Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
References

Overview

Jörg Cassens

SoSe 2019

Contextual Design of Interactive Systems

Foreword

Does good design pay?

A simple premise: If we design and develop digital products in such a way that the people who use them can easily achieve their goals, they will be satisfied, effective, and happy. They will gladly pay for our products—and recommend that others do the same. Assuming that we can do so in a cost-effective manner, this will translate into business success. (Cooper et al., 2014)

Does it? What do you think?

Required Reading

Required Reading
Week 1
Academic Literacy: Reading
Introduction
Design Processes
Linear Models
Iterative Models
References

Week 1

Assignment 2.1: D. Norman

Required Reading

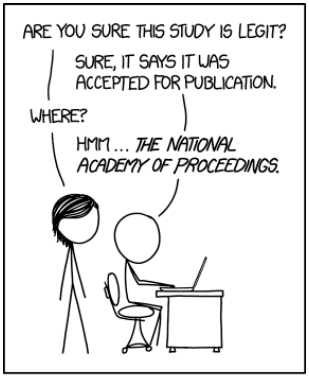
- Required reading for week 1
  - Norman, Donald A. “Human-centered design considered harmful.” interactions 12, no. 4 (2005): 14-19.
- The text will be discussed in the tutorial 16.04.2019

- Course readings can be downloaded in the learnweb
- Every text has a wiki-page in the learnweb
  - Use it to describe the text
  - Use it to link the text to the course
- Results of the discussion may also be written up

Academic Literacy: Reading

General Structure

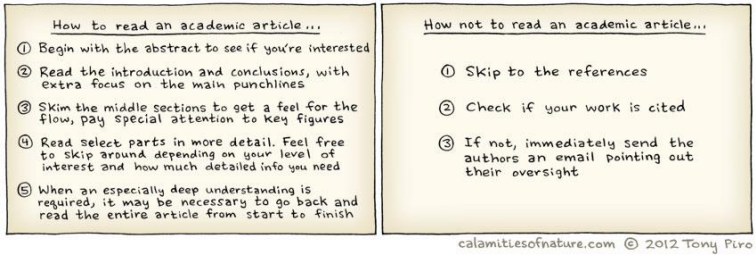
- Title
- Abstract
- Introduction
- Methods
  - Analysis
  - Design
  - Implementation
- Results
  - Evaluation
- Discussion/Conclusions
  - Further Works
- Acknowledgements
- References



☞ xkcd: dubious study

Skim & Read

- Do not read from start to finish
  1. Abstract
  2. Conclusions
  3. Introduction
  4. “the rest”
- Whether you continue with the conclusions or the introduction depends on your familiarity with the topics…and on the length of the sections



☞ Calamities of Nature

Skim, Re-Read, Examine, Summarize

- Another approach championed by Natalia Rodriguez
- Four steps
  - Skim
    - Read for “big picture”
  - Re-read
    - Examine graphs, tables, figures
    - Interpret the data yourself
  - Examine
    - What problems are addressed?
    - Why is it important?
    - Is the method good?
  - Summarize
    - Write a summary of key point in own words
- ☞ Elsevier Connect, ☞ research4life.org

Three Pass Reading

- Read the Paper in three passes
  1. Quick scan to get a bird's-eye view of the paper to be able to answer the five C:
     1. Category: What type of paper is this?
     2. Context: Which other papers is it related to?
     3. Correctness: Do the assumptions appear to be valid?
     4. Contributions: What are the main contributions?
     5. Clarity: Is the paper well written?
  2. Read the paper with greater care, but ignore details such as proofs
     - Afterwards, you be able to summarize the main thrust of the paper, with supporting evidence, to someone else
  3. Attempt to virtually re-implement the paper
     - Making the same assumptions as the authors, try to re-create the work
- ☞ S. Keshav: How to Read a Paper

What to Look For

- Five elements to look out for:
  1. A significant question or claim
  2. A position in the academic debate
  3. An explanation of the research method or approach
  4. A presentation of the findings and argument
  5. A statement of the implications and contributions of the research study
- You should also aim to place a journal article within the broader academic debate
- ☞ Nicholas Carah and Eric Louw: Guide to reading journal articles

Paper on Reading Papers

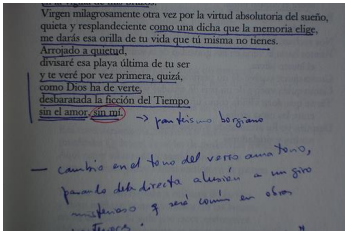
RV Subramanyam

"The reader should begin by reading the title, abstract and conclusions first. If a decision is made to read the entire article, the key elements of the article can be perused in a systematic manner effectively and efficiently. A cogent and organized method is presented to read articles published in scientific journals."

Subramanyam R V. Art of reading a journal article: Methodically and effectively. *J Oral Maxillofac Pathol [serial online]* 2013; 17:65-70. Available from: http://www.jomfp.in/text.asp?2013/17/1/65/110733

Notes & Annotations

- Annotations
  - The paper advantage
  - Notes, marks, scribbles, Post-Its are sign of active, creative examination of the content
- Notes
  - Never read a text without pen & paper



cc by-nc Manuel Sanfuentes

cc by Kristian D.

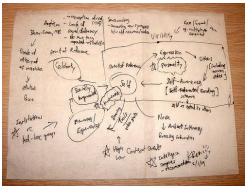
Excerpts

- Reproducing parts of a text
- Paraphrased or word-by-word
- WordNet synonyms: excerpt, excerption, extract, selection

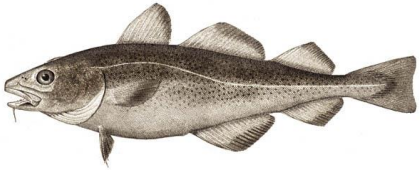
1. Orientation
   - Get a grip of the structure of the text
2. Excerpt
   - Work with the text – “what is the contribution of this part of the text?” and “what are the main points made?”
3. Compact
   - Summarize the texts and the excerpts

Visualisation

- Visualisation
  - Mindmaps, Concept Maps, …
- Individual preferences



cc by-nc-sa Kevin Lim



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Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Introduction

Assignment 2.2: Buzzword Bingo

Discussion

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Please share your associations with the following terms:

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies
- Storyboards

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies
- Storyboards
- Personas

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies
- Storyboards
- Personas
- Scenarios

Assignment 2.2: Buzzword Bingo

Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies
- Storyboards
- Personas
- Scenarios
- Prototypes

Assignment 2.2: Buzzword Bingo

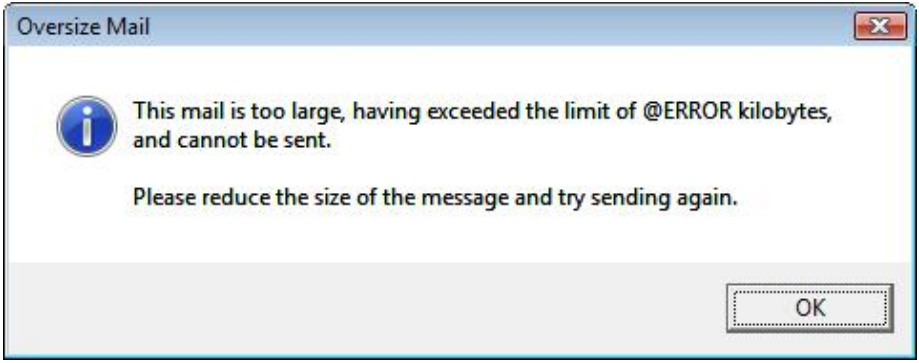
Discussion

- Human-Computer Interaction
- Design rules
- Human-Centred Design Processes
- User tests
- Field studies
- Storyboards
- Personas
- Scenarios
- Prototypes
- Evaluation

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

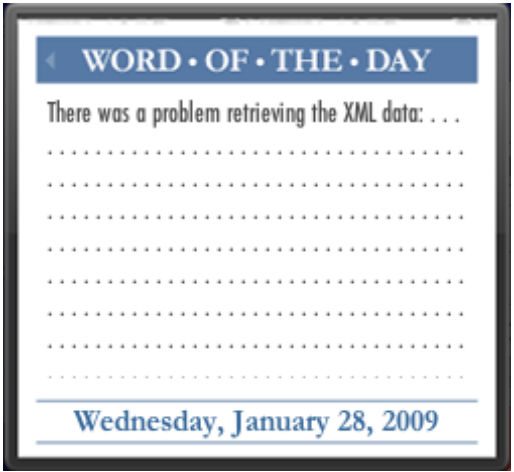
Errors

Notes



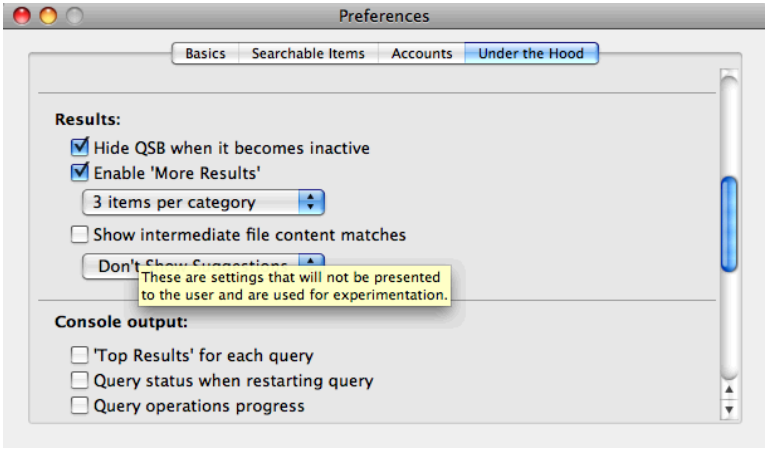
Quelle: ☞ The Daily WTF

Word of the Day



Quelle: ☞ The Daily WTF

Google Quick Search



Quelle: ☞ The Daily WTF

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

What do you mean?

OK or Cancel?

Quelle: ☞ Ryan from gdgt

Quicktime

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Brill Publishing

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Fabricland

MENU
HOME PAGE
Help / FAQ
frequently asked questions and conditions of sale
BATIK
BONING AND HOOPING
BROCADES FOR EVENING AND BRIDAL WEAR
BRIDAL FABRICS
BRIDAL SATINS
PLAIN BUDGET SATIN AND NOVELTY SATINS
BROIDERY ANGLAIS
CHEAP FABRICS ALL SORTS
CHIFFONS and printed GEORGETTES
CHINESE BROCADES
COTTON BATIK PRINTS
SEERSUCKER
FABRIG LAND
PRESS www.fabricland.co.uk to get to the menu.
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now established 24 years
21st February 1985 - 2009
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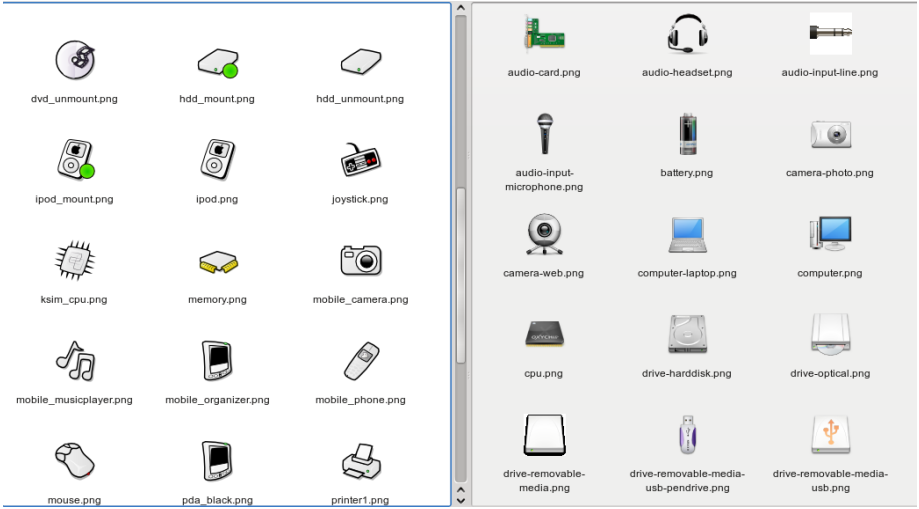
Tel No. 01425 461444
www.fabricland.co.uk
Cutting the 20 year cake
WELCOME TO OUR FABRIC SITE

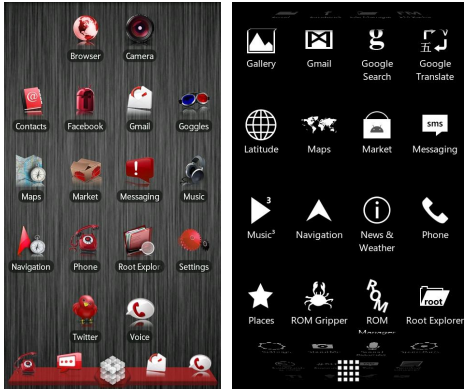
Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Choices

Icons PC

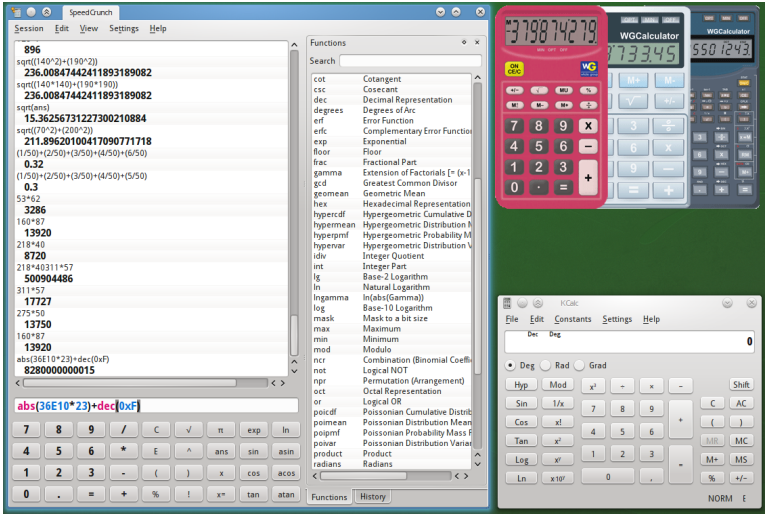

dvd_unmount.png
hdd_mount.png
hdd_unmount.png
ipod_mount.png
ipod.png
joystick.png
ksim_cpu.png
memory.png
mobile_camera.png
mobile_musicplayer.png
mobile_organizer.png
mobile_phone.png
mouse.png
pda_black.png
printer1.png
audio-card.png
audio-headset.png
audio-input-line.png
audio-input-microphone.png
battery.png
camera-photo.png
camera-web.png
computer-laptop.png
computer.png
cpu.png
drive-harddisk.png
drive-optical.png
drive-removable-media.png
drive-removable-media-usb-pendrive.png
drive-removable-media-usb.png

Icons Mobile



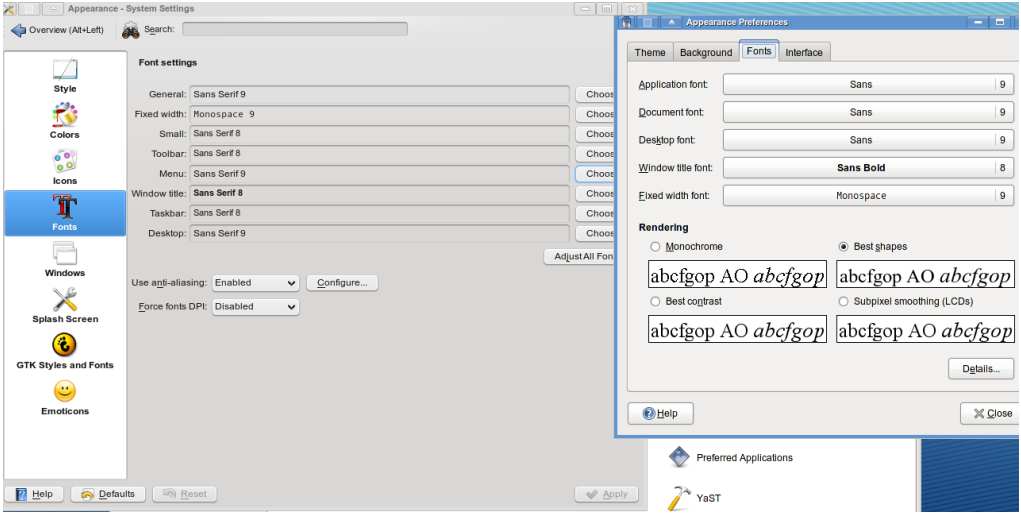
Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Calculators



Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

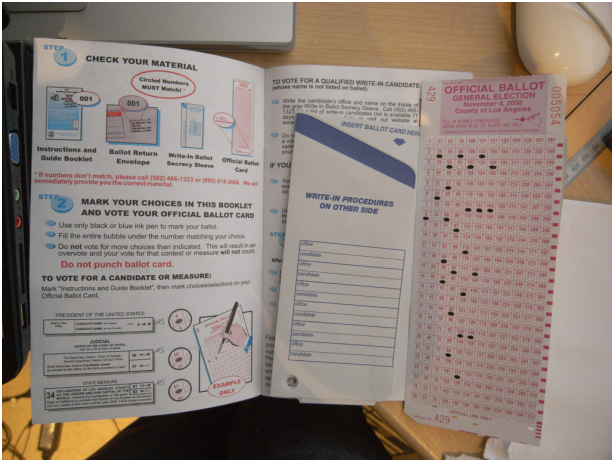
Font Preferences



Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Hardware

Ballot



cc by-nc-nd ☞ Julian Bleecker – Easily readable…for whom?

Knobs and Arows

How to prepare for the presentation? (cc Danny Hope)

Affordances

“Push here”, “Pull here”

Superficial

- These problems are only “skin deep”
- What about problems that do not manifest themselves in what we see?
- What about problems stemming from the fact that some activity is not supported?
- Common problems: Computers…
  - …are rude, the user is at fault
  - …require you to think like a computer, e.g. “Enter SSID”
  - …are sloppy, e.g. asking you to save a document after you printed it
  - …require humans to do the heavy lifting, e.g. try to paste formatted text

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

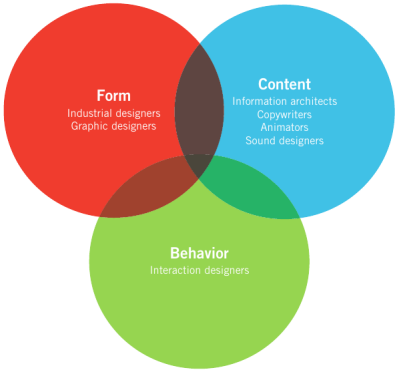
Mitigation

Required Reading
Introduction
Errors
What do you mean?
Choices
Hardware
Mitigation
Design Processes
Linear Models
Iterative Models
References

Introduction

- Development and design of digital media and software applications can become very costly for larger projects
- For small projects with one or few developers, ad-hoc approaches may work
- More extensive productions require communication and coordination
- Classic problem of software development
- Often a mixture of different areas
  - Software design
  - Media design
  - Usability design
  - User experience design
- Focus here
  - Iterative processes
  - Human-centred models

UX



User experience (UX) design has three overlapping concerns (Cooper et al., 2014)

Design

Definition

Human-oriented design activities include:

- Understanding the desires, needs, motivations, and contexts of people using products
- Understanding business, technical, and domain opportunities, requirements, and constraints
- Using this knowledge as a foundation for plans to create products whose form, content, and behavior are useful, usable, and desirable, as well as economically viable and technically feasible

Learning outcomes

- Understanding the necessities of design processes
- Specific challenges when developing and designing interactive systems
  - Particularly involving digital media
- Different human-centred processes and their advantages and shortcomings
- Be aware that there are different challenges for
  - Interactive productivity software
  - Games
  - Digital media
- One needs to find a fitting model and then understand how to use it

Design Processes

Goals

- The design process should be …
  - goal-oriented
  - have the desired use, material, cost, usability and user experience in mind
  - should enable creativity
  - include cost and goal planing
  - make decisions traceable
- We also need plans and requirements
  - Where are we?
  - What is missing?
- Flexibility and alternatives should be possible

Usability Engineering

- Usability Engineering and user experience design cannot stand on their own
- They need to be connected to software development methodologies
- Different process models and design philosophies are differently suitable
- Mediation between different “stakeholders” is a key issue for usability experts
  - We need to know and understand software engineering processes
  - We need to know and understand artistic and design processes
  - We need to communicate with customers and users

Assignment 2.3: Gadget Design

Group Work

What about a new gadget that includes:

- FM-Radio
- “something with USB”
- CD-Player
- Telephone
- Answering machine
- (Alarm) Clock
- Lamp (night stand or desk)
- Maybe even:
  - TV
  - “Smart features” (controlling toaster, coffee machine)

Assignment 2.3: Project Idea

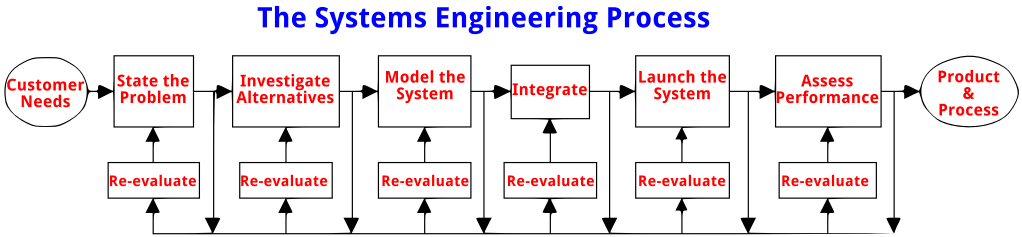
Group Work

- Form groups of 3-6
- Describe product & process
- Product:
  - Develop the outline of a project idea which would implement such a system
  - Prepare a short pitch
- Process:
  - How would you manage development
  - How would you make sure your product is usable and can be implemented?
- Pitch your idea in the course

Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
References

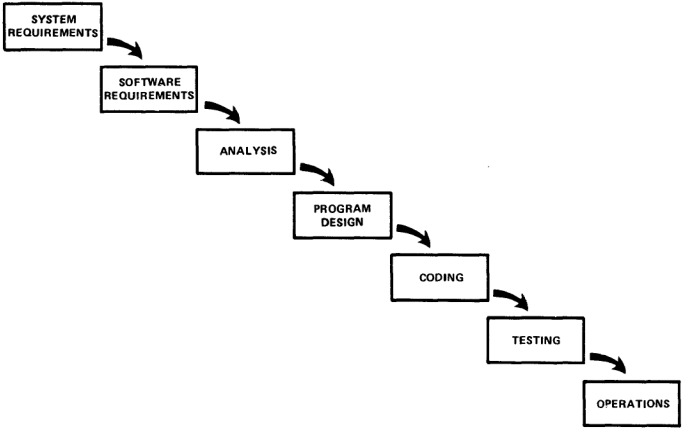
Linear Models

Systems Engineering

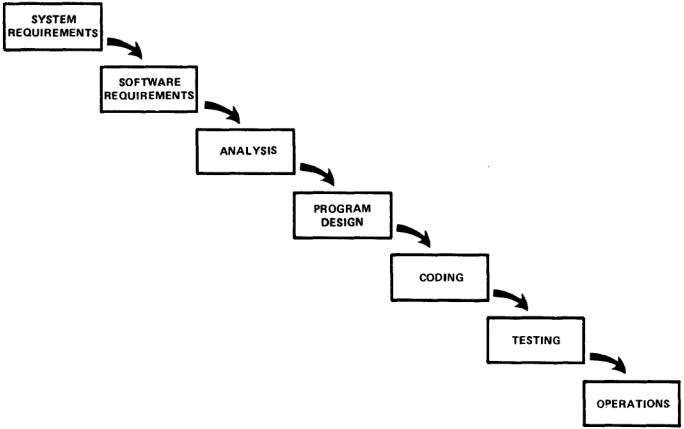


According to Bahill and Gissing (1998)

Waterfall


SYSTEM REQUIREMENTS
SOFTWARE REQUIREMENTS
ANALYSIS
PROGRAM DESIGN
CODING
TESTING
OPERATIONS

Waterfall



"In my experience, …the simpler model has never worked on large software development efforts …" – Royce (1970)

Advantages and Disadvantages

- Advantages
  - Clear demarcation of phases
  - Easy planing and control
  - Simple cost estimates
- Disadvantages
  - Does not scale
  - Inflexible requirements
  - Realization starts late
  - Late discovery of faulty conceptualizations

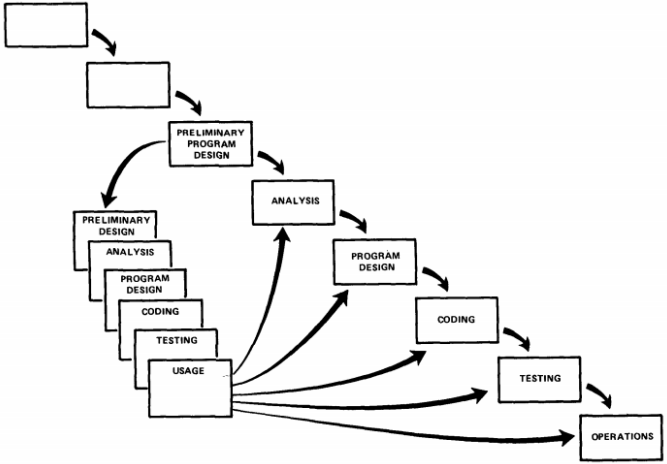
Results

- What is interesting is more the aspects than the structure
  - Analysis – Understanding the world
  - Concept – Designing a solution
  - Implementation – Realization of said solution
  - Evaluation – Test of said solution
- We will need to cover these aspects

Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
Analysis
Concept & Design
Implementation
Evaluation
References

Iterative Models

Waterfall – Do it twice



Royce (1970)

Praxis

- Development processes are rarely as simple and straight as the linear models suggest
- Changes in requirements or requirements that are hard to formalize make the “waterfall” difficult to follow
- Worst case: develop a product removed from user requirements that will not be usable
- Software engineering has therefore developed different process models to counter these aspects
- Just a few examples
  - Spiral model
  - Unified process model (rational)
  - Agile Models
    - Feature driven development
    - Scrum

Iterative Models

- Iterative models paint s a much more realistic picture of development processes
- In real world settings, there will be phases where different sub tasks will be worked on independently
  - Producing media
- Later project phases will need a stronger relationship
- It is important to keep some aspects in mind
  - Different design activities can take a different amount of time and cannot easily be parallelized
  - Decision in some areas might be costly to revise later (music, video production)

User-Centred Design

Definition

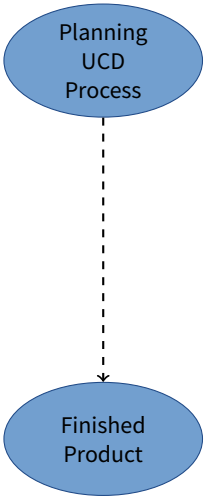
A User-Centred Design Process

- is a method, that includes relevant human factors
- caters for conscious and accountable decisions
- helps set the focus on important questions and requirements
- supports evaluation and testing of assumptions

Process as well as product are based on goals, activities, tasks, capabilities, needs and context of users. Therefore, user participation plays a role early in the process. To be able to measure success, requirements need to be translated into quantifiable and measurable criteria

Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
Analysis
Concept & Design
Implementation
Evaluation
References

ISO Model

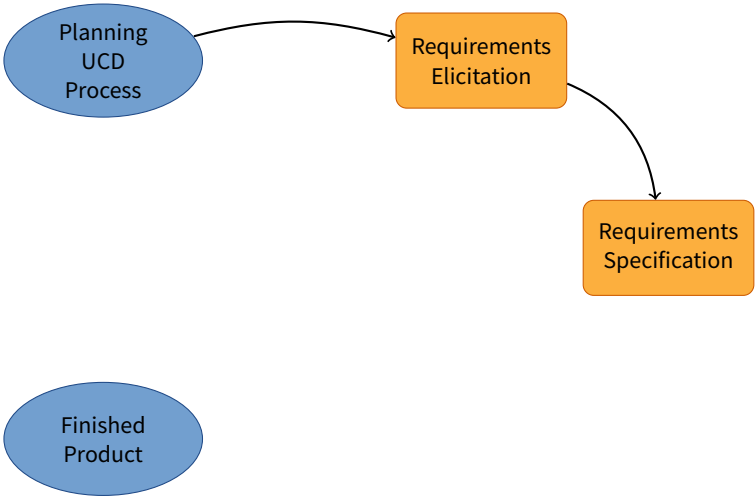


ISO Model

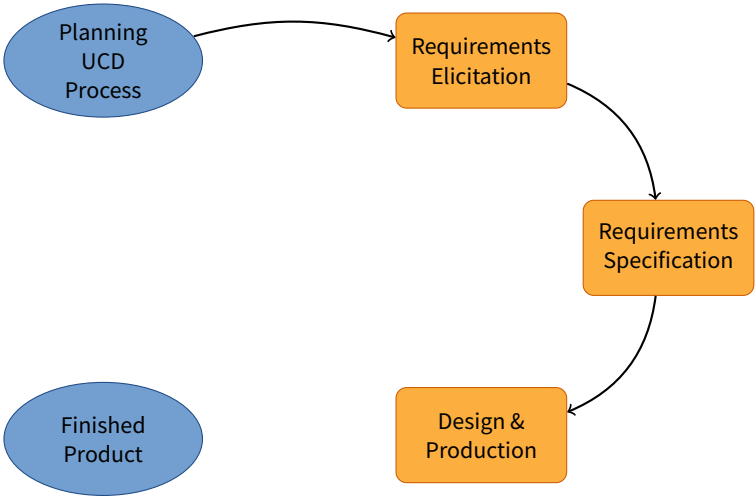
Planning
UCD
Process
Requirements
Elicitation

Finished
Product

ISO Model


Planning UCD Process
Requirements Elicitation
Requirements Specification
Finished Product

ISO Model


Planning UCD Process
Requirements Elicitation
Requirements Specification
Design & Production
Finished Product

Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
Analysis
Concept & Design
Implementation
Evaluation
References

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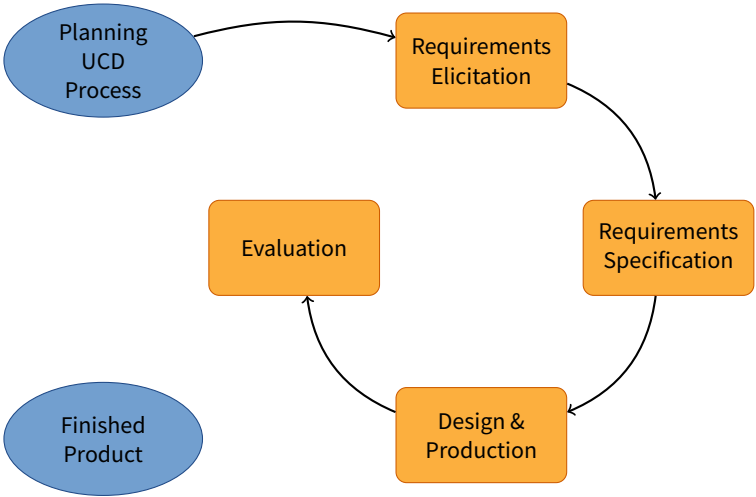

Required Reading
Introduction
Design Processes
Linear Models
Iterative Models
Analysis
Concept & Design
Implementation
Evaluation
References

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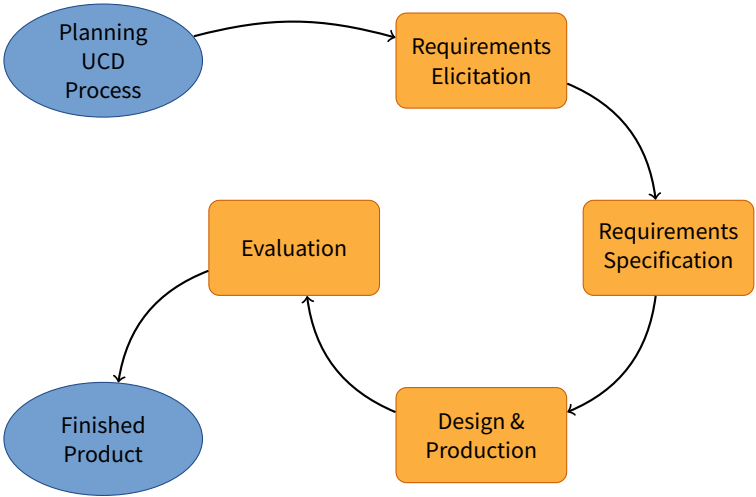
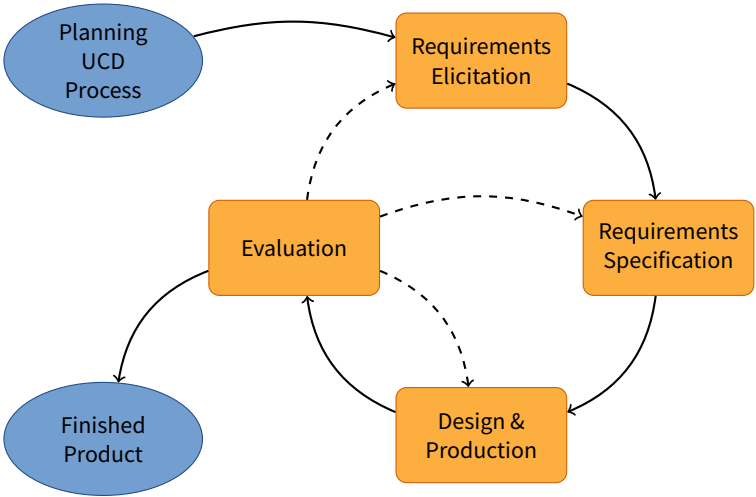


ISO Model


Planning
UCD
Process
Requirements
Elicitation
Evaluation
Requirements
Specification
Finished
Product
Design &
Production

Usability

Definition

The official ISO 9241-11 definition of usability is: “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”

- It should be easy for the user to become familiar with and competent in using the user interface during the first contact
- It should be easy for users to achieve their objective through using the interface
- It should be easy to recall the user interface and how to use it on subsequent visits

Processes and Steps

- The ISO-Standard gives only a broad definition of human-centred processes
- A couple of different approaches can be classified as being instantiations of such an abstract definition
- We will often find the following aspects
  - Analysis (Requirements Elicitation)
    - Description of context
    - Description of user
    - Activity analysis
    - Artefact analysis
  - Concept (Requirements Specification)
    - Activity design
    - Information design
    - Interaction design
  - Prototypical Implementation (Design & Production)
  - Evaluation (Evaluation)

Assignment 2.4: Learning Support Systems

Group Work

What about a new learning management system that can help you

- Access course material
- Connect material from different sources
- Upload and share your own material
- Helps you organize your study groups
- Gives you early feedback on your learning outcomes
- Helps you write reports and do assignments

Assignment 2.4: Project Idea

Group Work

- Form groups of 3-6
- Describe product & process
- Product:
  - Develop the outline of a project idea which would implement such a system
  - Prepare a short pitch
- Process:
  - How would you manage development
  - How would you make sure your product is usable and can be implemented?
- Pitch your idea in the course

Required Reading
Introduction
Design Processes
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References

Analysis

Context- and Institutional Analysis

- To begin with, we need to describe the context of use of the product
  - Production, safety-critical, entertainment
  - Market analysis – expectations of users
- Description of the spatio-temporal setting for using the system
  - Is it to be used outside? At what time?
- Description of the institutional context of use
  - for business software, how is it used in the business

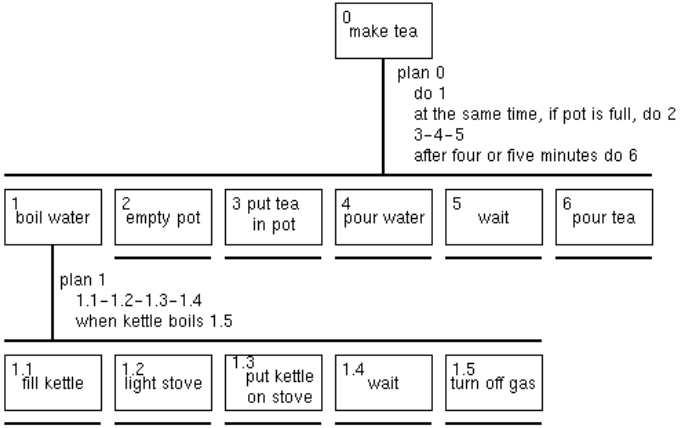
User Analysis

- Description of the target audience of the system
  - Physical and cognitive abilities
  - Cultural and social factors
- Different methods available
  - User classes – the potential users of the system are categorized into different classes, using a range of criteria
    - Experts, casual users
    - Roles they have using the system
  - Personas – concrete, but fictitious description of person dealing with the system
    - Primary, secondary, negative

Task Analysis

- Different techniques can be used, such as interviews or ethnological studies
- First we need to know, how the users work today
  - And that is not how they (or their boss) thinks how they do it
- Individual activities, tasks and operations can be identified and e.g. hierarchically organized
- Different models exist, for example the Hierarchical Task Analysis (HTA)
- Example: In a bank, the tasks REVIEW-ACCOUNTS can be divided into:
  - RETRIEVE-ACCOUNT-LIST
  - FIND-RECENT-ACTIVITY
  - REVIEW-ACTIVE-ACCOUNTS

Hierarchische Aufgabenanalyse



☞ Nick Gibbins

Artefact Analysis

- Description of artefacts used
- What are the “things” that are being used? And how?
- What is an artefact? A culturally defined object.
  - Office furniture
  - Pens, staplers, hole punchers
  - Protocols
  - Forms
  - Files
  - Computer (Hard- and Software)

Artefacts

cc by-nc-sa Ian Lewis

Assignment 2.5: Artefacts

Discussion

- What artefact use do you notice?

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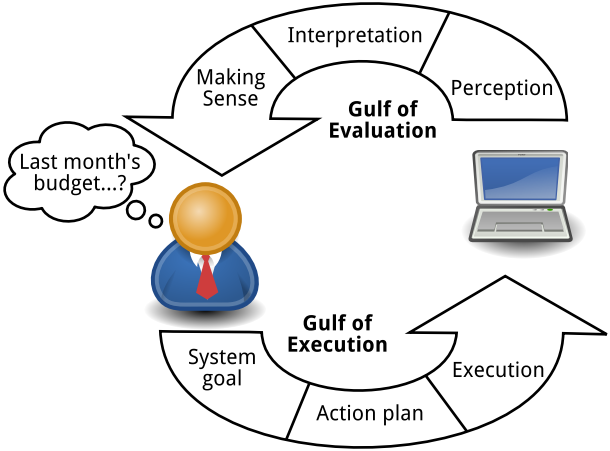
Concept & Design

Activity Design

- First step: what activities are to be supported by the new system?
- Some process models have this as an explicit step (e.g. Scenario-Based Development)
- Challenges and opportunities of current situation are transformed into system behaviour
  - Keep opportunities and address challenges
- Goal: specification of what can be done with the system
  - What information is made available?
  - What operations are possible?
  - What kind of results is getting delivered?
- Activity design defines the opportunities, but the experience is constructed through the interface
- The activity design has to be transformed into a design that supports bi-directional interaction of human and computer

Gulfs


Interpretation
Making Sense
Perception
Gulf of Evaluation
Last month's budget...?
Gulf of Execution
System goal
Execution
Action plan

Information Design

- The **objects** and **actions** possible in a system are **represented** and **arranged** in a way that facilitates **perception** and **understanding**
- Includes the design of
  - Application screens
  - Web pages
  - Menus
  - Dialogs
  - Icons
- Other modalities
  - Sound
    - Speech synthesis
  - Tactile
    - Force feedback game controls
  - Visual
    - 3D-displays (geowall)
- Addresses the Gulf of Evaluation

Interaction Design

- Goal: specify the mechanisms for accessing and manipulating task information
- **Information design** focuses on determining which task objects and actions to show and how to represent them
- **Interaction design** tries to make sure that people can **do the right things at the right time**
- Broad scope:
  - Selecting and opening a spreadsheet
  - Pressing and holding a mouse button while dragging it
  - Specifying a range of cells
- Addresses the Gulf of Execution

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Implementation

Prototypical Implementation

- Instead of “Do it right the first time” we will develop iterative prototypes
- A prototype is a concrete but partial implementation of a system design
- Constructed and evaluated to guide redesign and refinement
- Created to explore many questions during system design
  - System reliability
  - Bandwidth consumption
  - Hardware compatibility
- User interface prototype
  - Built to explore usability issues
- User interface prototypes can be built early on in the design process
  - Paper prototype
- Late prototypes will probably be very close to the actual system (depending on process model)

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Evaluation

Evaluation

- Necessary to assess progress and satisfaction of requirements
  - Formative and summative
- Helps understanding the activity and resulting requirements
- This leads to enhanced specifications and implementations
- Evaluation can start early in the process
  - Not only “finished” Software can be evaluated
  - Evaluation of User-Interface-Specifications
- Evaluations help to detect deficits in the design early on and to correct mistakes

Assignment 2.6: Evaluation and Analysis

Group Work

- Form groups of 3-6
- Use a system you are acquainted with and research your use of it
  - Learnweb
  - Webmail
  - LSF
- Let group members use the system and describe their activities and problems
  - E.g. download of course material
- Document your findings
- Present your findings in the course

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Overview

Jörg Cassens

SoSe 2019

Contextual Design of Interactive Systems

medieninformatik
IMAI – Institut für Mathematik und Angewandte Informatik

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