DIGHEL4360: Sociotechnical approaches to software design and digitalization

13/11-23

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So far

- 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
- Approaches to sociotechnical design in IT and digitalization project -
    - The landscape of approaches
    - A way to distinguish them: scopes, analytical frameworks, values
- Some elements of a design process/"designerly thinking": divergent and convergent thinking

Think and note

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

Write some quick bullet points

What is design?

- 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

Design is about finding out how to get there

Current situation

Desirable situation
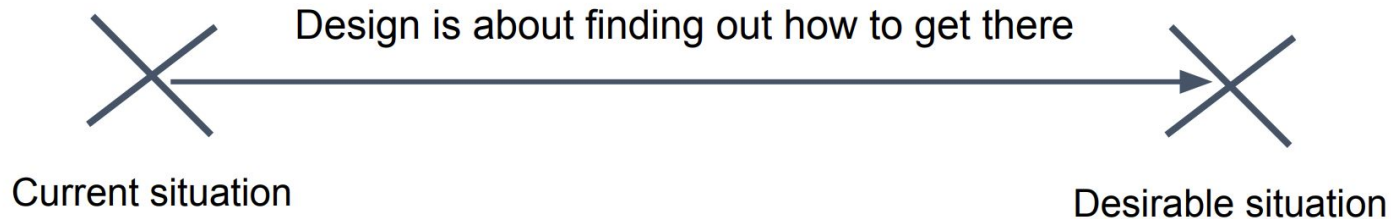
Sociotechnical design

Common argument: we need to consider technology as part of human/social systems

Sociotechnical in the sense that either

- Technology should be designed based on the social arrangements within the context of use

- Design should consider both technology and social arrangements (e.g., organizational routines, standards, roles)

Sociotechnical?

"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)

Sociotechnical?

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

Why sociotechnical 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

Why sociotechnical 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

    - IT is designed by "technology people": technology with low usability - technology designed based on what is technically "cool" instead of what is relevant for humans

    - Large IT projects fail: Introduction of technology not seen, planned or treated explicitly as organizational change

Approaches to sociotechnical design

Different design approaches has:

- A certain **"scope"** (object of design) 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**

Approaches to sociotechnical design

Design thinking

Business process improvement (and reengineering)

Interaction design

Human centered design

Participatory design

Service design

User experience design

Systemic design
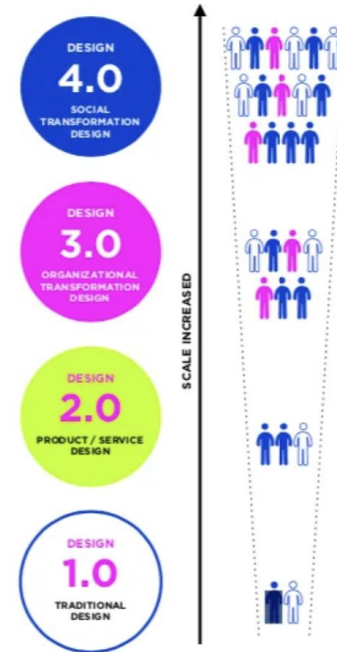
Activity centered design

Usability engineering

Approaches to sociotechnical design

Systems ———————————————————→ User interfaces

Service design

Usability engineering

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Business process
improvement
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User centered design

Activity centered design
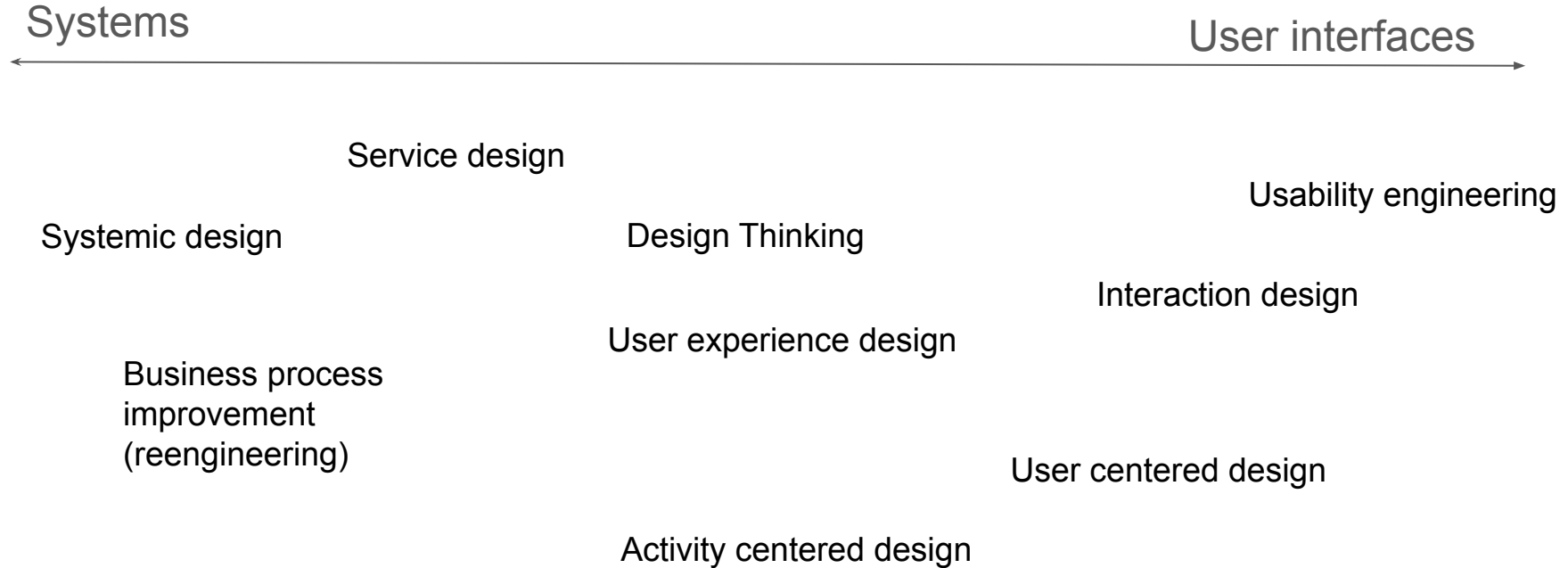
Four "domains" characterized by increased complexity

1. Artifacts and communications: design as making, or traditional design practice

2. Products and services: design for value creation (including service design, product innovation, multichannel, and user experience), design as integrating

3. Organizational transformation (complex, bounded by business or strategy): change-oriented, design of work practices, strategies, and organizational structures

4. Social transformation (complex, unbounded): design for complex societal situations, social systems, policy-making, and community design.

DESIGN 4.0 SOCIAL TRANSFORMATION DESIGN

DESIGN 3.0 ORGANIZATIONAL TRANSFORMATION DESIGN

DESIGN 2.0 PRODUCT / SERVICE DESIGN

DESIGN 1.0 TRADITIONAL DESIGN

SCALE INCREASED

Source

Values in design

- Design is never value neutral
  - Values may be based on ethical, commercial, organizational, systemic, ideological considerations
  - Values are ingrained in what we consider problems to be addressed (and who defines them), and in what we consider meaningful means, ends and solutions.
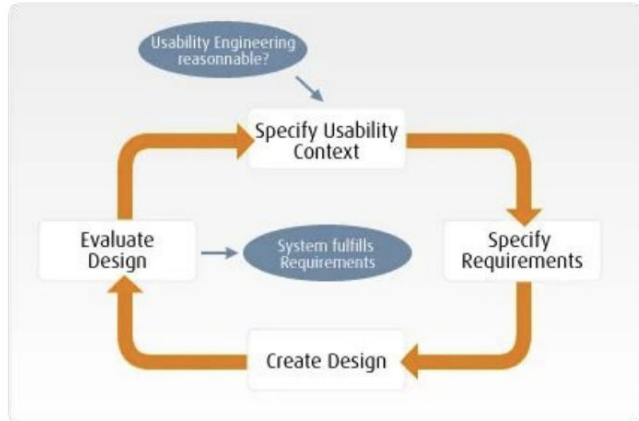
Many approaches are value agnostic (e.g., design thinking)

• Some are clearly commercial

• 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)
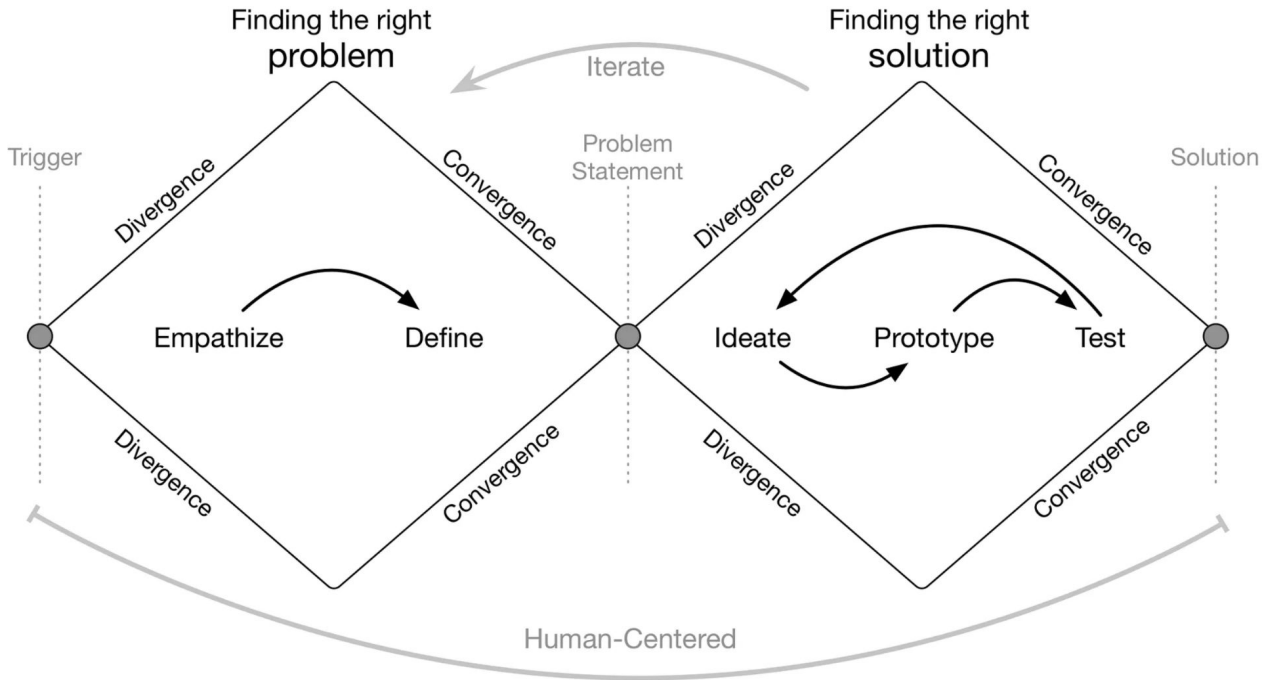
Design processes
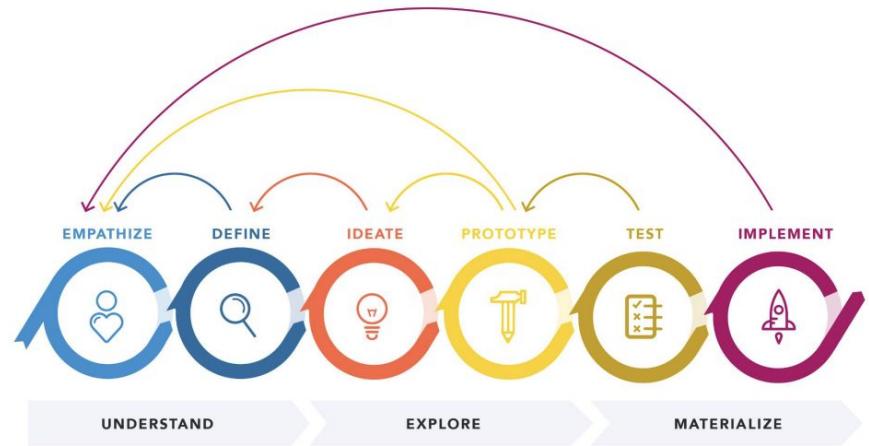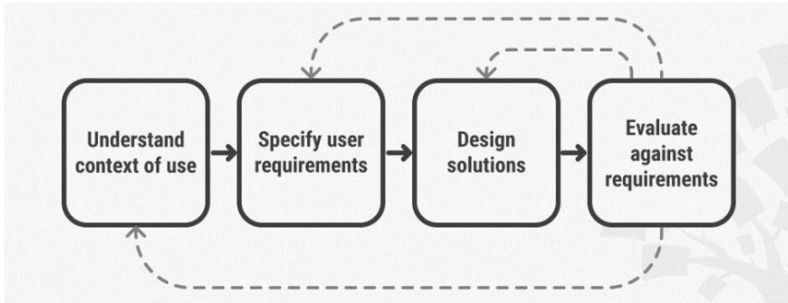
DESIGN THINKING 101 NNGROUP.COM

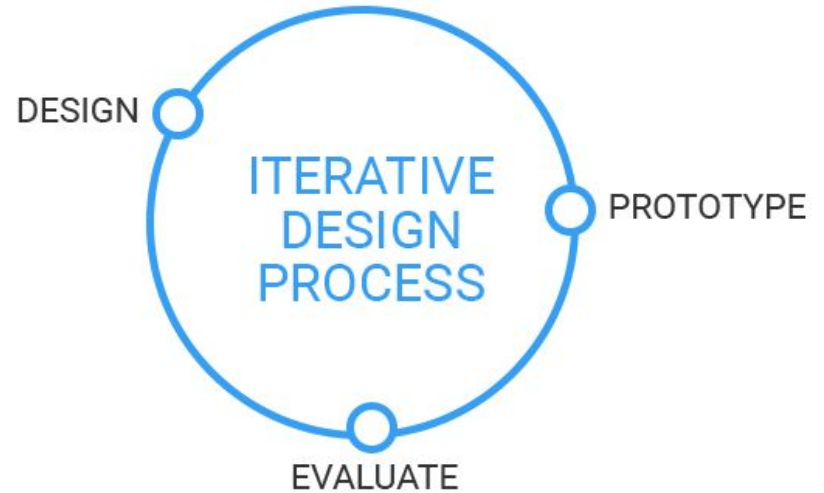Many different models from different approaches, but some activities often surface!

Divergent and convergent thinking

- "Designerly" thinking

Iterations

Iteration: many versions of a design - the same procedure repeated multiple times

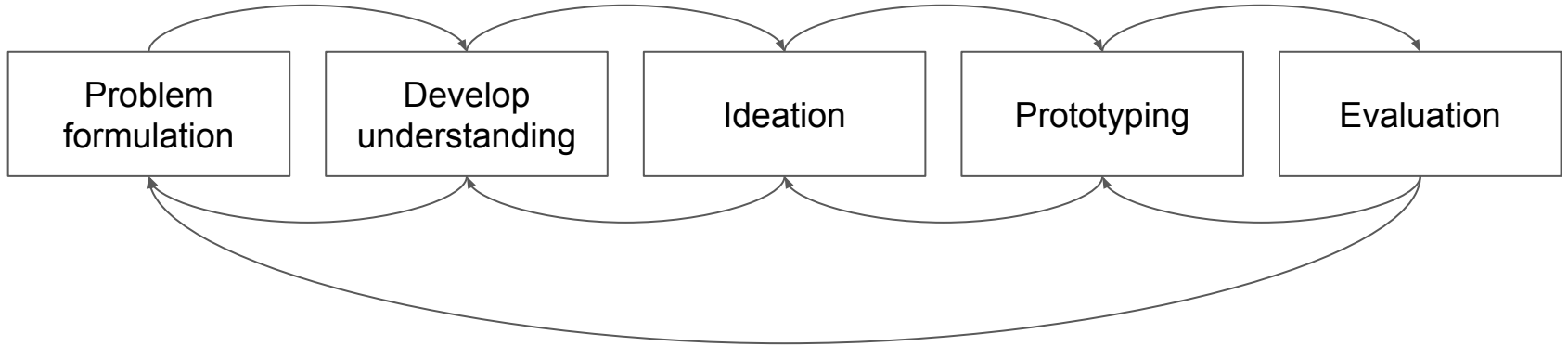# Some typical elements of a design process

| Problem formulation | Develop understanding | Ideation | Prototyping | Evaluation |

Some typical elements of a design process

- Iterative

Some typical elements of a design process

Problem formulation	Develop understanding

- An iterative process of developing an understanding of the problem situation

- And, challenging the problem formulation

- Finding out what the "right" problem to solve is

  - By: understanding/mapping stakeholders, users, needs, domain etc.

Some typical elements of a design process

Ideation

- Divergent vs. convergent thinking

- Leveraging design principles and methods

- Thinking about sustainability and cost - i.e., what are low-hanging fruits that involve minimum immediate and long-term costs? → Key role of IT professionals
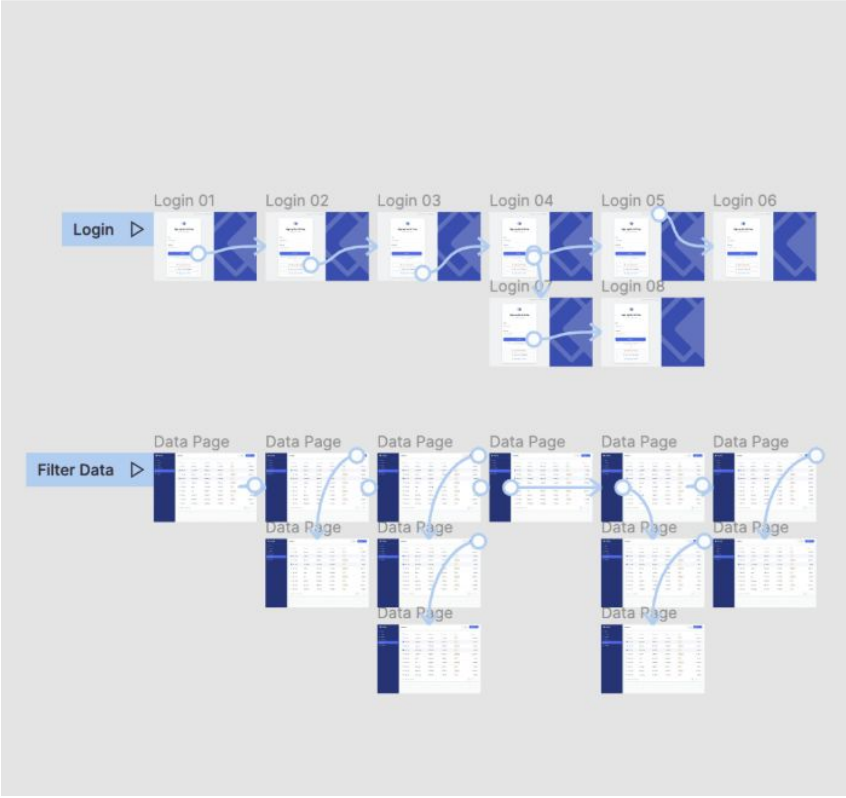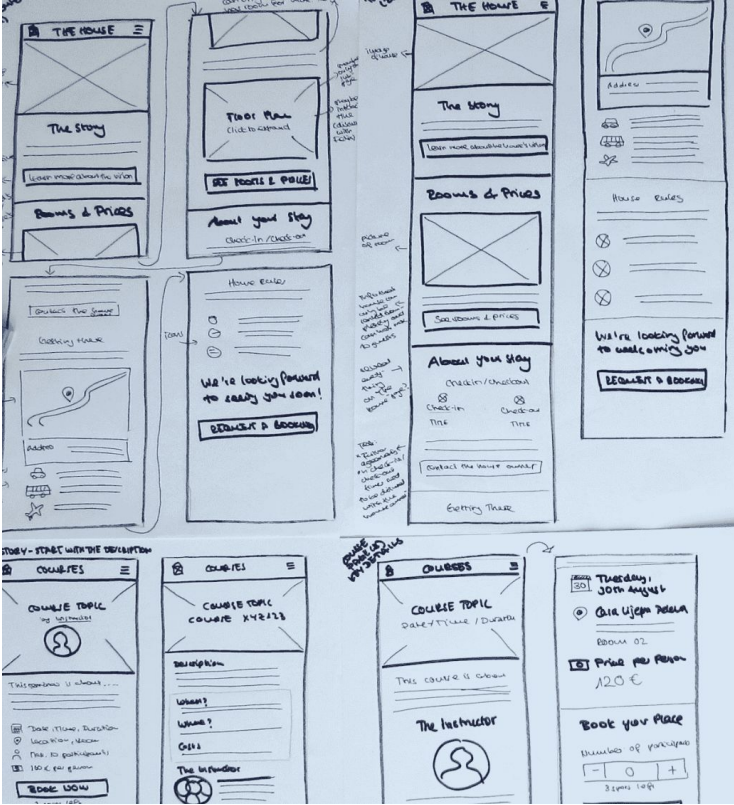
Some typical elements of a design process

Prototyping

Prototypes are developed for the purpose of evaluating / testing something

- Tied to learning and understanding
- Low-fidelity versus high-fidelity
- An important part of learning and improving

Prototyping/visualization

Prototyping

Some typical elements of a design process

Evaluation involves gathering insights with the help of prototypes

Form of evaluation depends on the dimension(s) being explored, and the form of prototyping

- E.g.,
    - Ideas, concept
    - Smaller increments
    - Overall solution concept → discussions and walkthroughs with stakeholders based on paper-prototypes, storyboards, flow-diagrams
    - Usability → wireframes or working prototypes
    - User experience

Evaluation

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