/>

Bardzell (2012) Critical Design and Critical Theory: The

<https://dl.acm.org/doi/10.1145/2317956.2318001>

"Critical design is critical thought translated into materiality. It is about thinking through design rather than through words and using the language and structure of design to engage people .."

(Dunne og Raby, 2013)



Designing for Provocation

Gaver et al, The prayer companion

Metode: Speculative design

Relatert til kritisk design
Fremtidige design, kritiske

Les mer:

Alma og Nick

*Speculative and Critical Approach to
Designing Technological Futures
through HCI Education*

<https://www.duo.uio.no/handle/10852/94443>

“an activity where conjecture is as good as knowledge, where futuristic and alternative scenarios convey ideas, and where the goal is to emphasize implications of “mindless” decisions for mankind.”
— *Anthony Dunne and Fiona Raby*



Metode: Design fiction

Design fiction er en designpraksis som utforsker og kritiserer mulige fremtider ved å skape speculative, ofte provoserende, scenarier som blir fortalt gjennom designerte artefakter

Les mer:

LaPlace et al (2022) Science Fictioning Participatory Design

<https://dl.acm.org/doi/10.1145/3536169.3537775>

Teknikk: Backcasting

Formulere en ønsket fremtid

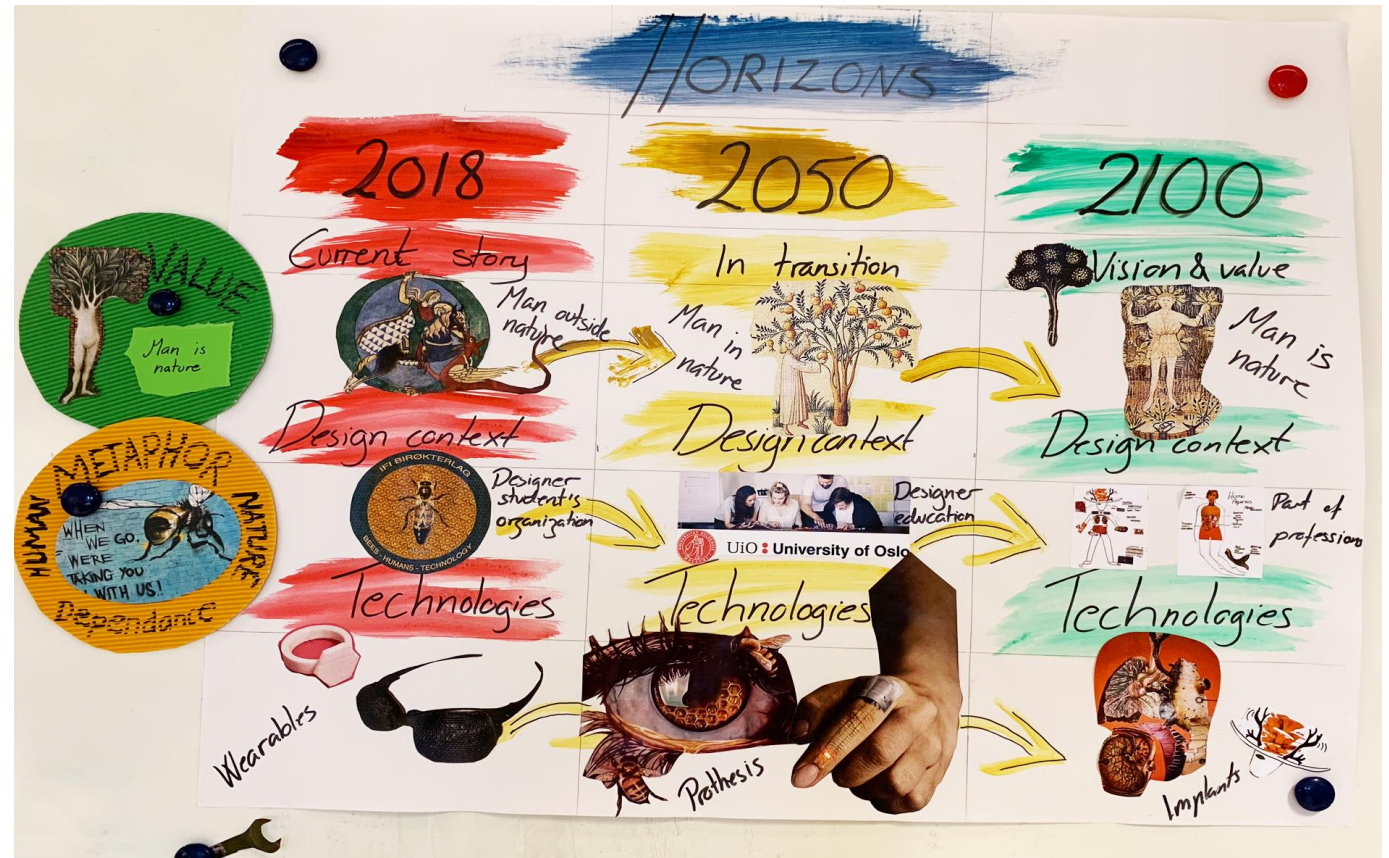
Gå fra denne fremtiden og bakover til dagens situasjon for å identifisere veier til en ønsket fremtid

Les mer:

Alma og Nick

Speculative and Critical Approach to Designing Technological Futures through HCI Education

<https://www.duo.uio.no/handle/10852/94443>



Twofold process and results and the format of publications

Two-fold process and outcome

The formats for disseminating (publishing) design research does not account for this dual process and outcome

How to publish a design artefact?

No space for the full design process

The research and design process does not match established formats for writing about research and writing about it is not automatically coupled to doing it



06.03.2023

Bilde: Dall-E og Heidi

IN5470 V2023 Heidi Bråthen



When does it matter?

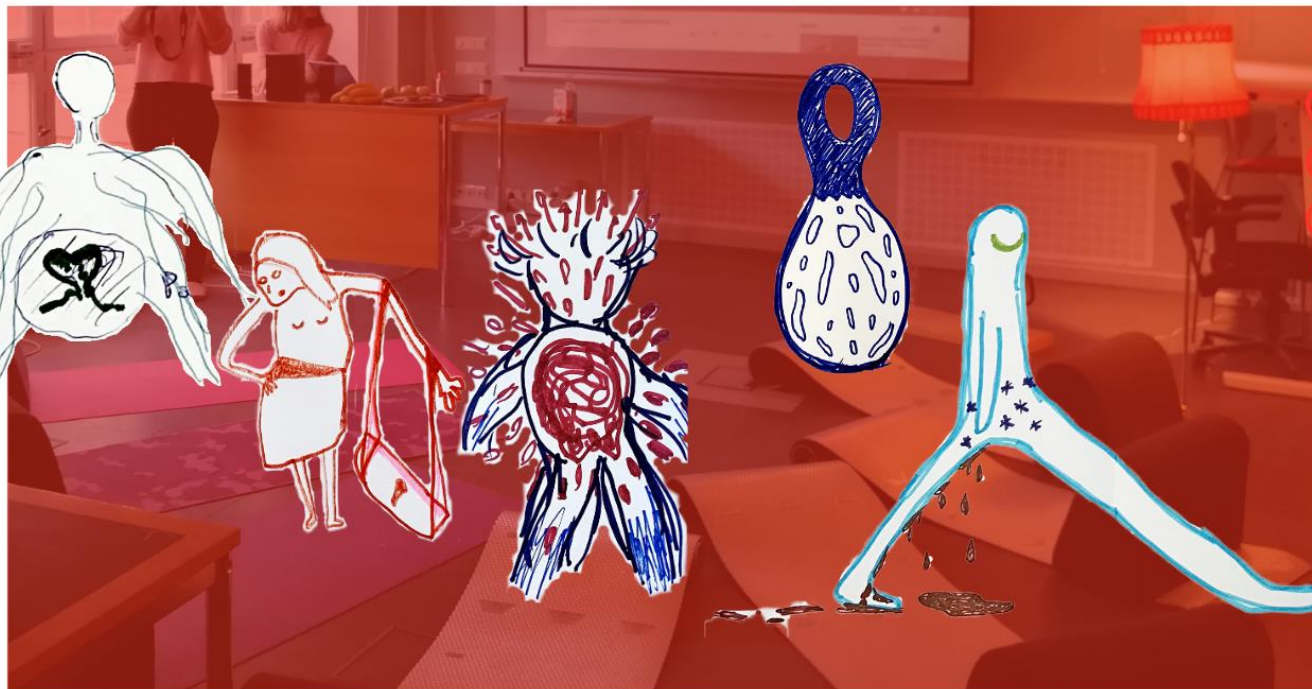
When do we need to publish the artefact?

When do we need to publish the full backstory of the design process?

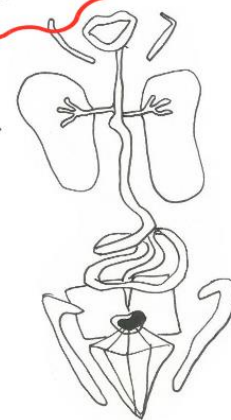
It depends on the question of the research

It depends on the answer you are trying to give

It depends on your focus within the dual process and outcome



menstrual monster : a way to challenge menstrual normativity; challenge the “controlled” and universal body; accepting the messy; acknowledging the pain; a way to embody (or not) one’s relation to their menstruation; an appropriation of the **body maps** used in soma design.



2. Expressing Menstrual Experiences

To broaden and challenge our first-person experiences of menarche and menstrual cycles, we organised two workshops. The purpose was to creatively engage with menstrual experiences through a participatory and movement-based process.

Workshop on Bodily Transitions of Menstruation

In the first workshop, we invited participants to accompany us in exploring bodily transitions of menstrual cycles and hormonal changes. The workshop involved the authors and four participants from our research group who all have first-person experiences with menstruation. We prepared the room with yoga mats, big pillows, warm light, cookies and tea. The three-hour workshop involved four main activities between which the participants shared their experiences. We started the workshop by serving raspberry leaf tea, which is said to work against

menstrual cramps. Following this, the first author guided an inward-looking meditative exercise to evoke a menstrual memory. With this memory in mind, the participants were asked to draw their “menstrual monster” in a small personal booklet, and they were invited to share it with the group. Then, we engaged with more bodily movements to attune to our bodies and its inner memories and current experiences. Firstly, we did a breathing exercise, where by breathing deeply into the diaphragm it may be possible open a connection between pelvic floor muscles and lower stomach, back, chest, mouth and jaw; creating a whole-body energizing experience. This breathing exercise worked as a precursor to a Feldenkrais lesson “Pelvic-o-clock”, which involves moving the pelvis around in small, detailed circular movements while laying on the back. After these bodily movements, we asked the participants to go back to their drawing

of the menstrual monster, and draw how the monster develops through time. We concluded the workshop by asking the participants to share their drawings and their experiences with the bodily movements.

Throughout the workshop, the participants opened up about their very first experiences of menstruation, experiences of changing contraceptives, and experiences of menopause, with their menstrual monsters as the starting point for telling these stories. We found that it was crucial to take time for each individual’s story, and that it worked well to shift between bodily movement, individual drawing and conversations. The participants appreciated the comfortable and cosy space that we had prepared, and noticed the tension between exploring longer life cycles and shorter menstrual cycles. One participant expressed that designing with menarche also means designing for discomfort and pain.

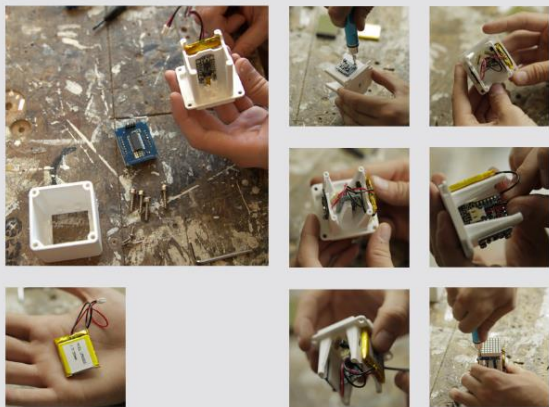
BALANCING TRADEOFFS IN CONCEPTUAL AND MATERIAL FORM



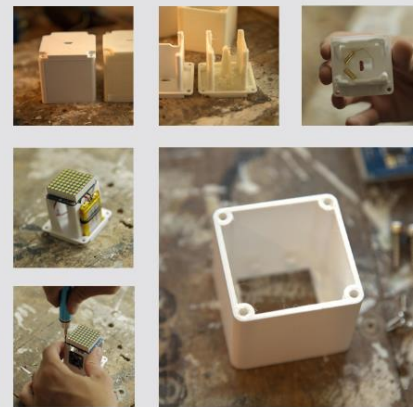
...and remaining intelligible to the end user. Collectively, these challenges appeared essential to successfully creating a Slow Technology research product that could achieve a high quality of fit in people's everyday environments and fade in and out of perceptual view in everyday life.

After the maple log completed drying, we created numerous experimental enclosures that situated the exposed tree bark on the cube's backside to connection point where the charging cable is inserted. We wanted to foreground the diverse and complex materiality of the felled log, settle in and find its place as an object among other domestic things, people, and places. In balancing these trade-offs and to support our goal of creating a slow technology research product that could become woven into people's everyday creative practices and domestic settings the following

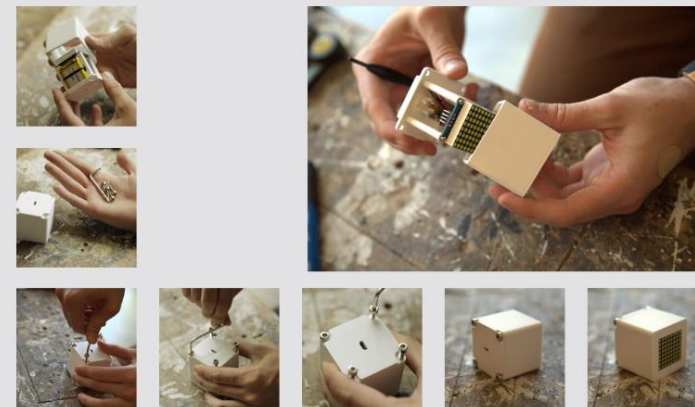
Step 1. Put electronics in



Step 2. Align the two parts



Step 3. Insert



Articulate embedded knowledge

Terminology (reminder)

Methodology

APPROACH TO
DOING RESEARCH

(Verne og Bratteteig, 2018)

Method

WHAT WE DO TO
GENERATE DATA,
«RECEIPES»

Data

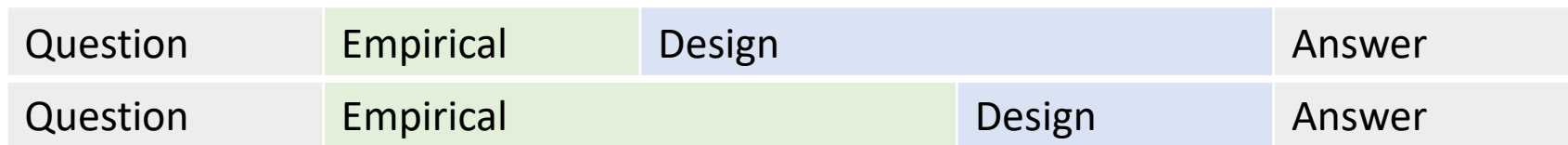
APPROPRIATE
KNOWLEDGE
ABOUT RELEVANT
ISSUES

Design Research at Ifi and in the Design group

Research design practices

qualitative methods that are adapted by design researchers and common in design practice outside of the academy, like interviews, observations, “r”esearch to understand the problem

Constructive design as a smaller or larger part of the research process

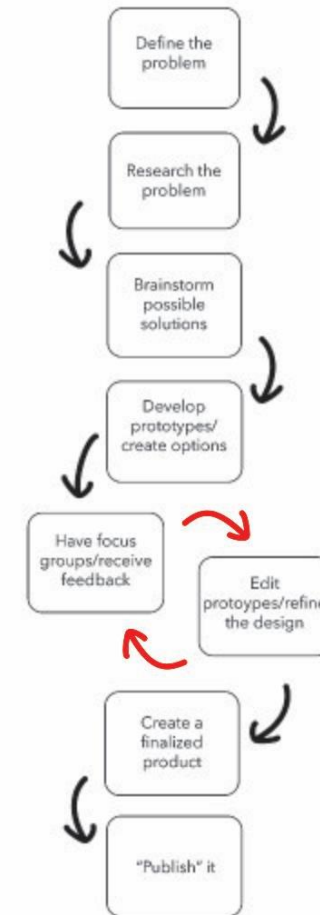


What are the “data” we generate in constructive design research?

Most often, we generate data through user involvement or understanding users, and then through evaluations involving users or experts

But what kind of data do we have without such investigations?

What data do we generate through the activities of making?



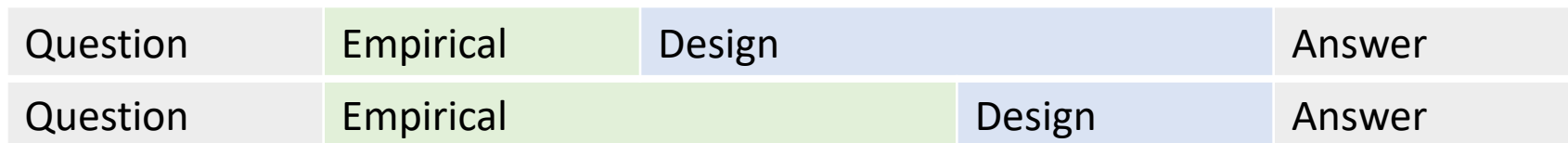
Simplified flow chart of the design process

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From Research Prototype to Research Product

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ABSTRACT

Prototypes and prototyping have had a long and important history in the HCI community and have played a highly significant role in creating technology that is easier and more fulfilling to use. Yet, as focus in HCI is expanding to investigate complex matters of human relationships with technology over time in the intimate and contested contexts of everyday life, the notion of a ‘prototype’ may not be fully sufficient to support these kinds of inquiries. We propose the *research product* as an extension and evolution of the research prototype to support generative inquiries in this emerging research area. We articulate four interrelated qualities of research products—*inquiry-driven*, *finish*, *fit*, and *independent*—and draw on these qualities to describe and analyze five different yet related design research cases we have collectively conducted over the past six years. We

pursuing are expanding. The focus of a growing portion of the HCI community has moved beyond designing for efficient use to investigating complex matters of human-technology relations that often involve messy, intimate, and contested aspects of everyday life. These kinds of questions include: What roles could—or *should*—interactive technology play when we consider it as a long-term, evolving component of everyday life? How do technologies mediate between humans and their actions in the world? How do choices that go into the materials, form, and computation of interactive systems shape human relations to them? And, how do they change over time?

A core goal of this paper is to motivate and develop the notion that investigating these kinds of research questions can require a type of a research artifact different from a

Articulate embedded and embodied knowledge

Documenting the design process

Frayling and Zimmerman and Forlizi: Document!

Photos, video and diary

Feltdagbok

Venstre side:

Beskrivelser:

fortløpende notater.

når, hvor, hvem, hva

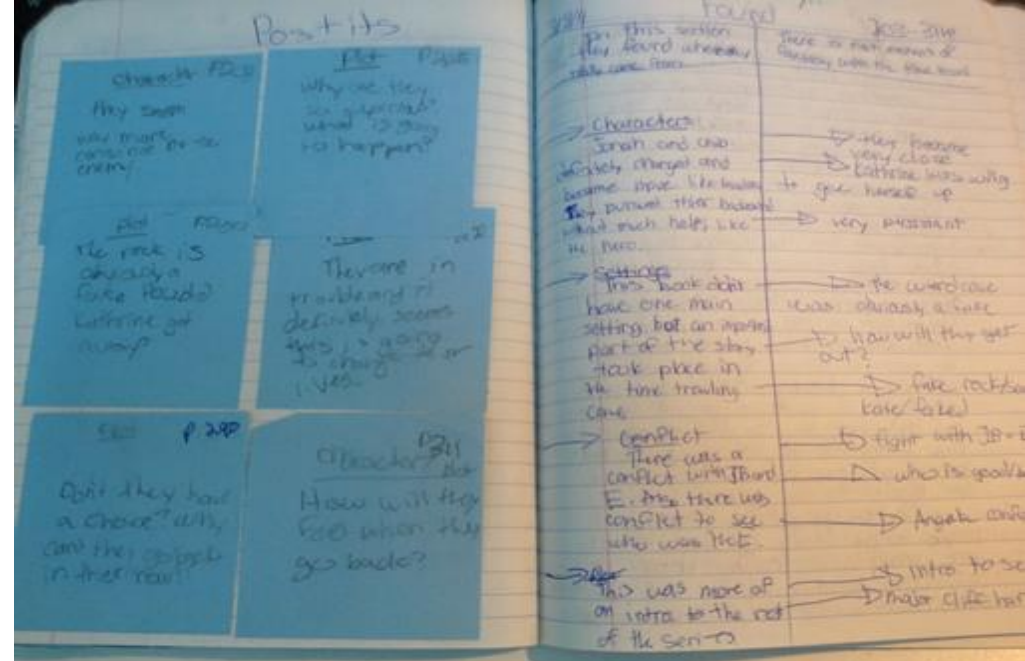
hvorfor

Høyre side:

Refleksjoner:

Egne refleksjoner om det som er beskrevet. Spørsmål, tanker, referanser til tekster.

<< og >> hvorfor



Diary

Field diaries let you generate material on the design process that can be analysed as texts

You can:

- Analyze the development of the design: narrative analysis (See walsham)
- Analyze your developing understanding of the problem/design: Hermenutic exploration (see Walsham)

Feltdagbøker lar deg:

- Generere data om prosessen som senere kan analyseres som tekst
- F.eks.:

➤ Analysere *utviklingen* av designet: **narrativ analyse**

➤ Analysere utviklingen av din «forståelse» av designet: **hermeneutisk utforskning**

Narrativ analyse

- Utgangspunkt for narrativ analyse:
Identifisere:
 - *Hendelser*: (vendepunkter)
 - *Aktører*: de som gjør noe i teksten, hvilken rolle har de?
 - *Beskrivelser* av hendelser og aktører (hvem «ser» i teksten? Hvordan?, hvilke ord er brukt for å beskrive dem?, hva peker de samme ordene på i andre sammenhenger?)
-
- Mieke Bal 2009: *Narratology: Introduction to the theory of narrative*



Hermeneutisk utforskning

- Hvordan endrer delene du jobber med hvordan du forstår prosjektet som helhet (til en hver tid)?
 - Hva gjør at du begynner å omtale temaet du utforsker annerledes i teksten?
 - Når er det designet selv omtales? («forklaring») Når er det hva designet gjør eller skal gjøre «i verden» som omtales? («forståelse»)
-
- Nils Gilje 2020: *Hermeneutikk som metode – ein historisk introduksjon*
 - Paul Ricoeur 1981: *What is a text? Explanation and Understanding*

