TMR52: Multimediale Kommunikation

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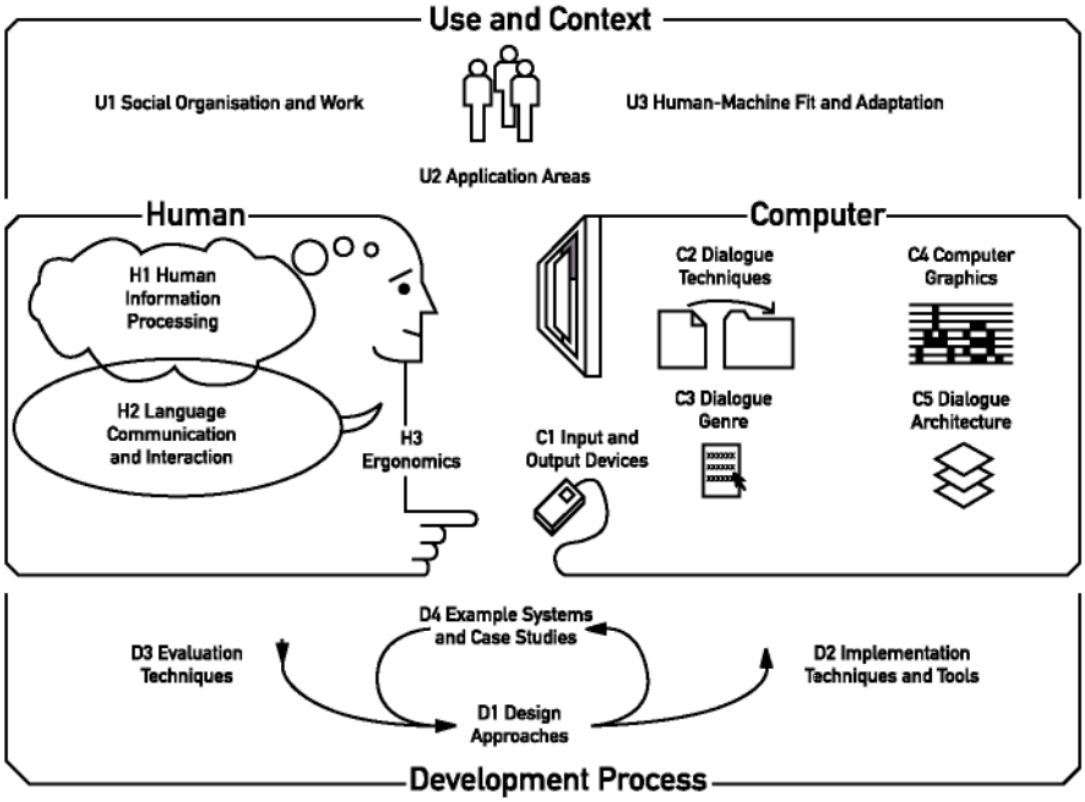
Wirtschaftsinformatik Herbstsemester 2016

Inhalt

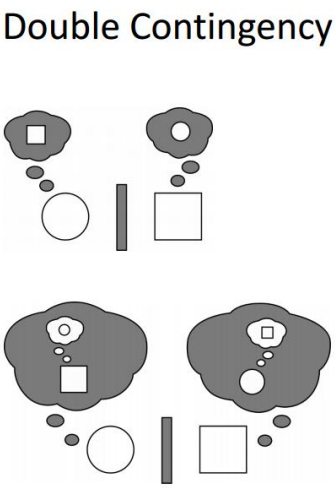
1 Einführung UCD Vorgehensmodelle

1.1 Use and Context



1.1.1 Doppelte Kontigenz

Der Begriff beschreibt (in der reinen Form) eine soziale Situation, in der mindestens zwei Teilnehmende sich gegenseitig wahrnehmen, und in der noch völlig unbestimmt ist, was als Nächstes geschehen soll. Die Situation ist dadurch gekennzeichnet, dass nichts notwendig (zu tun) ist und zugleich auch nichts unmöglich (zu tun) ist



1.1.2 Indexicality

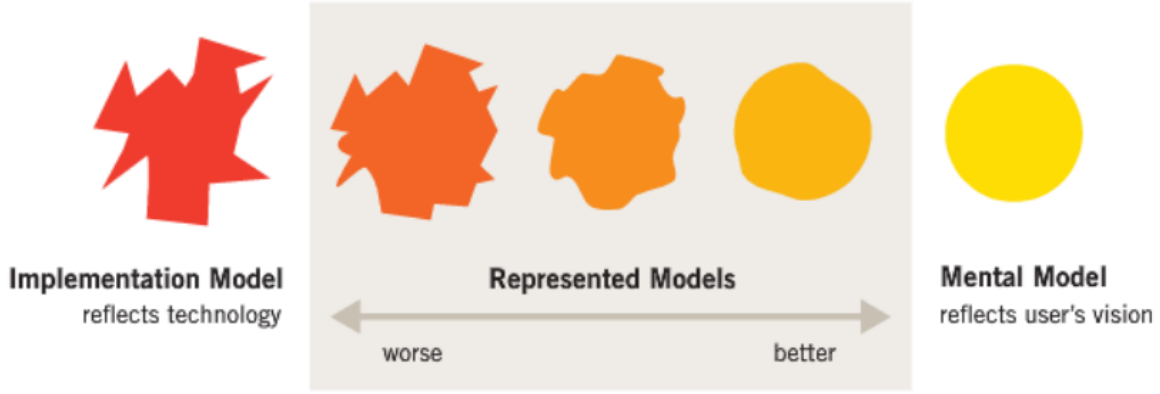
Localization: here / there

Time: now / then / earlier / … (tenses)

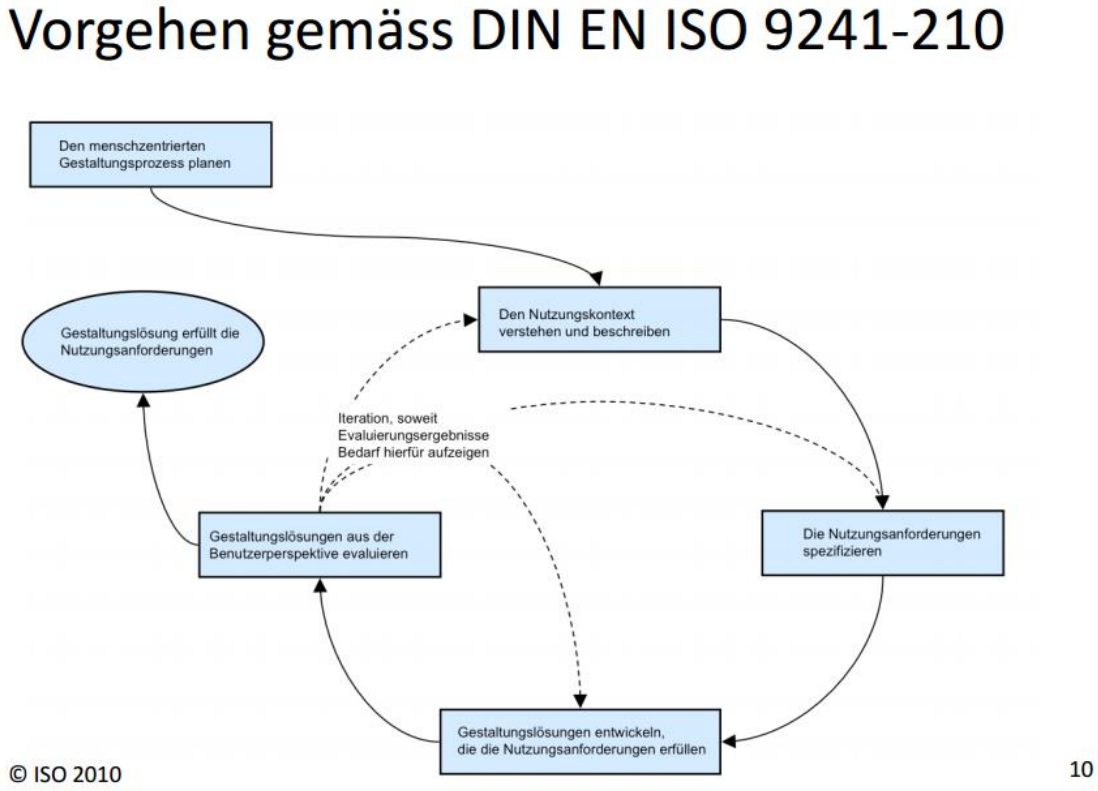
Pointing out: this / that / these / those

Social relationships: I / you / we / … (personal pronouns)

1.1.3 Represented Models

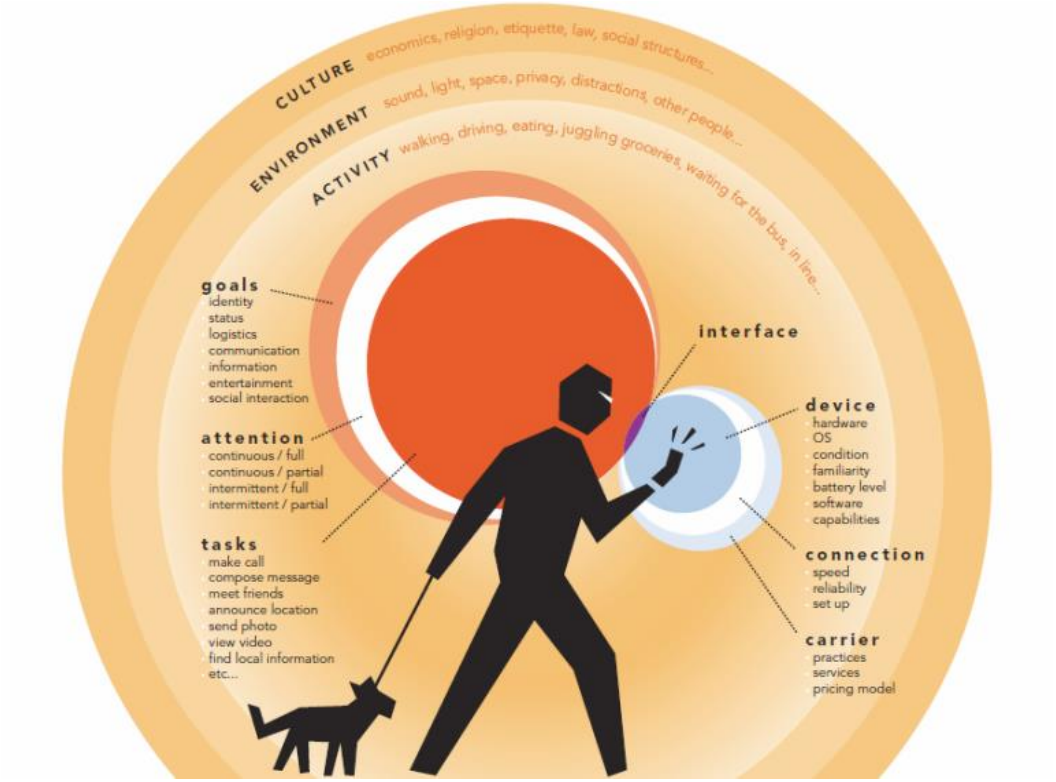


1.2 Menschenzentrierte Gestaltungsaktiviäten



Aktivitäten	Ergebnisse der menschzentrierten Gestaltung
Den Nutzungskontext verstehen und beschreiben	Nutzungskontextbeschreibung
Die Nutzungsanforderungen spezifizieren	Nutzungskontextbeschreibung für die Gestaltung Bericht über identifizierte Erfordernisse Spezifikation der Nutzungsanforderungen
Gestaltungslösungen entwerfen, die diese Nutzungsanforderungen erfüllen	Interaktionsspezifikation Spezifikation der Benutzungsschnittstelle Die Benutzungsschnittstelle
Entworfene Gestaltungslösungen aus der Benutzerperspektive evaluieren	Entwicklungsbegleitende Prüfberichte Bericht über Konformitätsprüfung Bericht über Felddaten aus der Langzeitnutzung

1.3 People using Technology



- Location: where (fixed objective coordinates).
- Locale: material setting for social relations.
- Sense of Place: subjective and emotional attachment (a feeling of what is like to 'being there').

1.4 Nutzungskontext

Nutzungskontext: Benutzer, Arbeitsaufgaben, Ausrüstung (Hardware, Software und Materialien) sowie die physische und soziale Umgebung, in der das Produkt genutzt wird.

Anwendungskontext: Krankengeschichte via Desktop

- lack of mobility
- separation of keyboard and monitor → dividing the domain where information is entered from where it is read
- unlike the paper record, the computer, in particular the screen, is an ‹active› domain

1.5 Persona

Personas provide us with a precise way of thinking and communicating about how groups of users behave, how they think, what they want to accomplish, and why. By using personas, we can develop an understanding of our users' goals in specifc contexts — a critical tool for ideating and validating design concepts.

The best way to successfully accommodate a variety of users is to design for specific types of individuals with specific needs

1.5.1 User Goals

- **Life goals** (reflective): Who the user wants to be (e. g. be attractive, popular and respected by my peers)
- **End goals** (behavioral): What the user wants to do (e. g. get the best deal)
- **Experience goals** (visceral): How the user wants to feel (e. g. feel cool or hip or relaxed)

1.5.2 Behavioral Variables

- **Activities** — What the user does; frequency and volume
- **Attitudes** — How the user thinks about the product domain and technology
- **Aptitudes** — What education and training the user has; ability to learn
- **Motivations** — Why the user is engaged in the product domain
- **Skills** — User abilities related to the product domain and technology

1.5.3 PACT

PACT → People, Activity, Context, Technology

1.5.3.1 People

- **Physische Merkmale:** Grösse, Gewicht, Wahrnehmungsfähigkeiten (5 Sinne), Behinderung. **Psychische Merkmale**: Arbeitsweise, Erinnerungsfähigkeit, räumliche Orientierung, Aufmerksamkeit, mentales Modell.
- **Nutzungsmerkmale**: Benutzertypen (Anfänger, Erfahrener, Experte), Heterogene/Homogene Benutzergruppe.

1.5.3.2 Activity

- **Zeit**: Häufigkeit, Regelmässigkeit, Zeitdruck, Stosszeiten, Kontinuität (Unterbrüche), Systemantwortzeiten.
- **Kooperation**: Einzel- / Zusammenarbeit.
- **Komplexität**: klare Abfolge (step-by-step) / vage Fragestellung.
- **Sicherheit**: Fehlerbehandlung / Auswirkungen (schwerwiegende Folgen?).
- **Dateninhalt**: Art der Information (grosse textliche Datenmengen eingeben, Barcode einlesen), mediale Informationsdarstellung (Text, Bild, Grafik).

1.5.3.3 Kontext

- **Physisch**: In welcher realen Umgebung findet die Interaktion mit dem System statt (Desktop/Arbeitsplatz; GPS/Auto; etc.).
- **Sozial**: Zusammenarbeit (gegenseitige Unterstützung), Akzeptanz, soziale Normen.
- **Organisatorisch**: Arbeitsbereich, Dienstwege, Geschäftsprozesse, Führungsstil.

1.5.3.4 Technik

- **Input**: Welche Eingabegeräte sind für welche Art von Daten (Scanner, Tastatur, Maus, etc.) sinnvoll?
- **Output**: Welche Ausgabegeräte sind für welche Art von Daten (Auflösung, Kontrast von Bildschirmdarstellungen, Audioqualität, etc.) sinnvoll?
- **Kapazität**: Bandbreite, Geschwindigkeit von Transaktionen, Speichergrösse.
- **Inhalt**: Charakterstik und Aktualität von Daten.

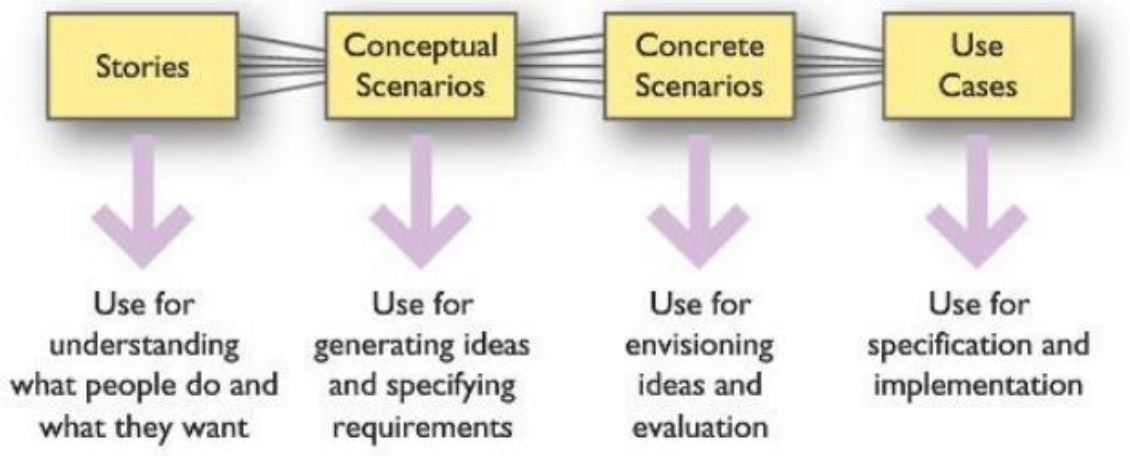
1.6 Szenarios

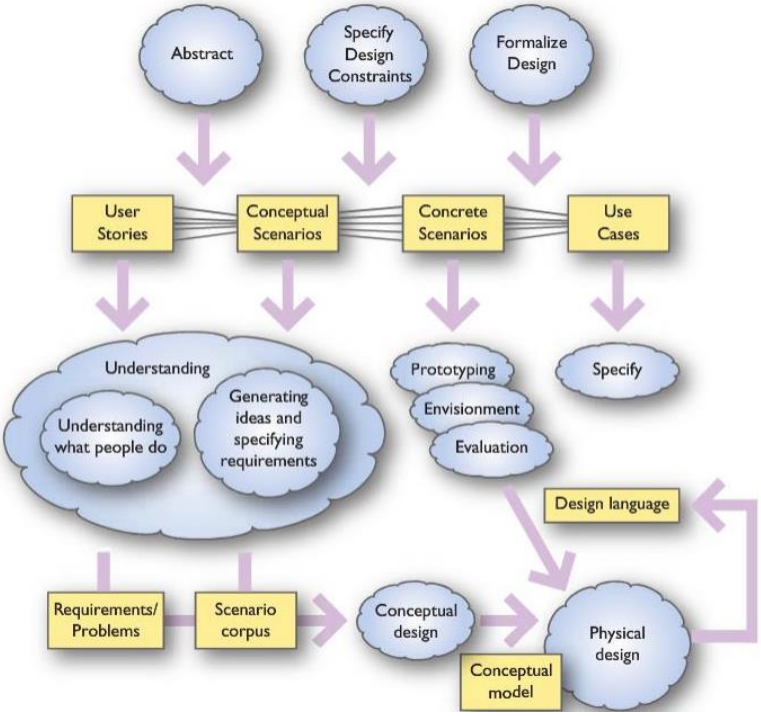
1.6.1 Definition

A scenario is an encapsulated description of:

- an individual user
- using a specific set of facilities
- to achieve a specific outcome
- under specified circumstances
- over a certain time interval

1.6.2 Design





1.7 Prototyping

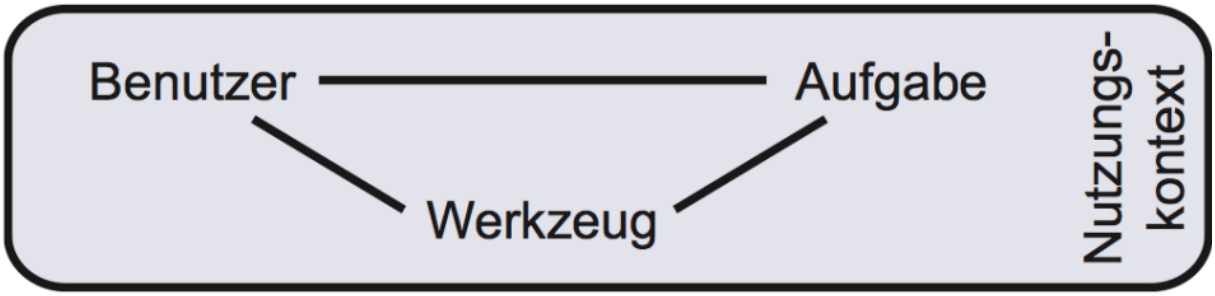
1. **Szenario beschreiben**: Wie sieht ein typischer Anwendungsfall aus?
2. **Interaktions-Objekte sammeln**: Mit welchen Objekten hat der Benutzer zu tun?
3. **UI Flow(s) festlegen**: Welche Schritte führen zum Ziel? Ablauf der benötigten Schritte (Screens)
4. **Interaktions-Gestaltung**: Wie sehen die Anzeige- und Bedienelemente im Verlauf der Interaktion aus? Welche Interaktionsmöglichkeiten werden angeboten? Wie werden die Informationen strukturiert und dargestellt?
5. **Test**: Wie löst eine Testperson die gestellte Aufgabe, die den zu untersuchenden Anwendungsfall repräsentiert?

1.7.1 Paper Prototyping

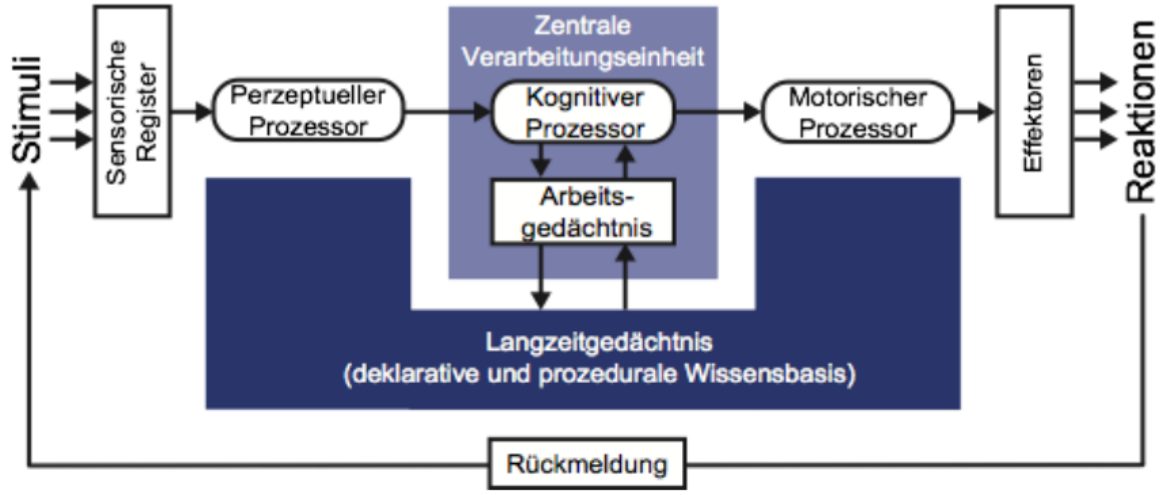
Paper prototyping is a variation of usability testing where representative users perform realistic tasks by interacting with a paper version of the interface that is manipulated by a person 'playing computer,' who doesn't explain how the interface is intended to work

2 Grundlagen

2.1 Grundmodell Mensch-Maschine



2.1.1 Menschliche Informationsverarbeitung

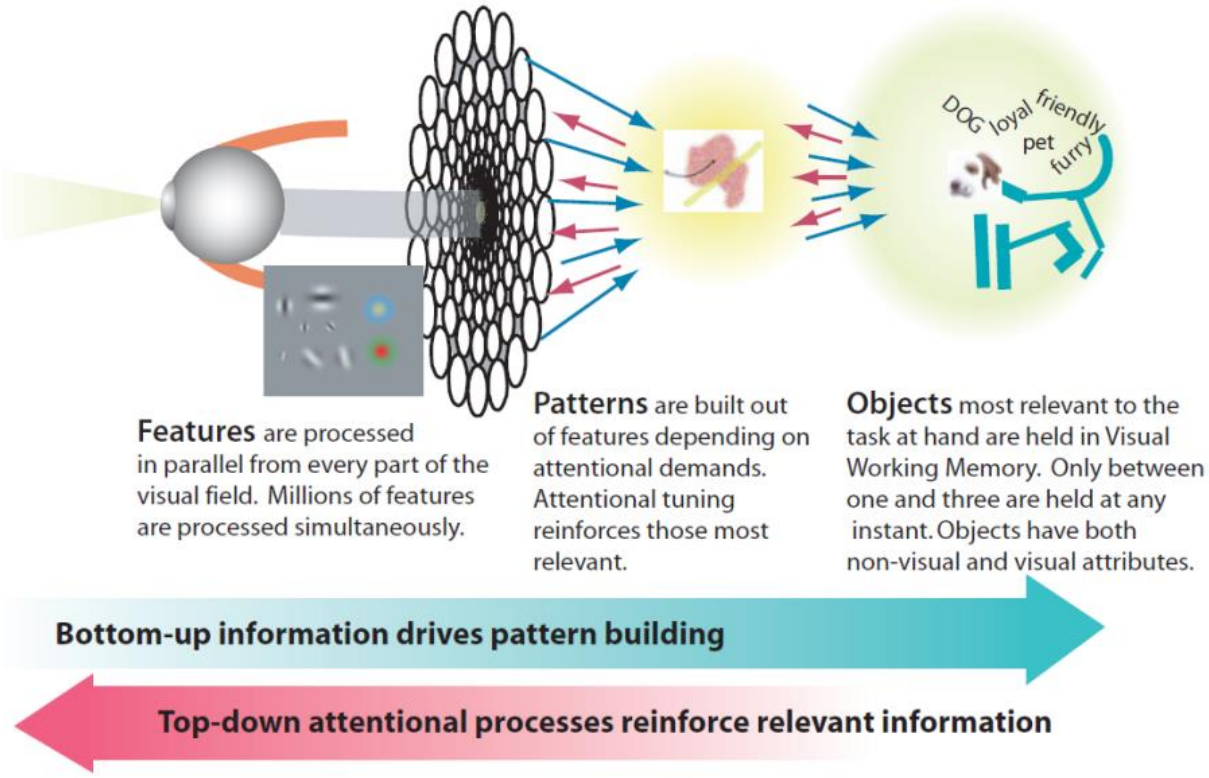


2.1.2 Funktions- und Organisationsprinzipen der Sinnesorgane

Sinn	Art des Reizes	Reizempfang durch Rezeptorzellen	Umwandlung der empfangenen Reize in bioelektrische Signale	Verarbeitungsbereiche im Gehirn
Sehen	Licht	Fotorezeptoren: Stäbchen (schwarz-weiß), Zapfen (Farben)	Licht (elektromagnetische Wellen) zunächst in biochemische Signale	Visuelles Zentrum (primäre Sehrinde)
Hören	Schall	Haarsinneszellen	Schallwellen zunächst in bioelektrische Signale	Hörzentrum (auditorische Rinde)
Fühlen	Druck, Vibration, Dehnung, Gewebe-schäden, Kälte/Wärme	Druck-, Tast-, Schmerz- und Thermorezeptoren	Mechanische Reize zunächst in bioelektrische Signale	Somatosensorische Rinde
Schmecken	Chemische Schmeckstoffe	Geschmacksrezeptoren	Chemische Reize lösen zunächst biochemische Reaktionen aus	Limbisches System
Riechen	Chemische Duftmoleküle	Riechsinneszellen	Chemische Reize lösen zunächst biochemische Reaktionen aus	Riechrinde, Limbisches System

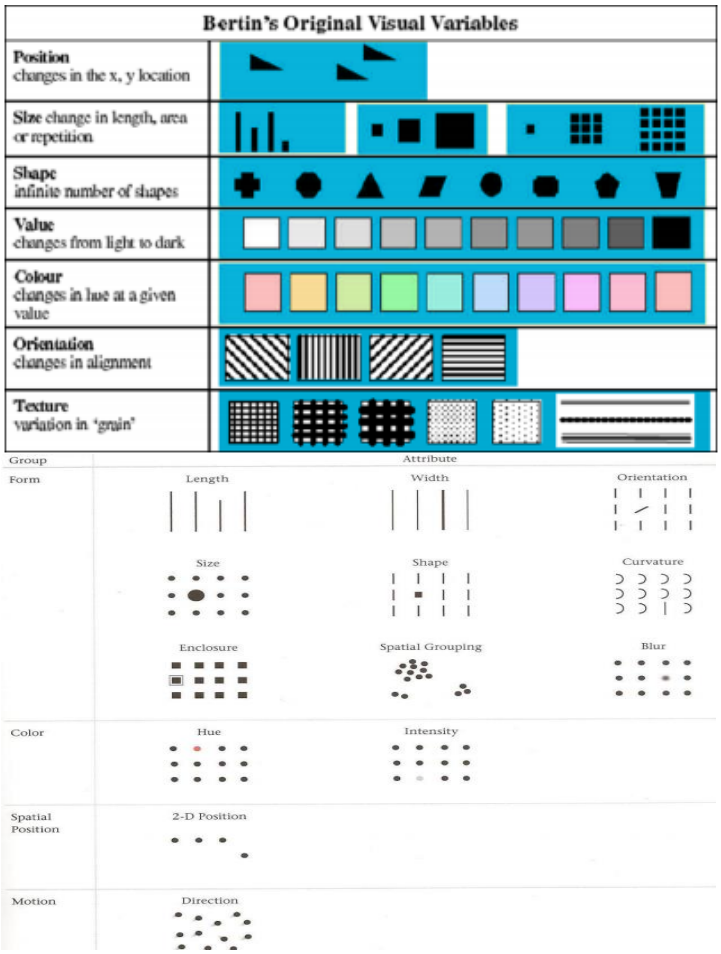
2.2 Perception

2.2.1 Process



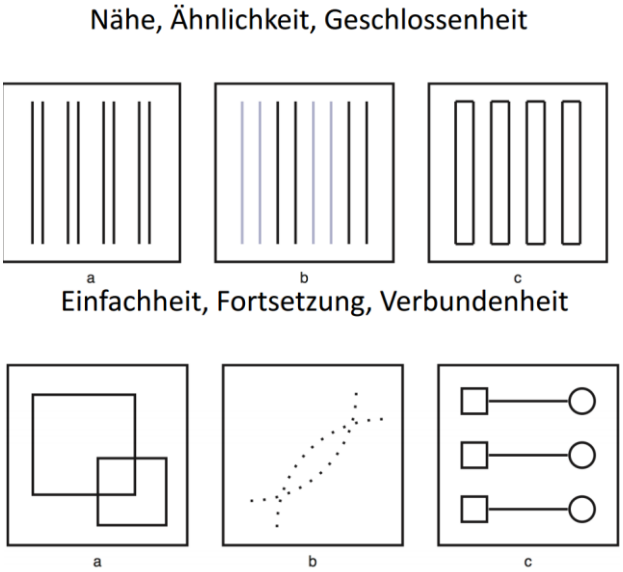
2.2.2 Visual Variables

- Position
- Shape (Mark)
- Size (Length, Area, Volume)
- Brightness (Luminence, Greyscale)
- Colour
- Orientation
- Texture
- Motion

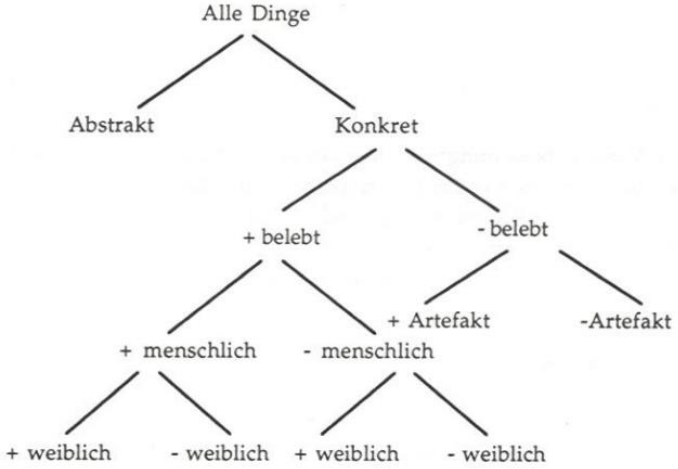


2.3 Patterns

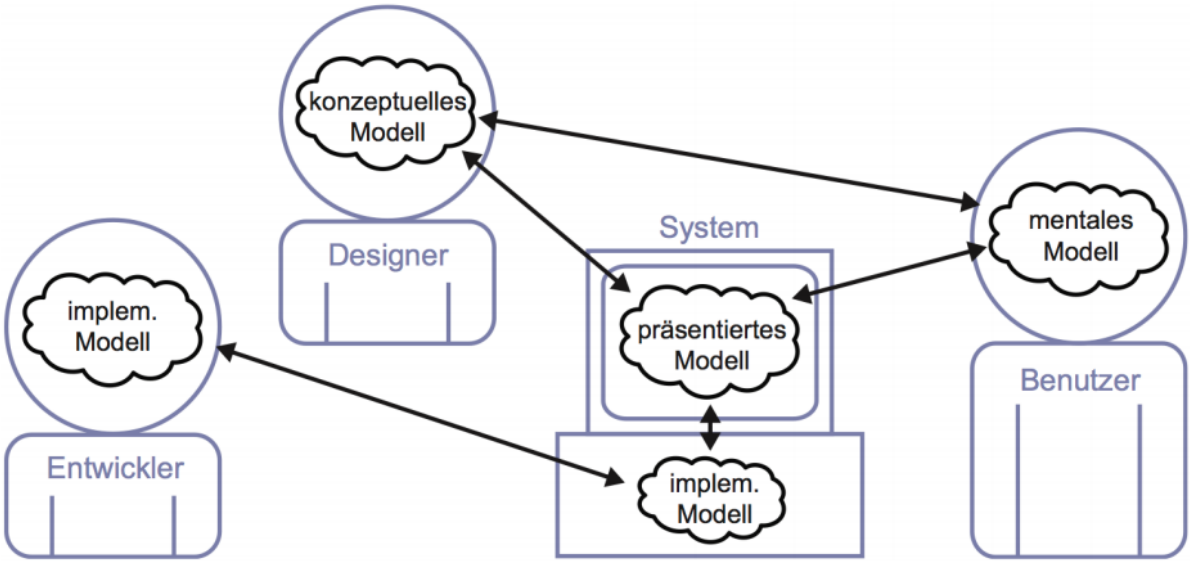
- Gesetz der Nähe
- Gesetz der Ähnlichkeit
- Gesetz der Geschlossenheit
- Gesetzt der Einfachheit
- Gesetz der guten Fortsetzung
- Gesetz der Verbundenheit



2.3.1 Begriffekategorisieren



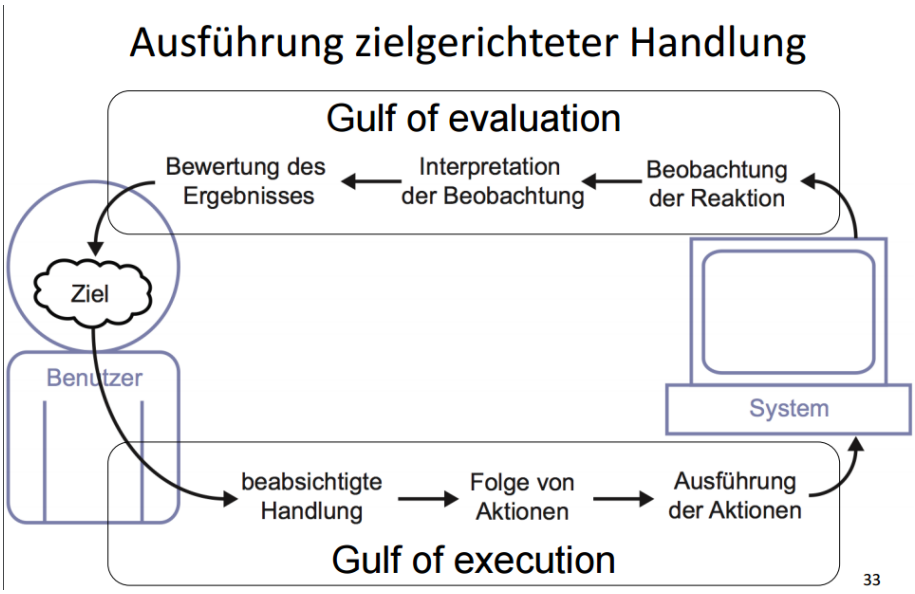
2.3.2 Modelle



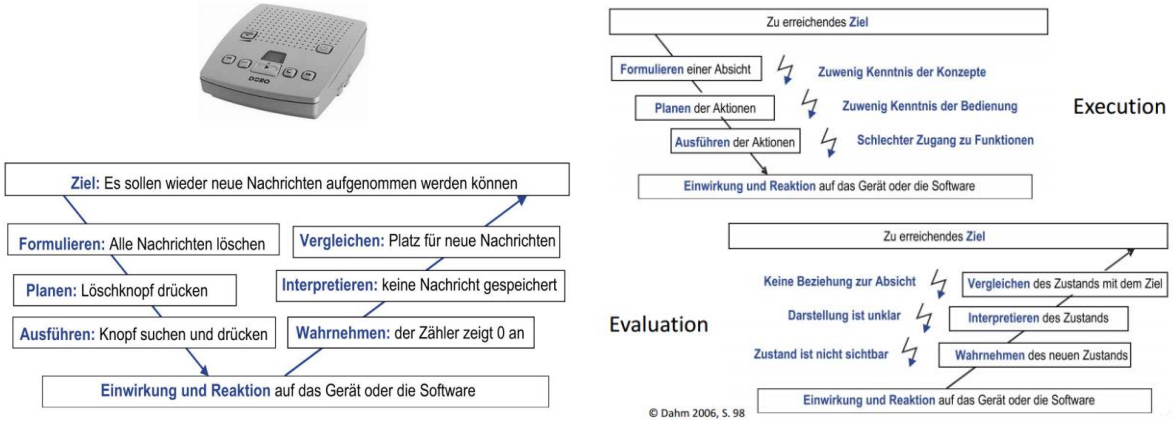
2.4 7 Handlungsschritte

1. **Discoverability**. It is possible to determine what actions are possible and the current state of the device.
2. **Feedback**. There is full and continuous information about the results of actions and the current state of the product or service. After an action has been executed, it is easy to determine the new state.
3. **Conceptual model**. The design projects all the information needed to create a good conceptual model of the system, leading to understanding and a feeling of control. The conceptual model enhances both discoverability and evaluation of results.
4. **Affordances** The proper affordances exist to make the desired actions possible.
5. **Signifiers**. Effective use of signifiers ensures discoverability and that the feedback is well communicated and intelligible.
6. **Mapping**. The relationship between controls and their actions follows the principles of good mapping, enhanced as much as possible through spatial layout and temporal contiguity. 7
7. **Constraints**. Providing physical, logical, semantic, and cultural constraints guides actions and eases interpretation.

2.4.1 Zielgerichtete Handlung



2.4.2 Ausführen Zielgerichteter Handlung



2.5 Affordance

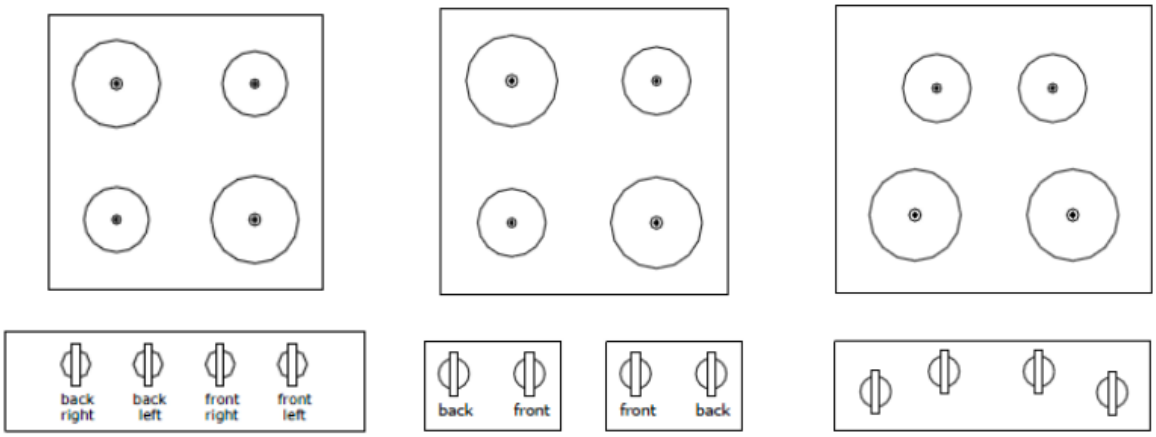
An **affordance** is the possibility of an action on an object or environment.

Additional meanings have developed, largely a result of misinterpretations. The original definition in psychology includes all actions that are physically possible. When the concept was applied to design, it started also referring to only those action possibilities which one is aware of.

Beispiel war wie eine Tür aufgeht… anders als erwartet?

2.6 Mapping

Siehe Entwicklung des « Mappings » von links nach rechts. Immer weniger Informationen da es offensichtlicher wird.



2.6.1 Einflussfaktoren

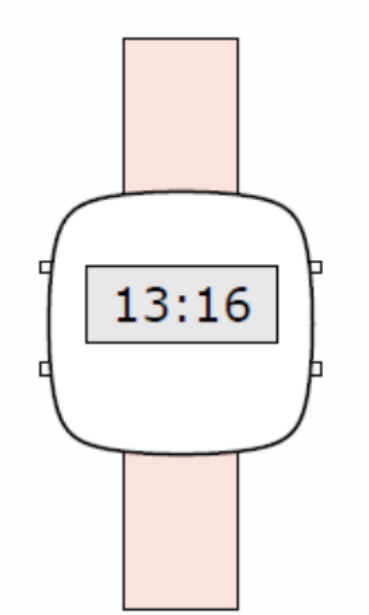
- familiarity with similar devices (transfer of previous experience)
- affordances
- mapping
- constraints
- causality
- instructions
- interacting with the device («blackboxing»)

2.6.1.1 Beispiel Schere

- Affordances: holes for putting fingers in.
- Constraints: small hole for thumb, big hole for several fingers.
- Mapping: between holes and fingers suggested and constrained by appearance.
- Conceptual Model: operating parts are visible and their implications are clear.

2.6.1.2 Beispiel Uhr

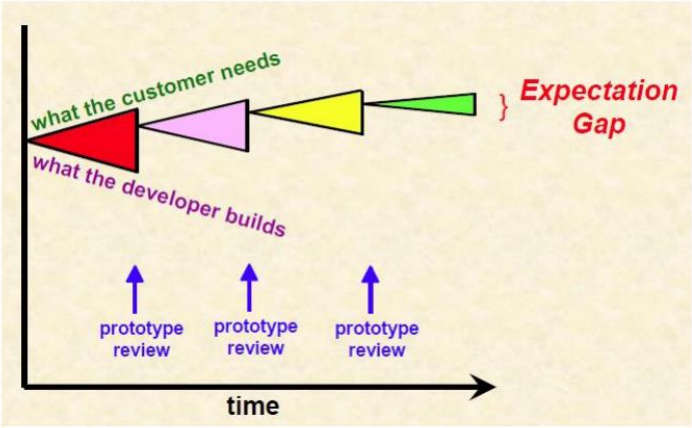
Digitale Uhr



- Affordances: four buttons to push – but what do they do?
- Mapping: no clear relationship between buttons and possible actions.
- Transfer of Prior Knowledge: little similarity to analog watches.
- Conceptual Model: must be learnt from instructions.

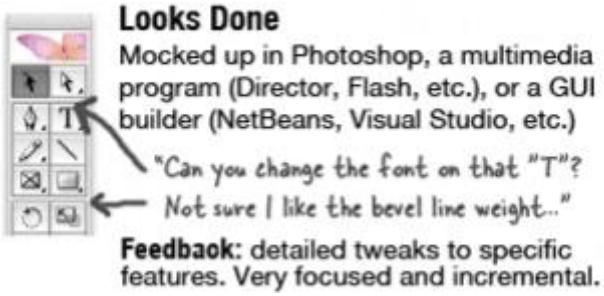
3 Interaction Design – IA – Evaluation

3.1 Prototyping

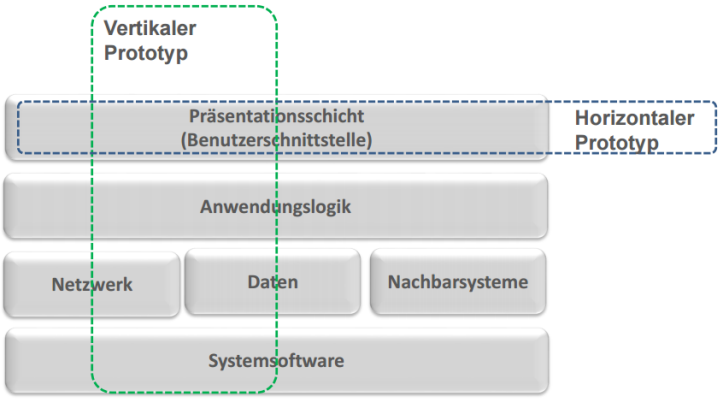


→ Reduce the Expection Gap!

Spezifisch wird hier im Skript das Paper Prototyping angesprochen.

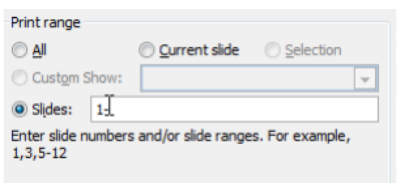


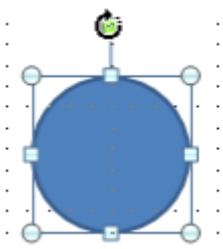
3.1.1 Horizontal & Vertikal



3.2 Interaktionskonzepte

Instructing **Conversing** **Manipulating** Exploring





3.2.1 CLI GUI NUI

CLI - Command Line Interface

GUI - Graphical User Interface

NUI - Natural User Interface

	CLI	GUI	NUI
Primäre Eingabemedien	Tastatur	Tastatur und Maus	Finger und Sprache
Interface	Abstrakt [Codes]	Indirekt [Metapher]	Unmittelbar und direkt
	Text	Grafik	Objekte
Denken in	Zahlen und Codes	Symbolen	Objekten
Interaktion	Unnatürlich	Semi-Natural	Natürlich
	Gelernt	Wiedererkennend	Intuitiv
Mediale Ausprägung	Monomedial	Multimedial	Multimodal
Zielerreichung	Getrieben	Explorativ	Kontext-sensitiv
User Experience	Nüchtern	Anschaulich	Erlebnisorientiert
Wirkungseffizienz	Gering	Mittel	Hoch

3.2.2 OUI

In human–computer interaction, an **organic user interface** (**OUI**) is defined as a user interface with a non-flat display.

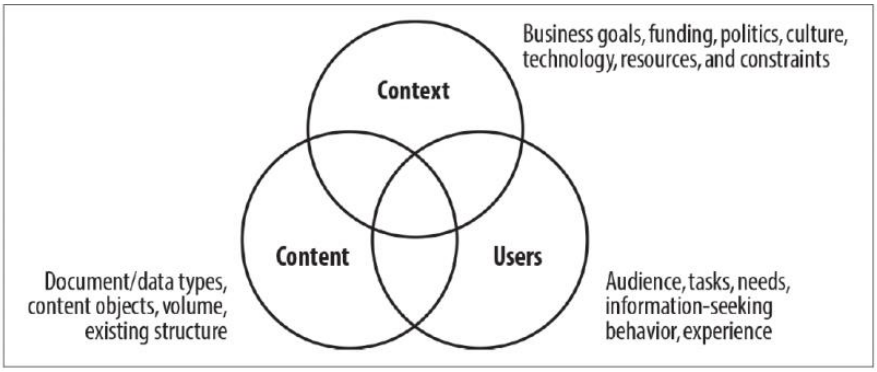
3.2.2.1 Types

Flexible (or deformable) user interfaces: When flexible displays are deployed, shape deformation, e.g., through bends, is a key form of input for OUI. Flexible display technologies include flexible OLED (FOLED) and flexible E Ink, or can be simulated through 3D active projection mapping.

Shaped user interfaces: Displays with a static non-flat display. The physical shape is chosen so as to better support the main function of the interface. Shapes may include spheres, cylinders or take the form of everyday objects

Actuated (or kinetic) user interfaces: Displays with a programmable shape controlled by a computer algorithm. Here, display shapes can actively adapt to the physical context of the user, the form of the data, or the function of the interface. An extreme example is that of Claytronics: fully physical 3D voxels that dynamically constitute physical 3D images.

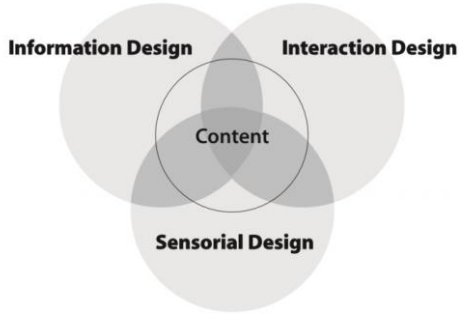
3.3 Information Ecology



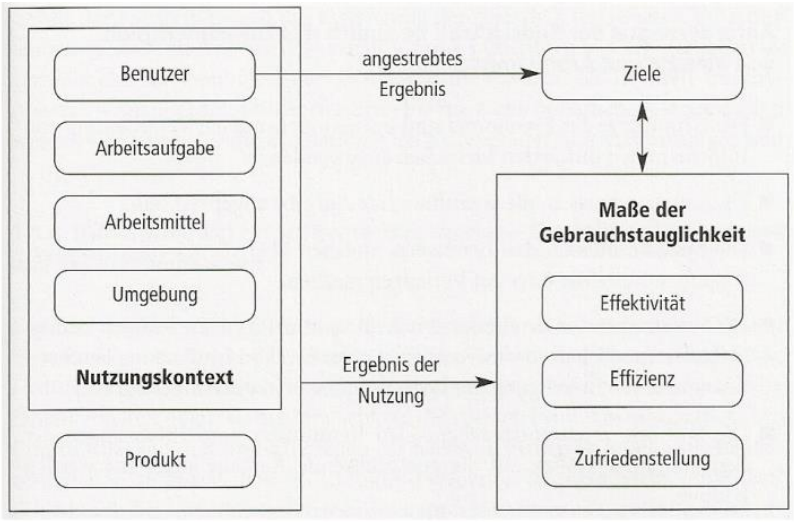
3.3.1 Information Architecture Components

- **Organization**: How do we categogrize information? (e. g. by subject or chronology)
- **Labeling**: How do we represent information? (e. g. by scientific terminology (‘Acer’) or lay terminology (‘maple’)
- **Navigation**: How do we browse or move through information? (e. g. clicking through a hierarchy)
- **Searching**: How do we search information? (e. g. executing a search query against an index)

3.3.2 Information Interaction Design



3.4 Usability



3.4.1 Review oder Test

Review: One or more (usually more) experts review an application, attempting to envisage and identify the problems thta users are likely to encounter (expert evaluations, heuristic evaluations)

Test: Representative users attempt to use an application (either functional or mocked up) to complete typical core tasks.

3.4.2 Guideline – EN ISO 9241 -10

- Aufgabenangemessenheit
- Selbstbeschreibungsfähigkeit
- Steuerbarkeit
- Erwartungskonformität
- Fehlertoleranz
- Individualisierbarkeit
- Lernförderlichkeit

3.4.3 Heuristic Evaluation

- Purpose: Find usability problems
- Usability specialist looks at system using common sense and/or guidelines
- The specialist lists problems (Consults with other experts)

3.4.3.1 Schritte

- Einarbeitung
- Getrennte Evaluation
- Ergebniszusammenführung
- Ausarbeitung von Verbesserungsvorschlägen

3.4.3.2 Nielsen's usability heuristic

1. Visibility of app status

The app should always keep users informed about what is going on, through appropriate feedback.

Shazam provides feedback as it analyzes audio.

2. Match between app and the real world

The app should sense the user's environment and adapt the information display accordingly.

The compass changes the map orientation as needed.

3. User control and freedom

Users often choose app functions by mistake and need a clearly marked "emergency exit."

"Cancel" and "x" buttons are common iPhone controls.

4. Error prevention

Eliminate error-prone conditions or check for them and present users with a recovery option.

Spell check has an option to reject its recommendation.

5. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing.

Kindle uses standard controls for bookmarking and showing progress.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible.

Yelp's Recents tab stores businesses recently viewed.

7. Flexibility and efficiency of use

Accelerators can help expedite tasks and reduce typing.

Urbanspoon provides suggestions as a user enters a query.

8. Aesthetic and minimalist design

Screens should not contain information that is irrelevant or rarely needed.

Photo controls are hidden when not in use.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language that precisely indicates the problem and the solution.

Epicurious displays a message when users are offline.

10. Help and documentation

Help should be contextual, concise, and specific.

Ocarina provides contextual help upon start-up; users can also access tutorials while using the app.

3.5 Testing

3.5.1 Vorbereitung

- Testziel / Fragestellung
- Testart
- Testperson
- Tester / Moderator
- Aufgabestellung
- Durchführung
- Auswertung

3.5.2 Konzept

First you choose the tasks to test – the things you want them to try to do.
→ List of the most important tasks that people need to be able to do.

Then you expand these tasks into scenarios – the little scripts that add any details of context they'll need to know.
→ Converting the simple description of the task into a script that the user can read, understand, and follow.

3.5.2.1 Beispiel

Apply for a doctoral program at Harvard Business School.

You've got an MBA, and after a lot of research you've decided to enter the doctoral programm at Harvard Business School in Science, Technology & Management.
Apply for admission to the programm!

3.5.3 Moderierte Tests

- Sich (Moderator) vorstellen
- In die Testsituation einführen
- «Was ist das Produkt?»
- «Wie wird das Produkt benutzt?»

3.5.4 Was / Wie

figure out what the product is: «Take a look at this website. Feel free to scroll around. What kind of services do you think this website offers?»

figure out how to use the product: «To test this website, I'm going to give you a task. I'll read it to you first, and then I'll givt it to you in written form.»

3.5.5 Evaluation

- Werden die Benutzer versuchen, die richtige, gewünschte Aktion auszuführen?
- Werden die Benutzer bemerken, dass die richtige Aktion verfügbar ist?
- Werden Benutzer die richtige Aktion mit dem gewünschten Effekt in Verbindung bringen?
- Wird ein Benutzer nach der Ausführung bemerken, dass die Aktion in gewünschter Weise ausgeführt worden ist?

3.6 Golden Rules des HCI gemäss HSLU

- Strive for consistency → Consistent sequences of actions in similar situations
- Cater to universal usability → Give Nocies explanations, Give Experts Shortcuts
- Offer informative feedback → System feedback for every User Action
- Design dialogs to yield closure → Sequenzes need a Beginning, Middle and End

- Prevent errors → Make it Foolproof.. gray out Menues etc
- Permit easy reversal of actions → Actions should be reversible
- Support internal locus of control → Put the User in Charge. The UI should display what he wants
- Reduce short-term memory load → We have limited memory… ~7 +- 2 things