User Experience Design I (Interaction Design)

Day 3 (May 09, 2019, 9am-12pm):

Usability II and Approaches to UX/IxD

Recap Session (Previous lecture): Process Models, Elements and Usability

GRAPHIC DESIGN

2D

PRODUCT DESIGN

3D
+Z-axis
(spatial depth)

INTERACTION DESIGN

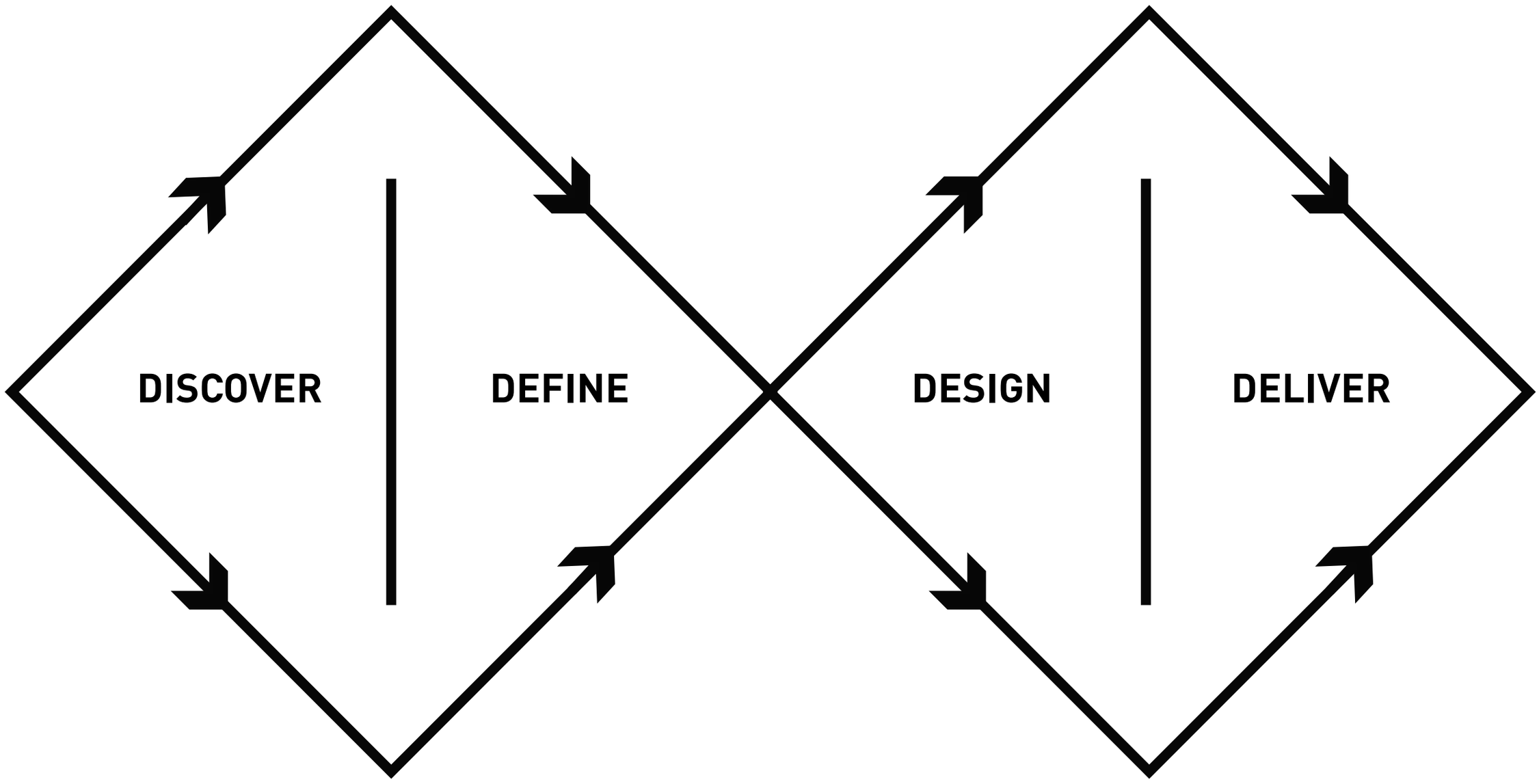
4D
+T-axis
(temporal dimension)

SERVICE DESIGN

5D
+W-axis
(multi-local simultaneity)

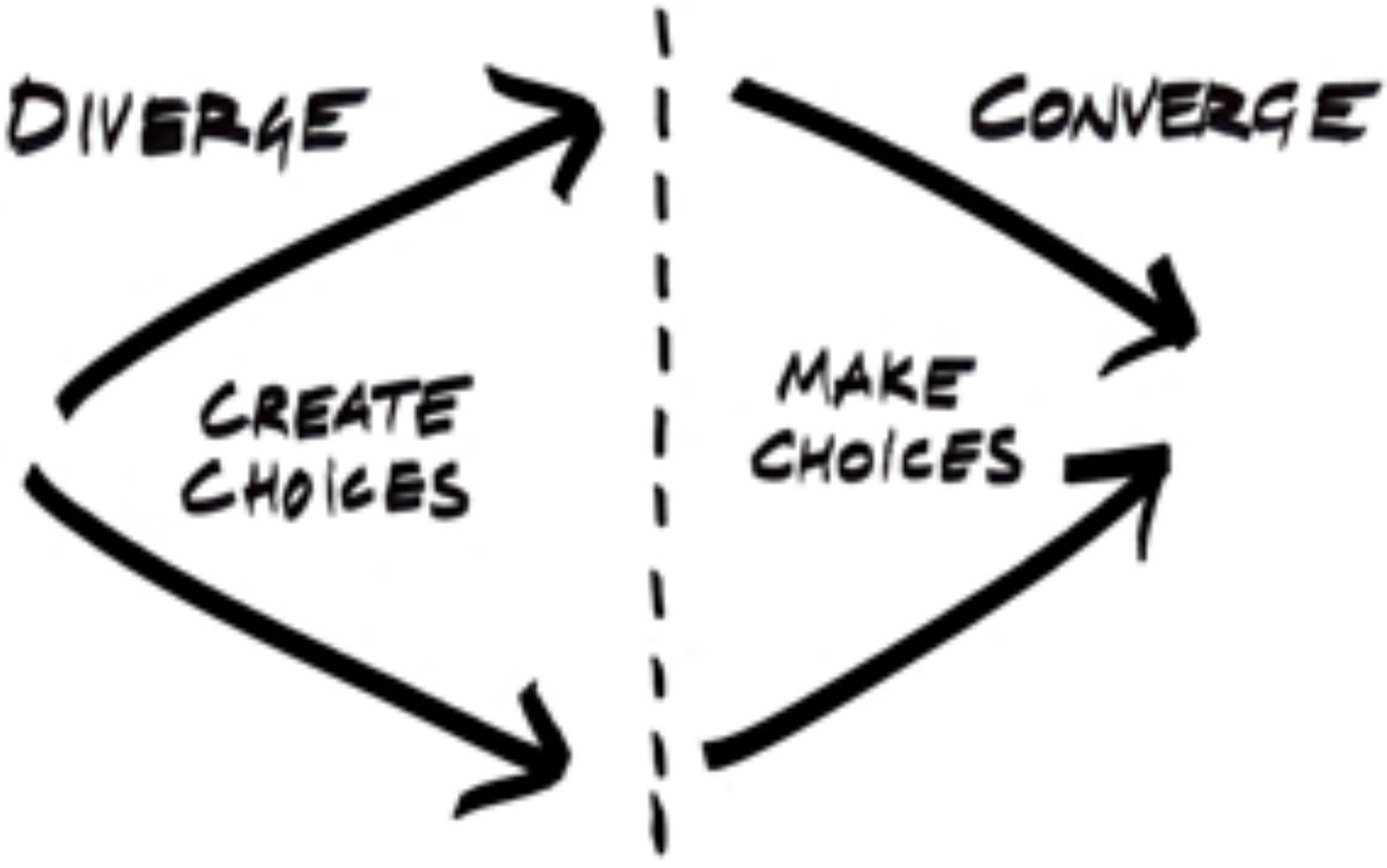
Model: Benjamin N.N. Schulz; Icons: Dima Yagnyuk, Daphne Espinosa, George Agpoon / The Noun Project

Double Diamond



source: [2]

Double Diamond



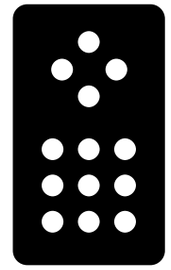
source: [2]

Appearance/Affordances

Appearance

Appearance is the major source (texture is the other) of what cognitive psychologist James Gibson, in 1966, called **affordances**.

Gibson explored the concept more fully in his 1979 book *The Ecological Approach to Visual Perception*, but it wasn't until Don Norman's seminal book *The Psychology of Everyday Things*, in 1988, that the term spread into design.



An **affordance** is a property, or multiple properties, of an object that provides some indication of how to interact with that object or with a feature on that object.

source: [2&5]

Heuristic Evaluation

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

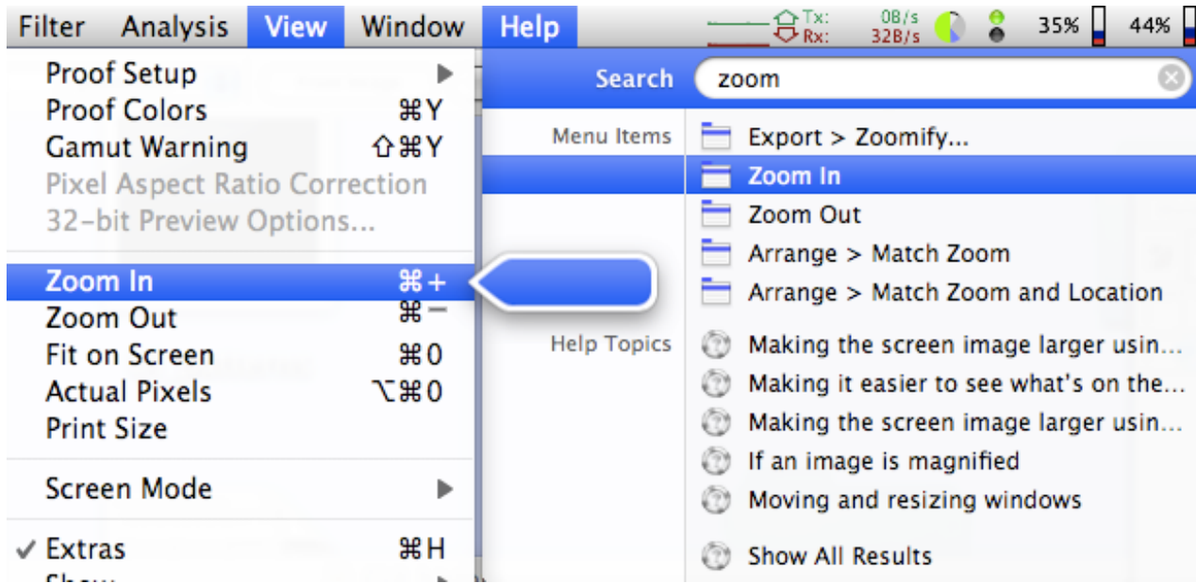
Recognition rather than recall

Flexibility and efficiency of use

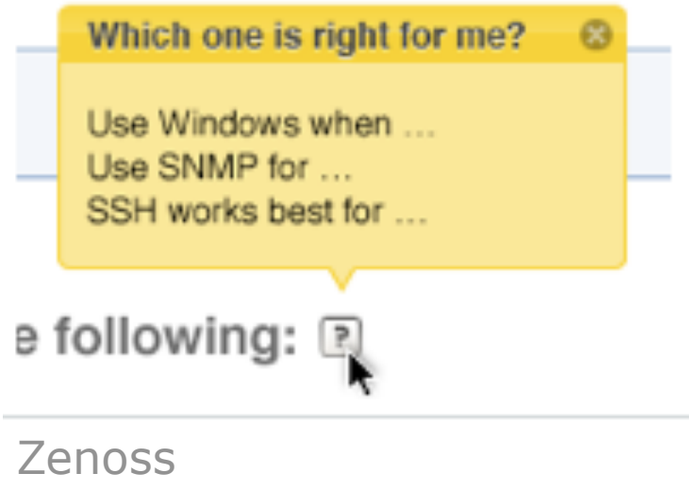
Aesthetic and minimalist design

Help users recognize, diagnose, and recover from errors

Help and documentation



Mac OSX 10.5 (Screenshot)



Zenoss

Quelle: [3,7]

User Experience Design I (Interaction Design)

Day 3 (May 09, 2019, 9am-12pm):

Usability II and Approaches to IxD/UX

Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design

EUROPÄISCHE NORM **EN ISO 9241-10**

EUROPEAN STANDARD

NORME EUROPÉENNE 1995-02-09

ICS 331.101.1.-651.2.,681.31.022

Deskriptoren: Ergonomie, Büromaschinen, Datenverarbeitungseinrichtung, Textverarbeitung, Datenendeinrichtung, Bildschirmgeräte, Leistungsbewertung, Grundlagen, Softwaregestaltung

Deutsche Fassung

Ergonomische Anforderungen für Bürotätigkeiten mit Bildschirmgeräten Teil 10: Grundsätze der Dialoggestaltung (ISO 9241-10 : 1995)

Ergonomic requirements for office work with visual display terminals (VDTs) - Part 10: Dialogue principles (ISO 9241-10 : 1995)

Exigences ergonomiques pour travail de bureau avec terminaux à écrans de visualisation (TEV) - Partie 10: Principes de dialogue (ISO 9241-10 : 1995)

ISO 9241

Unterschiede zwischen Usability und User Experience

- Die DIN EN ISO 9241-210 versucht die beiden Begriffe Usability und User Experience voneinander abzugrenzen.

- User Experience umfasst demzufolge alle Effekte, die ein Produkt bereits vor der Nutzung (antizipierte Nutzung) als auch nach der Nutzung (Identifikation mit dem Produkt oder Distanzierung) auf den Nutzer hat.

- Usability wiederum fokussiert auf die eigentliche Nutzungssituation (Effektivität und Effizienz)

https://www.dakks.de/sites/default/files/71_sd_2_007_leitfaden_usability_1.3_0.pdf

3 Grundsätze der Dialoggestaltung

Die Grundsätze der Dialoggestaltung werden zusammen mit einer kurzen Beschreibung und typischen Empfehlungen, gefolgt von Beispielen, dargestellt. Die Beispiele veranschaulichen mögliche Realisierungen. Empfehlungen und Beispiele wurden zur Verdeutlichung ausgewählt und sind nicht erschöpfend.

3.1 Aufgabenangemessenheit

Ein Dialog ist aufgabenangemessen, wenn er den Benutzer unterstützt, seine Arbeitsaufgabe effektiv und effizient zu erledigen.

Empfehlungen:	**mögliche Beispiele:**
Der Dialog sollte dem Benutzer nur solche Informationen anzeigen, die im Zusammenhang mit der Erledigung der Arbeitsaufgabe stehen.	Formatierungen wie z.B. Farbe und Informationen wie z.B. Wochentag, Datum usw. werden nur angezeigt, wenn sie die Erledigung der Arbeitsaufgabe erleichtern.
Die angezeigte Hilfe-Information sollte von der Aufgabe abhängen.	Wenn der Benutzer Hilfe aufruft, zeigt das Dialogsystem Informationen zur gegenwärtigen Aufgabe an (z.B. während des Editierens eine Liste der Editierbefehle). Wenn eine Dialog-Box angezeigt wird und der Benutzer Hilfe aufruft, zeigt das Dialogsystem Informationen zu dieser Dialog-Box an.
Alle Aufgaben, die sinnvollerweise dem Dialog-	Die Positionsmarke wird automatisch auf das

ISO 9241

Bei der Gestaltung des Dialogs sollte der Komplexität der Arbeitsaufgabe unter Berücksichtigung der	In einem öffentlich zugänglichen Dialogsystem wird dort, wo es eine Reihe alternativer Eingabe-

Usability concept

- Erkennbarkeit (die Aufmerksamkeit des Benutzers wird zur benötigten Information gelenkt)
- Unterscheidbarkeit (die angezeigte Information kann genau von anderen Daten unterschieden werden);
- Lesbarkeit (die Information ist leicht zu lesen);
- Klarheit (der Informationsgehalt wird schnell und genau vermittelt);
- Verständlichkeit
  (die Information wird im Zusammenhang mit der Aufgabe verstanden);
- Kompaktheit/Prägnanz (den Benutzern wird nur jene Information gegeben, die für das Erledigen der Aufgabe notwendig ist);
- Konsistenz (gleiche Information wird innerhalb der Anwendung entsprechend den Erwartungen des Benutzers stets auf die gleiche Art dargestellt).

ISO 9241

https://www.dakks.de/sites/default/files/71_sd_2_007_leitfaden_usability_1.3_0.pdf

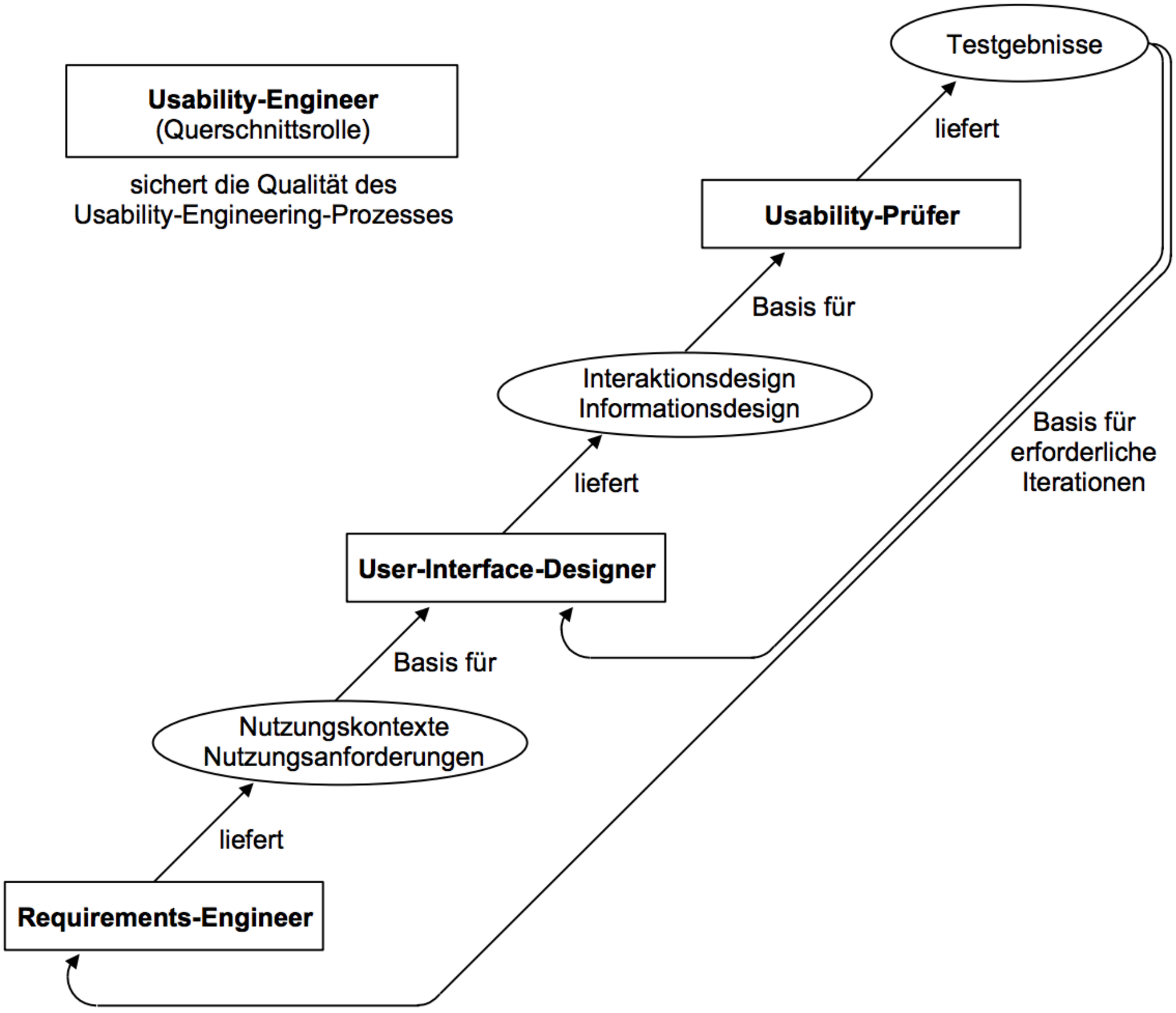
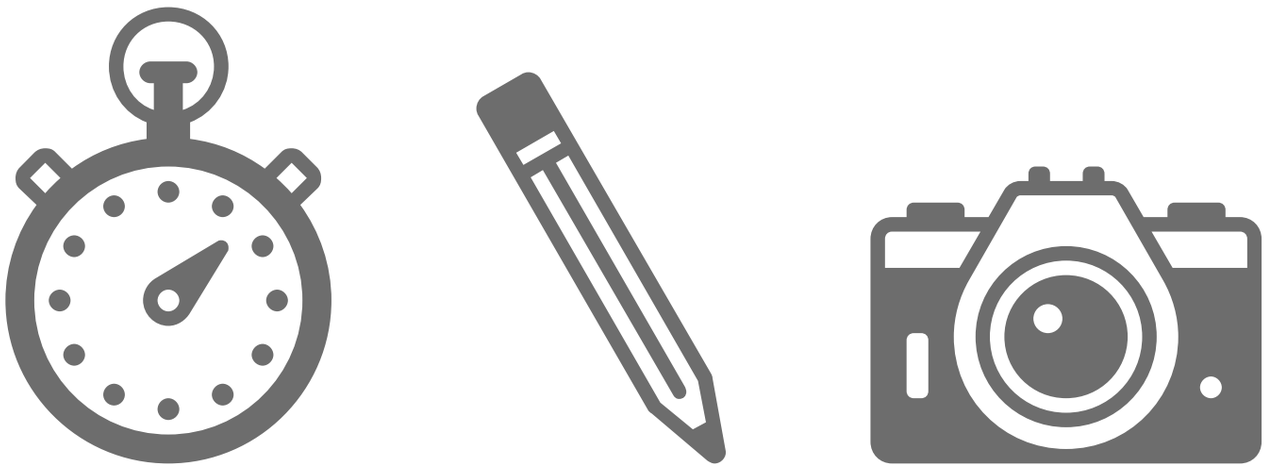


Abbildung 5: Zusammenspiel der Rollen und Ergebnisse im Usability-Engineering-Prozess

https://www.dakks.de/sites/default/files/71_sd_2_007_leitfaden_usability_1.3_0.pdf

Usability concept

ISO 9241:
effectiveness (% of goal achieved)
+ efficiency (time to complete a task, or the error rate, or the amount of effort)
+ satisfaction (subjective rating scale)
= Usability



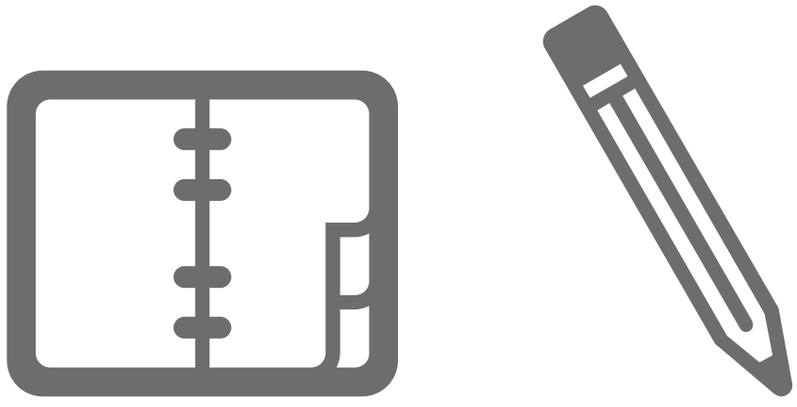
ISO 9241

source: [6]

(User) Satisfaction

Satisfaction: the level of comfort that the users feel when using a product and how acceptable the product is to users as a means of achieving their goals

- Subjective aspect
- Difficult to measure
- Often be strongly correlated with effectiveness and efficiency



ISO 9241

source: [6]

Usability testing

Usability testing determines whether the users can find and use the features in the amount of the time and effort they willing to expend searching.

- Primary goal – improve the usability
- Real users do the real task(s)
- Observation
- Analysis

ISO 9241

source: [6]

http://www.usabilis.com/img/user-research-france/usability-testing.jpg

Standart Usability Lab Layout

Observer Room

- Screen-Capture Software
- Audio
- Live-Video (3 Cameras)
- Space for Attendees

User Room

- Screen(s) for Testing Prototypes
- Microphones (2)
- Pleasant Atmosphere

© IMAGO Design GmbH 2018

Lab Usability testing

Specifically constructed testing room
...instrumented with data collection devices

Separate observation room
...usually connected to the testing room by one-way mirror and audio system / data recording and analysis

Test users perform prepared scenarios
...and use the ”Think aloud” technique

Problem
...very artificial setting
→ bias in test results

Usability Inspection Methods Overview

Inspection methods: need to be carried out by cognitive expert.

They are good in finding problems

- **Heuristic evaluation:** better predictor
- **Cognitive walkthrough:** finding end-user problems towards ease-of use
  (The cognitive walkthrough method is a usability inspection method used to identify usability issues in interactive systems, focusing on how easy it is for new users to accomplish tasks with the system)

Actual user testing is still **very important** (Triangulation)

User testing and inspection methods do not have a high degree of overlapping findings

source: [6]

Usability Test Plan I

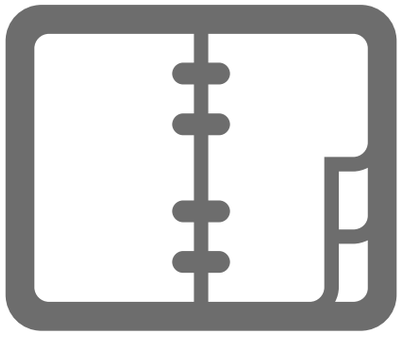
- What kind of knowledge they you need to have before you can carry out the usability tests of the product?
- Where and how can you get the knowledge?
- Do you need any skill training as well? You need to specify the discussion as detailed as possible.
- What kind of team members do you like to have when you are asked to organise the usability tests?
- Would you prefer to carry the test in the lab, or in the field, or both? Why?

http://www.usabilis.com/img/user-research-france/usability-testing.jpg

source: [6]

Usability Test Plan II

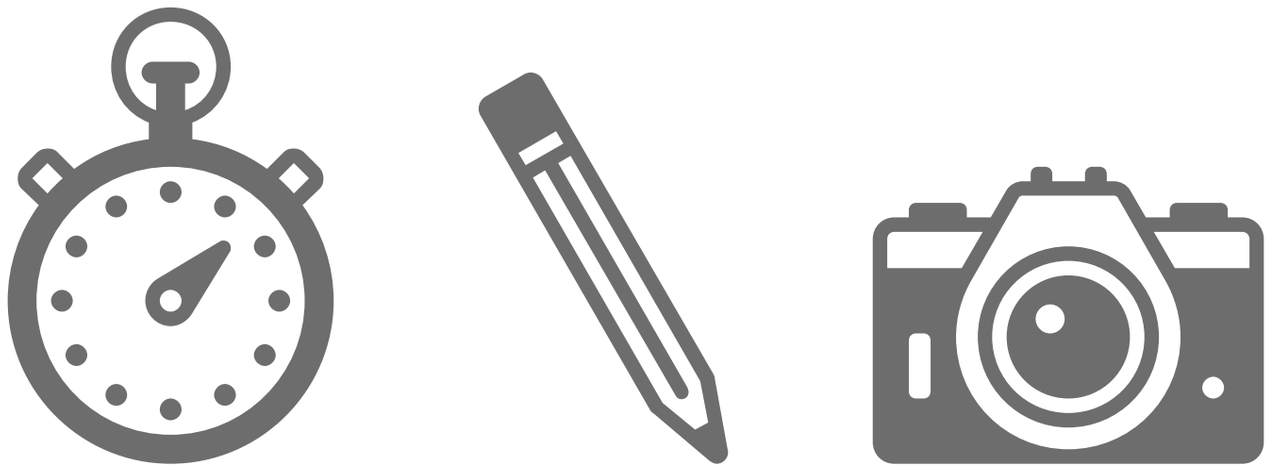
- What kind of preparations do you need to do before you can design the tests?
- What can be the best schedule ?
- **Who shall be your tests subjects?** How many of them in each group? How can you find them?
- **How many tests you plan to carry out?** How would you design your testing scenarios? What kinds of design features and functions you are planning to test?



source: [6]

Usability Test Plan III

- **Prepare your testing tools**. What kind of tools will you need? How shall they look? What do you plan to measure?
- **Data analysis.** Based on your study plan, test your plan of measurements: How will you analyse the results? What kind of conclusions are you expecting from the data analysis ?
- **Preparing your usability testing report**. Structure how your usability testing report shall look.



source: [6]

Usability II and Approaches to UX/Interaction Design

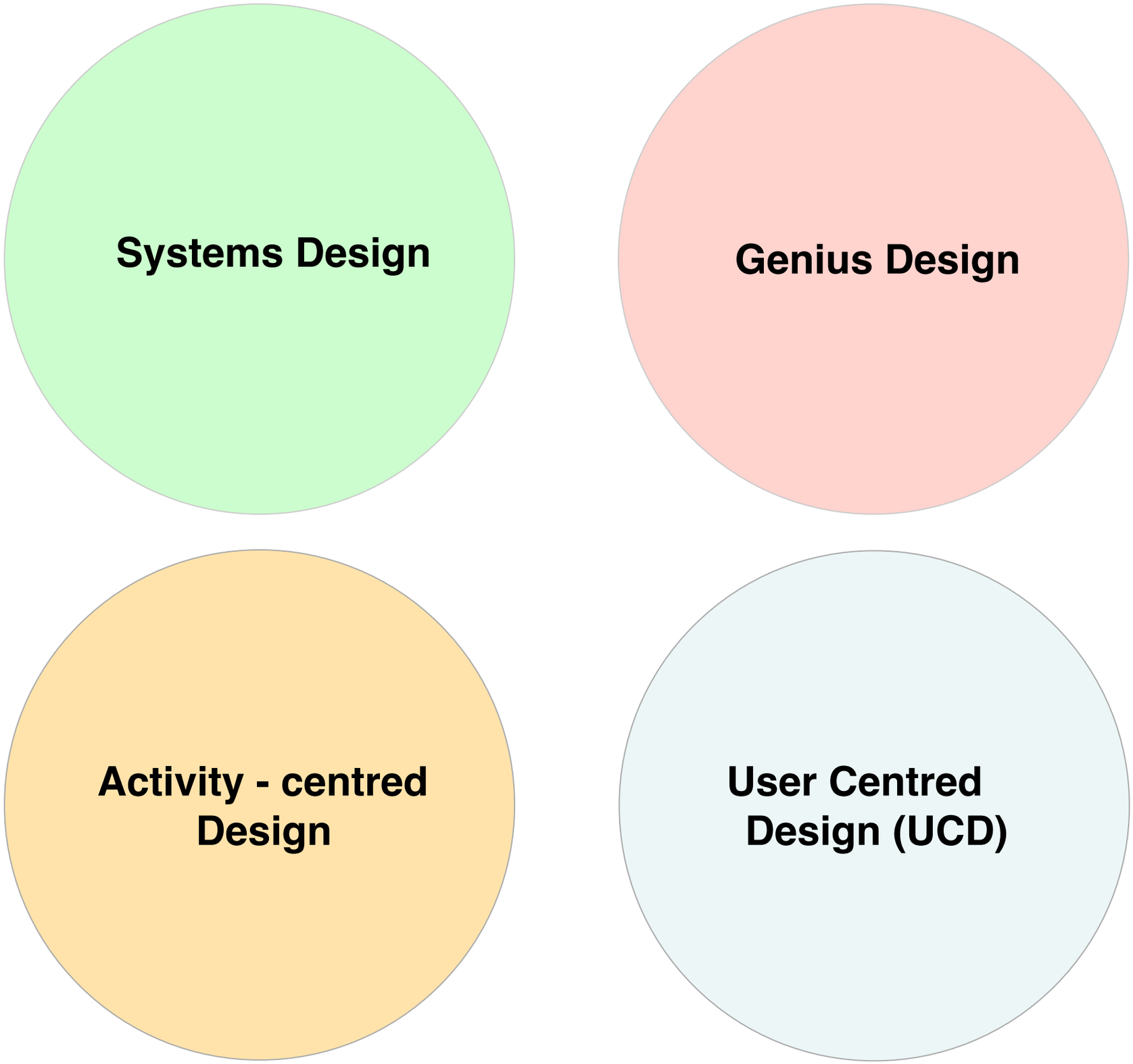
- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design

Design is a funny word. Some people think design means how it looks. But of course, if you dig deeper, it's really how it works.

Steve Jobs

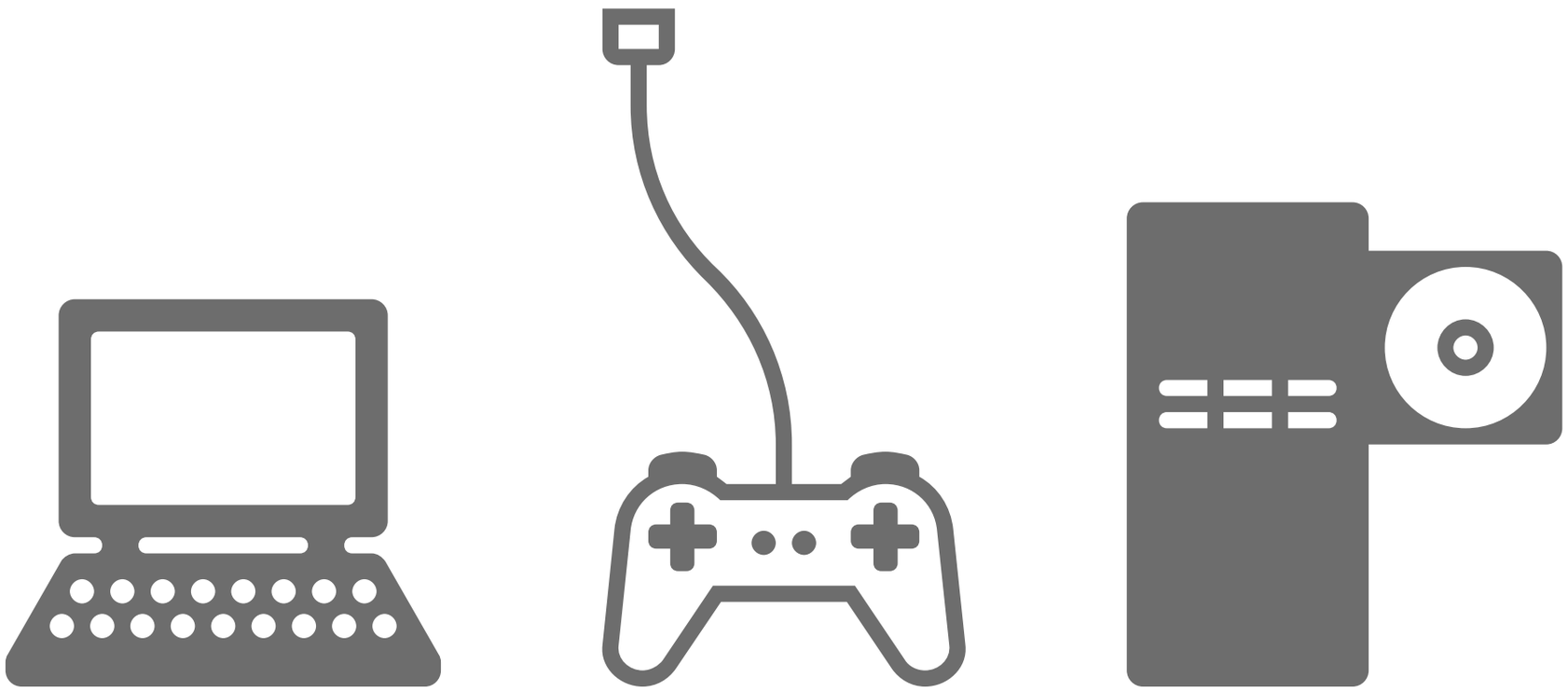
Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design


Systems Design
Genius Design
Activity - centred Design
User Centred Design (UCD)

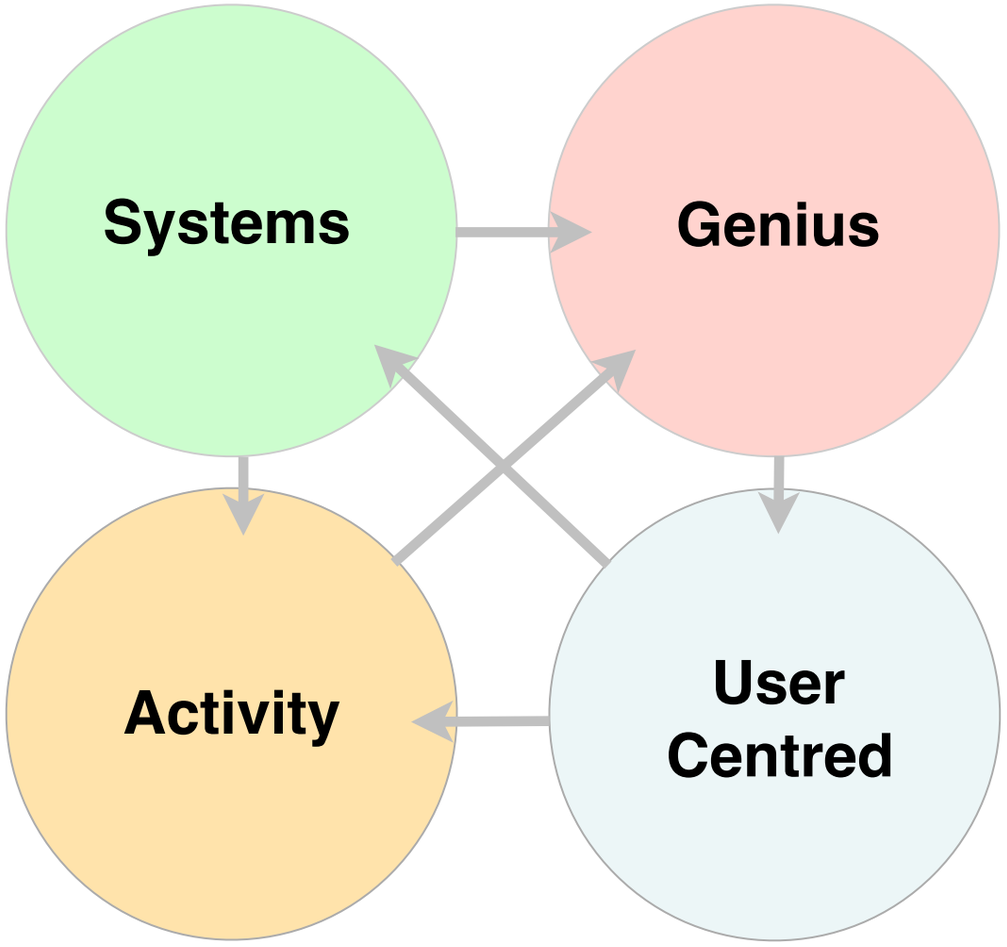
source: [5]

• can be used in many different situations to crate vastly different products and services,
• e.g. Web sites, consumer electronics or nondigital services.



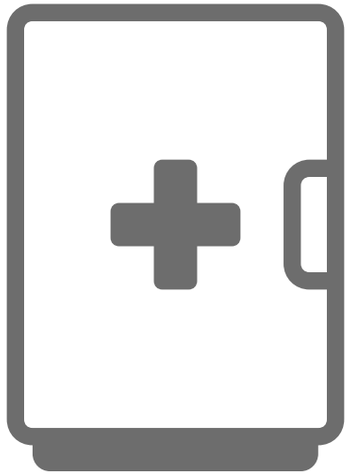
source: [5]

• move between approaches, applying the best approach to the right context
• sometimes applying multiple approaches even within a single project.



source: [5]

• problematic situations can be improved by developing at least one of these approaches



source: [5]

Four Approaches to Design

Approach	*Overview*	*Users*	*Designer*
User-Centered Design	Focuses on user needs and goals	Guide the design	Translates user needs and goals
Activity-Centered Design	Focuses on the tasks and activities that need to be accomplished	Perform the activities	Creates tools for actions
Systems Design	Focuses on the components of a system	Set the goals of the system	Makes sure all the parts of the system are in place
Genius Design	Relies on the skill and wisdom of designers used to make products	Source of validation	Is the source of inspiration

source: [5]

Design-Led

design-led
with
expert mindset

design-led
with
participatory mindset

Expert Mindset
“users” seen as subjects
(reactive informers)

Participatory Mindset
“users” seen as partners
(active co-creators)

research-led
with
expert mindset

research-led
with
participatory mindset

Research-Led

source: [6+7]

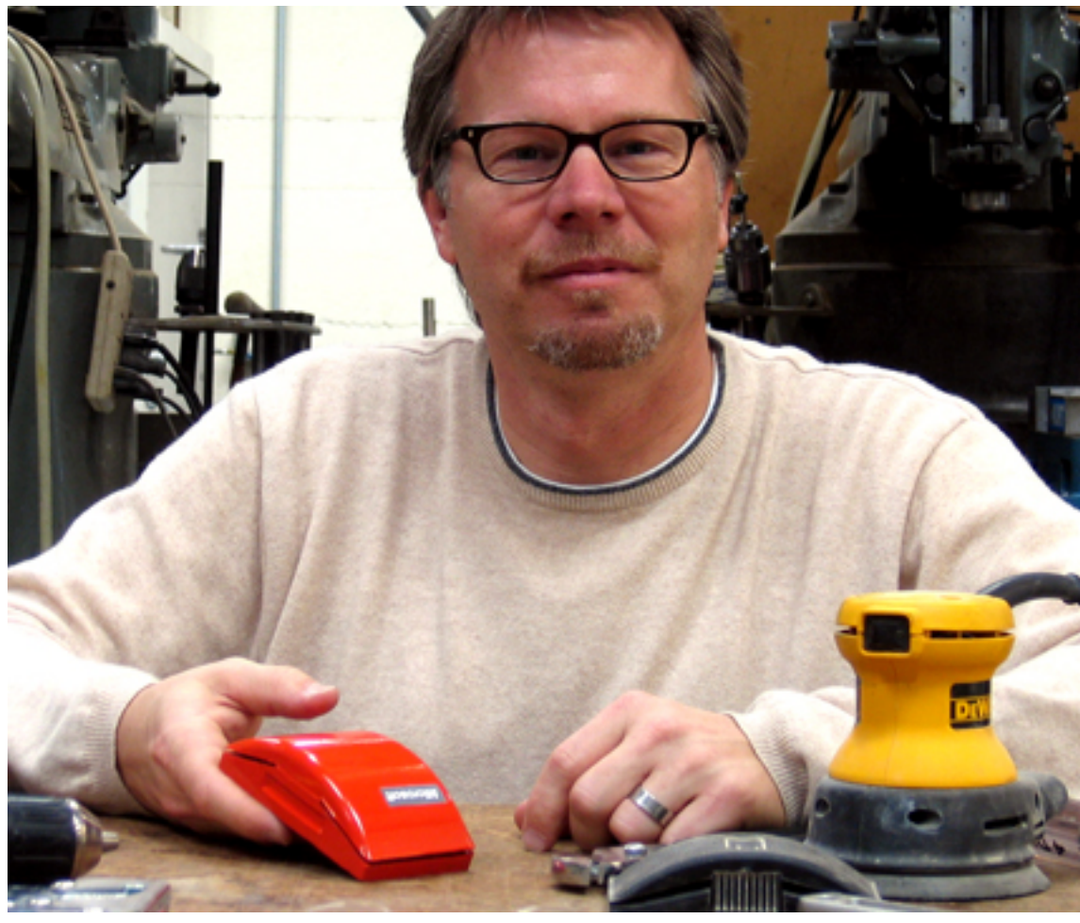
Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design

Case Study:

Paul Bradly

-designed the “Microsoft Mouse”
-followed an established
“User Centred Design Process” (UCD)
-helps Interaction Designers at IDEO
developing their prototypes

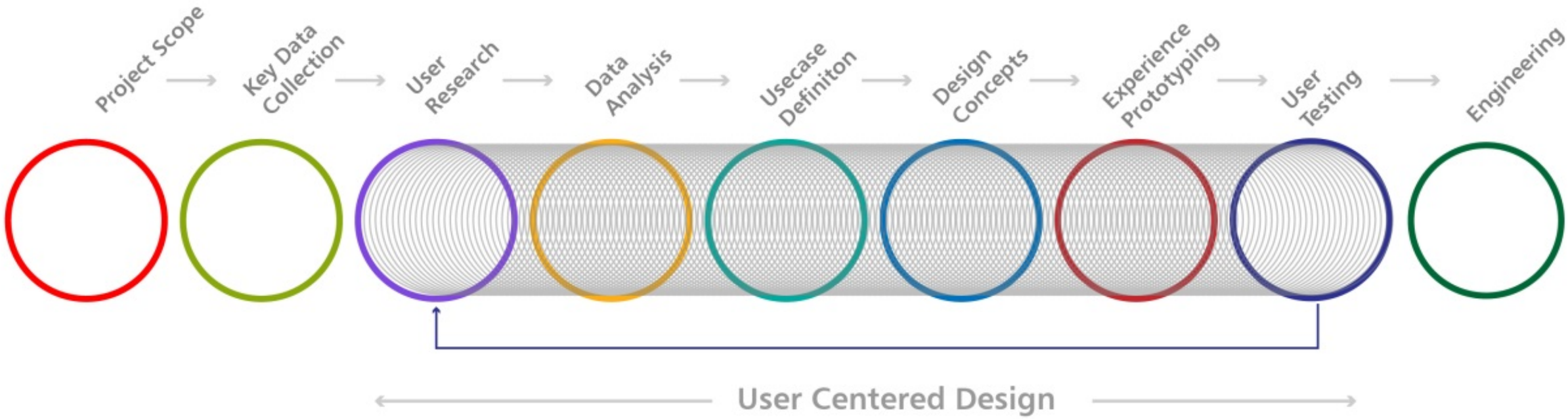


http://www.designinginteractions.com/interviews/PaulBradly

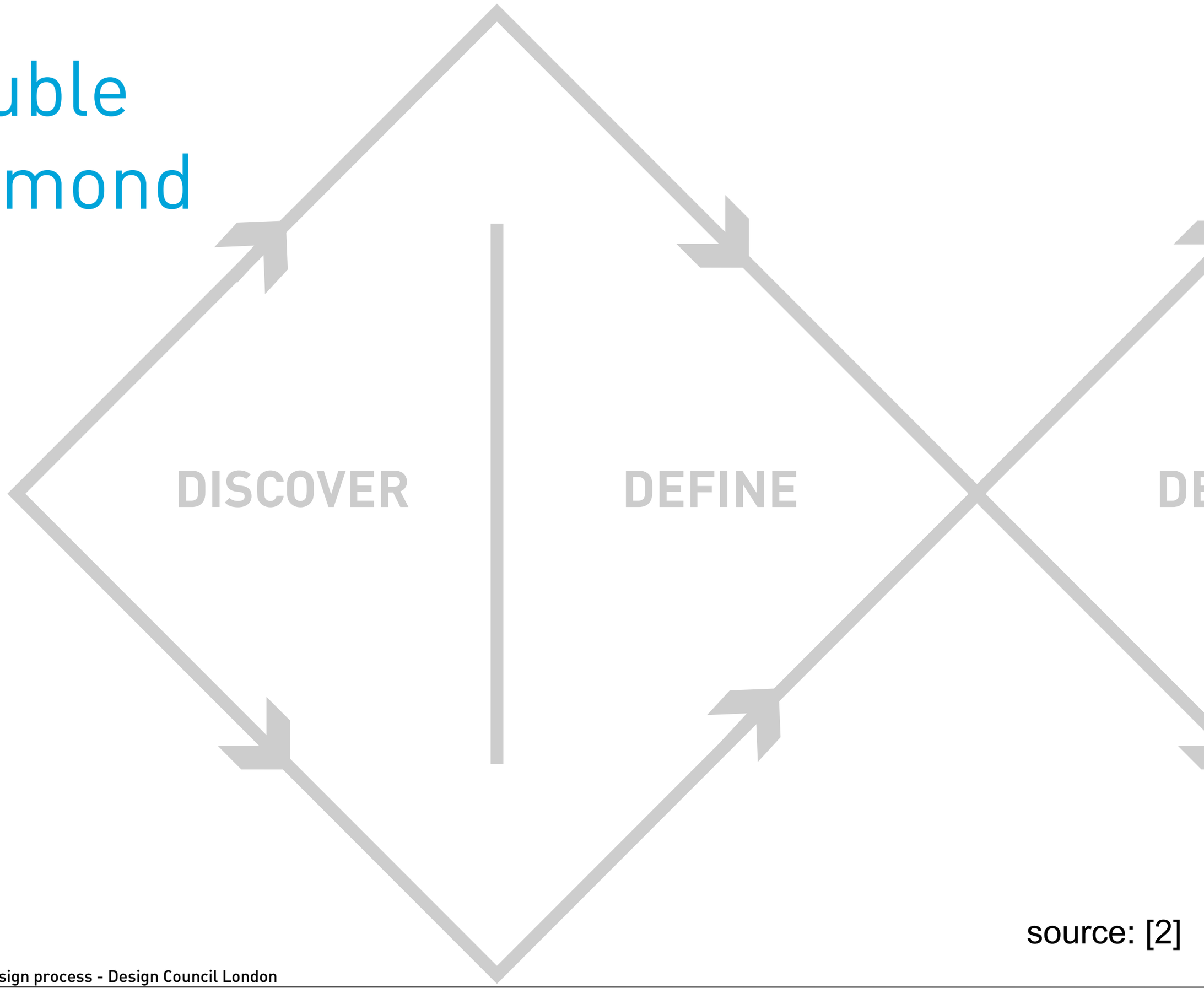
source: [3]

Microsoft

UCD Design Process Model



Double Diamond



source: [2]

© A study of the design process - Design Council London

User Centred Design (UCD)

Philosophy: Users know best

People who will be using a product or service know what their needs, goals and preferences are

Designers aren't the users.

Participation from users at every stage of the design process.

Roots in industrial design and ergonomics:
Industrial designer Henry Dreyfuss (Bell) popularised the method with his 1955 book "Designing for People".

Software designers were long time unaware of the method

source: [5]

Why a user centred approach?

- With increased memory and processor powers and color monitors different forms of interfaces were now possible
- In the early 1980´s a movement began focusing on the users not on computers.

source: [5]

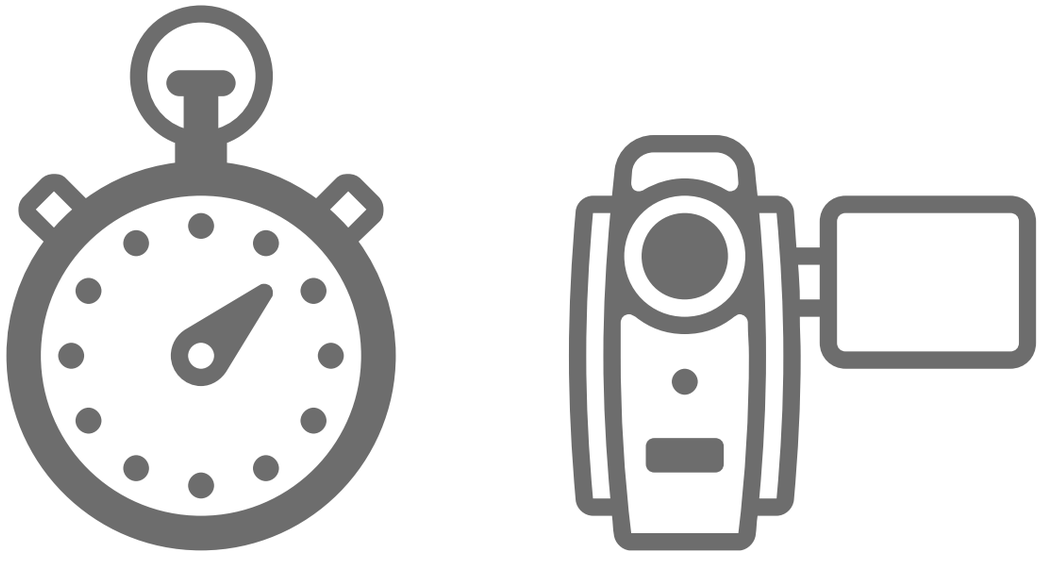
What is a user centred approach?

- User centred approach is based on:

  Early focus on users and tasks: directly studying cognitive, behavioural, anthropomorphic & attitudinal characteristics

  Empirical measurement: users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analysed

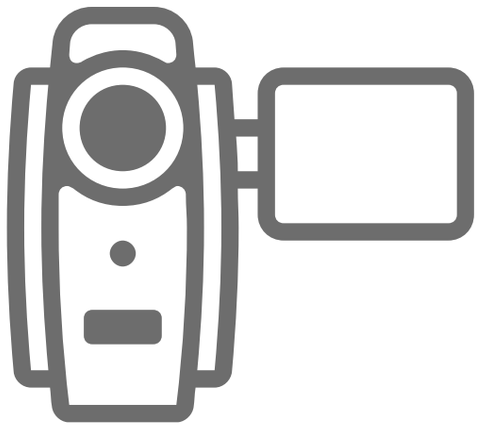
  Iterative design: when problems are found in user testing, fix them and carry out more tests



source: [4]

Four basic activities

- Identifying needs and establishing requirements
- Developing alternative designs
- Building interactive versions of the designs
- Evaluating designs



source: [4]

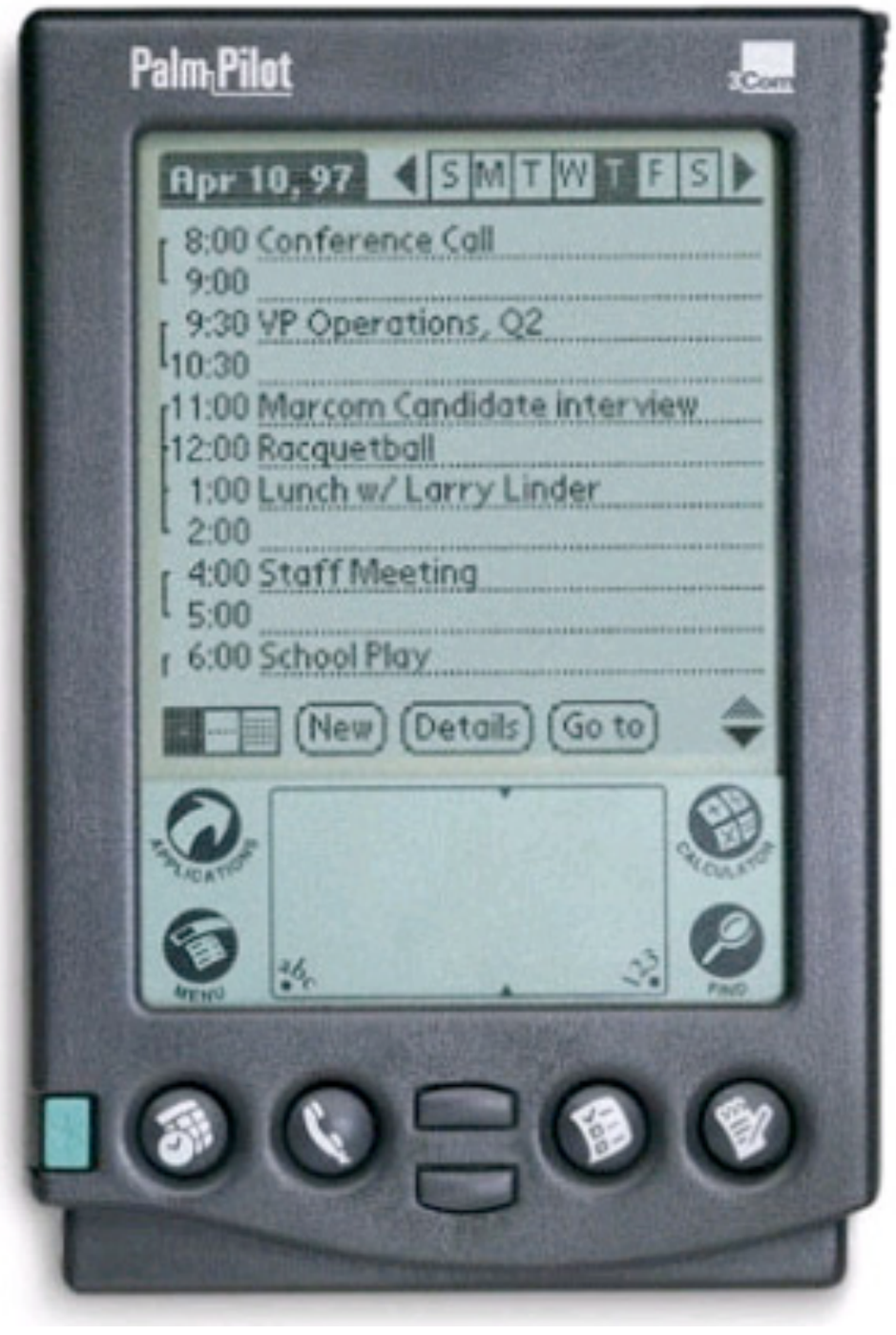
Summary:

- Goals are important in UCD -→ interaction designer focus on what the user ultimately wants to accomplish.
- Interaction designer determines the user´s task and means necessary to achieve those goals -→ always with the users needs and preferences in mind
- Interaction designers involve users at every stage of the process
- Users are consulted of the very beginning of a new project
- Interaction designers conduct extensive research (Chapter 4) up front to determine what the users goals are in the current situation
- Interaction Designers test and try prototypes of a system with users
- User data is a determining factor throughout the project when making decisions

source: [5]

Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design



http://www.computerwoche.de/i/detail/artikel/199577/1/2025886/EL_12463480213128031273 1/

Case Study:

Jeff Hawkins

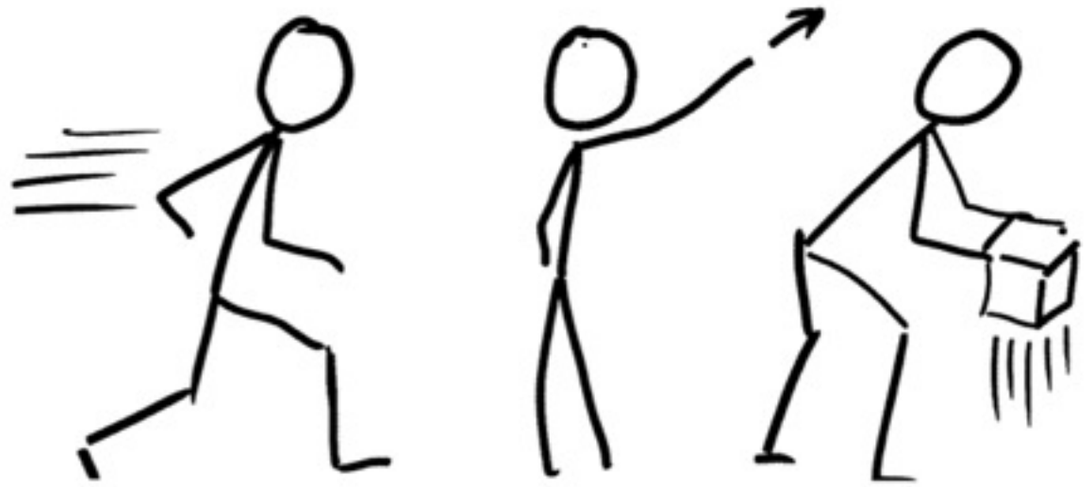
-worked with the team that developed the first laptop, the Compass by GRID
-developed the first tablet PC, the GRIDpad
-started PALM computing

http://www.designinginteractions.com/interviews/JeffHawkins

source: [3]

Activity Centred Design

- Philosophy: Activities as the main design focus
- Activities are a cluster of actions and decisions that are done for a purpose (tasks)
- The purpose of an activity is not necessarily a goal
- Purposes are more focused and tangible than goals



source: [5]

Summary:

- The difference between a task and an activity can be fairly minor
- Some tasks have enough parts to be considered as sub activities themselves
- Like UCD, activity centred design relies on research as the basis for its insights, albeit not as heavily
- Interaction designers catalog users´ activities and tasks which leads to a specific design solution to help users accomplish the task, not to achieve a goal per se
- The **activity**, not the people doing the activity **guides the design process**

source: [5]

A danger in **activity centred design**
is that designers might not look for solutions for the
problem as a “whole”

(Not see the forrest for the trees)

source: [5]

Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design

Systems Design

• Analytical method of approaching design problems

• A set of entities that act upon each other is center of the design process

• Systems can range from simple (heating system in a house) to the enormously complex (power-plant)

• Systems design is a structured, rigorous design methodology

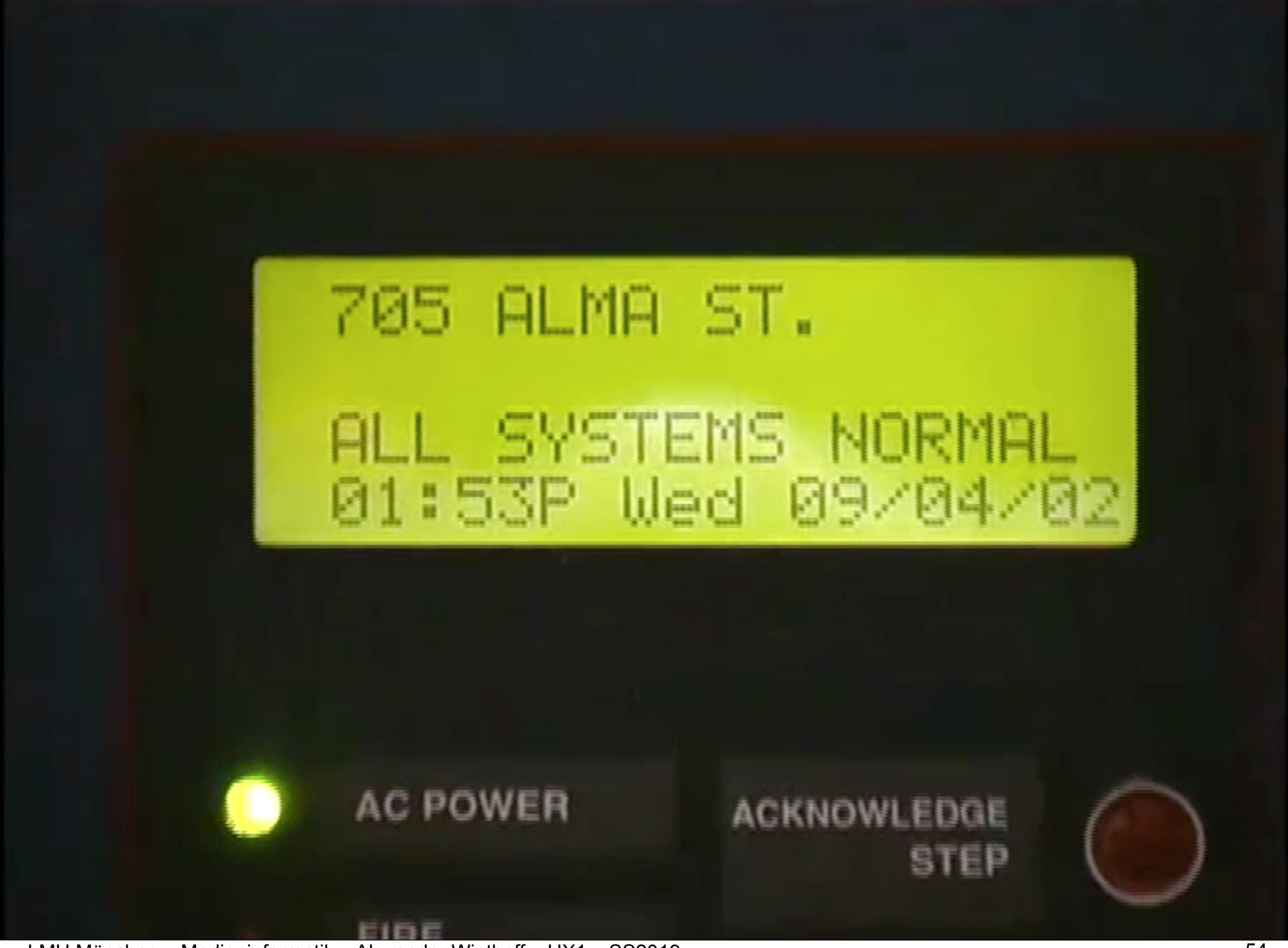
• Excellent for tackling complex problems

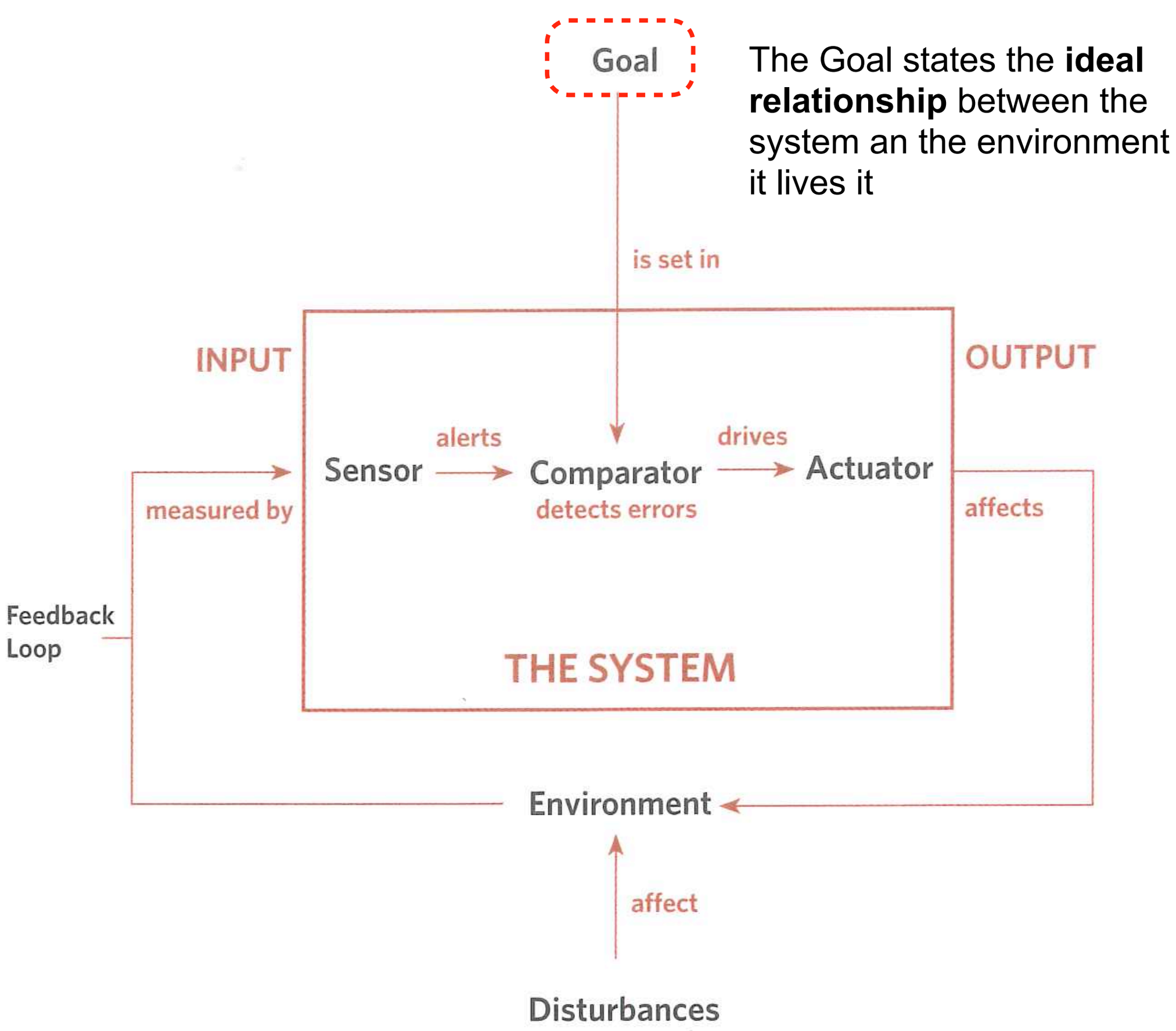
• Holistic design approach (focus on the context of use)

• Systems design outlines the components that systems should have:
A **goal**, a **sensor**, a **comparator** and an **actuator** (these parts are shaped by the interaction designer)

• Compared to other approaches systems design provides a clear roadmap for designers to follow

source: [5]


705 ALMA ST.
ALL SYSTEMS NORMAL
01:53P Wed 09/04/02
AC POWER
ACKNOWLEDGE
STEP



The Goal states the **ideal relationship** between the system an the environment it lives it

source: [5]

Systems Design

• Analytical method of approaching design problems

• A set of entities that act upon each other is center of the design process

• Systems can range from simple (heating system in a house) to the enormously complex (power-plant)

• Systems design is a structured, rigorous design methodology

• Excellent for tackling complex problems

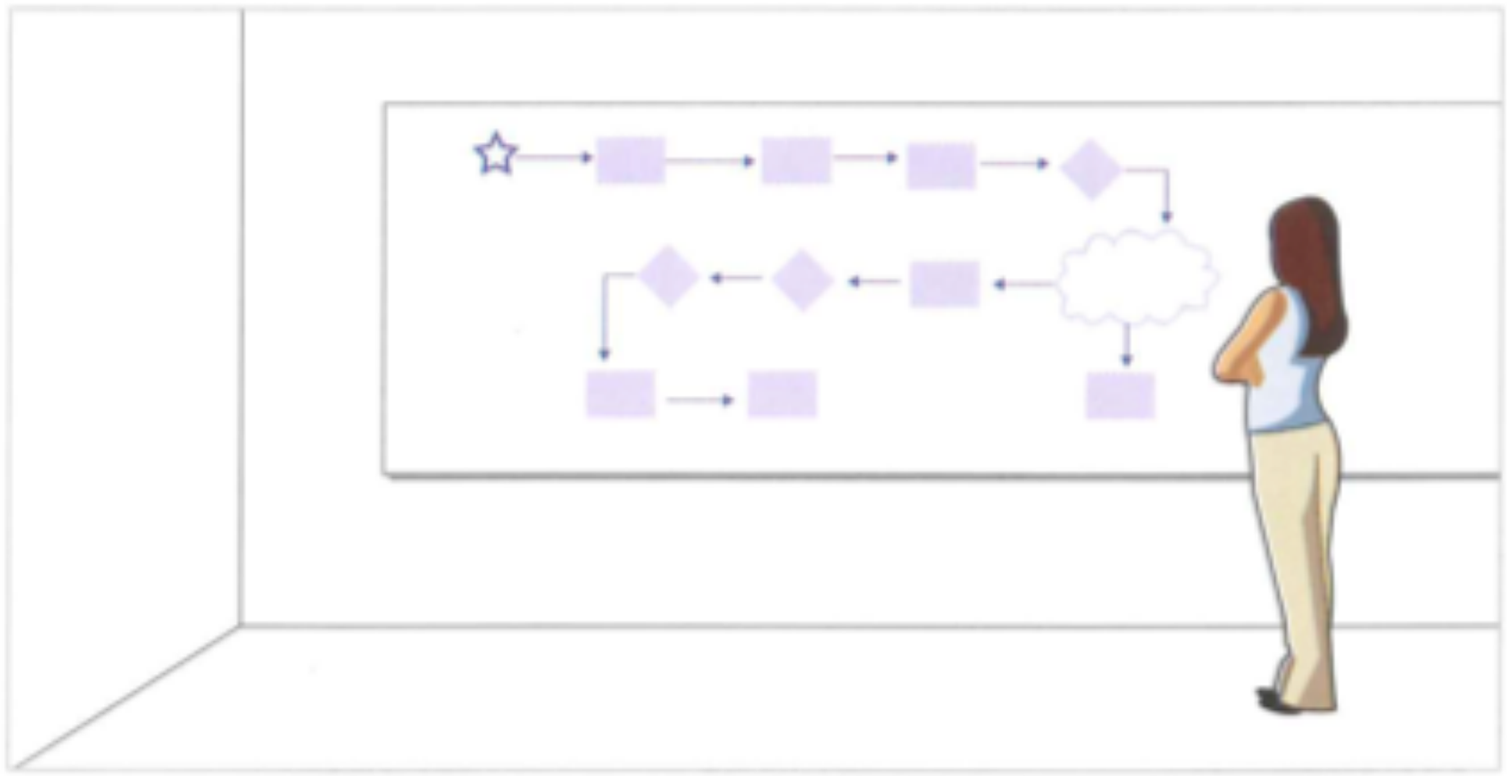
• Holistic design approach (focus on the context of use)

• Systems design outlines the components that systems should have:
A **goal**, a **sensor**, a **comparator** and an **actuator** (these parts are shaped by the interaction designer)

• Compared to other approaches systems design provides a clear roadmap for designers to follow

source: [5]

Flow Diagram



Represent a series of events, actions or processes of different actors.
Usually have a beginning and an end point.

Systems Design

- What is the environment ?
- What goal does the system have in relation to its environment ?
- What is the feedback loop by which the system corrects it´s actions ?
- How does the system measure whether it has achieved its goal ?
- Who defines the system, environment, goals and monitors it ?
- What resources does the system have for maintaining the relationship it desires ?
- Are the resources sufficient to meet the systems purpose ?

source: [5]

Usability II and Approaches to UX/Interaction Design

- Usability II
- The Purpose of Different Approaches
- Four Main Approaches
- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design

Genius Design

• Philosophy: Design relies almost solely on the wisdom and experience of the interaction designer making the design decisions.

• Probably best practiced by experienced designers who have encountered several types of problems and can draw solutions from
previous design issues

source: [5]

http://upload.wikimedia.org/wikipedia/commons/1/11/IPod_family.png

http://www.flickr.com/photos/moparx/5321857668/sizes/l/in/photostream/

JONATHAN IVE

http://www.loopinsight.com/wp-content/uploads/ive.jpg

"Great design is as much about prospecting in the past as it is about inventing the future.”

Bill Buxton

[2]

Beau Brownie Camera 1930

iPod Shuffle 2004

http://wwwapple.com
http://www.businessweek.com/innovate/next/archives/kodak_ipod.jpg

source: [8]

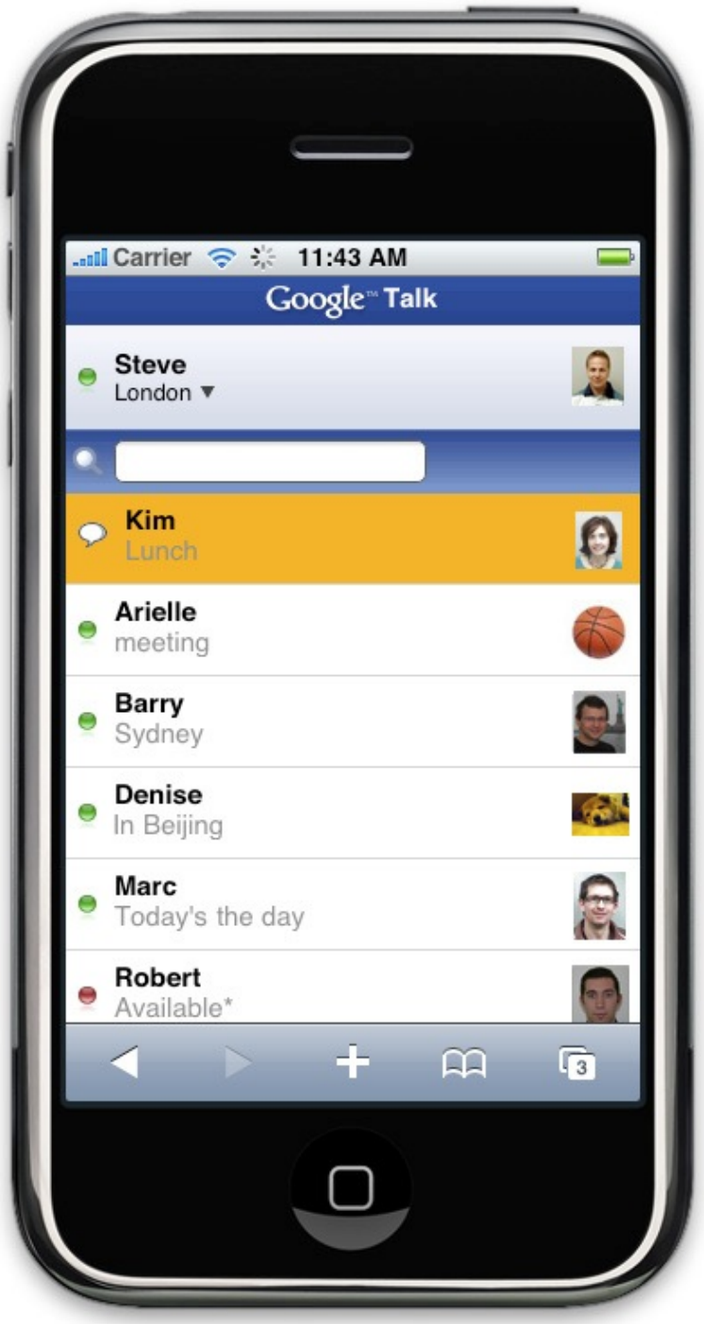
source: [8]

http://www.businessweek.com/innovate/next/archives/kodak_ipod.jpg

"A mobile device with a touch interface and only one physical button ?”

[2]

IBM Simon 1993



Apple iPhone 2007

source:[8]

http://upload.wikimedia.org/wikipedia/commons/0/0c/IBM_SImon_in_charging_station.png

References (Books):

[1] Buxton, W. Sketching User Experiences, *Morgan Kaufmann 2007.*
[2] Norman, D. The Psychology of Everyday Things, *Basic Books 1988.*
[3] Moggridge, B. Designing Interactions, *MIT Press, 2006.*
[4] Rogers, Y., Preece, J. & Sharp, H. Interaction Design, *Wiley & Sons 2011.*
[5] Saffer, D. Designing for Interaction, *New Riders 2009.*
[6] Usability Seminar - Chalmers - Gothenburgs University 2005

References (Papers):

[6] Sanders, E. An Evolving Map of Design Practice and Design Research. *In ACM Interactions 15,6 2008*
[7] Sanders, E. Stepping Stones Across the Gap.Essay in DAIM – Rehearsing the Future, *DKDS Press 2010.*

Articles:
[8] http://www.businessweek.com/innovate/next/archives/2008/12/what_apple_lear.html