

USABILITY ENGINEERING

GOOD DESIGN DOES NOT HAPPEN BY CHANCE

Prof. Dr. Dr. Dr. Carsten Röcker

Mario Heinz-Jakobs, M.Sc

Christoph Wächter, B.Sc.

LECTURERS



Prof. Dr. Dr. Dr. Carsten Röcker

Office: inIT, CIIT 1
05261 / 702 - 5488
carsten.roecker@th-owl.de



Mario Heinz-Jakobs, M.Sc.

Office: CIIT 1, EG 2.6a
05261 / 702 - 5640
mario.heinz@th-owl.de



Christoph Wächter, B.Sc.

Office: CIIT 1, Raum EG 2.6a
05261 / 702 - 5104
christoph.waechter@th-owl.de

STUDY MATERIAL

- ▶ all slides will be made available on ILIAS after the lecture
- ▶ password: UEN_2022

OFFICIAL DATES

- ▶ Lecture: Wednesdays, 14:50 - 16:30
- ▶ Exercise: Wednesdays, 16:35 - 18:15

- ▶ **important:** schedule and lecture format will be adapted to requirements of a practical course
- ▶ see next slide for actual course program

COURSE SCHEDULE

Week	Date	Topic
1	21.09.2022	Exam Week
2	28.09.2022	Lecture 1: Introduction
3	05.10.2022	Lecture 2: Interaction Design Basics
4	12.10.2022	Lecture 3: Software Process & Design Rules
5	19.10.2022	Lecture 4: Evaluation Techniques & Data Analysis
6	26.10.2022	Lecture 5: Presentation of Practical Project
7	02.11.2022	Practical Project
8	09.11.2022	Participation in User Study 1
9	16.11.2022	1. Check-In: Q&A Software & Usability Study
10	23.11.2022	Practical Project
11	30.11.2022	Practical Project
12	07.12.2022	Practical Project
13	14.12.2022	2. Check-In: Q&A Data Analysis & Usability Report
14	21.12.2022	Practical Project
15	28.12.2022	Christmas Holidays
16	04.01.2023	Participation in User Study 2
17	11.01.2023	Practical Project
18	18.01.2023	Deadline for Usability Report
19	25.01.2023	Exam Week
20	01.02.2023	Exam Week

EXAM

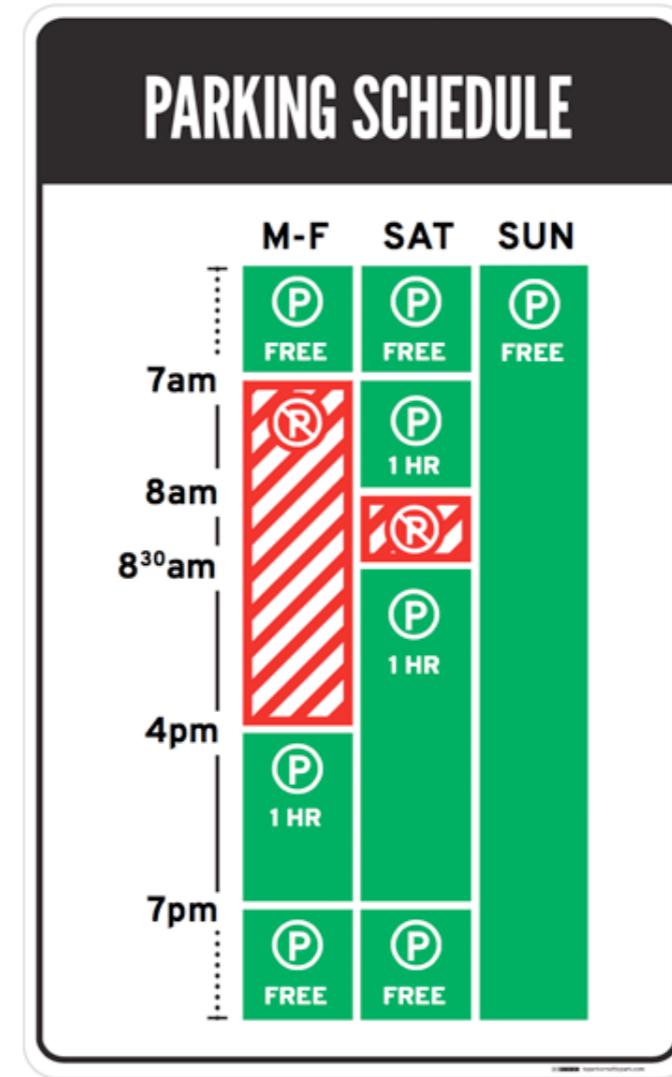
Requirements for Successful Completion

- ▶ completion of practical project
- ▶ participation in user studies
- ▶ written report (graded)

BAD DESIGN VS. GOOD DESIGN



BAD DESIGN = NOT USABLE



GOOD DESIGN = USABLE

WHAT IS USABILITY?

Usability defines the extent to which a product, system or service can be used by specific users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specific context of use.



USABILITY SELLS



DVD Player (1996)

iPhone (1st quarter 2007)

iPad (first 80 days 2010)

EXAMPLE – DEUTSCHE BAHN



EXAMPLE – DB-NAVIGATOR REDESIGN (1)

Starting Point

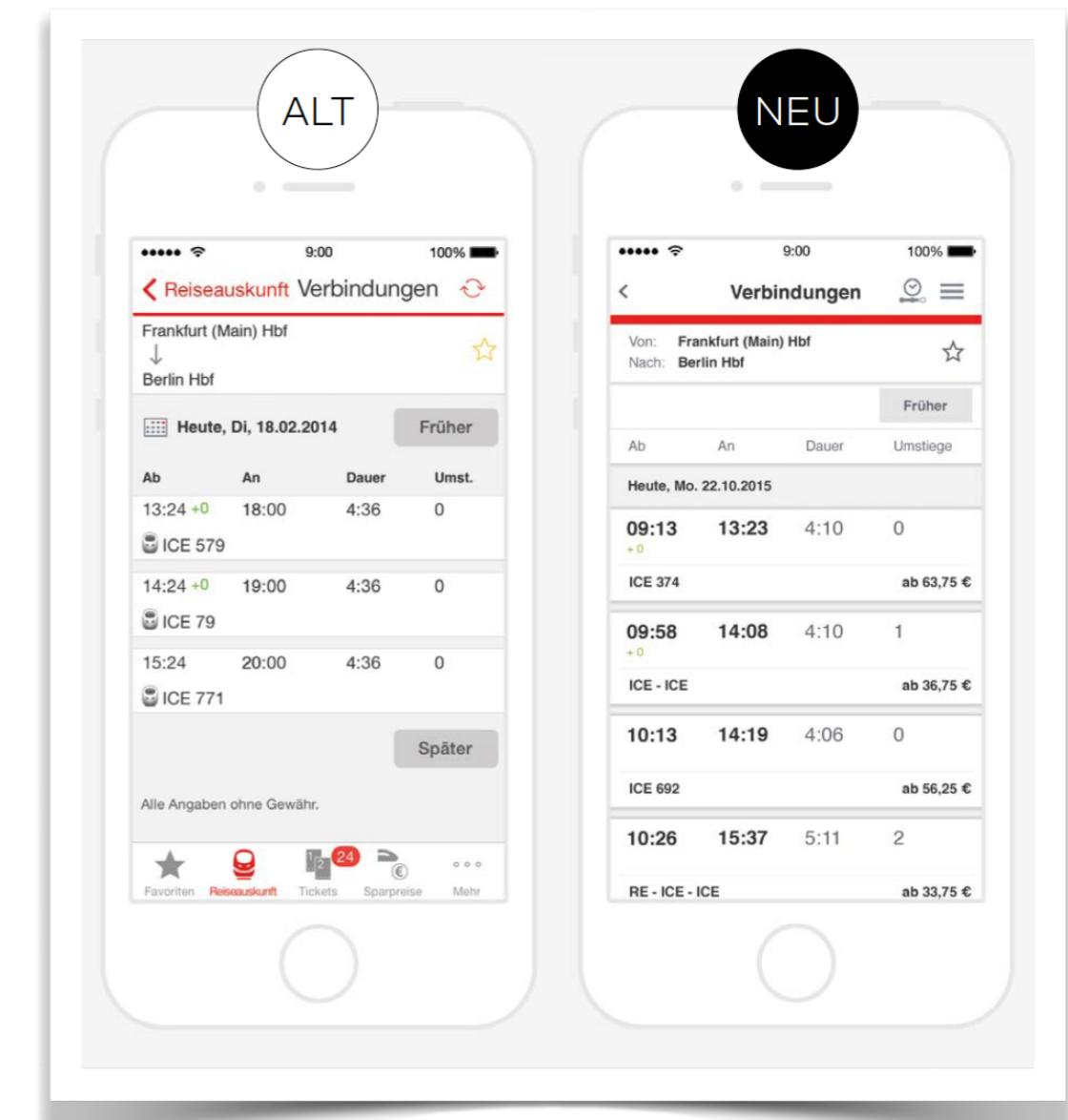
- ▶ outdated design
- ▶ complicated interaction

Process

- ▶ user driven and data based
- ▶ capturing of user behavior

Goal

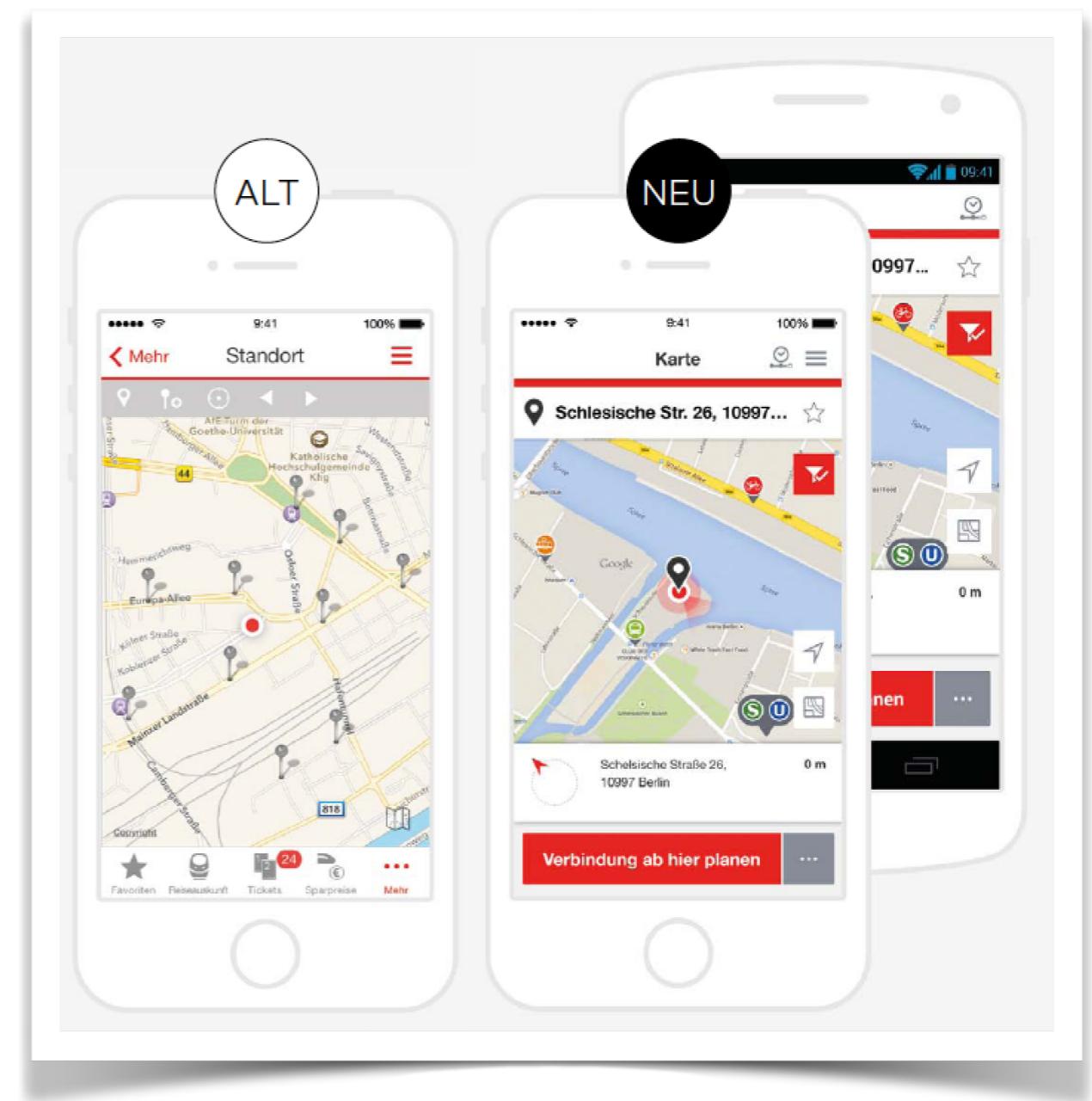
- ▶ „provide best support before, during and after the journey“



EXAMPLE – DB-NAVIGATOR REDESIGN (2)

Adaptation of Functionality to User Context

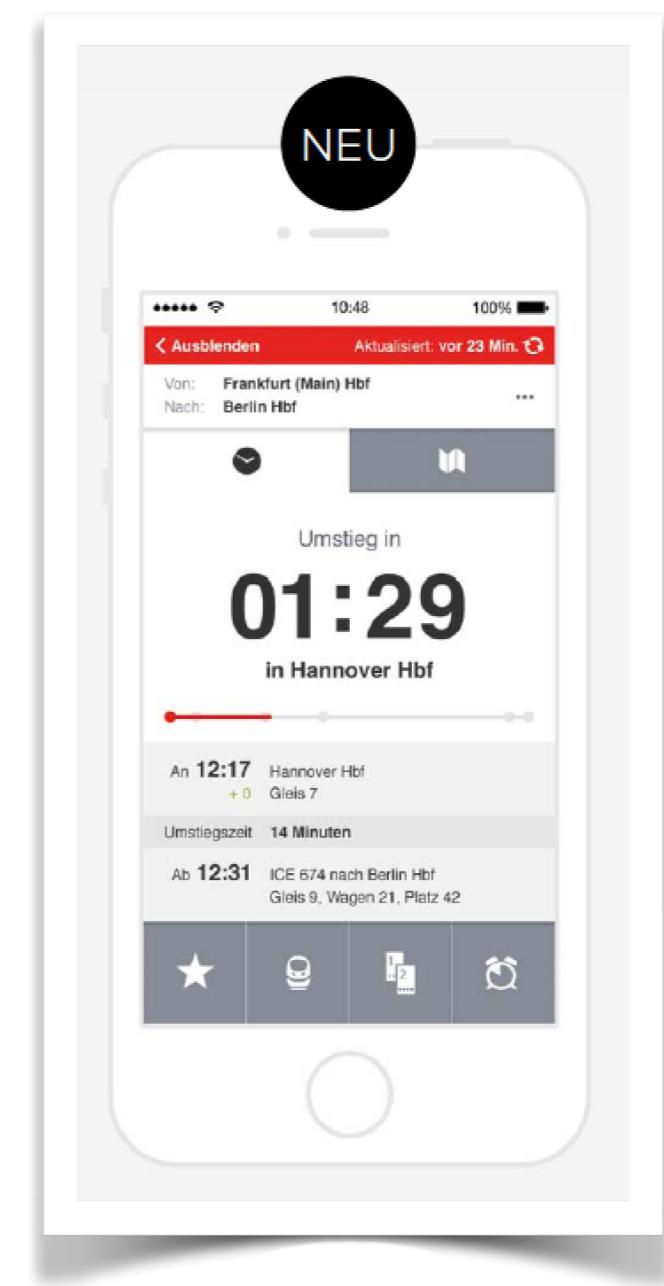
- ▶ map during mobile usage
- ▶ visualization of location-based information and adaptation to current user goal
- ▶ reduction to information relevant at the moment



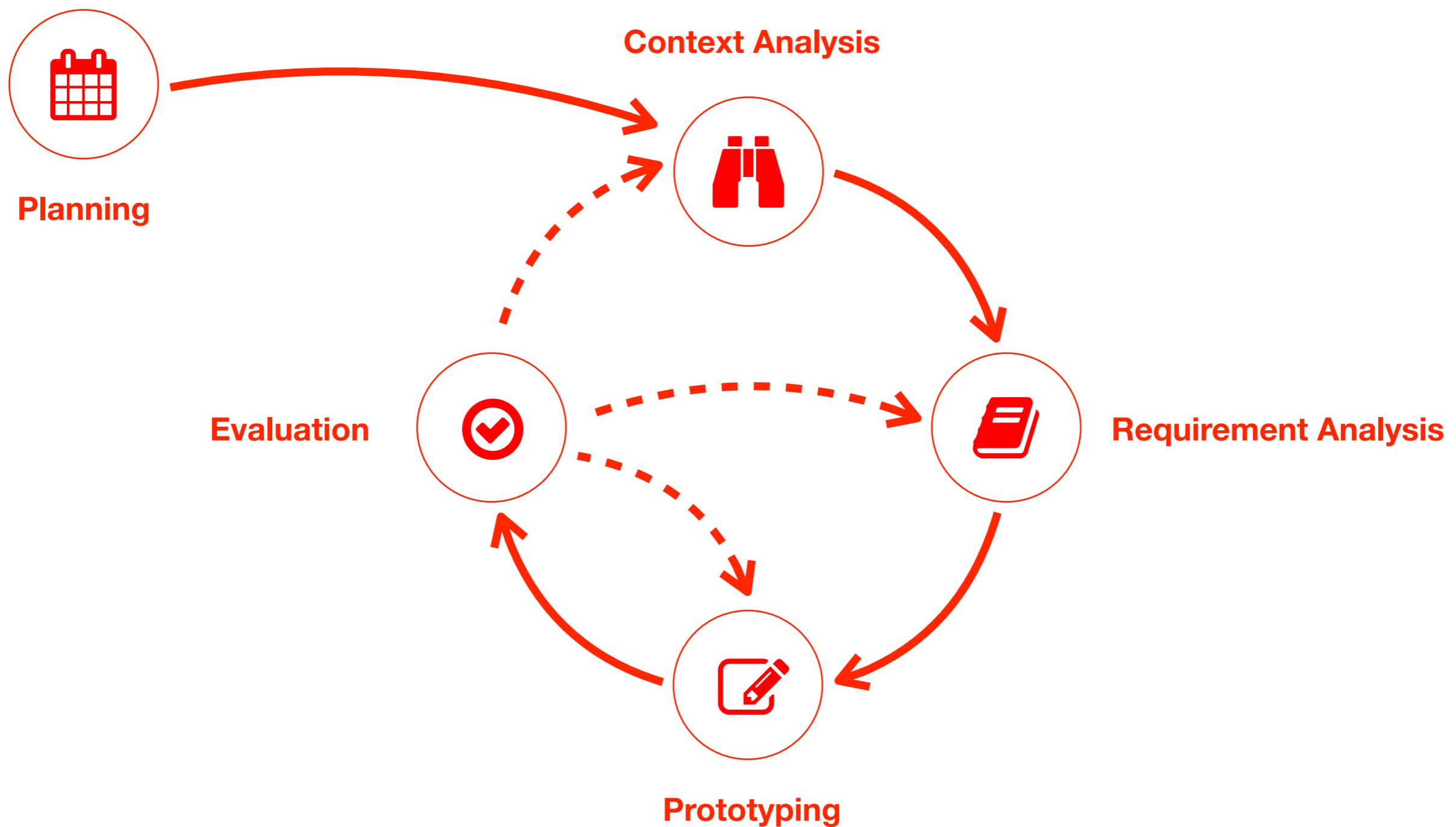
EXAMPLE – DB-NAVIGATOR REDESIGN (3)

Context-Adapted Information Visualization

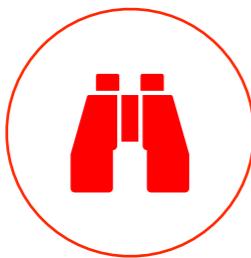
- ▶ before the journey: absolute times important
- ▶ during the journey: relative times helpful
- ▶ advantage: reduction of cognitive load



HUMAN-CENTERED DESIGN - ISO 9241-210



HUMAN-CENTERED DESIGN - METHODS



Context Analysis

Field Observation
Interview
Contextual Inquiry
Ethnography
Questionnaires
Focus Groups
Apprenticing
Journey Map
Diary Study
Card Sorting
Day-in-the-Life



Requirement Analysis

Use Cases
User Stories
Persona
Scenarios
Req. Workshop
GOMS



Prototyping

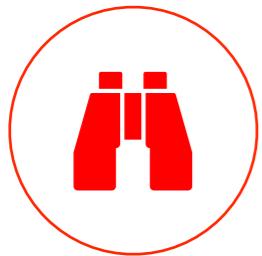
6-3-5
Storyboards
Paper Prototyping
Creative Toolkits
Wireframes
Design the Box
Rapid Prototyping
Design Sprints



Evaluation

Usability Inspection
Heuristic Evaluation
Cognitive Walkthrough
A/B Testing
Usability Testing
Remote Testing
Wizard of Oz
Eye-Tracking
Hallway Testing

HUMAN-CENTERED DESIGN - METHODS



Context Analysis

Field Observation

Interview

Contextual Inquiry

Ethnography

Questionnaires

Focus Groups

Apprenticing

Journey Map

Diary Study

Card Sorting

Day-in-the-Life

- ▶ combination of Interview and observation
- ▶ conducted in the environment of the user
- ▶ usability experts accompanies users at work
 - ▶ observes, takes notes and asks questions



HUMAN-CENTERED DESIGN - METHODS



Requirement Analysis

- ▶ fictive person representing a group of users
- ▶ market research to identify typical characteristics
 - ▶ e.g. goals, interests, character and behavior
- ▶ helps to develop a common understanding of user needs

Use Cases

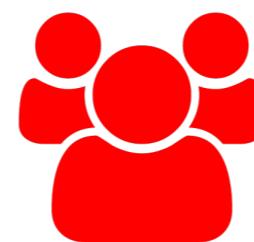
User Stories

Persona

Szenarios

Req. Workshop

GOMS



User Group

Market Research



Persona

Design Research

HUMAN-CENTERED DESIGN - METHODS



Requirement Analysis

Use Cases
User Stories
Persona
Szenarios
Req. Workshop
GOMS



Hans Messerschmidt, 68

- ▶ retired
- ▶ likes photography and traveling
- ▶ lives in the country, his children and grand children live in different German cities
- ▶ frequent traveller (bonus card, monthly ticket)
- ▶ buys ticket a vending machine, is often late
- ▶ not interest in using apps
- ▶ problem statement

“I want to enter my destination and get my standard ticket: economy class, window, quiet area.”

HUMAN-CENTERED DESIGN - METHODS



Prototyping

6-3-5

Storyboards

Paper Prototyping

Creative Toolkits

Wireframes

Design the Box

Rapid Prototyping

Design Sprints



HUMAN-CENTERED DESIGN - METHODS



Prototyping

6-3-5

Storyboards

Paper Prototyping

Creative Toolkits

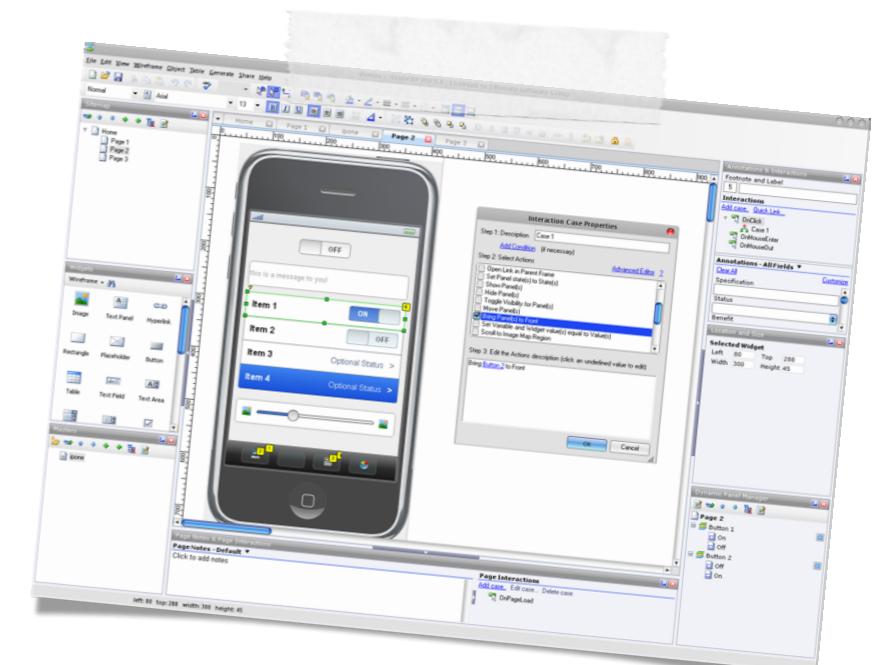
Wireframes

Design the Box

Rapid Prototyping

Design Sprints

- ▶ cheap and easy to make
- ▶ interaction by removing and adding parts
- ▶ „low fidelity“ format encourages experimentation
- ▶ Axure, Adobe XD, Powerpoint



HUMAN-CENTERED DESIGN - METHODS



Evaluierung

Usability Inspection

Heuristic Evaluation

Cognitive

Walkthrough

A/B Testing

Usability Testing

Remote Testing

Wizard of Oz

Eye-Tracking

Hallway Testing

- ▶ expert tests most important interaction sequences
- ▶ A **heuristic evaluation** is an analytic method in which a group of usability experts inspects the user interface of a product for possible usability problems using a list of established principles (so-called *heuristics*).
- ▶ A **cognitive walkthrough** is an analytic method in which multiple usability experts put themselves in the role of users and perform typical tasks.

HUMAN-CENTERED DESIGN - METHODS



Evaluierung

- ▶ In a **usability test**, participants are asked to perform certain tasks with a given interface and are monitored how well they are able to do this.

Usability Inspection

Heuristic Evaluation

Cognitive

Walkthrough

A/B Testing

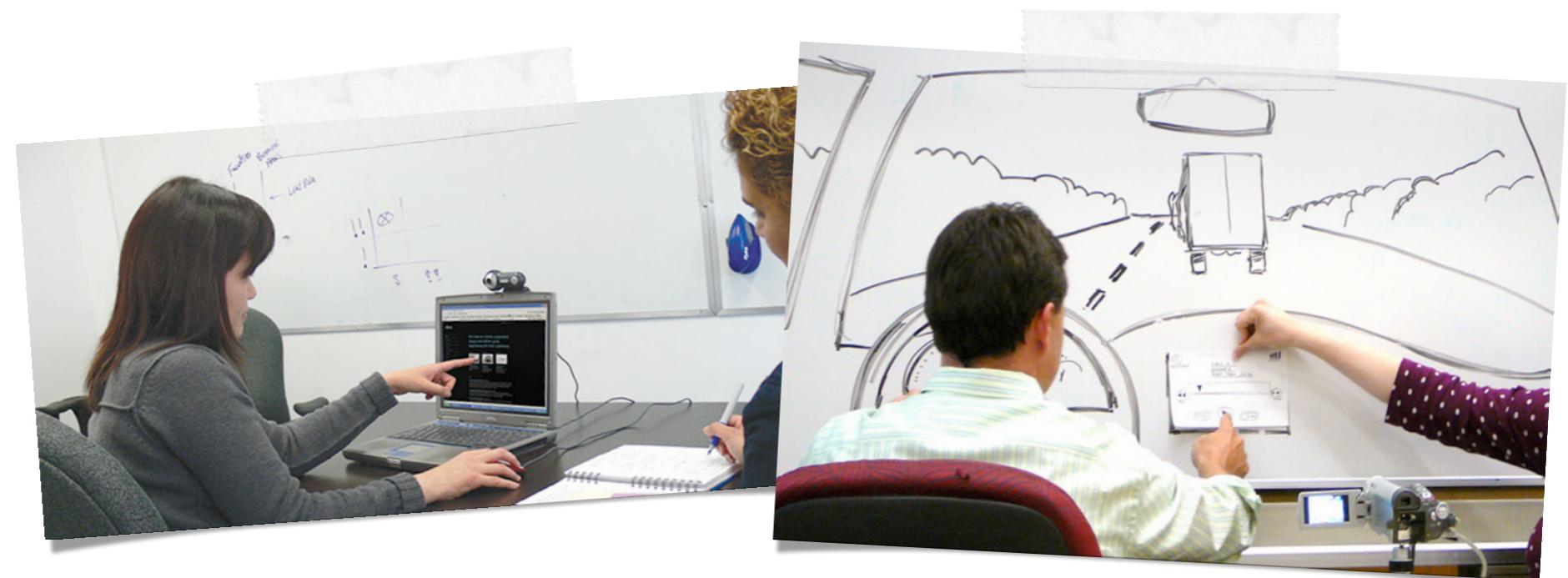
Usability Testing

Remote Testing

Wizard of Oz

Eye-Tracking

Hallway Testing



HUMAN-CENTERED DESIGN - METHODS



Evaluierung

Usability Inspection

Heuristic Evaluation

Cognitive

Walkthrough

A/B Testing

Usability Testing

Remote Testing

Wizard of Oz

Eye-Tracking

Hallway Testing



USABILITY ENGINEERING

GOOD DESIGN DOES NOT HAPPEN BY CHANCE

Prof. Dr. Dr. Dr. Carsten Röcker

Mario Heinz-Jakobs, M.Sc

Christoph Wächter, B.Sc.