

Interaktive Systeme

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• interaction Design goals

- develop usable products : usability (easy to learn, effective to use, enjoyable experience)
- involve users in the design process
- requirements → develop alternatives → Prototyping → evaluate
- multidisciplinary teams (different backgrounds, perspective,...)

• User Experience

- How a product behaves and is used by people in the real world
- design for a user experience

• Usability Goals

- effectiveness (does it do what it's supposed to?)
- efficiency (how good is it doing it?)
- safety (is it safe to use the product)
- utility (does the system provide the tools to do what is needed)
- learnability (how easy to learn/find what to do)
- memorability (recall, how easy to remember what to do)

• User Experience Goals

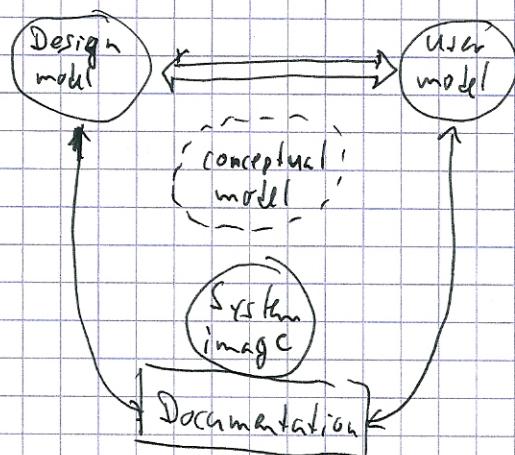
satisfying	helpful	fun
enjoyable	motivating	provocative
engaging	challenging	surprising
pleasurable	enhancing socialibility	rewarding
exciting	supporting creativity	emotionally fulfilling
entertaining	cognitively stimulating	

- Normans Design Principles

- Affordance: wahrgenommene Eigenschaft, die Eindruck von der Bedienung vermittelt. UI → perceived affordance
- Constraints: schränken mögliche Bedienhandlungen eines Objekts ein
- Mapping: Beziehung zwischen Bedienhandlung und (internem) Zustand eines Objekts
- Visibility: sichtbarer Zustand und mögliche Bedienhandlungen
- Feedback: Art und Weise, wie ein Objekt auf Bedienhandlungen reagiert
- Consistency similar operations use similar elements
 - easier to learn and use
 - internal: consistency within the same program
 - external: consistency across applications & devices → rarely achieved
- Grundlagen der Dialoggestaltung
 - Anfassbaranpassbarkeit: den Benutzer bei der Erfüllung seiner Aufgaben unterstützen
 - Selbstbeschreibungsfähigkeit: jeder Dialogschritt durch Beschreibungen oder Rückmeldungen verständlich
 - Steuerbarkeit: Steuern des Dialogablaufs (Richtung & Geschwindigkeit)
 - Erwartungskonformität: entspricht den Kenntnissen des Benutzers, Dialog ist konsistent
 - Fehlertoleranz: Bei fehlerhaften Eingaben kann Ergebnis ^{der Korrektur} erreicht werden
 - Individualisierbarkeit: Dialog anpassbar
 - Lernförderlichkeit: Unterstützung beim Erlernen der Anwendung

- conceptual model: a high-level description of how a system is organized and operates (2)

→ enables designers to straighten out their thinking



- Metaphors and Analogies: understand what product is for and how to use it for an activity
- Concepts: that people are exposed to (task domain objects, attributes, operations)
- Relations and Mappings between concepts

• Interaction types

- Instructing: issuing commands and selecting options
- Conversing: interact with system as if having a conversation (chatbot)
- Manipulating: interacting with objects by manipulating them
- Exploring: moving through virtual environment or physical space
- direct manipulation (DM)
 - continuous representation of objects
 - physical actions + button pressing instead of commands/complet syntax
 - reversible actions with intermediate feedback

• Cognition

- Attention: Select things to concentrate on, structure information
- Perception/Recognition: Text to be readable, Icons distinguishable

Gestalt laws: Ähnlichkeit, Nähe, Gute Gestaltung, Fortsetzung, Gemeinsames Schicksal, Vertreintheit

- Memory: Sensorisches Kurzzeitgedächtnis, Kurz-/Langzeitgedächtnis, Assoziation, Erfahrung, Lernunterstützung

- Veränderungsblindheit: värges Bild zwischen schalten

→ auch größere Veränderungen werden nicht wahrgenommen

- kognitive Dissonanz: Wenn etwas out-of-context

→ Dinge passen nicht zum Kontext, also werden sie ignoriert

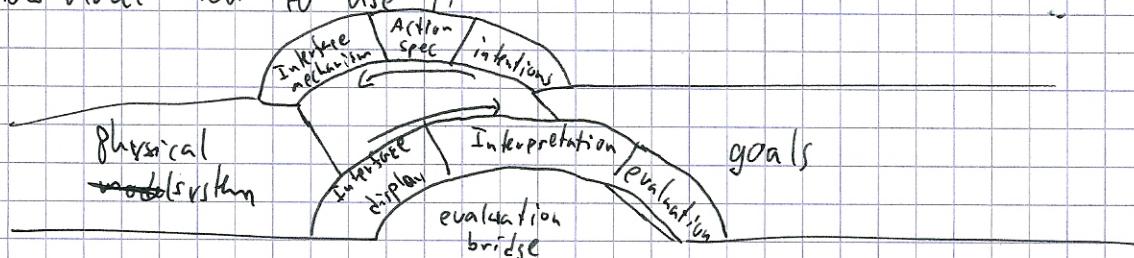
- geringe Kapazität des Kurzzeitgedächtnisses

⇒ recognition > recall

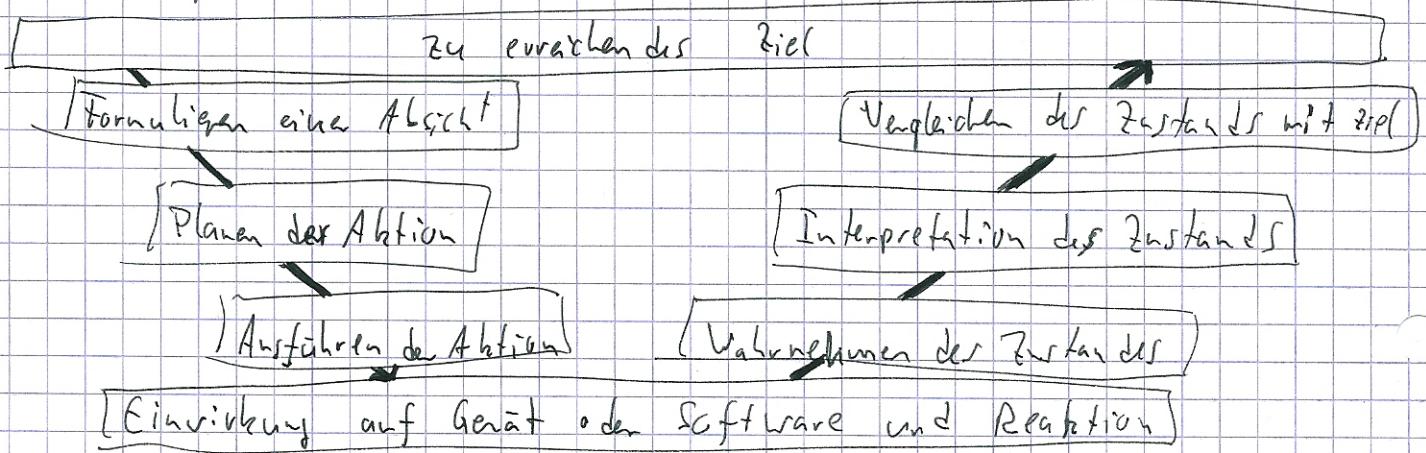
• Mentaler Modell: Modell eines Objektes, das ein Benutzer entwickelt

- deep model: how does it work

- shallow model: how to use it



- Handlungsschritte nach D. Norman



• social interaction

- Collaboration Matrix

	Same time synchronous	different time asynchronous
same place - local	roomware, tabletop, powerwall	message board
different place - distributed	livecasting, ICQ, ...	vibis, Online communities

• emotional interaction

- design systems to make people respond in certain ways
- certain aspects may be accepted, if result is pleasing
- friendly interfaces/helpers (petri, coby, yui)

(3)

- avoid words like FATAL, INVALID, BAD
- avoid UPPERCASE and long hex code/numbers
- let computer apologize upon error
- Anthropomorphisms: attribute human-like qualities to objects

- emotional design model

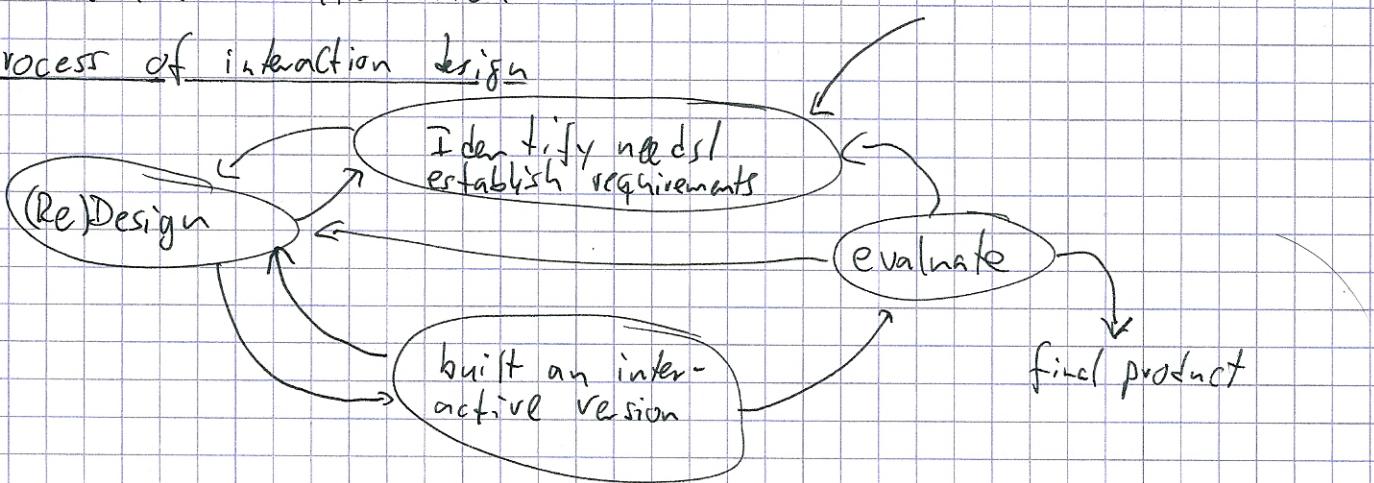
- people react differently depending on emotional state
- frightened → less tolerant
relaxed → more likely to overlook problems

- future design

- naïve physics
- body awareness & skills
- environment awareness & skills
- social awareness & skills
- domains of design:
 - Individual Interaction
 - Social Interaction & communication
 - workflow
 - physical environment ("Control Room Scenario")

⇒ Planned Interaction

- process of interaction design



- user centred design approach

- + Realistic Expectations
- + less surprises, disappointments
- + timely training
- + Communication, no hype

Ownership:

- + make users active stakeholders
- + more likely to forgive/accept problems
- + can make difference in success/failure

- user involvement:

member of design-team: full-time: constant, loose touch with user

part-time: patchy input, stressful

short-term: inconsistent across project-life

long-term: consistent, loose touch with user

newsletter & dissemination device

- communication both ways
- reach wide selection of users

- User-centered approach

- focus on users and tasks
- empirical measurements (reactions, performance, ...)
- iterative design

- Who are users/stakeholders: more complex than it seems

people who interact directly, manage users, receive output, purchasers, ...

primary \Rightarrow secondary \Rightarrow tertiary

- users capabilities (size of hands, motor/sensor abilities, height, strength (child/stay), disabilities)

- users needs:

- cannot be told by users \Rightarrow look at existing tasks

- alternatives: look at similar/different products

\Rightarrow prototype-driven specification (iRise, IDEO TechBox)

- choose among alternatives: test prototypes

- Data Gathering

- setting goals: how to analyze data

- identify participants: whom to ask

- relationship with participants

- triangulation: look from more than one perspective

- pilot studies: small trial of main study

- data recordings: Notes, Video, Photo, Audio

- Interviews:

- unstructured: not guided by script, rich, not reproducible
- structured: scripted, questionnaire, replicable,
- semi-structured: combination of both (free-form-fields)

- closed vs open questions

- Questionnaires

- possible for large groups (paper, email, web)
- sampling problematic (population size unknown)
- question order important (impact on answer)
- instructions should be provided
- checkboxes, rating scales, free-form-fields
- 60% response rate is good, 20% often acceptable

- Observation

- in the field (inside/outside observer)
- in controlled environment
- track user activities (diaries/logs)
- user requirements: a statement about an intended product

- environment

- physical (dark, water, vacuum,...)
- social (sharing of files, distances,...)
- organisational (hierarchy, IT department, training,...)

- users

- ability, background, attitude to computers
- System use: novice, expert, casual, frequent
- Personas: capture user characteristics
 - not idealized
 - no real people
 - feel real (name, story, goals,...)

- Data interpolation & analysis

- start soon after data gathering
- discuss findings with others

- Task descriptions (user centered)

- scenarios: narrative story, natural, personal
- use cases: assume interaction with system / detailed understanding
- essential use cases: abstract, not same assumptions as use cases

- Usability Goals

- Prototyping

- technical issues (feasibility, performance)

- work flow, task design

- screen layout

- low-fidelity: quick and easy

- paper, cardboard

sketches, task sequence, slides
post-it notes, storyboards,
Wizard of Oz, wireframes

- high-fidelity:

- same material as in product

flash, Visual Basic, Mockups,
MS Expression Blend

- Evaluation: check user requirements

- controlled setting (laboratories, living labs, usability lab)

- natural settings (field studies)

- analyze + modeling