DIGHEL4360: Sociotechnical design in IT and digitalization projects

08-11-2022

Magnus Li

Senior lecturer and Researcher
magl@ifi.uio.no

Department of Informatics and the HISP Center
University of Oslo

UNIVERSITETET
I OSLO

Trial exam

Hi, as there are no past exams to consult, we're handing out a trial exam after the lecture on Nov 16. It's not mandatory but will be similar to the final exam in the course. It will have the same type of assignments as the exam and will be of similar length, i.e. to be completed within 4 hours. I will go through it during the last lecture on Nov 23

- Johan

Until now

- An overview of “IT” and “digitalization” projects
- Looked at the role and practices of software teams and software engineering
- Today and next week: “sociotechnical design” in IT and digitalization projects

Today

- What is “sociotechnical design”
- Why sociotechnical design in IT and digitalization projects: Three problems
- Approaches to sociotechnical design in IT and digitalization project
  - The landscape
  - A way to distinguish them: scopes, analytical frameworks, values
- Typical “design” activities (possibly next week)

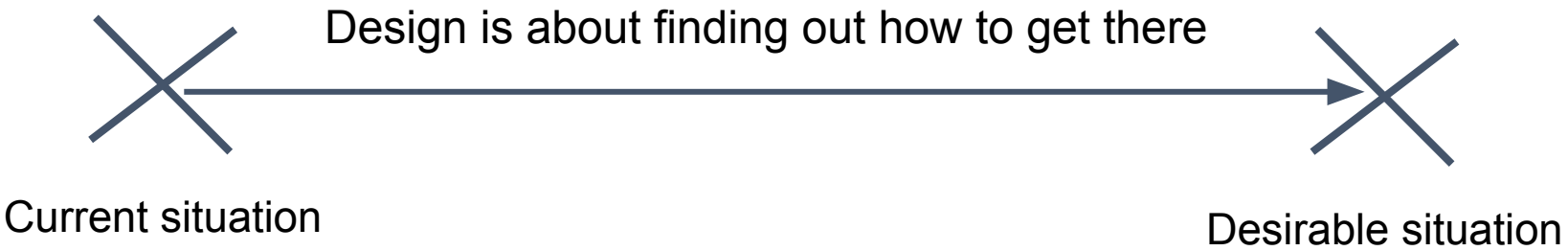
Think and note

- What do you think when you hear “design” and “designer” in relation to IT and digitalization projects?

Write some quick bullet points for 1 min…

“Design” - beyond colours and layouts

- Can broadly be defined as systematic attempts to transform undesirable situations into preferred ones (Simon, 1979)
- Or; devising for how to solve problems
- Hence, central to many professional disciplines, e.g., engineering, architecture, organizational management, computer science, informatics



“Sociotechnical design”

Sociotechnical in the sense that either

- technology should be designed with basis in technical and social arrangements within the the context of use
- design should consider both technology and social arrangements (e.g., organizational routines, standards, roles) in tandem

Approaches to sociotechnical design

Design thinking

Business process improvement (and reengineering)

Interaction design

Human centered design

Participatory design

User experience design

Service design

Systemic design

Activity centered design

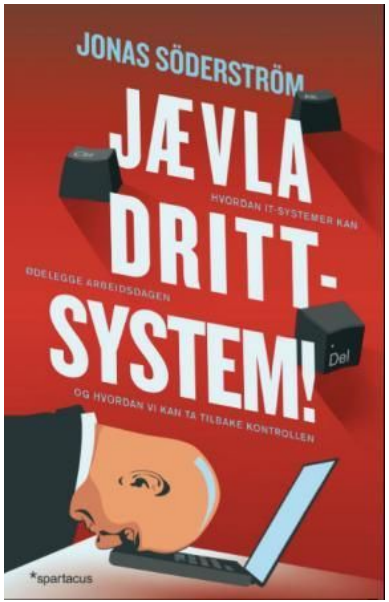
Usability engineering

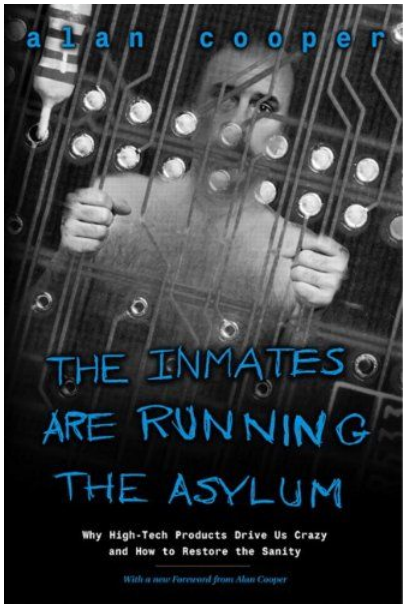
Why sociotechnical systems design

- Software engineering and IT is technology-oriented
- However, technology is there to support human activity and must integrate with social systems.
- The techno-orientation gives rise to several challenges - we will look at three

Problem 1: Technology + users = friction

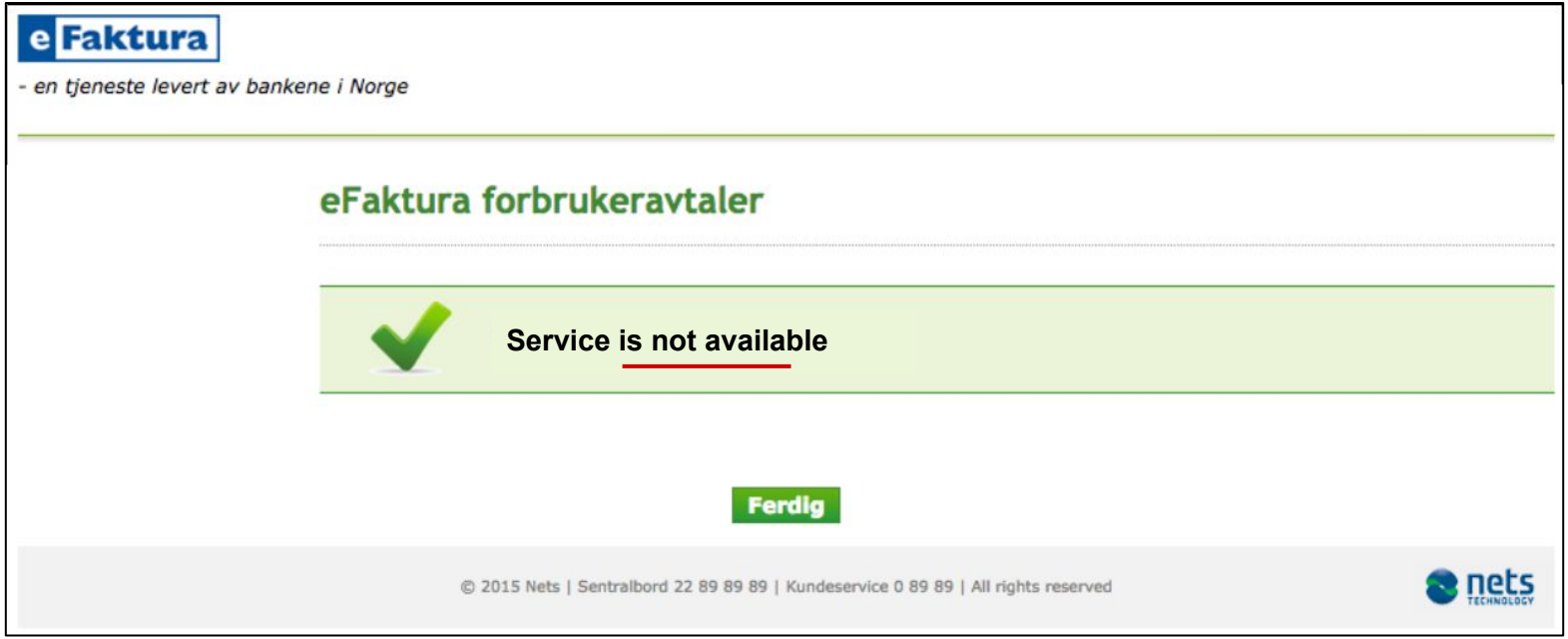
- Issue: IT is designed by “technology-people”
- Result is
  - technology with low *usability*
  - technology designed based on what is technically “cool” instead of what is relevant for humans






RICOH
Skanner
Klar
Plasser original og spesifiser destinasjon.
Lagre til
Status skannede filer
Kontroller innst.
Søk destin.
Forhåndsvisning
Tot. destin
0
Minne %
100%
S-H: tekst / strektegning
200 dpi
Auto gjenkjenn
E-post
Mappe
E-postadresse:
ProgDest
Skanneinnstillinger
Reg.nr.
Angi manuelt
Nylig
Til
Cc
Bcc
Auto, intens.
Frekv.
AB
CD
EF
GH
IJK
LMN
OPQ
RST
UVW
XYZ
Endre tittel
1-sidig original
Type original inn
Send filtype/-navn
Velg lagret fil
Tekst
Emne
Sikkerhet
Mottaksmelding
1/4
Skanne
16 OCT 2015
12:54


RICOH
Skanner
Klar
Plasser neste original innen 1 1 2 sek., og trykk Start. Hvis ingen, trykk ⊕.
Tot. destin
1
Minne %
99%
S-H: tekst / strektegning
200 dpi
Auto gjenkjenn
E-postadresse:
Til:
li.magnus@gmail.com
Skanneinnstillinger
Auto, intens.
1-sidig original
Type original inn
1/4
Skanne
16 OCT 2015
12:56


eFaktura
- en tjeneste levert av bankene i Norge
eFaktura forbrukeravtaler
Service is not available
Ferdig
© 2015 Nets | Sentralbord 22 89 89 89 | Kundeservice 0 89 89 | All rights reserved
nets
TECHNOLOGY

Operating manual on several pages for using a stapler (!)

Problem 2: large IT projects fail

- Some argue: since software engineering and IT projects are techno-oriented, it fails to consider social aspects

Two sides:

- Design of technology not sufficiently based on organizational arrangements
- Introduction of technology not seen, planned or treated explicitly as organizational change

Britenes journalprosjekt ble omtalt som «Titanic-utgaven av IT-katastrofer». Nå skal Norge forsøke å få til noe lignende.

England svidde av 100 milliarder kroner i et feilslått forsøk på å få på plass et felles journalsystem for helsevesenet. Når Norge nå skal forsøke noe lignende, mener myndighetene at de har langt bedre forutsetninger for å lykkes.

Jan Tore Sanner:- Jeg valgte å stoppe prosjektet

Akson: Prosjektet har for høy risiko med for mange uavklarte problemstillinger

Et nytt felles datasystem til regjeringskontorene skulle kostet over 600 millioner kroner. Da satt Jan Tore Sanner foten ned.

Staten styrer mot endå ein it-skandale

Vend i tide. Det er inga skam å snu.

Halvparten av alle norske IKT-prosjekter havner i problemer

Slik skal politiets «IKT-lokomotiv» komme tilbake på sporet

Til tross for at over 200 millioner kroner har blitt brukt til forberedelser, forkastes programmet som skulle gi politiet et sårt tiltrengt IKT-løft. – Pengene har ikke blitt kastet ut av vinduet, sier Politidirektoratets IKT-direktør Cato Rindal.

Derfor gikk på NAV på en IT-smell i milliardklassen

– Veldig bekymringsfullt at IT-skandaler skjer gang etter gang

Nav-sjefen fikk sparken for IT-rotet

– Alt Nav har gjort har vært fiasko

Milliardene de skal bruke på konsulenter er et endeløst rop om hjelp, mener IKT-Norge.

Death By 1,000 Clicks: Where Electronic Health Records Went Wrong

The U.S. government claimed that turning American medical charts into electronic records would make health care better, safer and cheaper. Ten years and $36 billion later, the system is an unholy mess. Inside a digital revolution that took a bad turn.

– Man må velge fra lister og unngå å bruke fritekst der det er lagt opp til strukturert dokumentasjon, sier Gotaas.

Mona Stedenfeldt, seksjonsleder for informasjonsforvaltning, mener det er viktig at klinikere ser seg selv som en del av en verdikjede, hvor dataene som registeres senere kan benyttes i et kvalitetsregister.

DAGENS Medisin

Nyheter | DMTV | Debatt | Pharma | DM Arena | Om oss

– Målet er å fylle registerne med gjenbruk fra journalsystemet, sier informasjonsarkitekt Eigil Gotaas.

Sparer 25.000 timer med tastetrykk

Stedenfeldt sier de har kalkulert tiden det tar å fylle kvalitetsregistrene med data fra Helse Midt-Norge.

– Da er vi oppe i over 25.000 timer hvor noen kun sitter og registrerer informasjon i kvalitetsregister, forteller seksjonslederen.

Dette er bare det det regionale helseforetaket er forpliktet til å registrere. Det inkluderer for eksempel ikke registrering i kreftregistrene eller lokale og regionale registre.

– Det er ganske mange timer med klikking og dobbelregistreing.

(From presentation by Eirik Nikolai Arnesen, 31.10.2022)

Helseplattformen:

Mye av det som framstår som tungvint med Epic i starten er altså et resultat av at «den nye tid» krever endring i arbeidsprosessene – og sikkert roller (hvem som gjør hva). Her kan en velge å ta i bruk det nye systemet med stor grad av gamle arbeidsprosesser – eller en kan tenke mer moderne og endre på disse arbeidsprosessene – mye eller lite. Det er en balansegang hvor mye det er lurt å endre i arbeidsprosessene ved oppstart av Helseplattformen – mye eller lite. Det er mulig en her har tatt i for mye – men det er altså mulig å endre på dette når en får satt systemet i produksjon.

https://www.tronderdebatt.no/det-gjor-meg-oppriktig-trist-a-se-hva-et-hundretalls-helsearbeidere-ved-st-olavs-far-seg-til-a-skrive-i-mediene/o/5-122-55871

But do we need change in the work processes? And what guides it?

(From presentation by Eirik Nikolai Arnesen, 31.10.2022)

Example: Excessive reporting

- Health clinicians spends increasing amount of time on reporting

Why?

Write some quick bullet points for 1 min…

Example: Excessive reporting

- Health clinicians spends more and more time on reporting
- What guides the process?
  - Possibilities in technology?
  - Who’s needs?

Problem 3: Adverse IT

Translated:

WARNING

This man is dangerous!

He is an engineer.

He has learned everything about technology,

but nothing about society

Therefore, he pollutes
Therefore, he builds environments hostile to humans
Therefore he produces weapons and poisonous substances

“The main benefit is for the employer, not the employees“

“UK startup creates uncomfortable toilet to increase workers’ productivity“ (CTV news)

StandardToilet (2019)

The Folldal Mine toilet (Norway, late 1700s)

Amazon chews through the average worker in eight months. They need a union

“delivery workers have been forced to urinate in bottles due to lack of access to bathrooms”

Source: the guardian

Sociotechnical design

- Responding to the different challenges raised, there is a range of sociotechnical approaches to IT/IS design.
- Common argument: we need to consider technology as part of human/social systems
- “Sociotechnical” in that they either emphasize
  - That technology should be designed with basis in technical and social arrangements within the the context of use
  - That design should consider both technology and social arrangements (e.g., organizational routines, standards, roles) in tandem

The design approach “zoo”

Approaches to sociotechnical systems design

Design thinking

Business process improvement (and reengineering)

Interaction design

Human centered design

Participatory design

User experience design

Service design

Systemic design

Activity centered design

Usability engineering

“Design” in IT and digitalization projects

Different design approaches has:

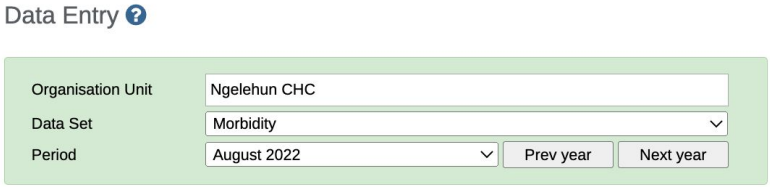
- A certain “**scope**” or types of problems it aims to address
- A certain **way of making sense** of the problem situation to be addressed
- A certain set of underlying **values**
- A set of **design activities**

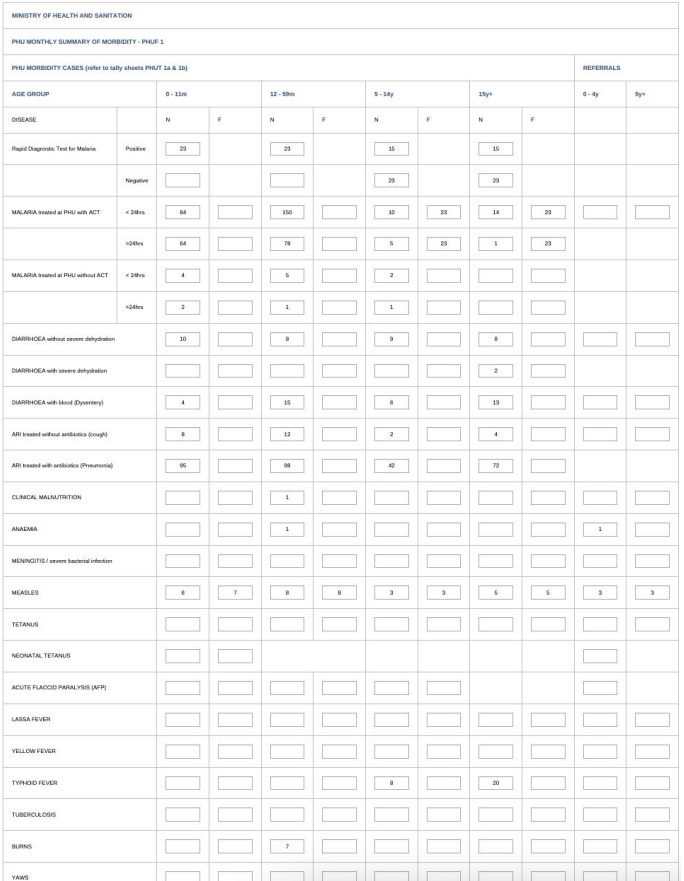
Three scopes of design

- three design “scopes” or types of problems relevant in digitalization projects:
  - **User interfaces** - e.g., usability engineering
  - **Tools** - e.g., user centered design
  - **Systems** - e.g., design thinking, systems design, business process improvement, service design

Three scopes of design: user interfaces

- Usability engineering
- Interaction design
- Some parts of “UX” design



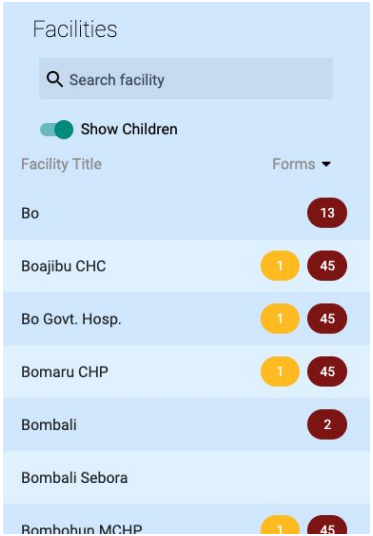

MINISTRY OF HEALTH AND SANITATION

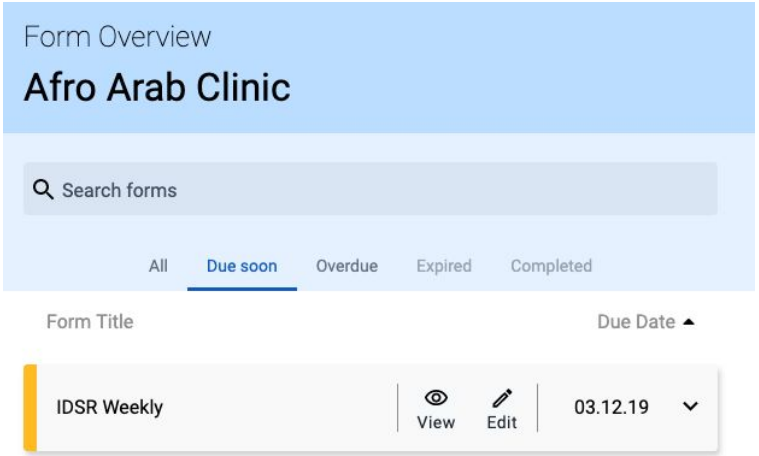
PHU MONTHLY SUMMARY OF MORBIDITY - PHUF 1

PHU MORBIDITY CASES (refer to tally sheets PHUT 1a & 1b)										REFERRALS	
AGE GROUP		0 - 11m		12 - 59m		5 - 14y		15y+		0 - 4y	5y+
DISEASE		N	F	N	F	N	F	N	F		
Rapid Diagnostic Test for Malaria	Positive	23		23		15		15			
	Negative					23		23			
MALARIA treated at PHU with ACT	< 24hrs	84		150		10	23	14	23		
	>24hrs	64		78		5	23	1	23		
MALARIA treated at PHU without ACT	< 24hrs	4		5		2					
	>24hrs	2		1		1					
DIARRHOEA without severe dehydration		10		8		9		8			
DIARRHOEA with severe dehydration								2			
DIARRHOEA with blood (Dysentery)		4		15		6		13			
ARI treated without antibiotics (cough)		8		12		2		4			
ARI treated with antibiotics (Pneumonia)		95		98		42		72			
CLINICAL MALNUTRITION				1							
ANAEMIA				1						1	
MENINGITIS / severe bacterial infection											
MEASLES		6	7	8	8	3	3	5	5	3	3
TETANUS											
NEONATAL TETANUS											
ACUTE FLACCID PARALYSIS (AFP)											
LASSA FEVER											
YELLOW FEVER											
TYPHOID FEVER						8		20			
TUBERCULOSIS											
BURNS				7							
YAWS											

Three scopes of design: tools

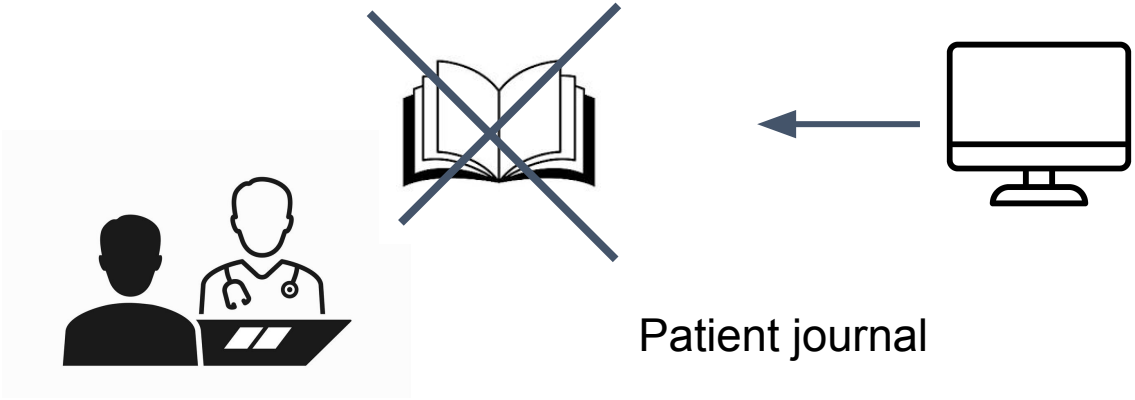
- User centered design
- ++





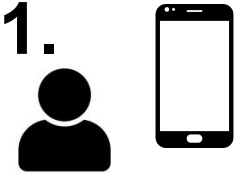
Three scopes of design: systems

- Design thinking
- Systemic design
- ++



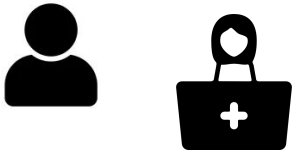
Three scopes of design: systems

1.



Patient potentially self registering on phone at home

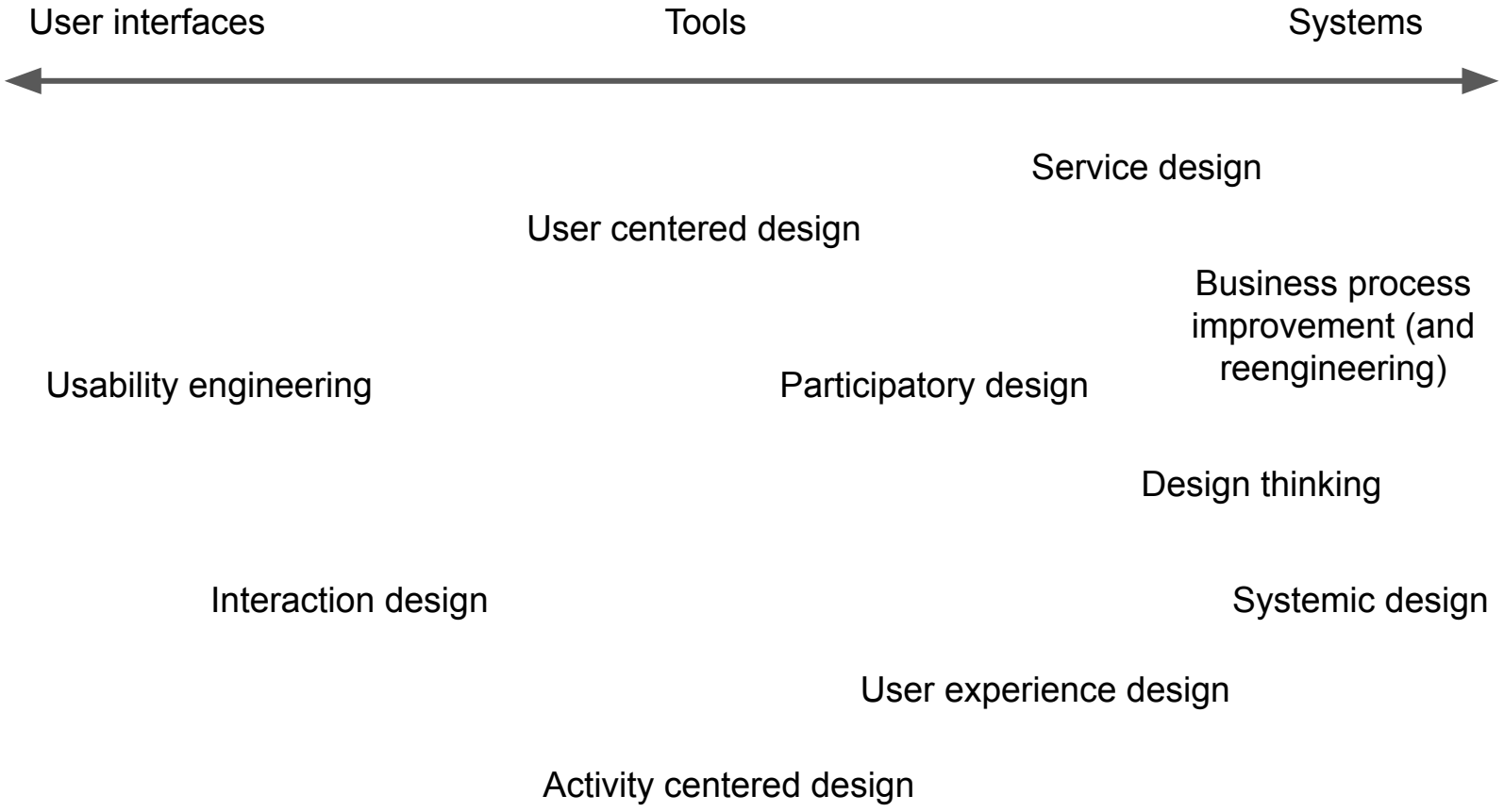
2.



Health secretary Registering patient info on patient arrival

3.

Patient is ready in list on doctors computer screen


User interfaces
Tools
Systems
Service design
User centered design
Business process improvement (and reengineering)
Usability engineering
Participatory design
Design thinking
Interaction design
Systemic design
User experience design
Activity centered design

“Design” in IT and digitalization projects

Different design approaches has:

- A certain “**scope**” or types of problems it aims to address
- A certain **way of making sense** of the problem situation to be addressed
- A certain set of underlying **values**
- A set of **design activities**

Ways of making sense of the problem situation to be addressed

- Systemic design → Systems theory
- Activity-centered design → Activity theory
- Many: theory-agnostic, or theory is implicit (e.g., “service”-design)

“Design” in IT and digitalization projects

Different design approaches has:

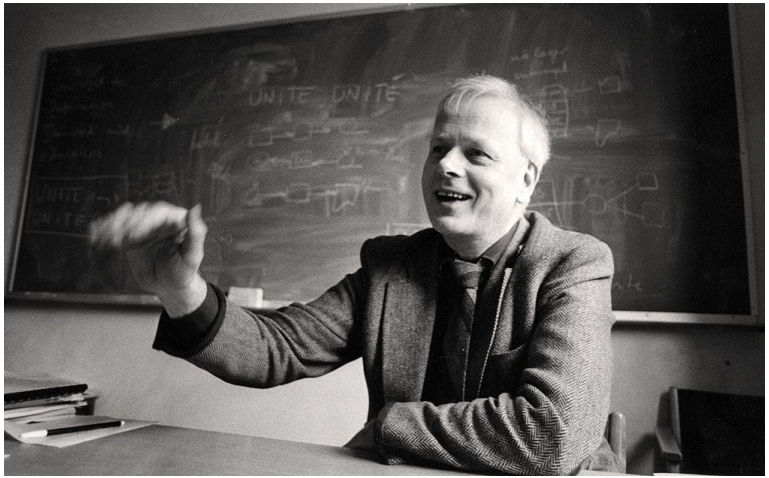
- A certain “**scope**” or types of problems it aims to address
- A certain **way of making sense** of the problem situation to be addressed
- A certain set of underlying **values**
- A set of **design activities**

Values in design

- Design is never value neutral
- Values are ingrained in what we consider problems to be addressed (and who defined them), and in what we consider meaningful means, ends and solutions.
- Many approaches are value agnostic (e.g., design thinking)
- Some are clearly commercial (with a touch of human-centered)
    - E.g., user-centered design - “products that is a joy to use and a joy to own”
- Some are about efficiency only (e.g., business process management and engineering)

Values in design: humanistic and democratic values

- Some approaches has clear humanistic and democratic values
- E.g., ETHICS by Enid Mumford
- Participatory design (“The Scandinavian tradition”)



Dahl and Nygaard at the time of Simula's development

“Design” in IT and digitalization projects

Different design approaches has:

- A certain “**scope**” or types of problems it aims to address
- A certain **way of making sense** of the problem situation to be addressed
- A certain set of underlying **values**
- A set of **design activities** → next week