in1060: bruksorientert design

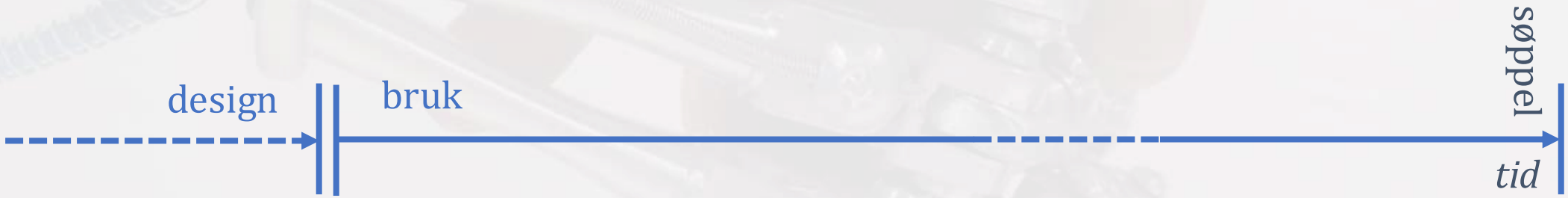
time 1:

- hvorfor bruksorientert design?
- kap. 1 i læreboka
- artikkel av Margot Brereton

time 2: inspirasjon til prosjektet

hvorfor bruksorientert design?

Det store bildet: livsløpet til det vi designer har mye lengre horisont enn design-prosessen.



hvorfor bruksorientert design?

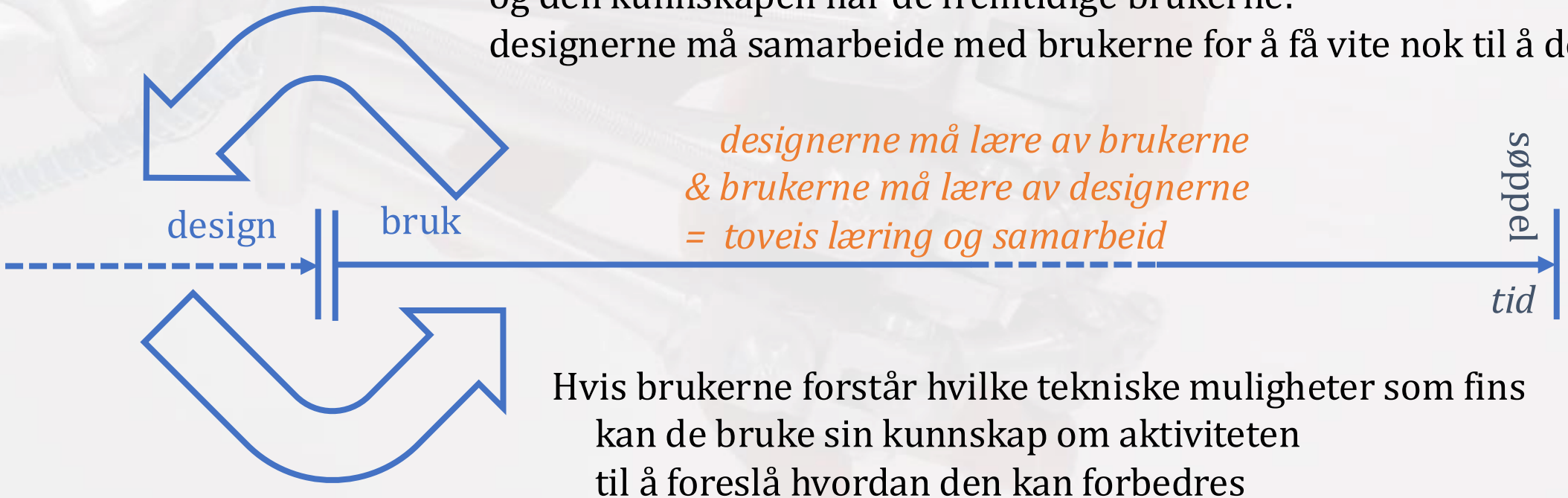
Designere designer ting (og systemer) for andre
som bruker tingene i sine gjøremål og aktiviteter
og der bruken er en del av aktiviteten.



hvorfor bruksorientert design?

Designere designer ting (og systemer) for andre
som bruker tingene i sine gjøremål og aktiviteter
og der bruken er en del av aktiviteten.

Designere må forstå nok om aktiviteten for å designe brukbare ting
og den kunnskapen har de fremtidige brukerne:
designerne må samarbeide med brukerne for å få vite nok til å designe.

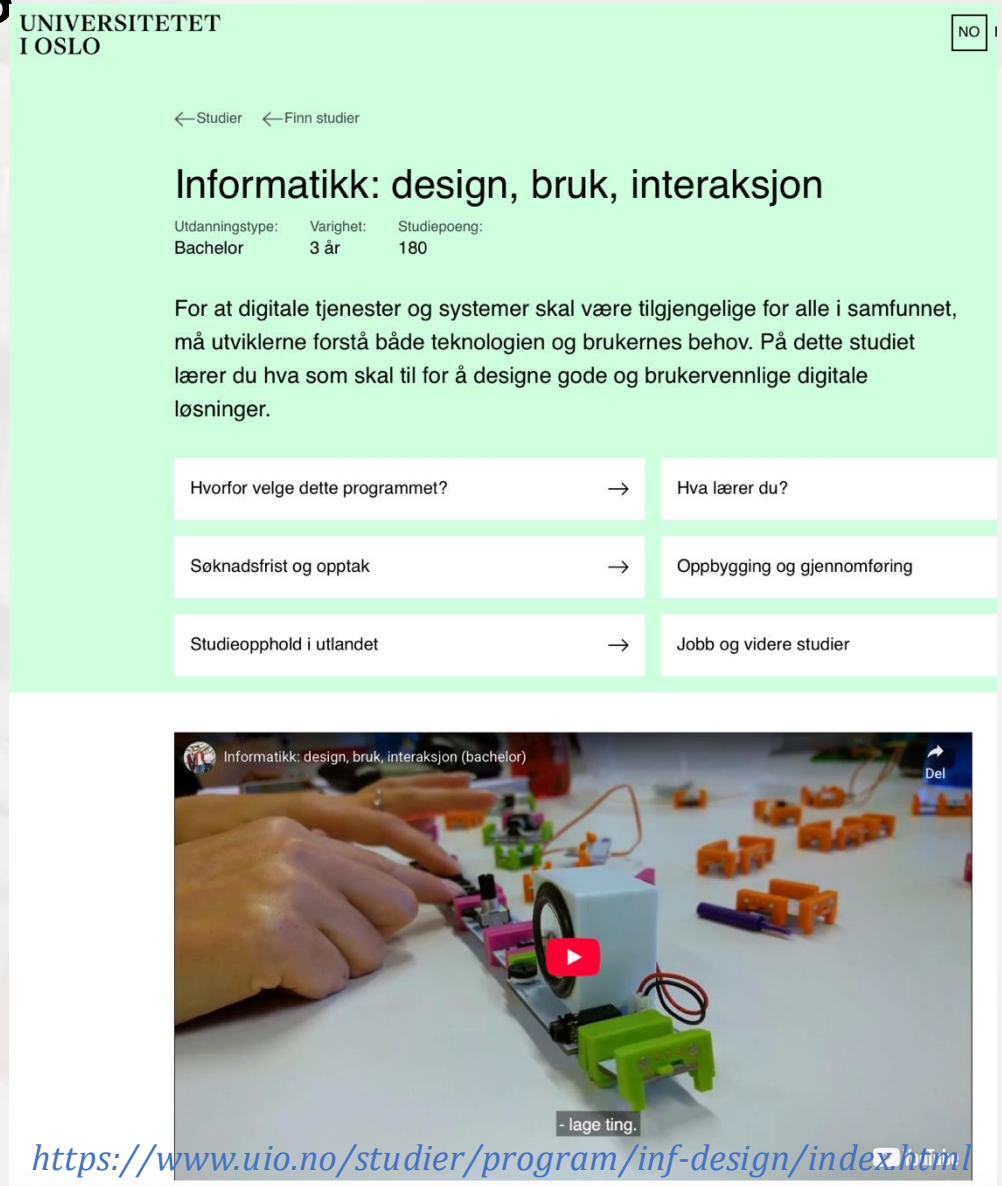


Hvis brukerne forstår hvilke tekniske muligheter som fins
kan de bruke sin kunnskap om aktiviteten
til å foreslå hvordan den kan forbedres
hvis og når de kan få en ny teknisk løsning.

hvorfor bruksorientert design?

Bruksorientert design / participatory design er sentralt i studieprogrammet *Design, bruk, interaksjon*

I in1060:
design av en digital artefakt for bruk med vekt på interaksjon med de som skal interagere med artefakten



https://www.uio.no/studier/program/inf-design/index.html

hvorfor bruksorientert design?

Bruksorientert design / participatory design er sentralt i studieprogrammet *Design, bruk, interaksjon*

I in1060:
design av en digital artefakt for bruk med vekt på interaksjon
med de som skal interagere med artefakten



brukeren		*maskinen*	
handlinger maskinen ikke registrerer	handlinger maskinen registrerer	effekter brukeren registrerer	effekter brukeren ikke registrerer
<hva brukeren gjør & tenker>			<hva maskinen prosesserer>

osv.

https://www.uio.no/studier/program/inf-design/index.html

bruksorientert design: Participatory design
hva handler det om?

overordnede prinsipper:

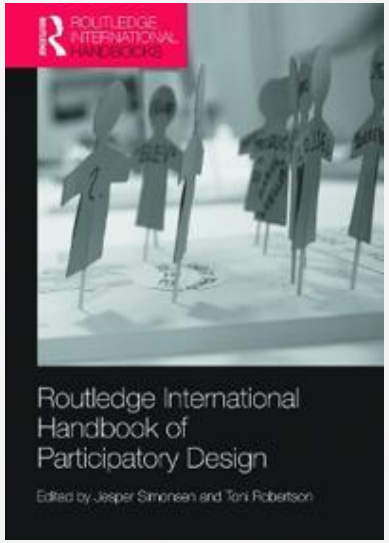
1) medbestemmelse i design-beslutninger
   «have a voice and have a say»
2) gjensidig læring / «mutual learning»
   toveis læring og tverrfaglig samarbeid
3) samskaping, samarbeid om utforming
   og konkretisering av design-ideer,
   «co-design», «co-construction»

<u>prosessen</u>

- metoder
- teknikker & verktøy
- brukerdeltakelse

<u>resultater</u>

- designforslag
- skisser, enkle prototyper
- «uavhengige» prototyper

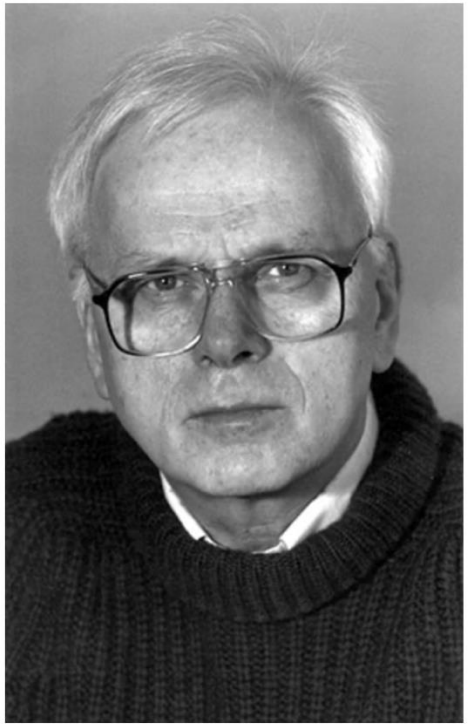




pdcproceedings.org

teknologien er ikke nøytral

Kristen Nygaard (1926-2002)



Professor Kristen Nygaard var en norsk informatiker som utviklet programmeringsspråket Simula, og la grunnlaget for objektorientert programmering, sammen med Ole-Johan Dahl.

- den kunne vært annerledes
- den preges av designerne og oppdragsgiveren
- teknologi er politikk

Department of Informatics

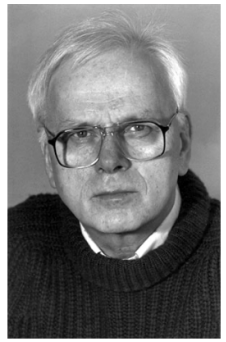
←About the department

Tribute to Kristen Nygaard

- Awards and Honors
- Education and Career
- Publications

Tribute to Kristen Nygaard

[August 27, 1926 - August 10, 2002]



Professor Kristen Nygaard was a Norwegian computer scientist and is considered to be the father of Simula and object-oriented programming, together with Ole-Johan Dahl.

His field was informatics and he won the two most prestigious international prizes specific to that field: The ACM A.M. Turing Award (considered to be the "Nobel Prize of Computing"), in 2001 and the IEEE John von Neumann Medal. He was made Commander of The Order of Saint Olav by the King of Norway in 2000, and received a number of other honors and awards.

With Ole-Johan Dahl, he produced the initial ideas for object-oriented (OO) programming in the 1960s at the Norwegian Computing Center (NR - Norsk Regnesentral) as part of the Simula I (1961-1965) and Simula 67 (1965-1968) simulation programming languages

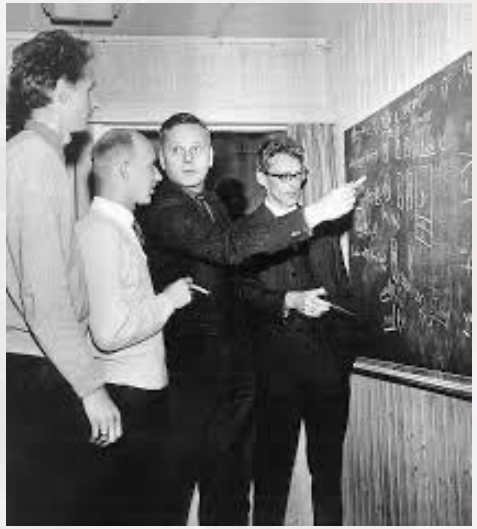
Nygaard and Dahl were the first to develop the concepts of class, subclass (allowing information hiding), inheritance, dynamic object creation, etc., all important aspects of the OO paradigm. Their work has led to a fundamental change in how software systems are designed and programmed, resulting in reusable, reliable, scalable applications that have streamlined the process of writing software code and facilitated software programming. Current object-oriented programming languages include C++ and Java, both widely used in programming a wide range of applications from large-scale distributed systems to small, personal applications, including personal computers, home entertainment devices, and stand-alone arcade applications.

Nygaard worked as a part-time professor emeritius in 1977, and a full-time professor emeritus from 1984-1996 at the University of Oslo.

In Memoriam of Kristen Nygaard

Kristen Nygaard & Ole-Johan Dahl





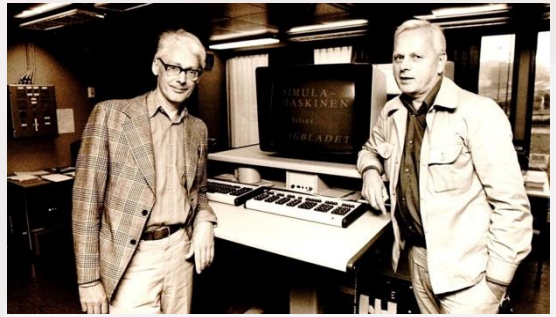




foto: Rune Ingar Myhre

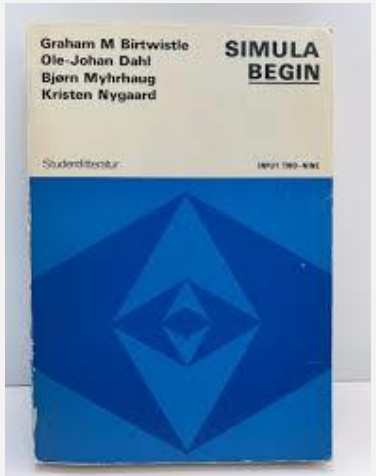
- *kommandører av St. Olavs Orden i 2000*

&

- *Turing-prisen i 2001*
- *von Neumann-medaljen i 2002*







Tone Bratteteig, 26. januar 2026

teknologien er ikke nøytral

- den kunne vært annerledes
- den preges av designerne og oppdragsgiveren
- teknologi er politikk



INFORMATION PROCESSING 86, H.-J. Kugler (ed.)
Elsevier Science Publishers B.V. (North-Holland)
© IFIP, 1986

Reprinted with permission from the author

PROGRAM DEVELOPMENT AS A SOCIAL ACTIVITY

Kristen NYGAARD
Institute of Informatics, University of Oslo
P.O. Box 1080 Blindern, N-0316 Oslo 3, Norway

The paper discusses social aspects of large scale program and system development in the meaning "societal". Informatics is defined as a science studying "information processes being e.g. program executions by computers and information processes jointly by people and computers. "Related phenomena" are program and system restrictions imposed upon program development, the knowledge-building "process", "structure" and "system" are discussed and used in this context. The study of program development. Agreements and laws regulating system development and used to characterize programming styles, attitudes towards program development participation of employees is treated in this context.

1. INTRODUCTION

This paper will argue on two fronts: The first front will be against those who want to make informatics exclusively a formal science, as mathematics - and who maintain that the study of the social implications of information technology is outside informatics, belonging to the social sciences. The second front will be against those social scientists who believe that they are capable of understanding the impacts of information technology "from outside", without bothering to learn informatics or working closely with researchers in

Bilde fra Norsk biografisk leksikon

Kristen Nygaard
Av Joanna Butler, 1981/NTB Scanpix ※.



We are very sad to inform you that Kristen Nygaard passed away on August 9th 2002.
A memorial site is at: http://heim.ifi.uio.no/~gisle/in_memoriam_kristen/

HOME PAGE FOR HJEMMESIDE FOR KRISTEN NYGAARD

TRE VERDENER - THREE WORLDS
FARGEKODER - COLOUR CODES
FORSKNING RESEARCH
POLITIKK POLITICS
PRIVAT PRIVATE

NAVIGARE NECESSE EST ...
HJEMME-SIDE HOME PAGE
SIDE-KONTROLL - PAGE CONTROL:
FØRSTE BUNN TOPP NESTE
FIRST BOTTOM TOP NEXT

Arbeid/Work:
Department of Informatics
University of Oslo, and
Norwegian Computing Center, both located in the Informatics Building

Gaustadalléen 23, 0316, Oslo Norway
Eller på norsk:
Institutt for informatikk
Universitetet i Oslo, og
Norsk Regnesentral
Tel: +47-22.85.24.79
E-post/E-mail: kristen @ simula.no
Vev/Web: http://www.simula.no/~kristen/
Simula Research Laboratory
Martin Linges vei 15-25, PBox 134
1325 Lysaker, Norway
Tel: +47-67.82.83.09
Hjem/Home:
Niels Juels gt. 6a, 0272 Oslo
Tel(Kontor/Office): +47-22.43.19.01
Tel(Privat/Private): +47-22.43.80.40

Kristen Nygaard
Professor (emer), University of Oslo
Consultant, Norwegian Computing Center
and Simula Research Laboratory

WORLD LANGUAGE INFORMATION
ENGLISH AS SPOKEN, WRITTEN AND UNDERSTOOD BY FOREIGNERS

INFORMASJON PÅ NORSK
(ANNERLEDESSPRÅKET)

I have divided this web site into three worlds: RESEARCH, POLITICS and the PRIVATE world.They are reached through the links on the top of this column. (They are carefully color coded: GREEN icons= RESEARCH, RED icons = POLITICS, and GOLDEN icons= PRIVATE.)

Most of those sharing my RESEARCH interests will not be interested in my POLITICAL world and vice versa. (Those sharing my POLITICAL interests may of course not at all share my views!) The PRIVATE world is mainly for friends and family, both groups being quite large, I am happy to say.

Jeg har delt sidene opp i tre

I am doing research in Informatics (Computer Science) and have together with Ole-Johan Dahl invented OBJECT-ORIENTED PROGRAMMING. I have also done research on SYSTEM DEVELOPMENT processes and on SOCIAL IMPLICATIONS OF INFORMATION TECHNOLOGY.

I have been active in politics and was the national leader of the successful CAMPAIGN AGAINST NORWEGIAN MEMBERSHIP IN THE EU.

These pages tell you what I am working on, professionally and politically, and what I have done in the past.

Jeg er forsker i informasjonsteknologi (IT) og har sammen med Ole-Johan Dahl oppfunnet OBJEKT-ORIENTERT PROGRAMMERING. Har også forsket om ARBEIDSFORMER I SYSTEMUTVIKLING og VIRKNINGER AV IT PÅ SAMFUNNET.

Jeg har vært politisk aktiv på en rekke områder og var leder av Nei til EU under EU-KAMPEN fra 1988 fram til seieren i 1994

Disse sidene forteller litt om hva jeg arbeider med faglig og politisk nå og om hva jeg har gjort tidligere.
Dessuten kan du lese om kursene





samarbeid med Jern & Metallarbeiderforbundet

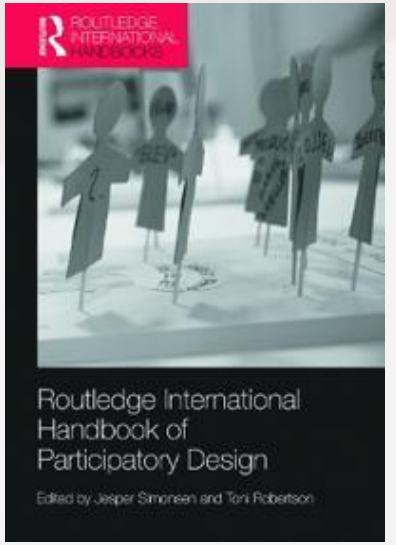
bruksorientert design: Participatory design
hva handler det om?

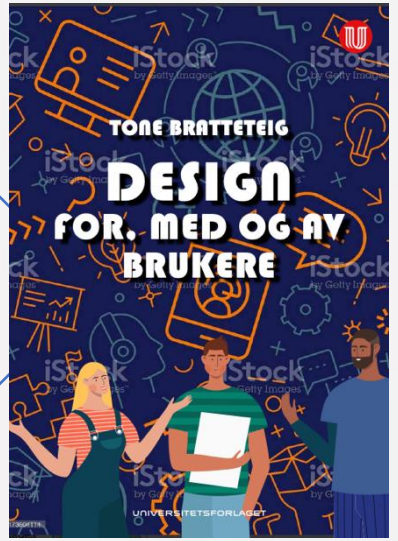
overordnede prinsipper:

1) medbestemmelse i design-beslutninger
   «have a voice and have a say»
2) gjensidig læring / «mutual learning»
   toveis læring og tverrfaglig samarbeid
3) samskaping, samarbeid om utforming
   og konkretisering av design-ideer,
   «co-design», «co-construction»

prosessen
- metoder
- teknikker & verktøy
- brukerdeltakelse

resultater
- designforslag
- skisser, enkle prototyper
- «uavhengige» prototyper





kap. 1 Design for, med og av brukere

Kapittel 1

Design for, med og av brukere

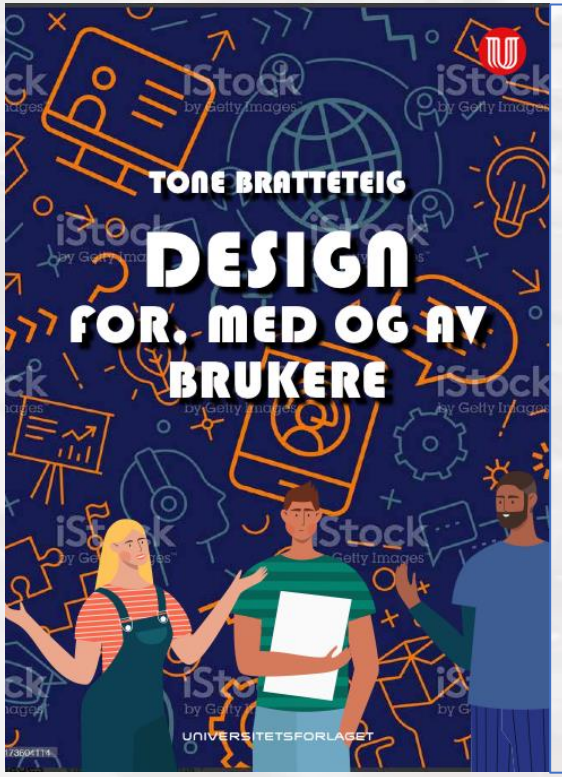
1.1 Hva er «design for, med og av brukere»?
- 1.1.1 Medvirkning for demokrati
- 1.1.2 Medvirkning for bedre kunnskapsgrunnlag

1.2 Kjennetegn ved «design for, med og av brukere»
- 1.2.1 Medbestemmelse
- 1.2.2 Gjensidig læring
- 1.2.3 Samskaping

1.3 «Design for, med og av brukere» er ikke en metode
- 1.3.1 Det store bildet
- 1.3.2 Et sosioteknisk perspektiv
- 1.3.3 Et kritisk perspektiv

1.4 Den skandinaviske tradisjonen
- 1.4.1 De første prosjektene
- 1.4.2 Alternative teknologier
- 1.4.3 Design for gevinst og et godt liv

1.5 Videre arbeid med temaet DMB
- 1.5.1 Litteratur
- 1.5.2 Oppgaver



INNHOLDSFORTEGNELSE

Forord
Innledning
1. Design for, med og av brukere
2. Design og designarbeid
3. Interaksjon
4. Bruk i kontekst
5. Å designe med brukere
6. Å undersøke bruk før bruk
7. Å lage og konkretisere ideer
8. Tverrfaglig samarbeid som arbeidsform

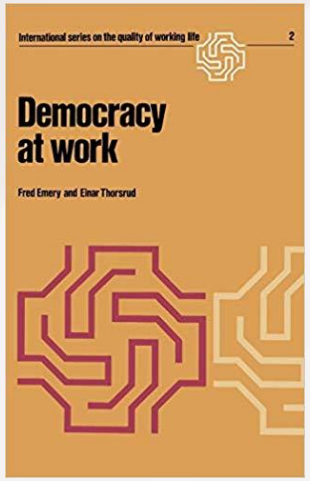
Avslutning
Stikkordsregister
Referanser

bakgrunn: sosiotekniske systemer

<u>Sosiotekniske systemer</u>

- Samspillet mellom det tekniske og det sosiale
- LO/NAF: det store samarbeidsprosjektet
  - Reaksjon på Taylor og «Scientific management»
  - «Human factors» og ergonomi
  - demokratisering av arbeidslivet
  - de ansatte skal være med på å utforme sitt eget arbeidsmiljø

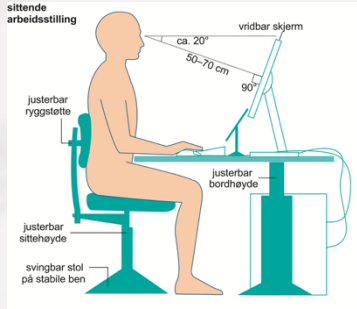




<u>Arbeidsmiljøloven (AML)</u>

- fra vern mot fysisk farlig arbeid
- til vekt på psykososiale forhold f.eks. meningsfylt arbeid







bakgrunn: sosiotekniske systemer

Sosiotekniske systemer

- Samspillet mellom det tekniske og det sosiale
- LO/NAF: det store samarbeidsprosjektet
  - Reaksjon på Taylor og «Scientific management»
  - «Human factors» og ergonomi
  - demokratisering av arbeidslivet
  - de ansatte skal være med på å utforme sitt eget arbeidsmiljø

- *«quiet quitting»*
- *«always on», konkurranse & prestasjonskultur*
- *«well-being», tilbake til naturen, bærekraft*
- *«work-life»-balanse*

  - til vekt på psykososiale forhold f.eks. meningsfylt arbeid





bakgrunn: systemtenkning

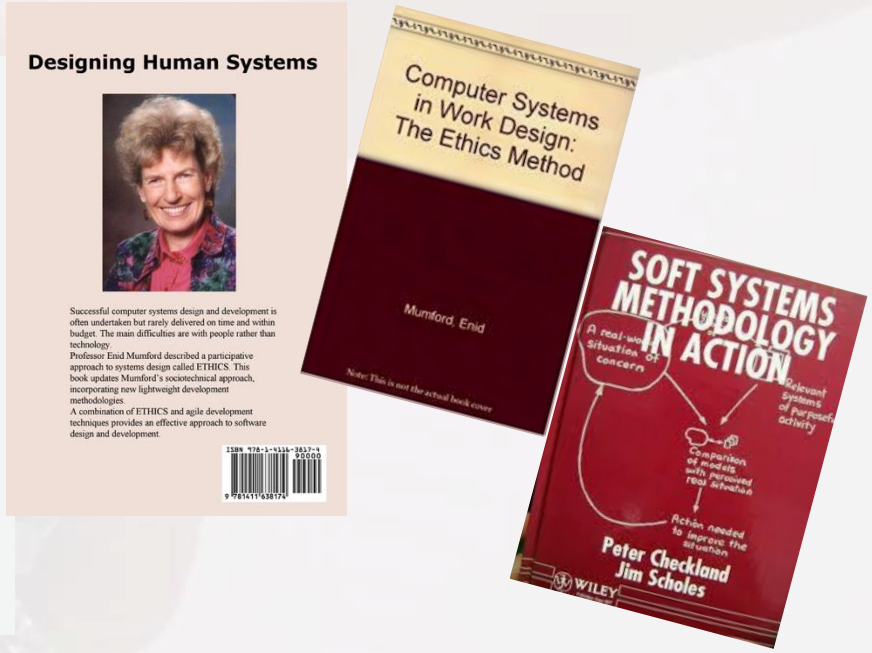
STORE NORSKE LEKSIKON

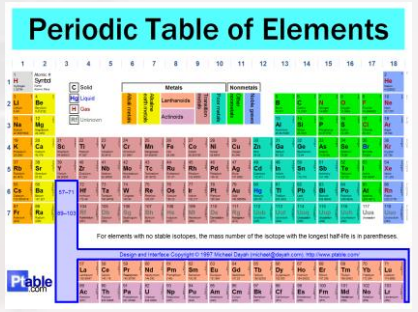
system

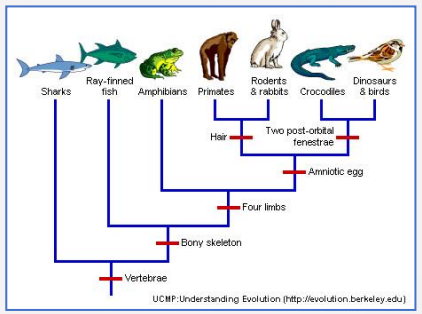
Store norske leksikon / Ordforklaringer / Fremmedord og lånord / Fremmedord med latinsk og gresk opphav

System er en ordnet sammenstilling av deler til et hele; eller planmessig fremgangsmåte. Begrepet brukes også om et sett eller gruppe av gjenstander eller deler som hører sammen eller er ment å virke sammen etter en bestemt plan.

UTTALE syst'em
ETYMOLOGI av gresk *systema* 'sammenstilling'







bakgrunn: systemtenkning

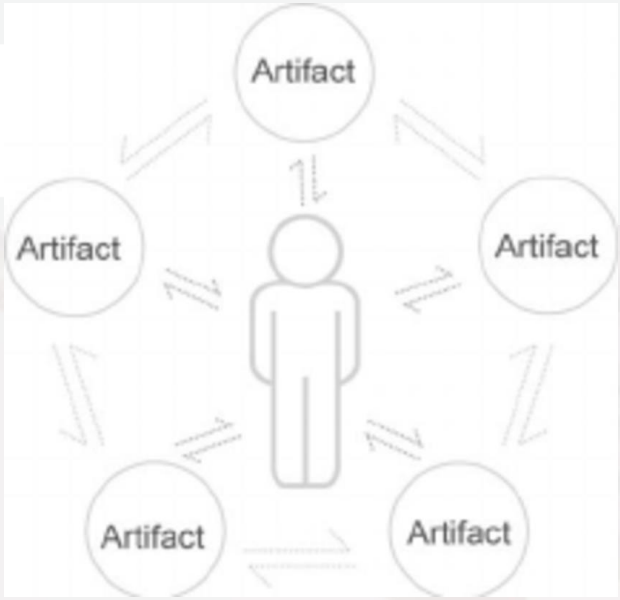
STORE NORSKE LEKSIKON

system

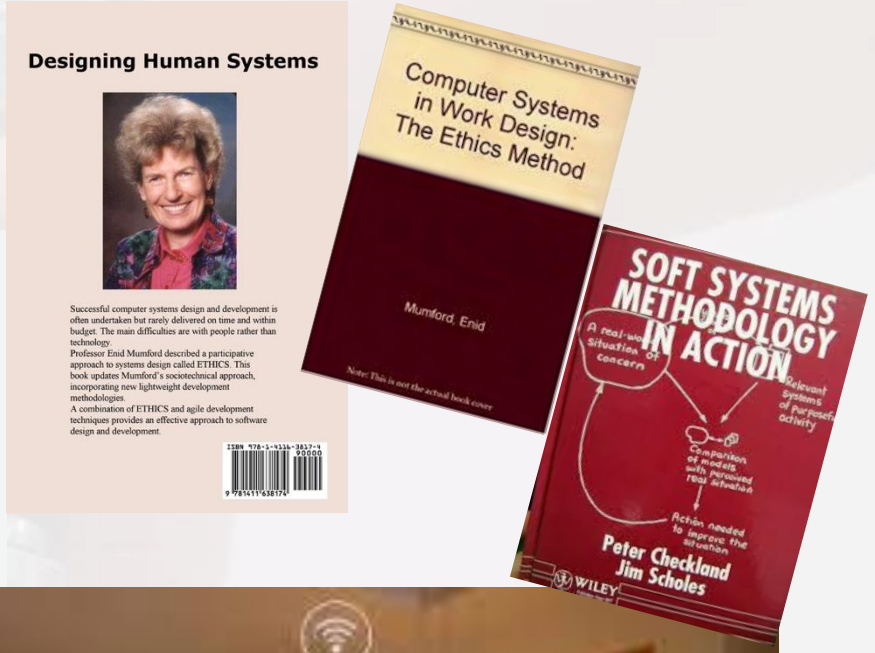
Store norske leksikon / Ordforklaringer / Fremmedord og lånord / Fremmedord med latinsk og gresk opphav

System er en ordnet sammenstilling av deler til et hele; eller planmessig fremgangsmåte. Begrepet brukes også om et sett eller gruppe av gjenstander eller deler som hører sammen eller er ment å virke sammen etter en bestemt plan.

UTTALE syst'em
ETYMOLOGI av gresk *systema* 'sammenstilling'



ill. fra Jung & Stolterman





ill. fra Elektroimportøren AS

bakgrunn: systemtenkning

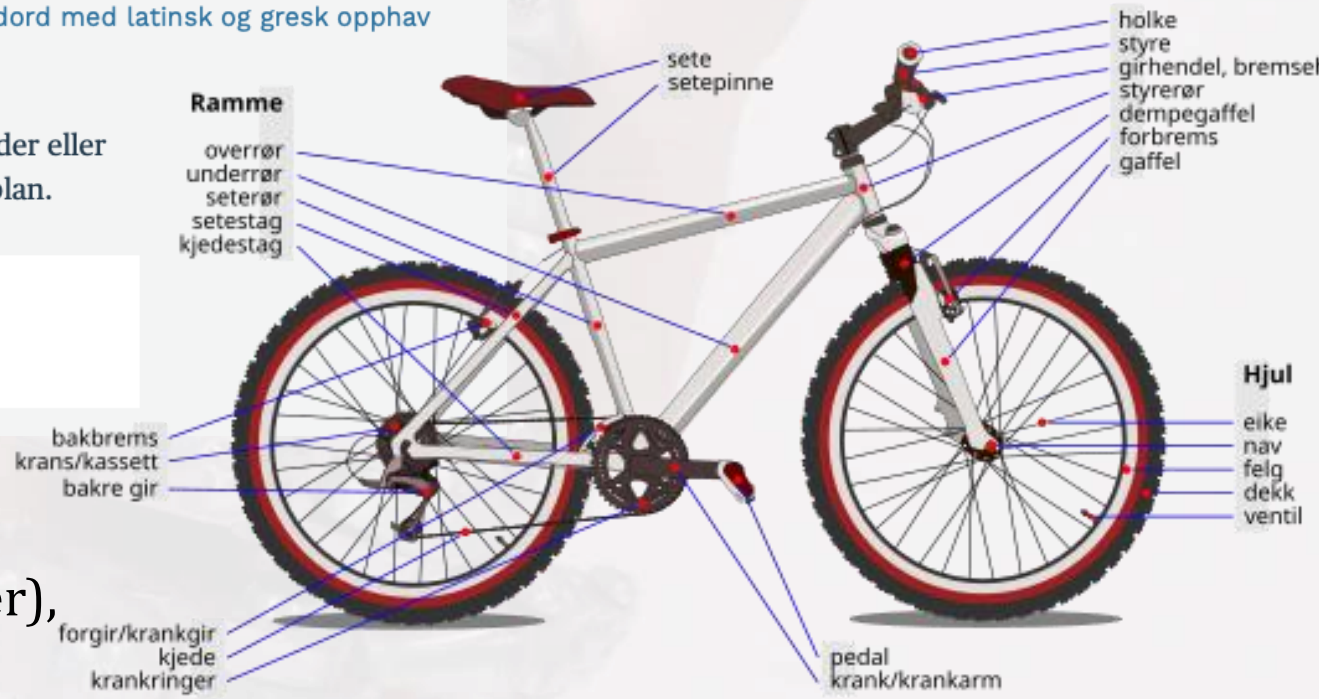
STORE NORSKE LEKSIKON

system

Store norske leksikon / Ordforklaringer / Fremmedord og lånord / Fremmedord med latinsk og gresk opphav

System er en ordnet sammenstilling av deler til et hele; eller planmessig fremgangsmåte. Begrepet brukes også om et sett eller gruppe av gjenstander eller deler som hører sammen eller er ment å virke sammen etter en bestemt plan.

UTTALE syst'em
ETYMOLOGI av gresk *systema* 'sammenstilling'



et system består av deler som spiller sammen,
ofte i et hierarki av del-systemer (ofte i flere nivåer),
og der høyere nivåer / hele systemet har andre
egenskaper enn hver av delene («emergent properties»)

ill. Wikipedia

bakgrunn: å tenke kritisk



STORE NORSKE LEKSIKON

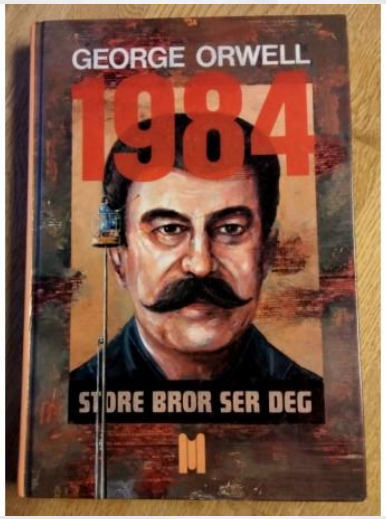
kritisk tenkning

Store norske leksikon / Psykologi / Kognitiv psykologi

Kritisk tenkning er det å analysere og vurdere informasjon om et saksforhold med tanke på danne seg en velbegrunnet og korrekt oppfatning, ofte som grunnlag for handling.

Kritisk tenkning omfatter flere ledd som alle er avhengige av hverandre:

- Observasjon og informasjonsinnhenting
- Tolkning, analyse, refleksjon og vurdering
- Slutning og forklaring
- Problemløsning, valg og eventuelt handling







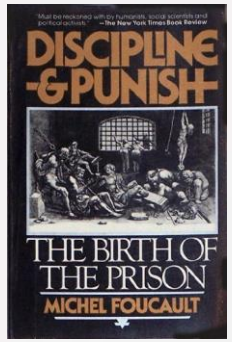
et kritisk perspektiv

stiller spørsmål om hvorfor ting er blitt som de er blitt

og generelt: stiller spørsmål ved vedtatte sannheter

fokuserer på å beskrive maktforhold





eks. på prosjekt = oppdrag ⟶prototype

IDEOs video av redesign av handlevogn

https://www.youtube.com/watch?v=M66ZU2PCIcM



<u>likheter og forskjeller med in1060-prosjektene</u>

- full designprosess fra oppdrag til prototype
- uklart oppdrag: for stort og for omfattende
- kort tid (de har dager, dere har uker)
- gruppearbeid der folk er avhengige av hverandre og der de bidrar med forskjellig kompetanse
- undersøke bruk og snakke med brukere
- jobbe med flere ideer
- prototype i flere runder (iterasjoner)



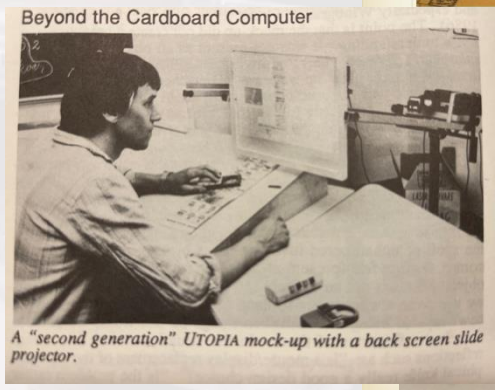
bakgrunn: UTOPIA-prosjektet



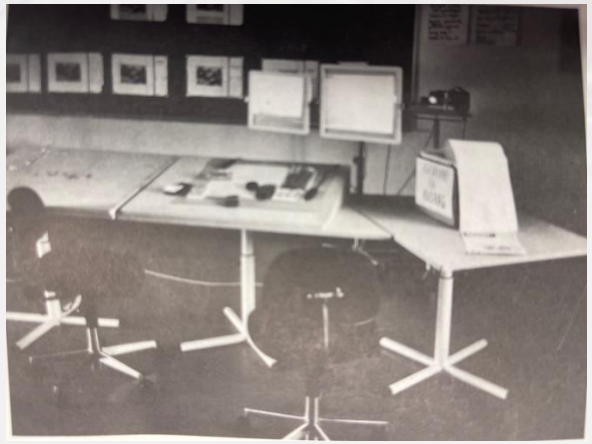
forskningsprosjekt i samarbeid med grafiske fagforeninger i Norden







A "second generation" UTOPIA mock-up with a back screen slide projector.







bakgrunn: Florence-prosjektet

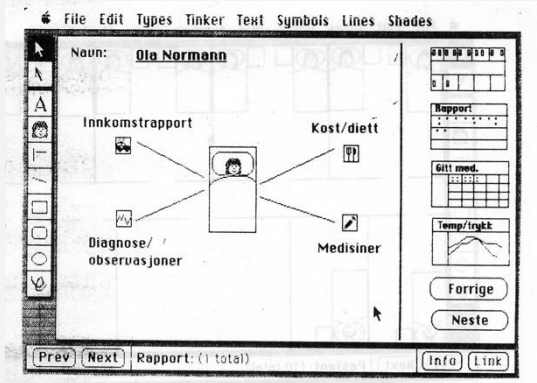
forskningsprosjekt i samarbeid med Sykepleierforbundet + Rikshospitalet og Sentralsykehuset i Akershus











The boundaries between 'the digital' and our everyday physical world are dissolving as we develop more physical ways of interacting with computing. This forum presents some of the topics discussed in the colorful multidisciplinary field of tangible and embodied interaction.

Eva Hornecker, Editor

Habituated Objects

Everyday Tangibles That Foster the Independent Living of an Elderly Woman

Margot Brereton
Queensland University of Technology | m.brereton@qut.edu.au

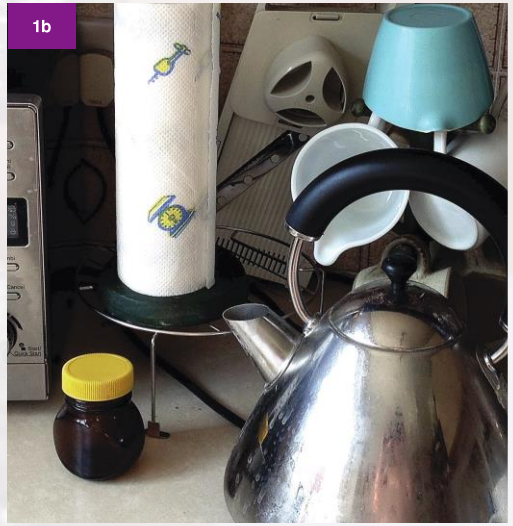
I recently visited an 82-year-old woman, Maria, the mother of a good friend whom I have known over the years. This visit got me thinking about tangible and embodied interaction in a different way: from the perspective of the everyday objects that inhabit and augment our lives and how they support independence and agency as we age. Maria is partially sighted and still getting used to living with an artificial hip she had implanted about a year ago. Still, she seems to navigate her fairly cluttered home with remarkable ease. And, like many of us, she wants to maintain her independence and control her own destiny for as long as she can. Many discussions about supporting independent living for the elderly begin with monitoring, and yet the concepts of monitoring and independence are rather uneasy bedfellows. I began to contemplate just how she lives with and fosters her own independence through all of her things and what we might learn from that for designing for the emerging Internet of Things.

Maria has many objects, devices, and technologies she has adopted and adapted to support her living, and these in turn shape how she lives. I call these things *habituated objects* because she has incorporated them into her routines and her home, and they have in turn played a role in shaping how she lives in her home. I asked her what she thought were her most important and favorite objects. It's a diverse and interesting list: magnifying glasses, shoes, tea-bag squeezer, big-screen TV, computer, key-on-a-string, free bus pass, sturdy shoes, and so on.

These important things might give a little insight into tangible and embodied interaction design, not from the perspective of the young and healthy visiting museums and collaborating in workplaces, but from the perspective of one older woman in her actual aging body with all of its specific capabilities and time-worn habits in the home she has adapted to suit her living for the past 15 years.

Maria grew up during World War II in the U.K. and knows what it was like to live on rations. She doesn't like to waste anything. There is a paper bag on the kitchen counter that I would be tempted to throw out, but is there in case she buys bananas—they keep better in a paper bag like that. There



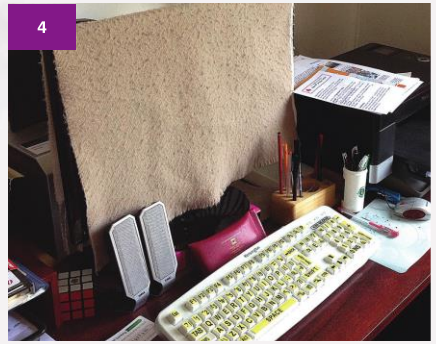












- Figure 1. (a) The kettle, tea, and tea-bag squeezer by the bed are all used for the habitual morning tea in bed. (b) The marmite jar that holds two portions of milk is taken upstairs at night in preparation for the morning tea in bed.
- Figure 2. Magnifying glasses are placed in strategic locations around the house. (a) The magnifying glass with built-in light is placed on a small table near where the bus timetables are kept. (b) A large magnifying glass kept in the kitchen for reading labels. (c) A magnifying glass placed near the couch.
- Figure 3. A key on a string by the windowsill is let down to welcome visitors.
- Figure 4. The computer monitor is often switched off and covered when not in use.

Tone Bratteteig, 26. januar 2026

The boundaries between 'the digital' and our everyday physical world are dissolving as we develop more physical ways of interacting with computing. This forum presents some of the topics discussed in the colorful multidisciplinary field of tangible and embodied interaction.

Eva Hornecker, Editor

Habituated Objects

Everyday Tangibles That Foster the Independent Living of an Elderly Woman

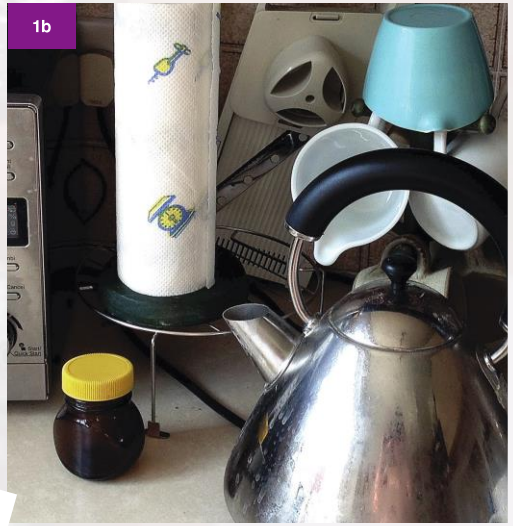
Margot Brereton
Queensland University of Technology | m.brereton@qut.edu.au

I recently visited an 82-year-old woman, Maria, the mother of a good friend whom I have known over the years. This visit got me thinking about tangible and embodied interaction in a different way: from the perspective of the everyday objects that inhabit and augment our lives and how they support independence and agency as we age. Maria is partially sighted and still getting used to living with an artificial hip she had implanted about a year ago. Still, she seems to navigate her fairly cluttered home with remarkable ease. And, like many of us, she wants to maintain her independence and control her own destiny for as long as she can. Many discussions about supporting independent living for the elderly begin with monitoring, a… yet the concepts of monitoring independence are rather uneasy bedfellows. I began to contemplate just how she lives with and fosters her own independence through all of her things and what we might learn from that for designing for the emerging Internet of Things.

Maria has many objects, devices, and technologies she has adopted and adapted to support her living, and these in turn shape how she lives. I call these things *habituated objects* because she has incorporated them into her routines and her home, and they have in turn played a role in shaping how she lives in her home. I asked her what she thought were her most important and favorite objects. It's a diverse and interesting list: magnifying glasses, shoes, tea-bag squeezer, big-screen TV, computer, key-on-a-string, free bus pass, sturdy shoes, and so on.

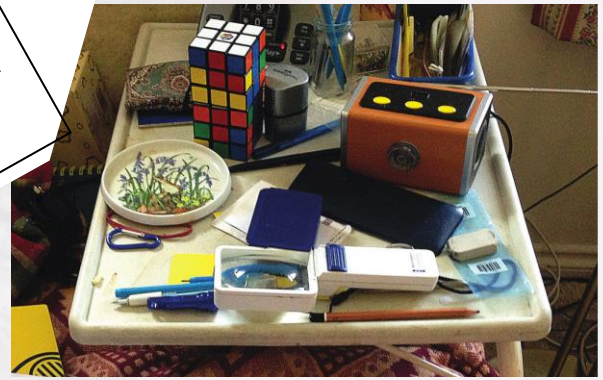
These important things might give a little insight into tangib… embodied interaction de… from the perspecti… and healthy vi… collabor… fro… The… coun… to thro… she buys… …eep bet-ter in a pa… …e that. There











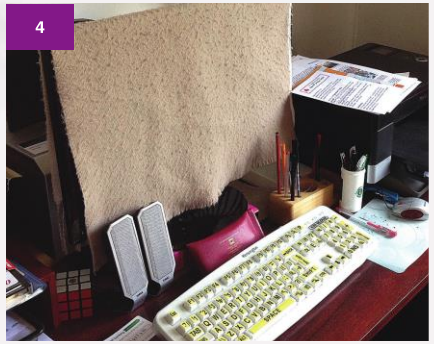
There is a small Marmite jar next to the kettle. I would recycle that one, but she tells me it's the perfect size for about two servings of milk (s. 20-22)

…in bed.
…e placed in …the house. (a) The …n built-in light is placed …e near where the bus time-… kept. (b) A large magnifying glass …in the kitchen for reading labels. (c) A magnifying glass placed near the couch.

▸ Figure 3. A key on a string by the windowsill is let down to welcome visitors.

▸ Figure 4. The computer monitor is often switched off and covered when not in use.





Tone Bratteteig, 26. januar 2026

The Messaging Kettle: Prototyping Connection over a Distance between Adult Children and Older Parents

Margot Brereton, Alessandro Soro, Kate Vaisutis, Paul Roe
Electrical Engineering and Computer Science, Queensland University of Technology
2 George St, Brisbane, QLD 4000, Australia
[m.brereton, alessandro.soro, k.vaisutis, p.roe]@qut.edu.au



https://www.youtube.com/watch?v=4c5KlzvOupU



Figure 1 The Kettle Mate and Tea Box. When the connected remote kettle (in another house) is switched on, the kettle mate displays a dynamic orange/red show of lights as shown.



Figure 2 Tea Box during in-home demonstrations showing a message sent from another continent.

Old Habits as a Resource for Design: On Learning and Un-learning Bodily Knowledge

ekstra litteratur

Tone Bratteteig
Department of Informatics
University of Oslo
P.B. 1080, 0316 Oslo, Norway
tone@ifi.uio.no

Guri Verne
Department of Informatics
University of Oslo
P.B. 1080, 0316 Oslo, Norway
guribv@ifi.uio.no

***Abstract*—There are many reasons why artifacts and systems are difficult to use in practice. In this paper, we investigate such difficulties as a basis for design for ease of use. Difficulties may stem from the artifact or system itself, or from the artifact or system in use in its real use context. Technology introduces new tasks, and both learning new tasks and unlearning old habits can be challenging. We discuss how users' previous knowledge and habits can be used to understand how and why an artefact is difficult to use. This understanding is useful for designing artefacts that are easy to use. We end the paper with presenting a conceptual framework for design for coherence and simplicity from the users' perspective, where users' habits and bodily knowledge act as resources for design.**

Keywords—usability; habits; automated behaviour; automation; participatory design.

I. Introduction

Usability is often defined as the ease of use and learnability of an artifact, sometimes narrowed down to specific users in a specified use context having specific achievement goals (e.g., ISO 9241). But what does "ease of use" mean more precisely? We have tried to find out what it is that makes some artifacts difficult to use for some users. This paper builds on an earlier paper [1] and expands the empirical material as well as the depth of discussion of possible reasons why some things turn out to be difficult to use. Our aim is that knowledge about how a piece of technology is difficult to use can be used as a basis for designing solutions that are easy to use.

Much of the research on artefacts that are easy – or difficult – to use is based on Nielsen [2], who lists five aspects of usability: learnability, efficiency, memorability, low error rate, and satisfaction. A more elaborate list is given by [3], who present eight aspects: consistency, universal design, feedback, closure of dialogs, reversal of action, control, error prevention, and memory load. Except for universal design, all the aspects are general and concern the design of the artifact seen as a stand-alone context-independent thing. Our research shows, however, that it is difficult to achieve a total independence of contextual design elements – it is impossible and even unwanted: "All products make some reference to either products extant during previous generations or products from different companies or product families." [4]. Such references are important to build on when trying to understand how to use the product. Even well-designed stand-alone artifacts can be difficult to use for users not sharing the contextual competence pre-supposed in the design. We have seen this in our and our colleagues' research, where we focus on elderly people and the technological support that is supposed to enable them to live independently in their homes longer [5].

The paper is structured as follows: Section II gives a review of literature about problems in using technologies. In Section III, we present two studies of use of technology: the use of public services like tax, and the use of common home artifacts like remote controls or mobile devices that need charging. Section IV summarizes the challenges we have identified in our research. In Section V we discuss the competencies users need to use an artifact, and how such competencies are experienced and embodied. Section VI summarizes what we have found to make things difficult to use. In Section VII, we turn to design for ease of use: we discuss how we can go from knowing about the difficulties people have using an artifact to design of an artifact that is easy for them to use. We divide the discussion in two parts, addressing first how designing with users can end up with design results that are easy to use, and lastly we discuss a more general approach to automation that addresses how the design itself creates user problems and how these can be resolved. Section VIII concludes the paper.

II. Problems when using Technology

A close study of people using IT artifacts reveals that they often find technology difficult to use (e.g., [6]). A classic study is Suchman's study of use of a Xerox copy machine [7][8] demonstrating how operating a copy machine was difficult due to the difference between the scripted "plan" in the copy machine and the users' (situated) understanding of copying. Another classic is Gasser's study of how people work around computer systems that do not fit the work they need to do, which shows that people carry out their jobs also with non-supporting artifacts [9]. Even when an IT system works well, it may not work well together with other systems [10][6]. Just using more than one system can





Figure 3. The prototypes for the knob (above) and the digital radio (below). Photo by Johnsen et al. [43].



Figure 2. A retired woman just laughed about using her large-sized and simplified remote control for her TV set (normal remotes to the left).





Figure 4. Testing several different induction chargers. Photo: Iversen [42].

prosjekt 2026 : design for og med mennesker på et sted

generelt for in1060: interaksjon uten skjerm

- «tangible interaction» (håndfast) eller
- interaksjon gjennom bevegelse i
  - «wearable computing» (bærbar)
  - «embedded computing» (innbakt)
  - «ubiquitous computing» (allestedsnærværende)

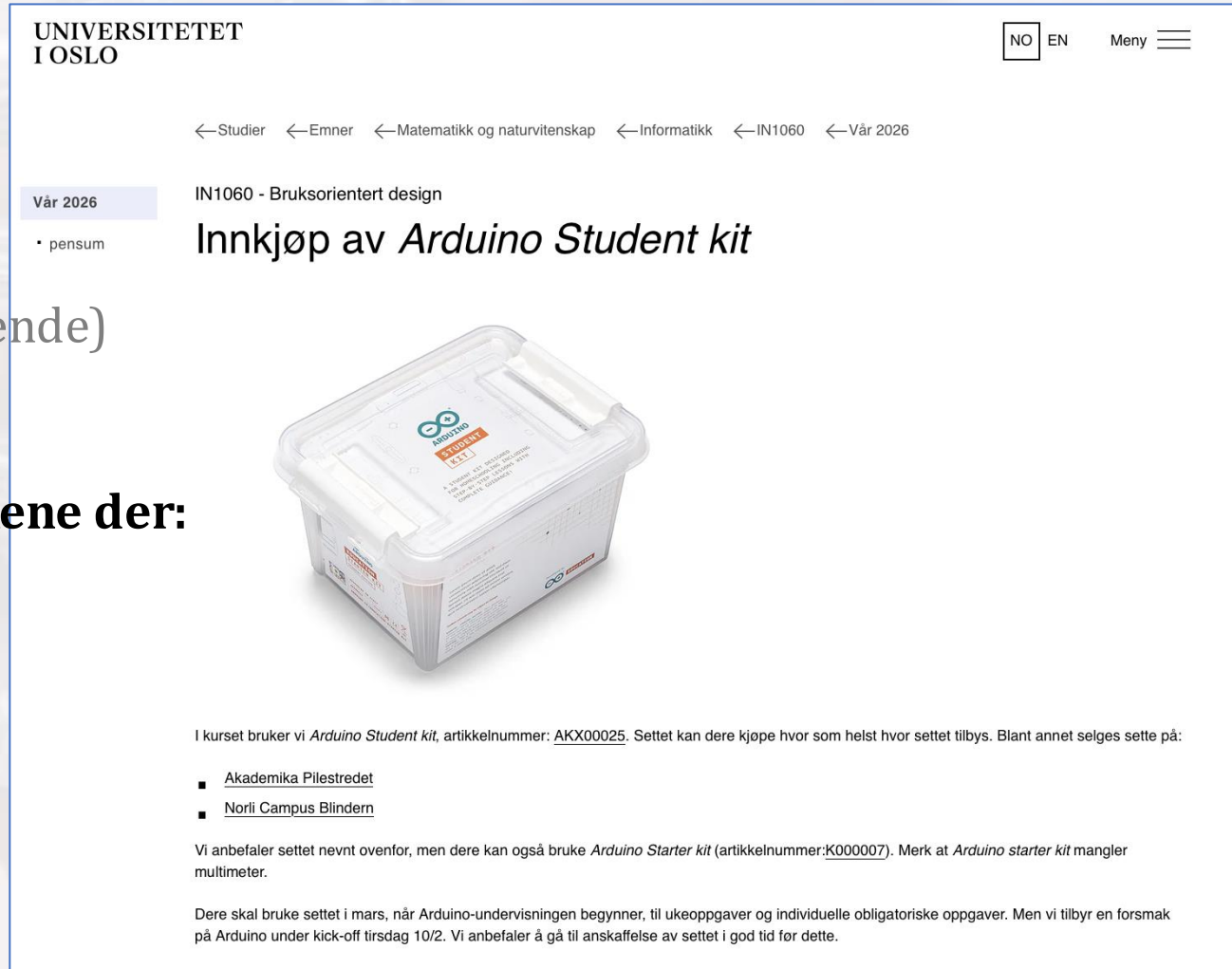
Tilnærminger til design for et sted & menneskene der:

A. designe støtte for en aktivitet på stedet

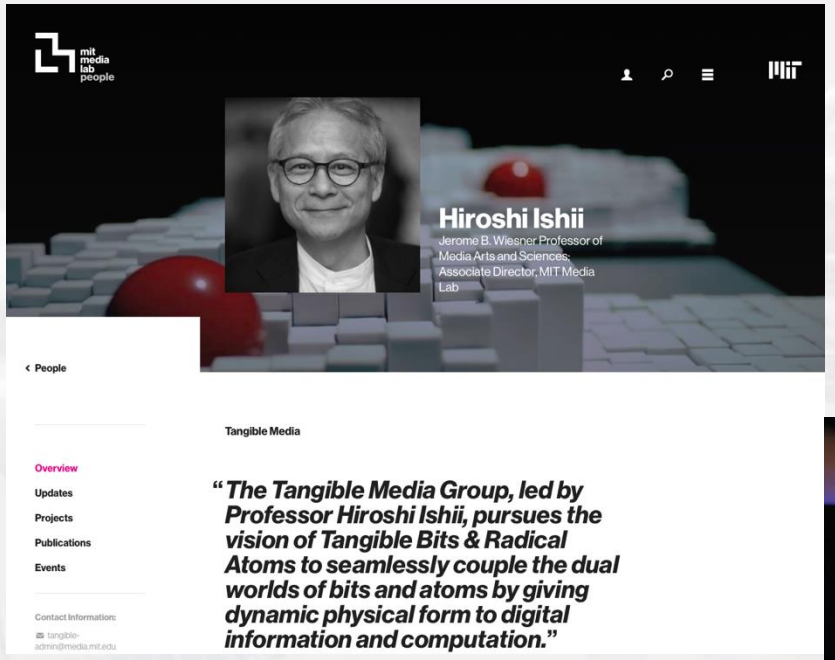
B. designe koblinger mellom steder

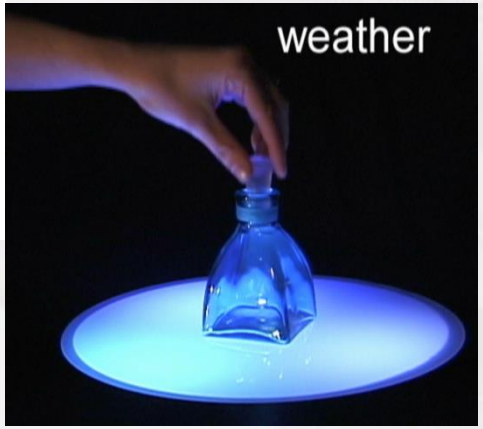
C. designe en utvidelse av stedet

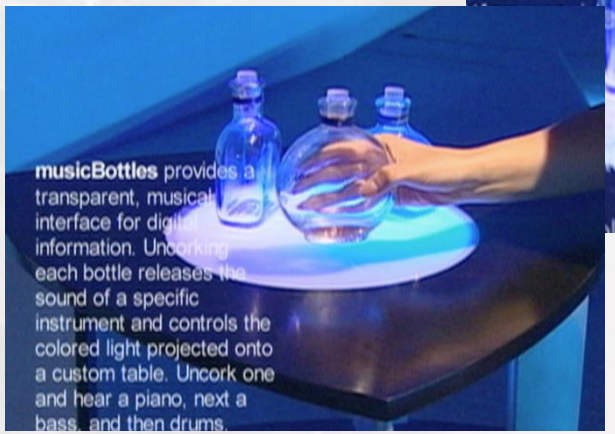
D. designe for å gi stedet en ny betydning



inspirasjon for prosjektene









inspirasjon for prosjektene

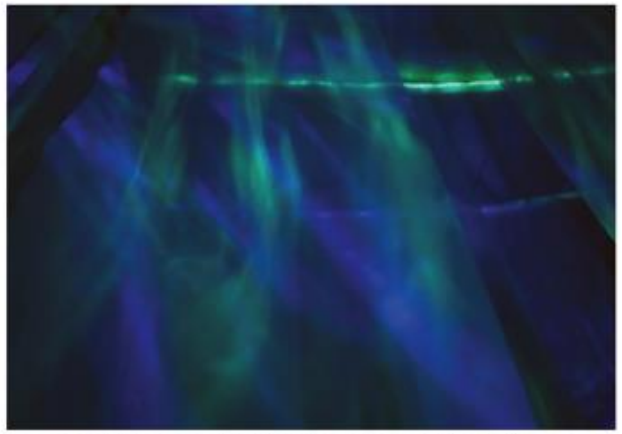
in5120 Tangible interaction – utstilling fredag 27. februar kl. 12

TANGIBLEINTERACTION

IN5120 - Tangible Interaction

AURORA BOREALISATION

By An Diep Vo, Jibrill Osman, Maria Siljuberg, Mila Toneff, Sandrine Eunice Taoum



Aurora Borealisation is an invitation to reflect on the invisible forces that shape our world and the universe beyond. At the edge of Earth's magnetosphere where solar winds collide, light and energy intertwine in a mesmerizing dance, shaping the sky with fluid, shifting patterns. Here, the seams between these forces – the point of collision – become a canvas for the phenomena we know as auroras.

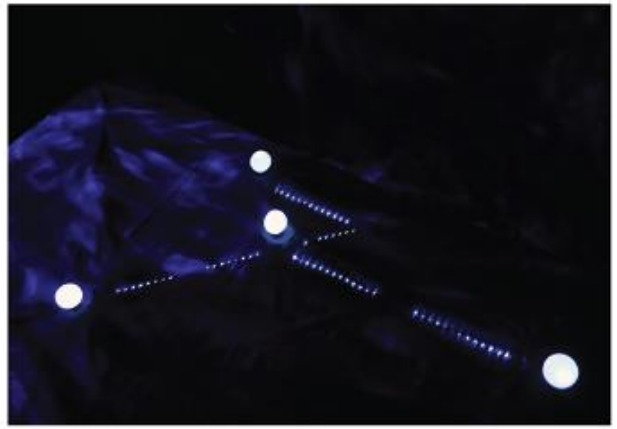
The installation uses light, sound, and movement to represent the invisible forces at play. As you step through the space, you are invited to experience the transition between the solar wind's unyielding energy and the Northern Lights' delicate, flowing luminosity, bringing to life the beauty of Earth's otherwise invisible magnetic boundary.



IN5120 - Tangible Interaction

REWRITE THE STARS

By Ajna Mutalimova, Kristine Løkke, Margrethe Stenvaag, Martin Langved, Ramin Salim



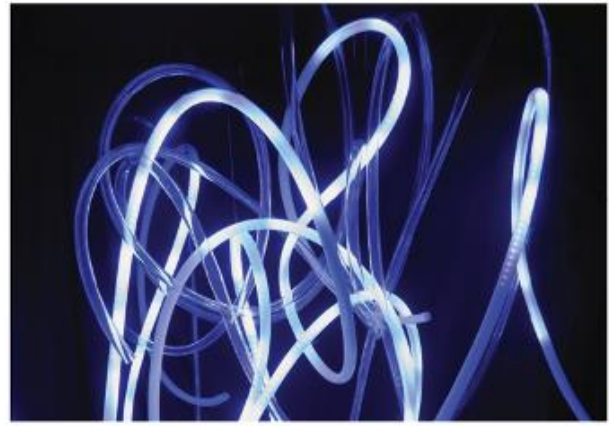
Rewrite The Stars is an interactive art installation that invites you to disassemble, deconstruct, and dismantle the starry sky as you know it. The sky functions as a metaphor for wholeness built from fragments. Constellations are formed by individual stars, so is the entire cosmos a patchwork of countless points of light. Rather than concealing the seams, we expose them, revealing how each piece connects to the next. Through active participation, you become a co-creator by reconstructing the sky, discovering new constellations, and, in the process, rewriting the stars themselves.



IN5120 - Tangible Interaction

ETHER

By Hallvard Drønen, Sara Netskar, Tina Polsangi Athari, Vendel Eikemo, Zehra Tien Ayden



The Internet is not seamless. Every message, search, and video stream moves through a vast physical network, consuming energy as it travels. Ether makes these hidden flows visible, showing how digital signals compete for space, encounter delays, and leave a footprint in the real world. Through shifting patterns and movement, the installation translates data into something tangible—revealing the unseen forces shaping our connected lives.

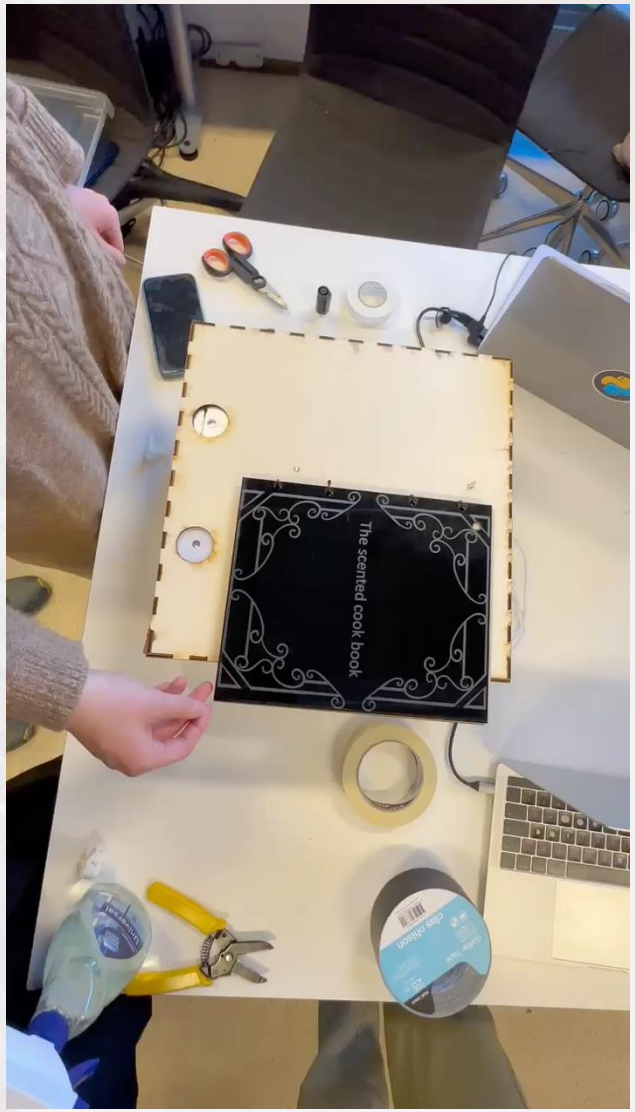


inspirasjon for prosjektene

in5120 TANGIBLEINTERACTION

utstilling fredag 27. februar kl. 12





lag en god prosjektgruppe

En god prosjektgruppe

1) kan møtes
   - på samme øvingsgruppe
   - kan finne prosjektmøte-tidspunkter utenom øvingsgruppa
2) har samme ambisjonsnivå
   - samme tidsbruk & prioritering av in1060
3) har forskjellig kompetanse, f.eks. programmering og bruksundersøkelser
   - har forskjellig personlige styrker (blå, rød, grønn)
4) og er enige om
   - et overordnet tema alle er interessert i og vil finne ut av
   - en målgruppe / brukergruppe alle er interessert i og som det er mulig å få tilgang til

NB NB

Konflikter i in1060 skyldes alltid følgende

1) vanskelig å finne tider der hele gruppa kan møtes
2) ulik prioritering av in1060
   - ➜ legger inn ulik arbeidsmengde
   - ➜ ulik kunnskap om & i prosjektet
3) medlemmenes bidrag blir veldig forskjellige

Videre planer

neste time:

- inspirasjon til prosjektene

neste uke:

<u>øvingsgruppene:</u>

- hva er viktig i pensum
- mer om oppstart av prosjektet

<u>neste forelesning 2. februar</u>

- kapittel 4 (hva er bruk)
- kapittel 6 (hvordan undersøke bruk)



uke	pensum	forelesning mandag 12.15 - 14.00			øvingsgruppe: tirsdag-mandag		innleveringer & oppgaver		bidrar	
4		19/1	Tone & Fabiano	intro til emnet: brukerorientert design om prosjektarbeidet, eksempler på prosjekter	ikke fellesøving	om prosjektet, idemyldring, bli kjent			pen-sum	pro-sjekt 0
5	kap 1 & art B	26/1	Tone	hvorfor brukermedvirkning? om prosjektet i emnet brukerorientert design	ikke fellesøving	diskusjon kap 1 & art B	tema & målgruppe			0
6	kap 4 + 6	2/2	Tone	hva trenger designere å forstå om bruk?	ikke fellesøving	diskusjon kap 4,6	tema & målgruppe + plan etabler prosjektgruppe			1
7	kap 2 & art B&W	9/2	Tone	hva er egentlig design? hvordan jobber designere?	kickoff til prosjektet	diskusjon kap 2 & art B&W	forbered presentasjon			2
8	kap 5 & art M+ vinterferie 16-20/2	16/2	Tone	design med brukere om prosjekt & obliger & designteknikk	mndig prosjekt-presentasjon	Gruppeoblig 1 presentasjon av prosjektidéer		Grp. øvingsgrp 17-18/2 obl 1 presenter prosjektidé		3
9	kap 7 & art H&H utstilling Tangible bare 27/2	23/2	Tone	hva er prototyping og hvordan inkluderer vi brukere i prototyping	ikke fellesøving	diskusjon kap 7 & art H&H	revurder, forfin prosjektidé, planlegg prosjekt			4
10		2/3	Nicli	introduksjon til Arduino	tilsvarsoppgaver Arduino	Arduino-jobbing		Grp. prosjektplan obl 2 innlev 3/3	Ardu-ino	5
11		9/3	Nicli	mer om Arduino, storm rom	hjelp til Arduino oblig 1	Arduino-jobbing		Ind. Arduino-oppgaver obl 1 innlev 12/3		6
12	in1810 midtveis 20/3 kl 13	16/3	Nicli	Arduino, sensorer og aktuatorer	tilsvarsoppgaver Arduino	Arduino-jobbing		Grp. intervjuplan + spørsmål obl 3 innlev 19/3		7
13		23/3	Nicli	prototyping med Arduino	hjelp til Arduino oblig 2	Arduino-jobbing		Ind. Arduino-oppgaver obl 2 innlev 26/3		8
14 påskeferie		30/3		påske[0].fra mandag 30/3 – mandag 6/4						
15	art B+	6/4			orgkvel	diskusjon art B+ & M+	revider prosjektidé,		pro-sjekt	9
16	kap 3 & H + S+	13/4	Tone	hva er egentlig interaksjon?	orgkvel	diskusjon kap 3 & art H + S+		Grp. statusrapport obl 4 innlev 16/4		10
17	kap 8 & N&W	20/4	Tone	å jobbe i team	orgkvel	Gruppeoblig 5 evaluere prosjektarbeidet		Grp. evaluer prosjektarbeidet obl 5 øvingsgrp 21-27/4		11
18	Tone Dagsturbi hele uke frå fredag 1/5	27/4	gjest		orgkvel	diskusjon kap 8 & art N&W				12
19		4/5	Tone	orgkvel	mndig prosjekt-presentasjon	Gruppeoblig 6 presentasjon av prototyper		Grp. presenter prototype obl 6 øvingsgrp 5-11/5		13
20	frå torsdag 14/5	11/5	Tone	om rapportering av prosjektet om evalueringskriterier & eksamen	orgkvel	revidér prototype		Grp. rev. plan design & test obl 7 innlev 14/5		14
21		18/5	Tone & Fabiano	oppsummering & eksamenstips	orgkvel	oppsummering & eksamenstips		Grp. siste prosjektrapport obl 8 innlev 22/5		15
22 in1810-eksamen fredag 29/5@15	frå mandag 25/5	25/5			orgkvel					16
23		1/6								17
24		tirsdag 9/6 onsdag 10/6 torsdag 11/6		presentasjon: presenter prosjekt presentasjon: presenter prosjekt presentasjon: presenter prosjekt						18
		fredag 12/6		innlevering prosjektrapport & teknisk innlevering individuell rapport						

forelesning	mandag 12-14	KN: store aud	Tone Bratteteig, Fabiano Pinatti & Nick Stevens (Arduino)
fellesøving	tirsdag 10-12	Casti	Mali Aalbu
gruppe 1	onsdag 12-14	Prolog	Mathea Hoen Borge
gruppe 2	mandag 10-12	Java	Milla Løvstad Solberg
gruppe 3	tirsdag 12-14	Smalltalk	Synne Haugensen Haga
gruppe 4	onsdag 10-12	Prolog	Simone Janey

pensum	
kap 1-8 lærebok	kap X
Brereton	B
Bratteteig & Wagner	B&W
Maartmann-Moe m.fl.	M+
Houde & Hill	H&H
Bråthen m.fl.	B+
Holmquist	H
Tone m.fl.	S+
Nixon & Wesnick	N&W

obliger	
for prosjektgruppa	
1: presenter prosjektid'e - 17-18/2 av grp	
2: prosjektplan torsdag 5/3	
3: intervjuplan + spørsmål torsdag 19/4	
4: statusrapport torsdag 16/4	
5: evaluer prosjektarbeid - 21-27/4 av grp	
6: presenter prototype - 5-11/5 av grp	
7: rev. plan design & test prototype torsdag 14/5	
8: siduet prosjektrapport torsdag 22/5	
for individuelle studenter	
1: Arduino #1 - torsdag 12/3	
2: Arduino #2 - torsdag 26/3	

eksamen	
for prosjektgruppa	
presenter prosjekt	tirsdag-torsdag 9-11/6
lever prosjektrapp. + tekn.rapp.	fredag 12/6
for individuelle studenter	
lever rapport	fredag 12/6

nettskjema for registrering av prosjektgrupper

Lykke til!