Introduction to Human-centered Design Part II

Shafiq Urréhman

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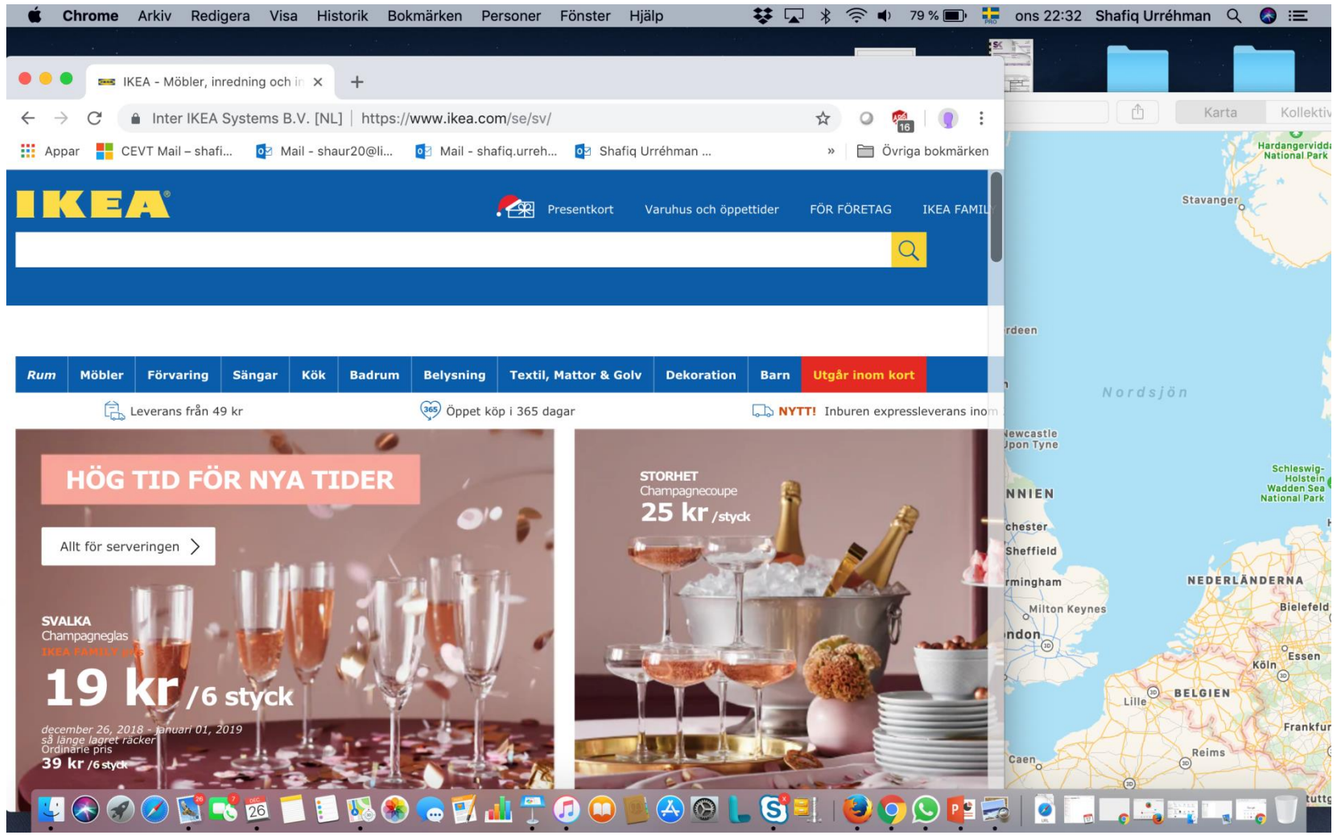
Slides are adopted from Jody Foo and previous LiU- Teachers

Welcome to TDDD60 & TDP022 !



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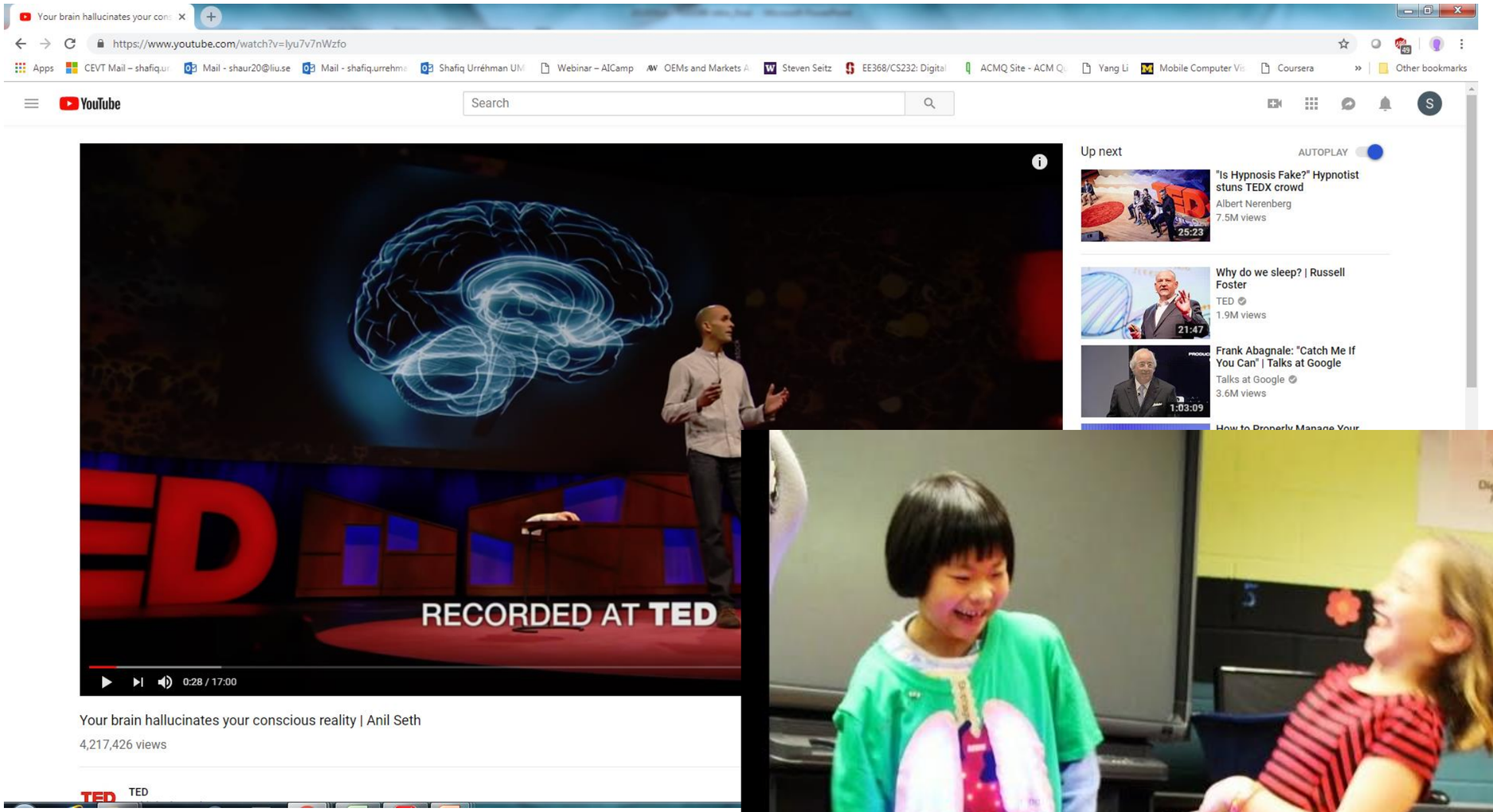
Welcome to TDDD60 & TDP022 !



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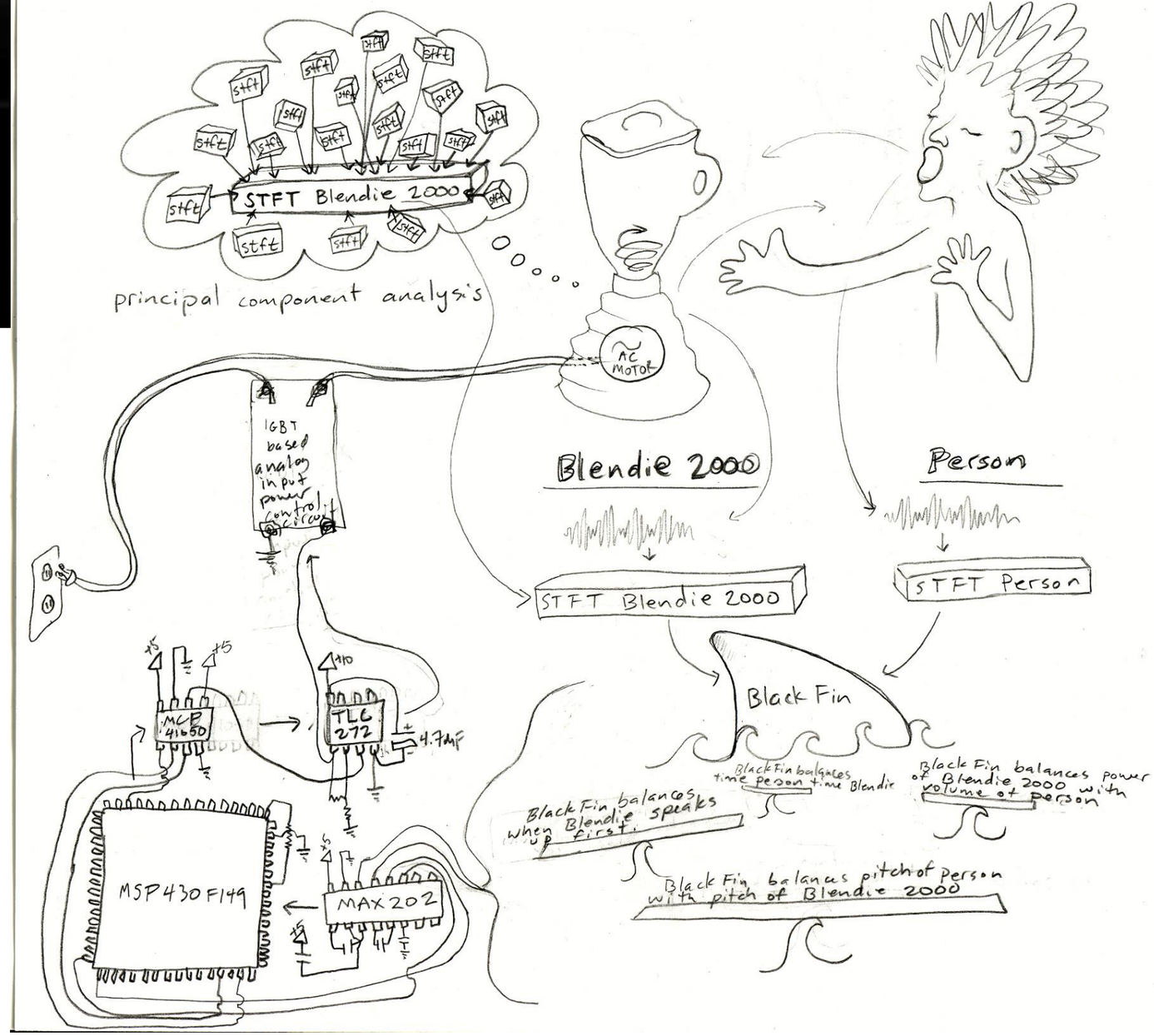

https://web.media.mit.edu/~monster/blendie/

Lecture Overview

- Introduction to Human-Centered design

  What, Why and How

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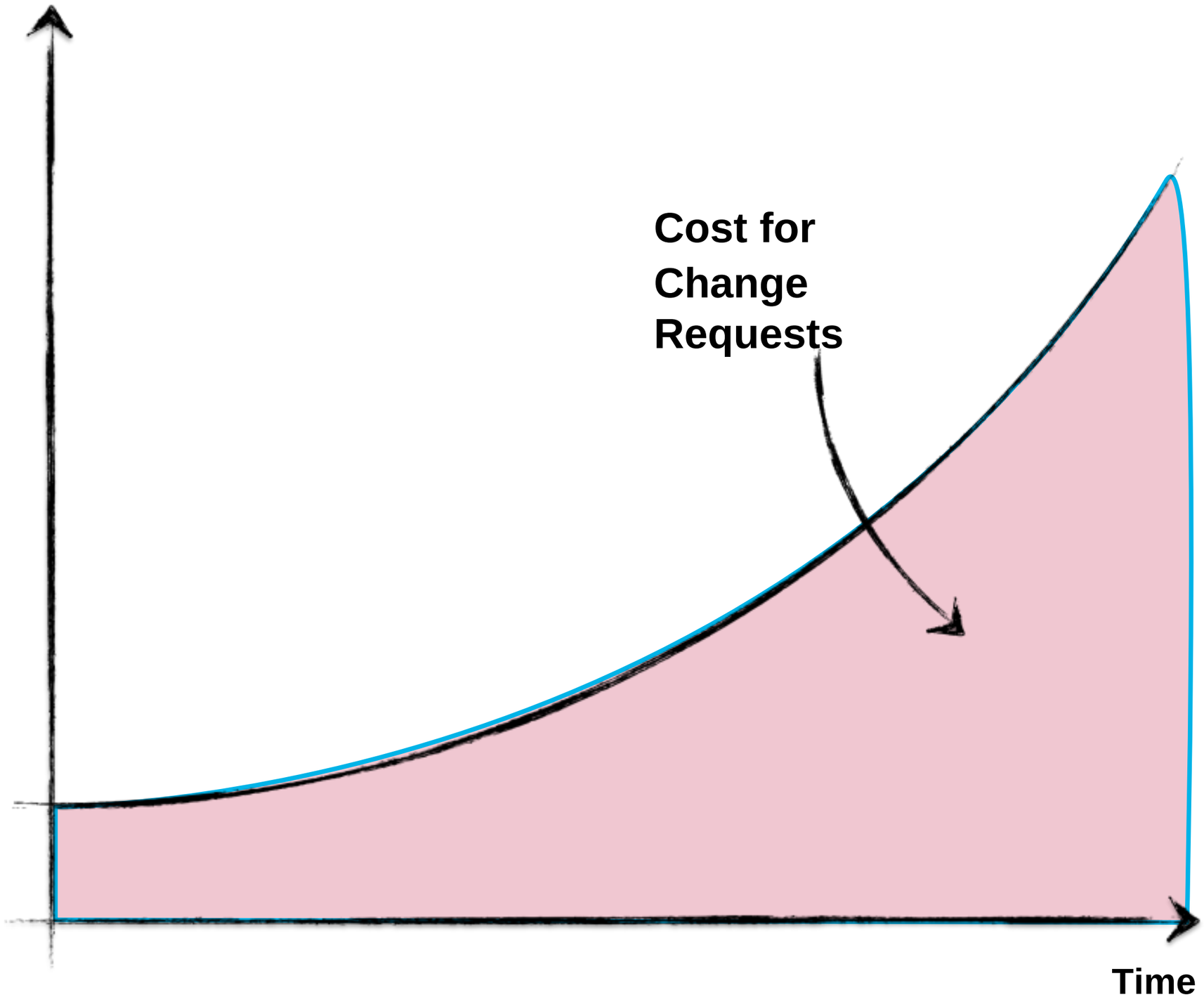
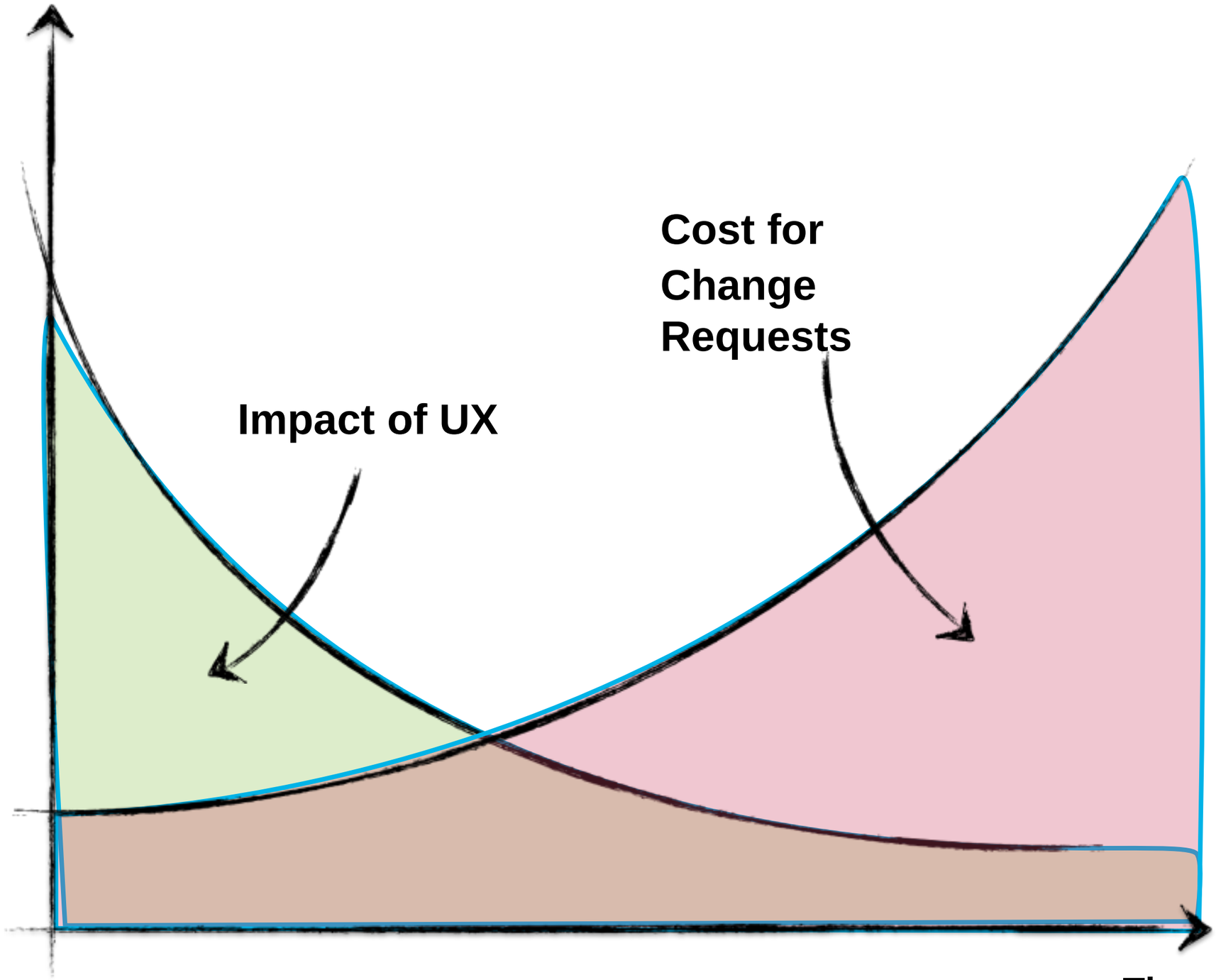
User Interface is System!

gräns|snitt s. -et; pl. = • förbindelselänk mellan en dator och dess kringutrustning; program som underlättar kontakten mellan dator och användare (SAOL)

Course Content

- Design and develop systems from scratch.
- Basic skills in designing user interfaces.
- Evaluate the usefulness of interactive systems.


Cost for
Change
Requests
Time



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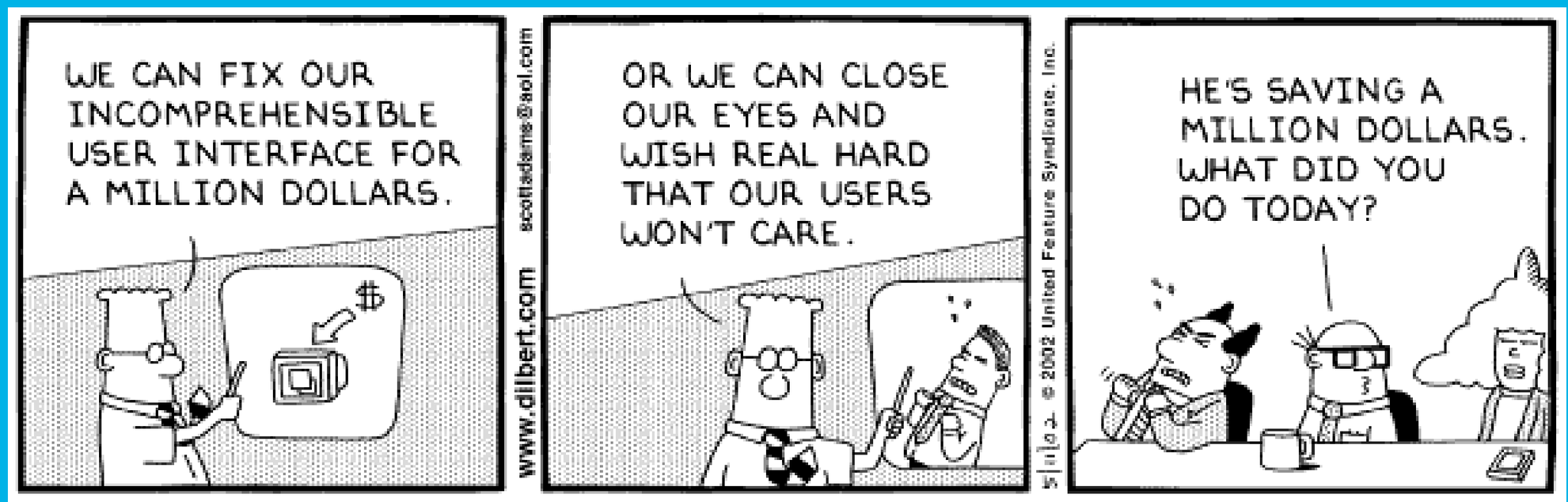
Human Centred Design



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user interface

- all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system

[SOURCE: ISO 9241-110:2006]

SAOL

de·sign [-saj´n] s. *-en -er*

• konstnärlig formgivning

de·signa [-saj´na] v. *-de*

• formge

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Subject introduction (Cont.)

Merriam-Webster

de·sign ***verb*** \di-ˈzīn\

: to plan and make decisions about (something that is being built or created)

: to create the plans, drawings, etc., that show how (something) will be made

: to plan and make (something) for a specific use or purpose

: to think of (something, such as a plan) : to plan (something) in your mind

Subject introduction (Cont.)

Merriam-Webster

Origin of DESIGN

Middle English, to outline, indicate, mean, from Anglo-French & Medieval Latin; Anglo-French *designer* to designate, from Medieval Latin *designare*, from Latin, to mark out, from *de-* + *signare* to mark — more at sign

First Known Use: 14th century

Subject introduction (Cont.)

"Interaction Design refers to the shaping of interactive products and services with a specific focus on their use."

(Löwgren, 2011)

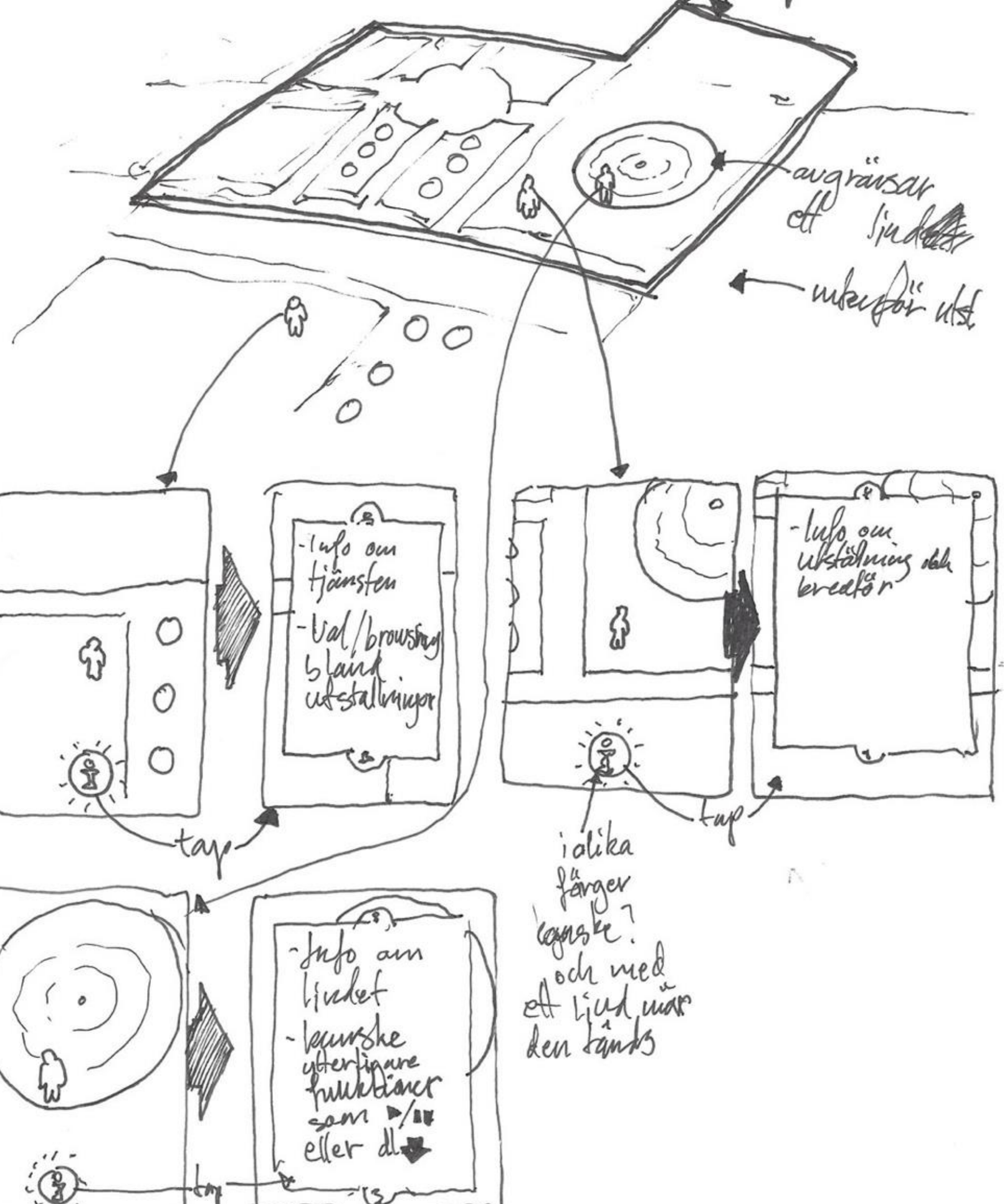
Design as a profession

- Explore possible futures
- Improves the situation through a product or service
- Includes practical, technical, ethical and aesthetic qualities
- The understanding of the design problem is developed at the same time as the understanding of possible readings
- Ideas are depicted concretely in sketches and models

(Löwgren, 2008)

Subject intro.

- Wicked problems (Rittel & Webber, 1973)
- You can not specify exactly what the problem is
- Any definition of the problem can be questioned and new issues redefine the problem
- No rules for when one is done
- No rules for what is correct or incorrect, just better or worse



Sketching and parallel prototyping

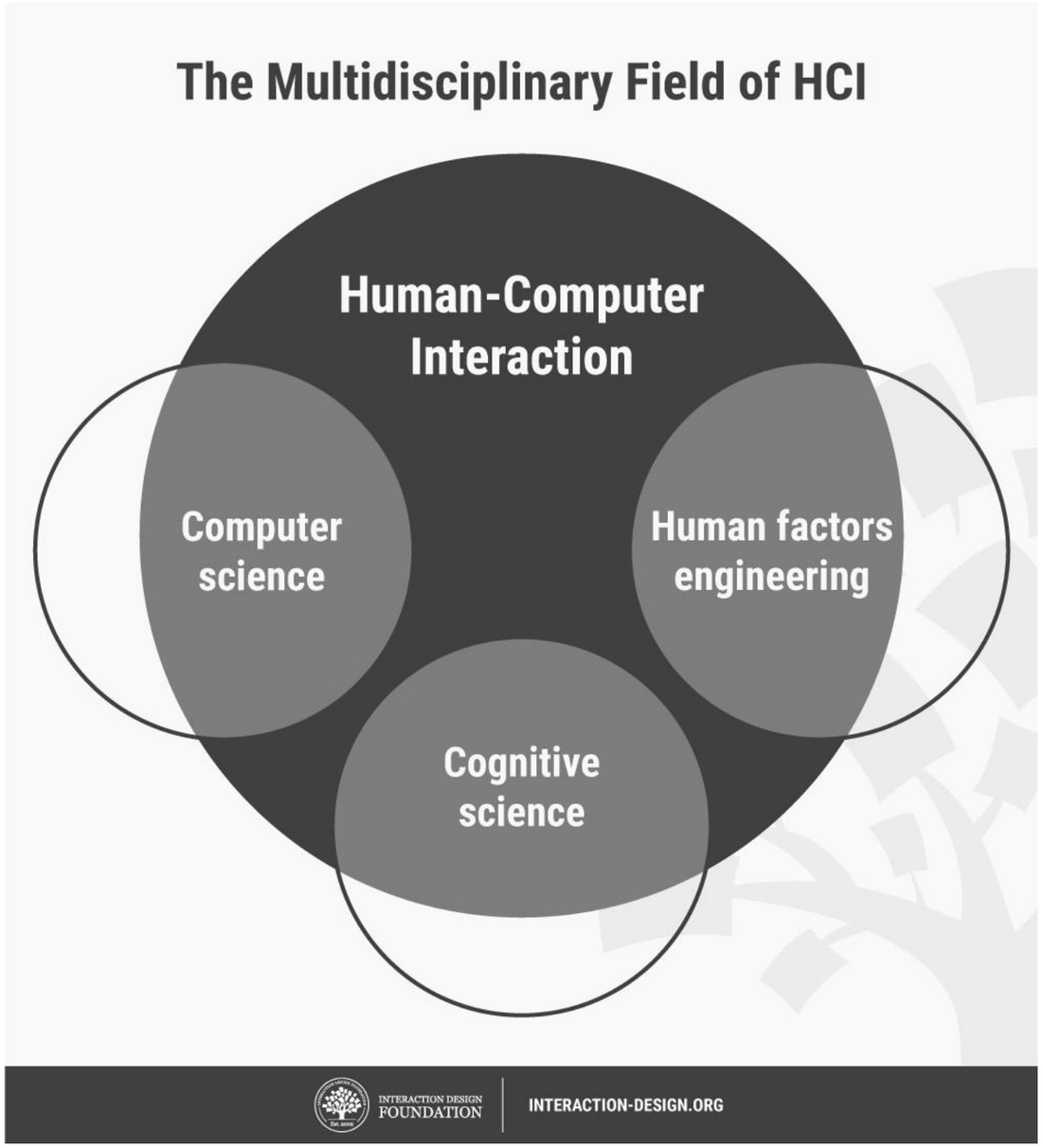
- Avoid the risk of iteration local optimum
- Safer in design
- More original and innovative design
- Better design

Design Ethics

- All design is based on a personal opinion on how you want to see the world, what is important and for whom.
- To what kind of world do you want to contribute?

Human Computer Interaction

- A research field with roots in technical psychology and computer science and with a close relationship with cognitive science



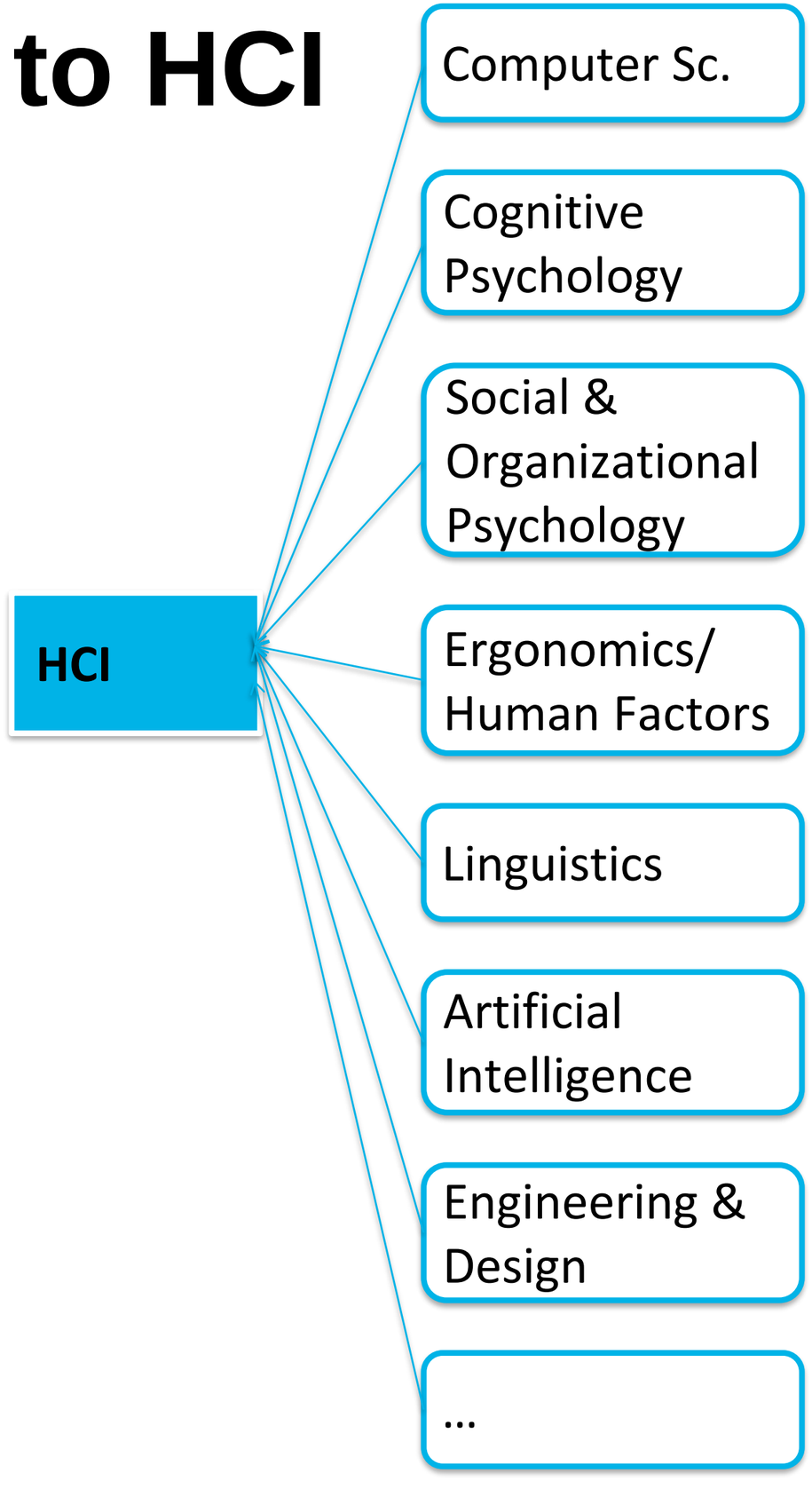
Computer-Human Interaction (CHI) /Man-Machine Interface (MMI)/HCI

An interdisciplinary subject that deals with the design, evaluation and construction of interactive systems for human use, which, for example, include:

- What people and computers can accomplish **together** as a system
- How people and computers **communicate** with each other
- Human/User's ability to **manage** computers (including **interface** learning)
- **Algorithms** in interface
- **Specification**, **design** and **implementation** of interfaces
- that **Compromises** in design

Disciplines contributing to HCI

- **Computer Science**
  - o technology
  - o software design, development & maintenance
  - o User Interface Management Systems (UIMS) & User Interface Development Environments (UIDE)
  - o prototyping tools
  - o graphics
- **Cognitive Psychology**
  - o information processing
  - o capabilities
  - o limitations
  - o cooperative working
  - o performance prediction
- **Social Psychology**
  - o social & organizational structures
- **Ergonomics/Human Factors**
  - o hardware design
  - o display readability
- **Linguistics**
  - o natural language interfaces
- **Artificial Intelligence**
  - o intelligent software
- **Philosophy, Sociology & Anthropology**
  - o Computer supported cooperative work (CSCW)
- **Engineering & Design**
  - o graphic design
  - o engineering principles
- …



http://www.cs.bham.ac.uk/people/russell

Use and Context

U1 Social Organization and Work

U3 Human-Machine Fit and Adaptation

U2 Application Areas

Human

H1 Human Information Processing

H2 Language, Communication and Interaction

H3 Ergonomics

Computer

C1 Input and Output Devices

C2 Dialogue Techniques

C3 Dialogue Genre

C4 Computer Graphics

C5 Dialogue Architecture

D4 Example Systems and Case Studies

D3 Evaluation Techniques

D2 Implementation Techniques and Tools

D1 Design Approaches

Development Process

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http://old.sigchi.org/cdg/cdg2.html

IxD (interaktion design)

Löwgren & Stolterman 1998

- Interaction design refers to the process that is arranged within existing resource constraints to create, shape, and decide all use-oriented qualities (structural, functional, ethical, and aesthetic) of a digital artifact for one or many clients.

Interactive systems

- Offer people to **collaborate** and **interact** with them, (through) them or by using them
- Interaction here means that users, products and services interact in a **harmonious** and **playfully** simple way at best
- The users and products or services **act jointly** towards a **common goal** and in a coordinated manner
- Computer-based products and services might respond to or initiate actions, which creates a dialogue system in **temporal flow**

INTERACTION DESIGN

according to Bill Verplank

Subject introduction

Human-Centered Design

According to ISO 9241-210:2010: Ergonomics of human-system interaction

—

Human-centred design is an approach to interactive systems development that aims to make systems usable and useful by focusing on

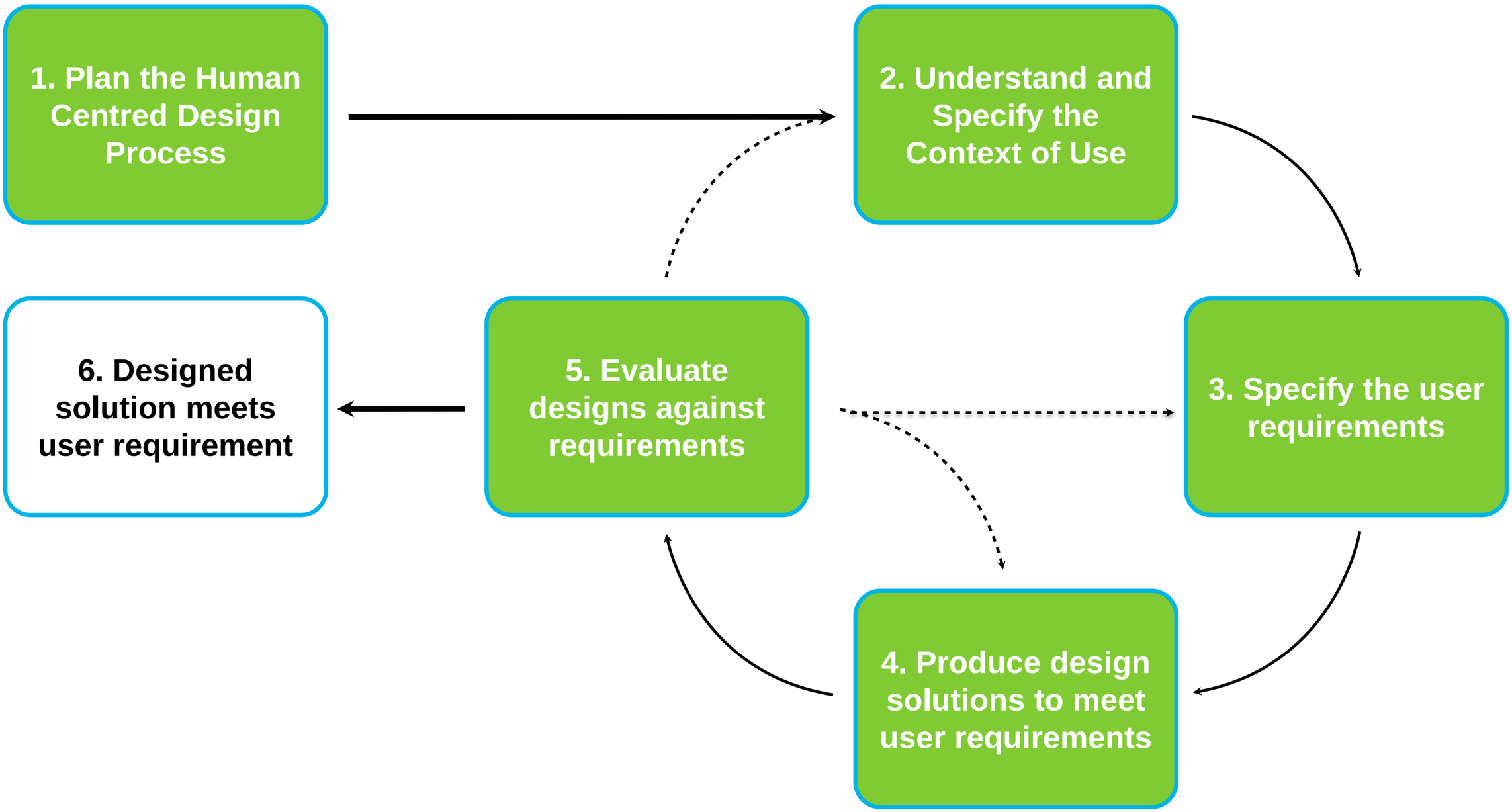
- the users,
- their needs and requirements, and
- by applying human factors/ergonomics, and
- usability knowledge and techniques

https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-1:v1:en

HCD Principles - ISO 9241-210

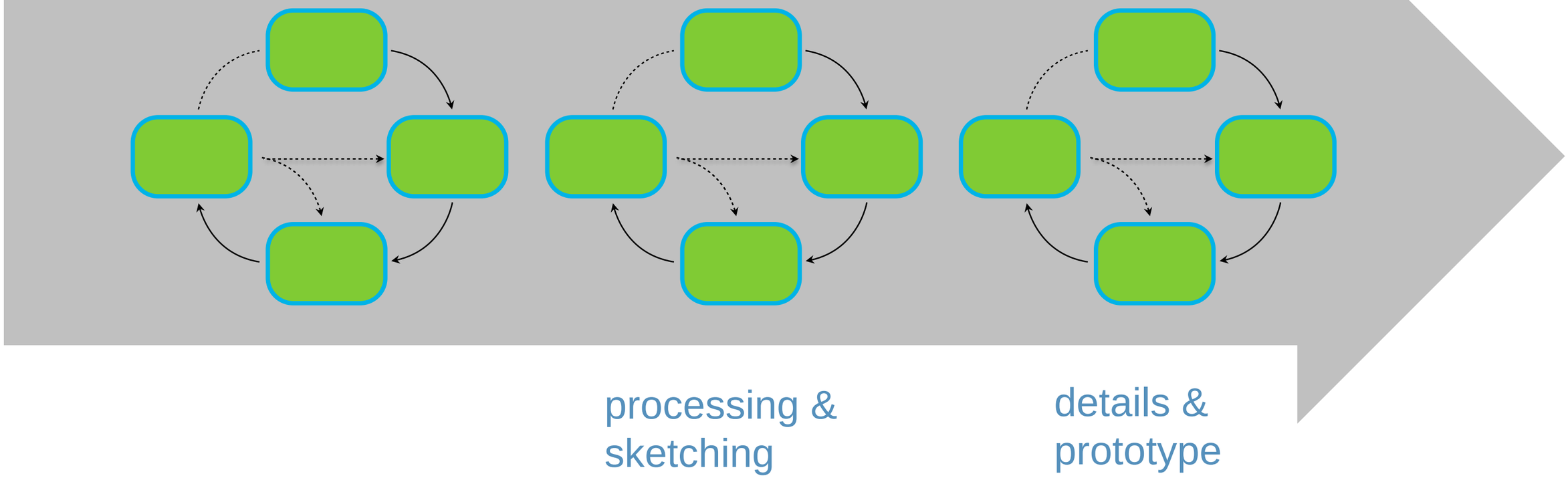
- The design is based on an explicit understanding of users, tasks, and environments.
- Users are involved throughout design and development.
- The design is driven and refined by user-centered evaluation.
- The process is iterative.
- The design addresses the whole user experience.
- The design team includes multidisciplinary skills and perspectives.

ISO HCD Framework



The human-centred design process (ISO 9241-210:2010).

Concept & ideas



processing & sketching

details & prototype

Affordances (handlingsinviter)

"...the term *affordance* refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used. [...] Affordances provide strong clues to the operations of things. Plates are for pushing. Knobs are for turning. Slots are for inserting things into. Balls are for throwing or bouncing. When affordances are taken advantage of, the user knows what to do just by looking: no picture, label, or instruction needed." (Norman, The Psychology of Everyday Things from 1988, p.9)

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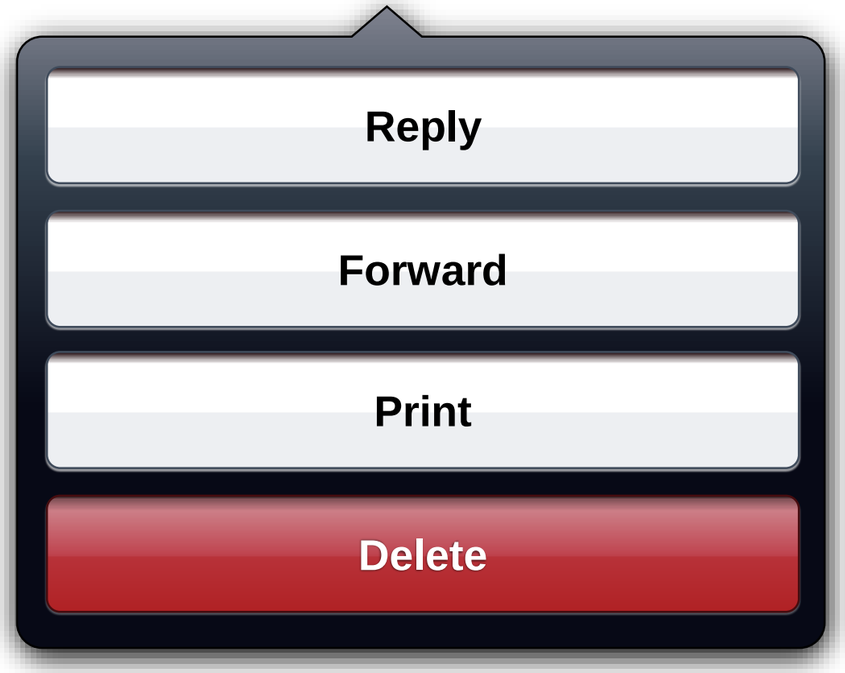
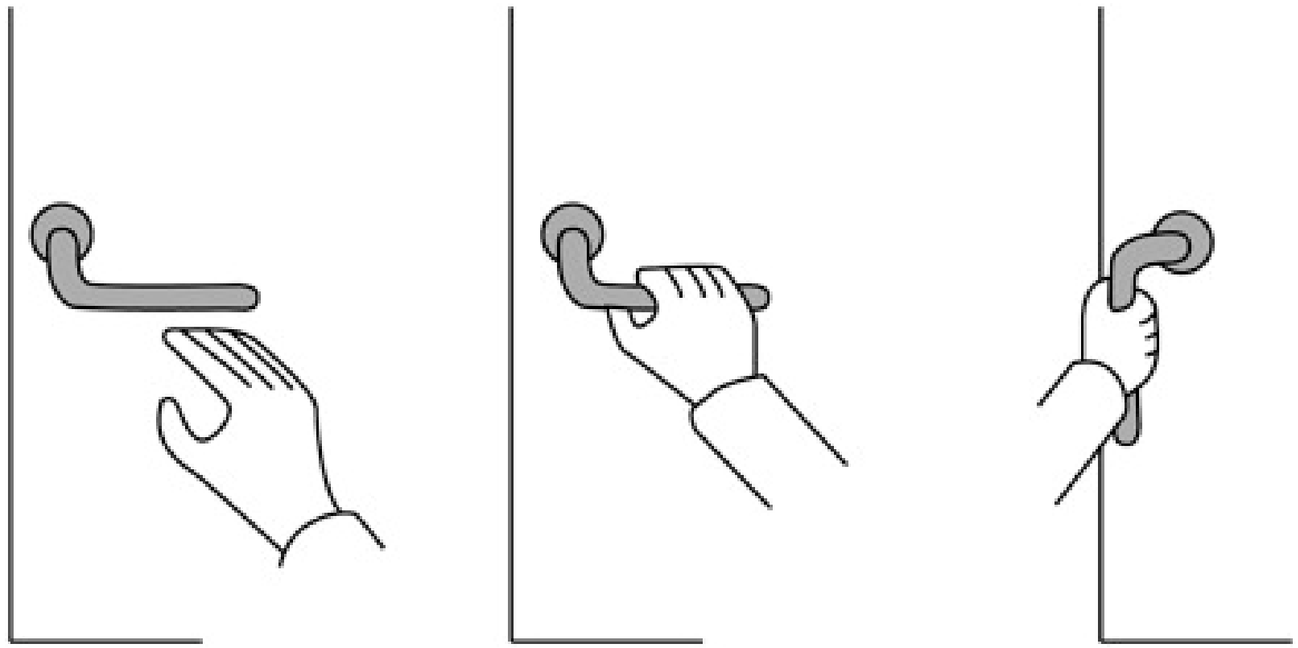
Buttons on the screen seem to give an invitation to press them but do not drag or edit them …



Action depiction (Handlingsinviter) sequence



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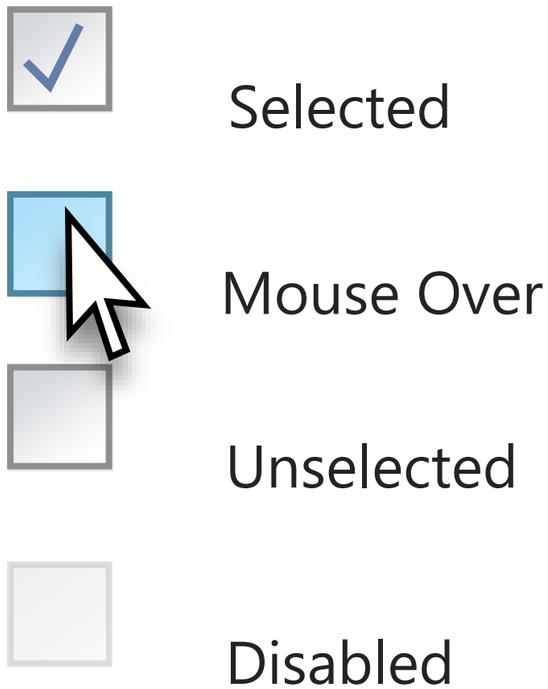
Action depiction (Handlingsinviter)
….. GUIs are also sequenced

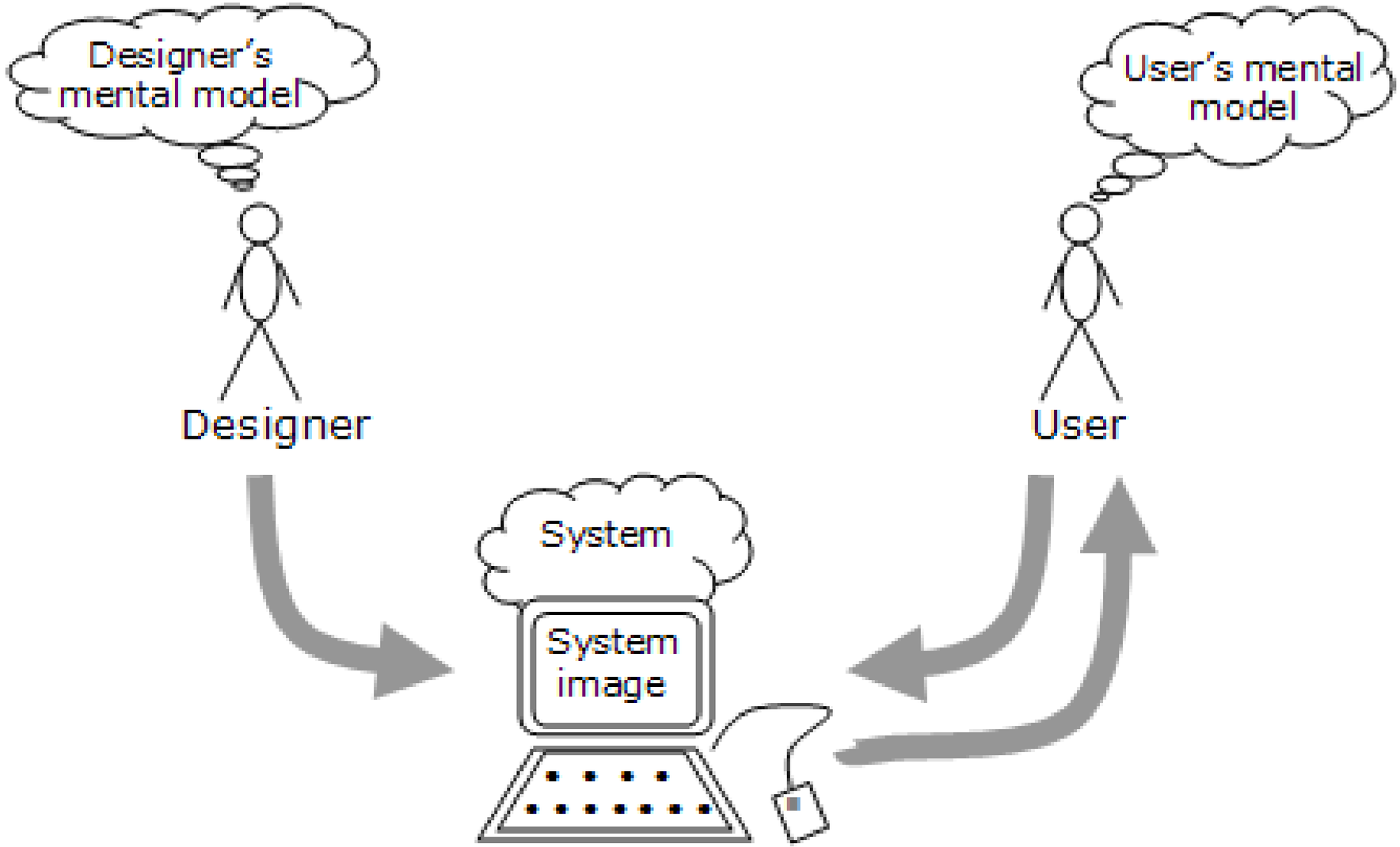


Which gives the clearest invitation to scroll?

Mental models

- User perceptions of the domain and the systems they use. How does it work in their world?

Mental models in design (Norman, 1988)

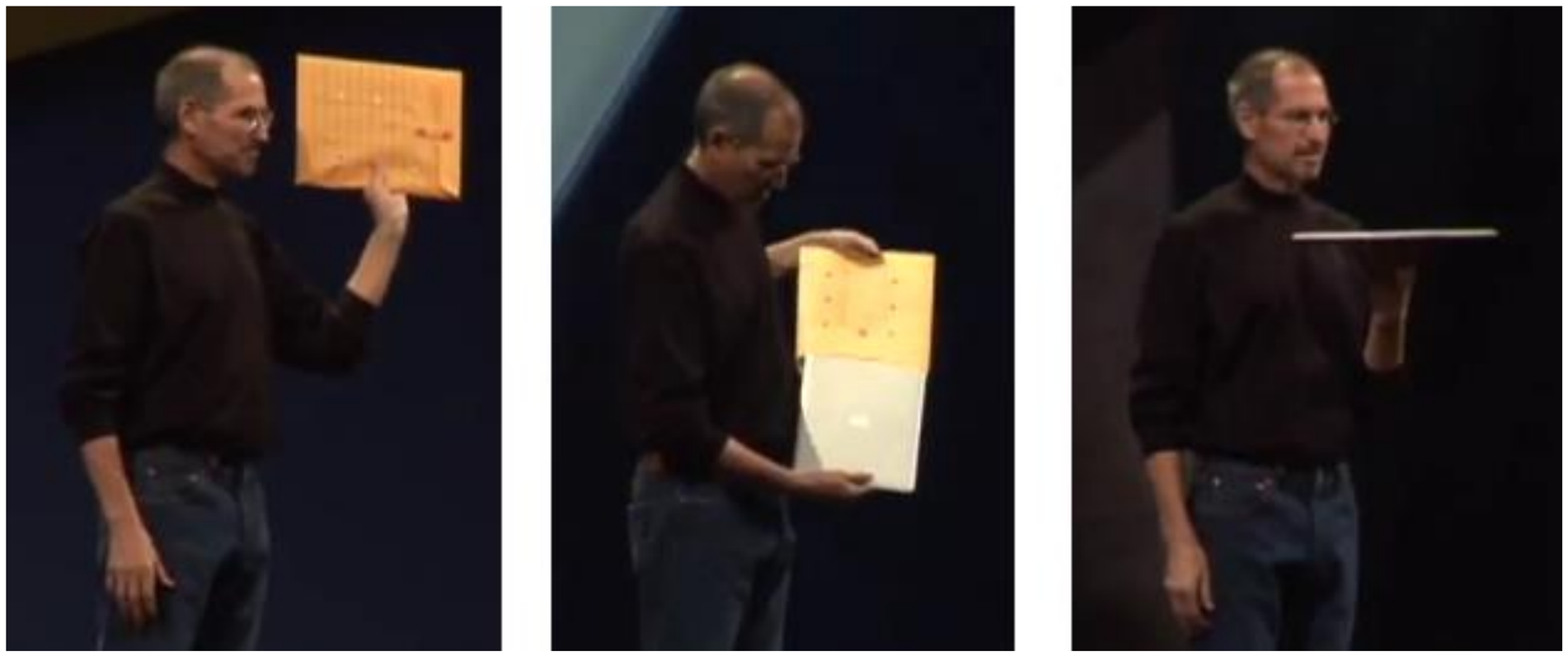


(adapted from Norman (1988) p. 16): The problem of ensuring that the user's mental model corresponds to the designer's model arises because the designer does not talk directly with the user. The designer can only talk to the user through the "system image" - the designer's materialised mental model. The system image is, like a text, open to interpretation.

Milestone
by a
Deliverables
that produce
Tasks
to complete
Estimated Hours
establishes
Planning
Managers
Company
belong to
including
Planned
is determined by comparing
Success
Project
consists of
Team Members
are responsible for
Tracking
Communicating
Sharing
measures
Time Spent
to complete
Activities
facilitated through
Messages
that produce
Actual
on a
Date
Documents
are
Assets

Metaphors

- Understanding a domain by analogy to another domain (metaphorical thinking) is a way of structuring a conceptual model.



Steve Jobs Presentation in MacWorld 2008

HCI metaphors - the Windows Recycle Bin

In order for a metaphor to work, there must be sufficient equivalents between the source and target domains.

Metaphor: Design as problem solving

- Design space - solution space.

- The metaphor **does not** cover all aspects of the design though.

Metaphor: Design as problem solving

- The metaphor **does not** cover all aspects of the design though.

Source: Interface Hall of Shame

It should work like that…

(Marcus, 1995)

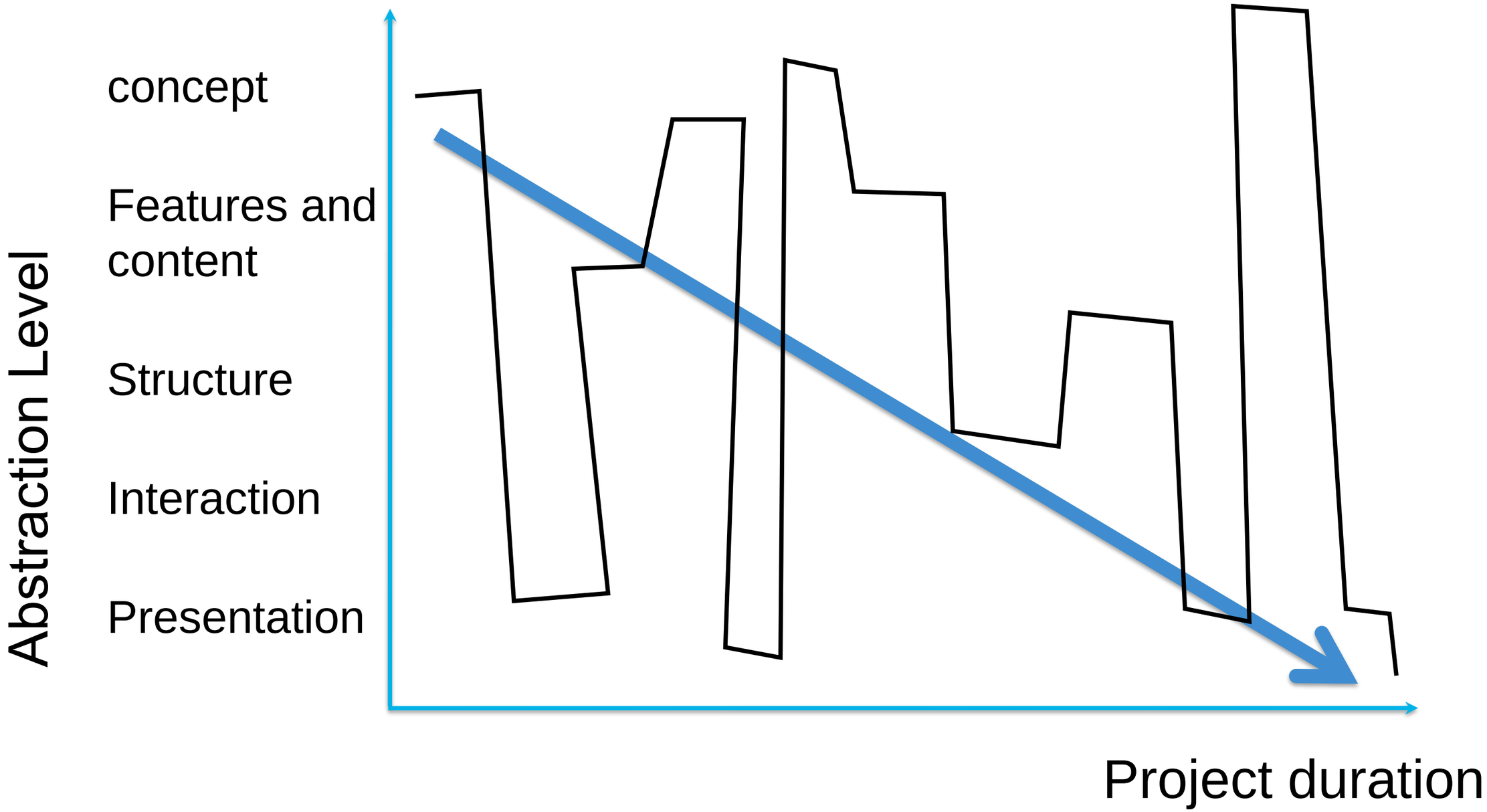
- A desk: Drawers, files, folders, papers, paper clips, stick-on note sheets
- A document: Books, chapters, bookmarks, pictures, newspapers, pieces, magazines, articles, newsletters, forms
- One photo: Albums, photos, photo brackets / holders
- TV: Programs, channels, TV companies, advertising, TV guide
- A deck of cards: Cards, piles
- A container: Shelves, drawers, compartments
- A tree: Roots, trunk, branches, leaves
- A city: People, areas, landmarks, roads, buildings, rooms, windows, desks

Functions should act as ... (Marcus, 1995)

- Traverse (Targeted): navigate, drive, fly, walk
- Browse (less targeted search for alternatives): quick scan, window shop, browse
- Scan (very fast browsing): scroll past, pass message boards along the highway
- Locate: touch, touch, dial
- Choose: touch, poke, grab, catch with lasso, place your finger on and pull
- Create: add, copy
- Delete: Discard, Destroy, Drop, Recycle, Shred

Source: Principles of Effective Visual Communication for Graphical User Interface Design

What is designed in interaction design



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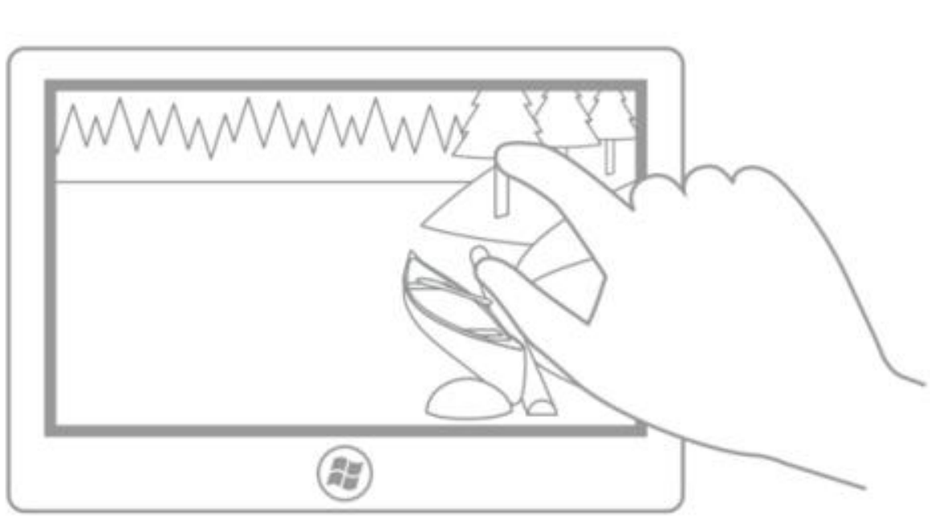
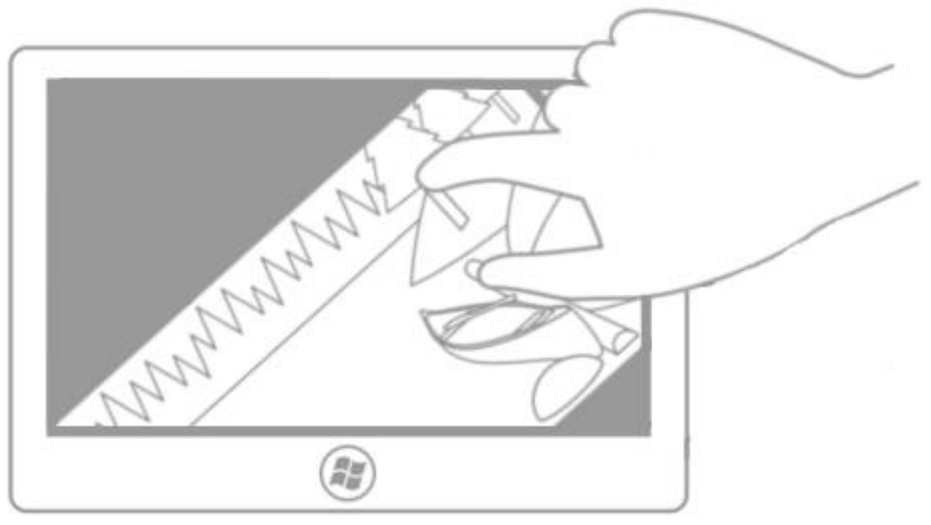
Direct Manipulation

http://msdn.microsoft.com/en-us/library/windows/apps/hh465315.aspx

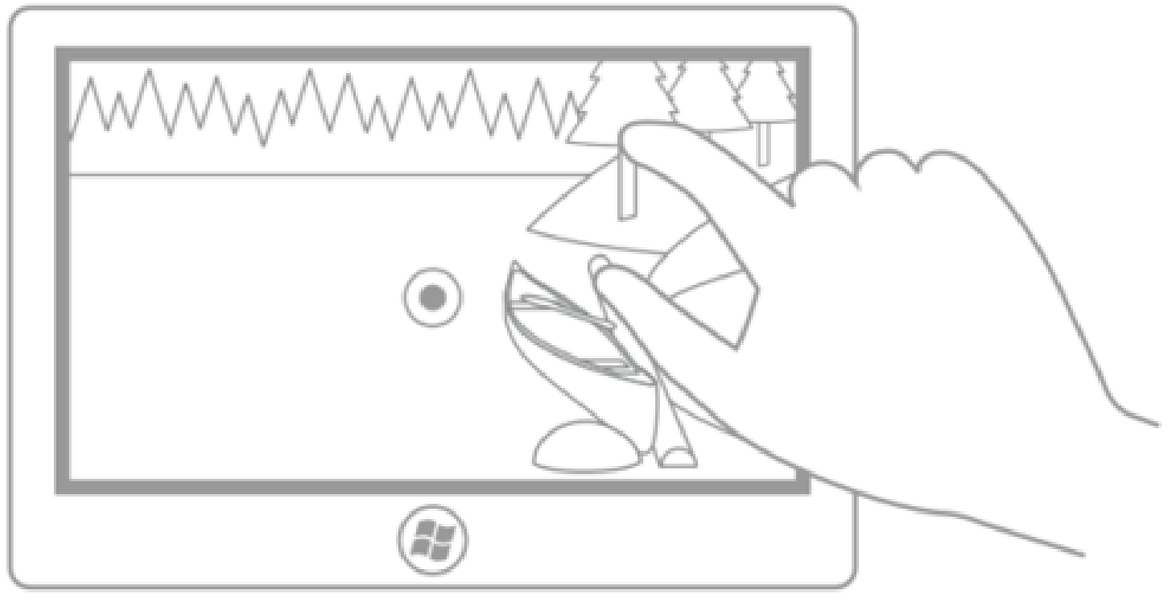
- Continuously represented objects and physical actions that give direct effect.

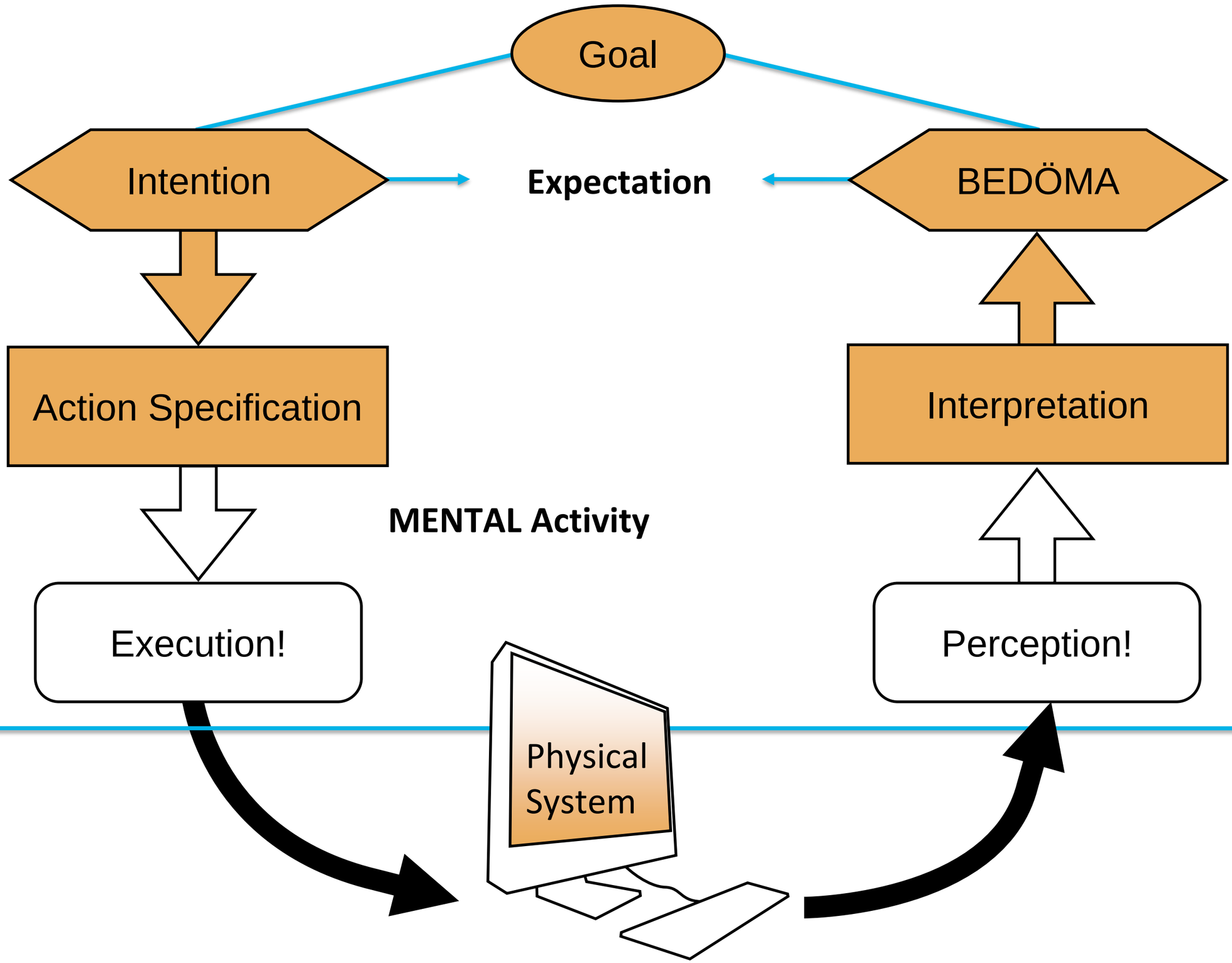




No direct manipulation

http://msdn.microsoft.com/en-us/library/windows/apps/hh465315.aspx





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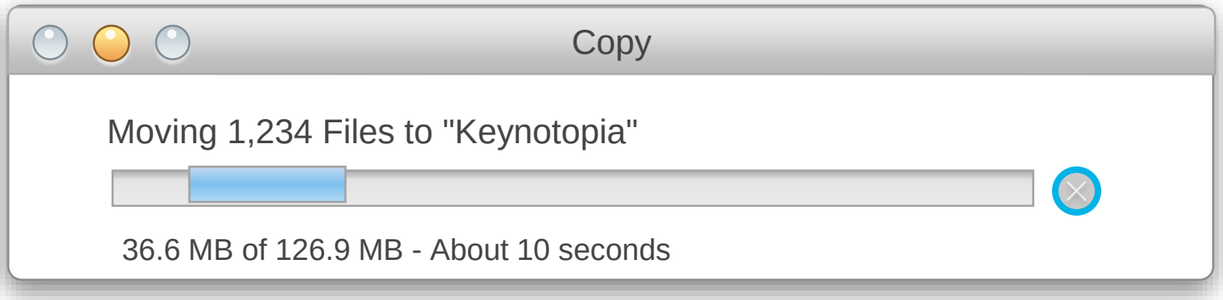
Norman's Action Cycle

Feedback

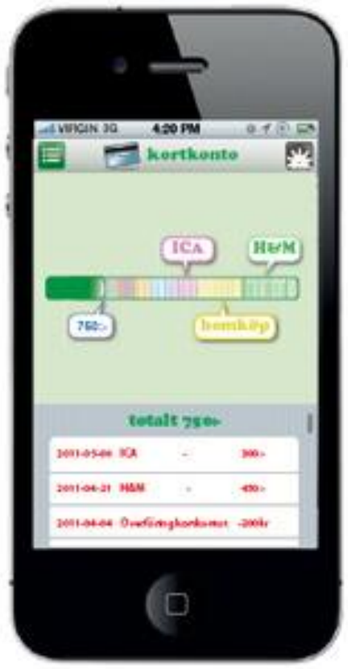
- Feedback on the result of an action.



Feedforward

- That you know what should happen before you do the action.

http://www.transformatordesign.se/case/attention-2/



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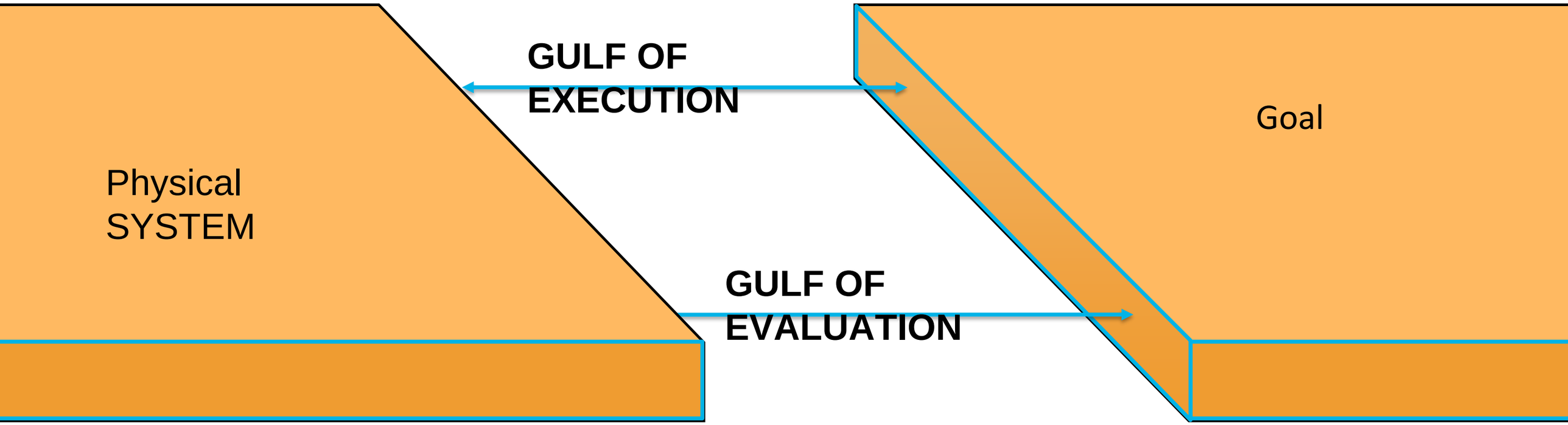
GULF OF
EXECUTION
Goal
Physical
SYSTEM
GULF OF
EVALUATION

Attention and the magic number 7 ± 2

If the environment steals focus, you lose what was in the work memory

Therefore:

- Help people remember what they are doing and the status of their work object
- Modes are both powerful and risky
- Remembering instructions with many steps is difficult. Make sure the user can see them while performing the steps.

In Short

- Read the study guide
- Read the literature to the information
- Get started and predict different concepts as soon as you have decided on which assignment you want to work with!
- Engage each other and others in concept generation
- Human-centered design Human-computer interaction and Interaction design
- Affordances, Mental models, Metaphors, Direct manipulation, Feedback, Feedforward, Gulf of execution & evaluation, Magic number 7 ± 2

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