
LUT
University

# User Interfaces and Usability

Antti Knutas

# Where we are?

- Previously
  - What are UIs
  - What is Usability and UX (including examining and critiquing “bad” systems)
- This week
  - How to start designing your own systems?
  - Human-Centered Design (HCD) process
  - User research and understanding the users and user groups
- Upcoming weeks
  - Specific techniques to use within the HCD process

# Interaction design processes

# Basic interaction design process

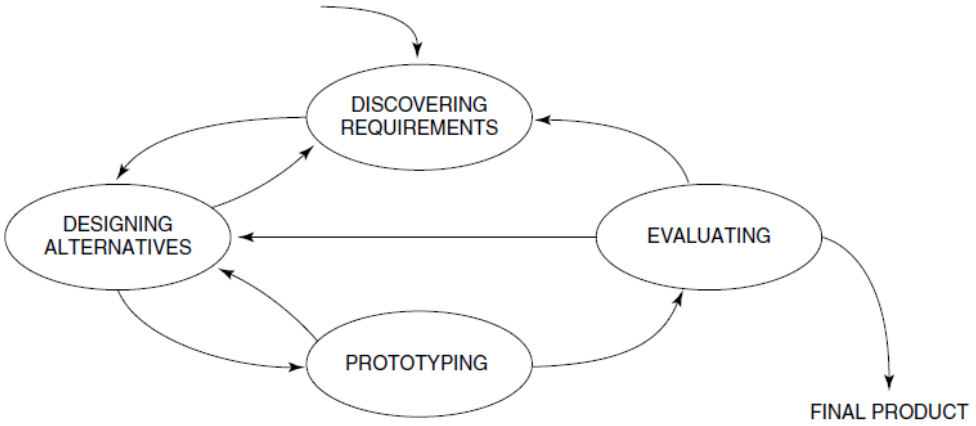



**Figure 2.5** A simple interaction design lifecycle model

Sharp (2019), pg. 52

# Technology-centric design

1. Pre-analysis - together with user
2. Requirements specification - experts only, technology first
3. Design - experts only
4. Implementation - experts only
5. Testing - users involved

What’s wrong in this process?

# User-centric design

1. Early focus on users and tasks
    a. Users' tasks and goals are the driving force
    b. Behavior and context of use are studies
    c. Users are studied and involved, users are not homogenous
2. Empirical measurement
    a. Reactions and performance of users are observed and measured
    b. Users interact with simulations and prototypes
3. Iterative design
    a. When problems are found in user testing, they are fixed and more tests and observations are conducted

# Human-Centered Design

- An approach to designing interactive products
- Aims for better **usability** and **user experience** of a specific solution
- Considers both human and organizations as a starting point
- Considers people as more than users

**What's the difference?**
Lecturer's five cents: Gives more agency to people than technology- or user-centric approaches.

Human-centered vs. user-centered? No clear difference in literature.

# Human-Centered Design, requires and applies

- Information about the user (tasks, abilities, needs, requirements)
- Information about the context
- Basic principles of usability
- Specific techniques and methods from human-centered design

# Human-Centered Design, video and link

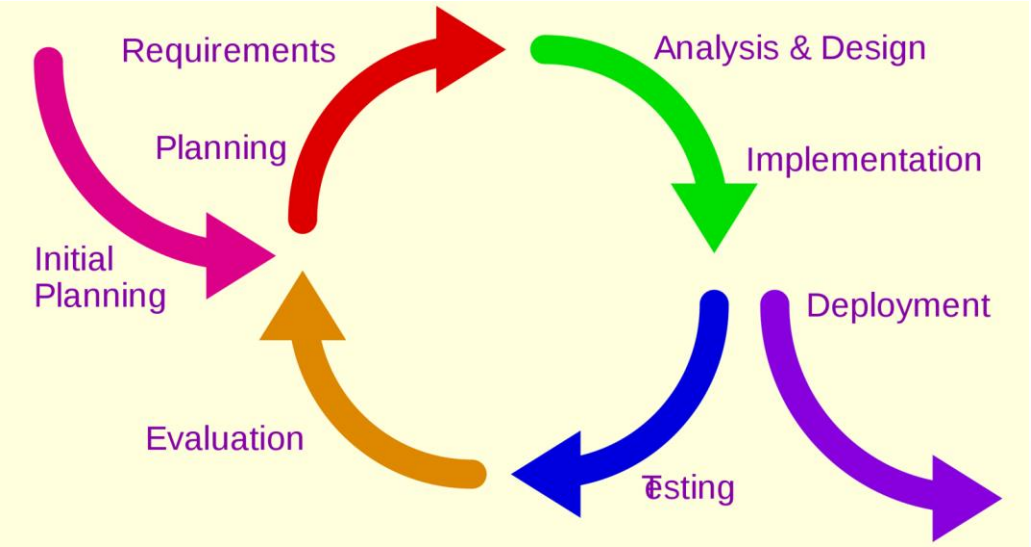
https://www.designkit.org/human-centered-design

# Formal, ISO 9241-210 definition

**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.** This approach enhances *effectiveness* and *efficiency*, improves *human well-being, user satisfaction, accessibility and sustainability*; and counteracts possible adverse effects of use on human health, safety and performance.

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

# **Compare:** Iterative software engineering process vs. human-centered (UI) design process




Source: Wikipedia (CC)

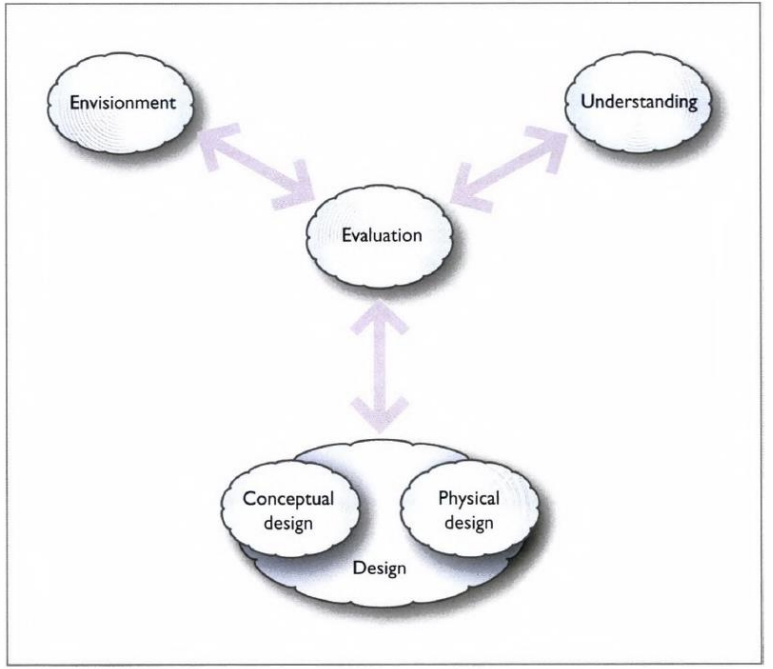



Figure 3.1 Understanding, design, evaluation, envisionment

Source: Benyon, pg. 49

# Human-Centered Design, ISO standard process model

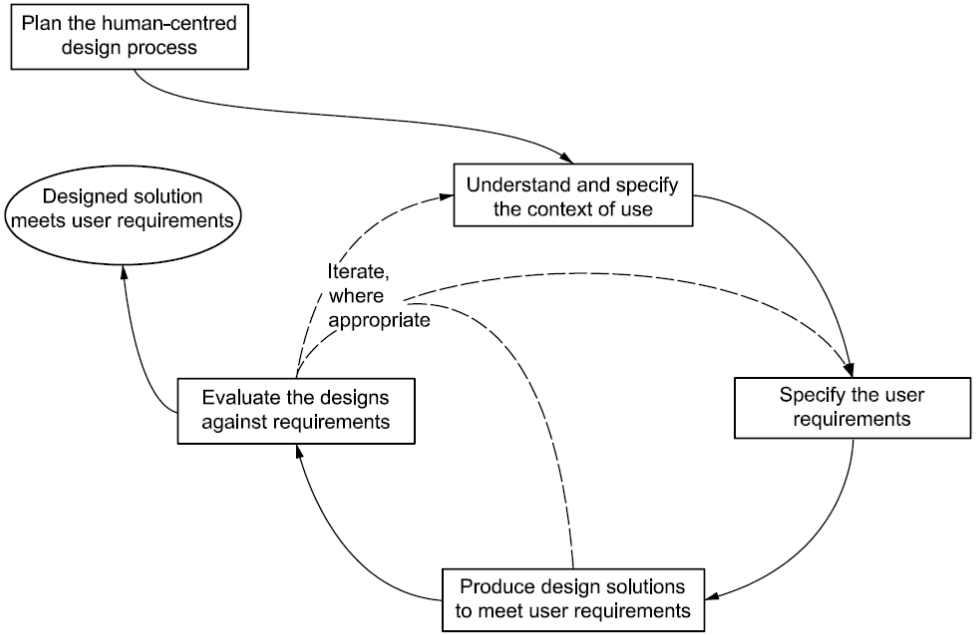



**Figure 1 — Interdependence of human-centred design activities**

ISO 9241-210:2010 Human-Centred Design for Interactive Systems

# Human-centered design principles

# Principles of human-centered design

1. Design is based on explicit understanding of users, tasks, and environments
2. Users are actively involved through design and development
3. Design is driven and refined by user-centered evaluation
4. Process is iterative
5. Design addresses the whole user experience
6. Design team includes multidisciplinary skills and perspectives

(ISO 9241-210; interpretation and thoughts included from Kirsikka Kaipiainen & Sharp)

# 1. Design is based on explicit understanding of users, tasks, and environments

- Identify all relevant user and stakeholder groups
  - People who use the system, interfaces, or services
  - People who might be affected by their use
- Context of use is essential
  - Refer e.g. to PACT framework (Benyon) or first course exercises
  - “Actual conditions under which a given product is used”

# 2. Users are actively involved through design and development

- Users need to participate in the design process with close interaction with the developers
- If the system has a broad user base, a representative group of users can be recruited => make sure that all target group(s) are involved and the group is representative
- User involvement gives input to requirements specification and to detailed design phases

# 3. Design is driven and refined by user-centered evaluation

- Feedback from users is critical
- Initial solutions are tested against scenarios (e.g. based on user stories)
  - feedback is collected and used to improve designs
- User evaluation should be involved in the final acceptance test
- User feedback
  - identifies issues that needs to be fixed and,
  - informs future design

# 4. Design process is iterative

- Design knowledge, documents, and prototypes are revised when new information is obtained
- Testing and feedback is constant and repeating
- Iterative approach: first designs should be **lightweight** and presented as a **prototype** (e.g. on paper)
- The further the project progresses, the more costly change is: Emphasize the early stage of design when change is cost-effective

# 5. Design addresses the whole user experience

- What is included?
  - Organizational impact, documentation, help, support, maintenance
  - Branding, packaging, advertising
- Emotional needs and the experience
  - What kind of experience is provided?
  - Exciting, professional, social?
  - Many current online software attempts to be engaging
    - => beneficial or not?

# 6. Design team includes multidisciplinary skills and perspectives

- More than software
  - Human-computer interaction
  - User research
  - Application domain and subject matter expertise
  - Aesthetic and interface design
  - Technical writing
  - Business analysis
- And of course software engineering
  - But also hardware engineering, software maintenance specialists, senior/lead programmers

## Summary and thoughts

- Understand the problem space before building
- Four basic activities: Discover requirements, design alternatives, prototype with users, and evaluate them
- Three principles: early focus on users, empirical evaluation, iterative design
- Involve the users!

Still, be innovative and try to provide more than users request. (see: iPhone, mouse, wheels in cars, the telephone, world wide web and hypertext)