University of Applied Sciences and Arts Northwestern Switzerland
School of Engineering
i4DS | Centre for Requirements Engineering | © Prof. Dr. Samuel Fricker

Requirements Elicitation
and Analysis of the System's Usage Context

Learning Objectives

Know

- Rights and duties of stakeholders and requirements engineers

Understand

- Common requirements elicitation techniques and their key ideas
- How to use the Kano model to select an appropriate elicitation technique

Be able to do the following activities

- Use contextual inquiry to document a customer's as-is situation

Where are Requirements Coming From?

Common Requirements Elicitation Techniques

Mapping of my names > to those of Pohl/Rupp

- Surveys > questionnaire
- Creativity workshops > creativity
- Document analysis > perspective-based reading
- Prototypes may be used in workshops, interviews, and for observation

Elicitation			
Total	+	414	99%
Workshops		328	78%
Feedback	±	183	44%
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System Archeology		292	70%
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Idea Databases		38	9%
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Other		12	3%

S. Fricker, R. Grau, A. Zwingli (2015): "Requirements Engineering: Best Practice". In: Requirements Engineering for Digital Health. Springer.

Problem Statement of the Diabetes Diary

Problem Statement

The problem of	inadequate blood glucose levels of Diabetes I patients
affects	patients, next-of-kin (e.g. relatives), doctors, and nurses
the impact of which is	severe complications for the patient and high treatment costs
a successful solution would be	to enable the patient in effectively balancing intake of insulin and carbohydrate, physical activity, and stress

Position Statement

Document Analysis

Perspective-based reading with conventional content analysis

- Goal: extract the essence out of a document.

1. Ask yourself a question that you want to answer,
   e.g. “what are the features of the here descriped app?”
2. Identify the sections that contain relevant information to answer the question
3. Read the relevant sections repeatedly: obtain a sense of the whole
4. Read the relevant sections word by word: obtain codes (names for markers) to label important things
5. Make notes about your impressions and thoughts: improve codes
6. Sort codes into hierarchical categories: organize what you learn into a tree
7. Develop definitions/descriptions for the categories and sub-categories
8. Identify the relationships between the categories: what leads to what?

Example

- Task: describe the characteristics of a diabetes self management application
- http://www.jdst.org/March2010/Articles/VOL-4-2-ORG7-ARSAND.pdf

Rupp/Pohl -> Perspective-based Reading
Hsieh, Shannon (2005): „Three Approaches to Qualitative Content Analysis“. Qualitative Health Research 15(9):1277-1288.

System Archeology

System archeology

- Goal: re-document the requirements as they have been implemented.
  1. Interact with the application to identify based elements of the app:
     - GUI (make screenshots or photographs, obs: show data but respect privacy)
     - User roles (identify types of users that can be administered and their rights)
     - Functions (identify menus and GUI elements to launch functionality)
     - Data (identify nouns contained in the GUI and forms that contain data)
  2. Interact with the application to identify detailed requirements:
     - Usage scenarios (identify meaningful sequences of using the application)
     - Lifecycle of data (identify the states and state transitions of data)
  3. Build a requirements document that describes the app as it has been implemented.

Example

- Task: identify the features of a diabetes self management application
- https://play.google.com/store/apps/details?id=com.mydiabetes

Observation

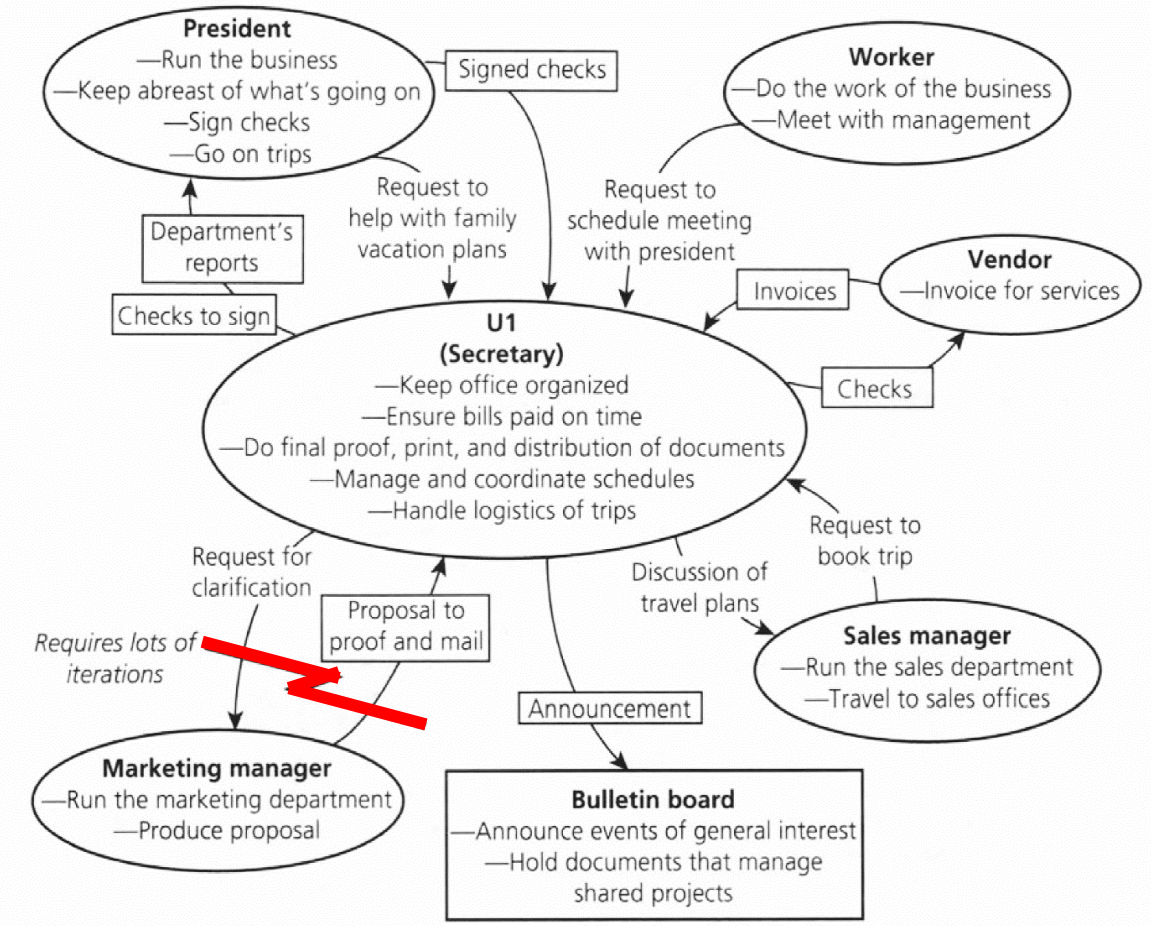
Goals:

What to document

- (Information) Flow Model
- (Activity) Sequence Model
- Artefact (Design) Model
- Cultural (Influence) Model
- Physical (Layout) Model

Beyer, Holtzblatt (1998): Contextual Design. Morgan Kaufmann Publishers.

(Information) Flow Model



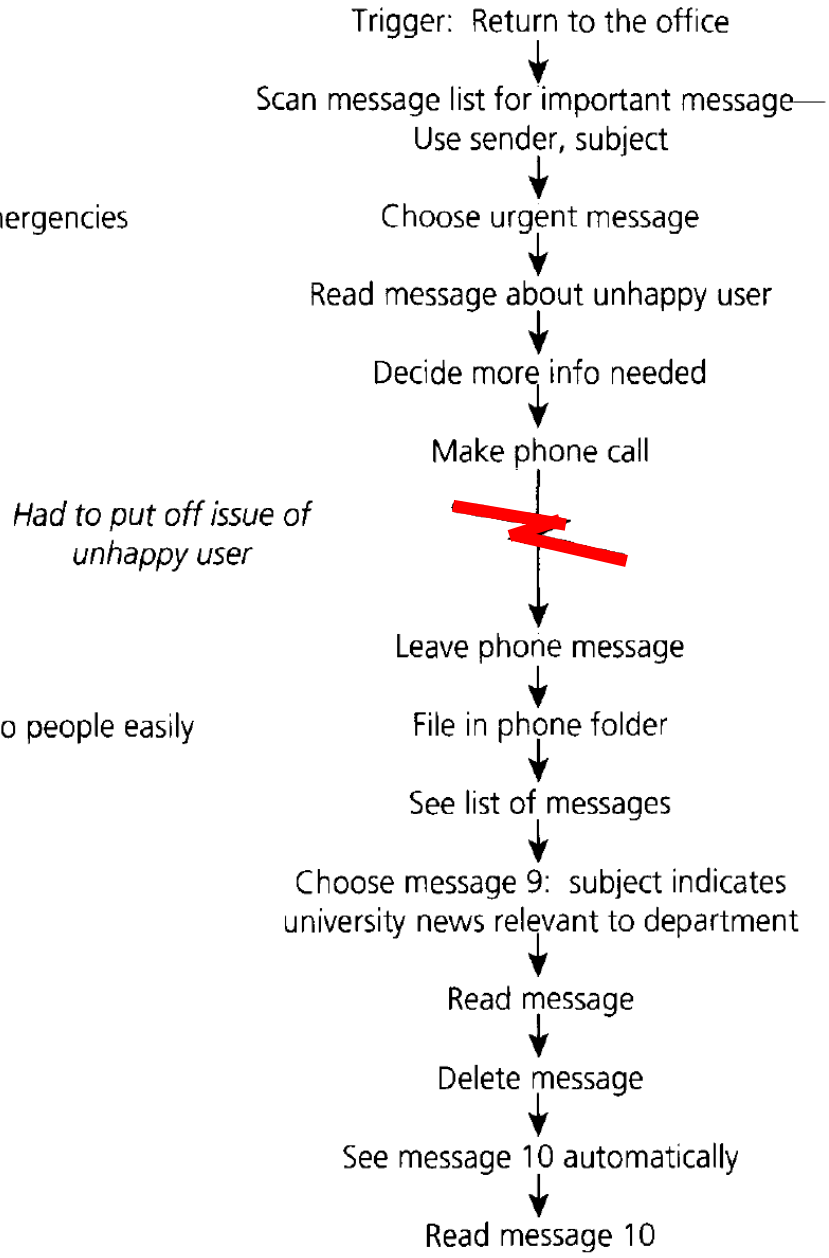
Beyer, Holtzblatt (1998): Contextual Design. Morgan Kaufmann Publishers.

(Activity) Sequence Model

Intent: Plug in

Intent: Handle emergencies

Intent: Get back to people easily



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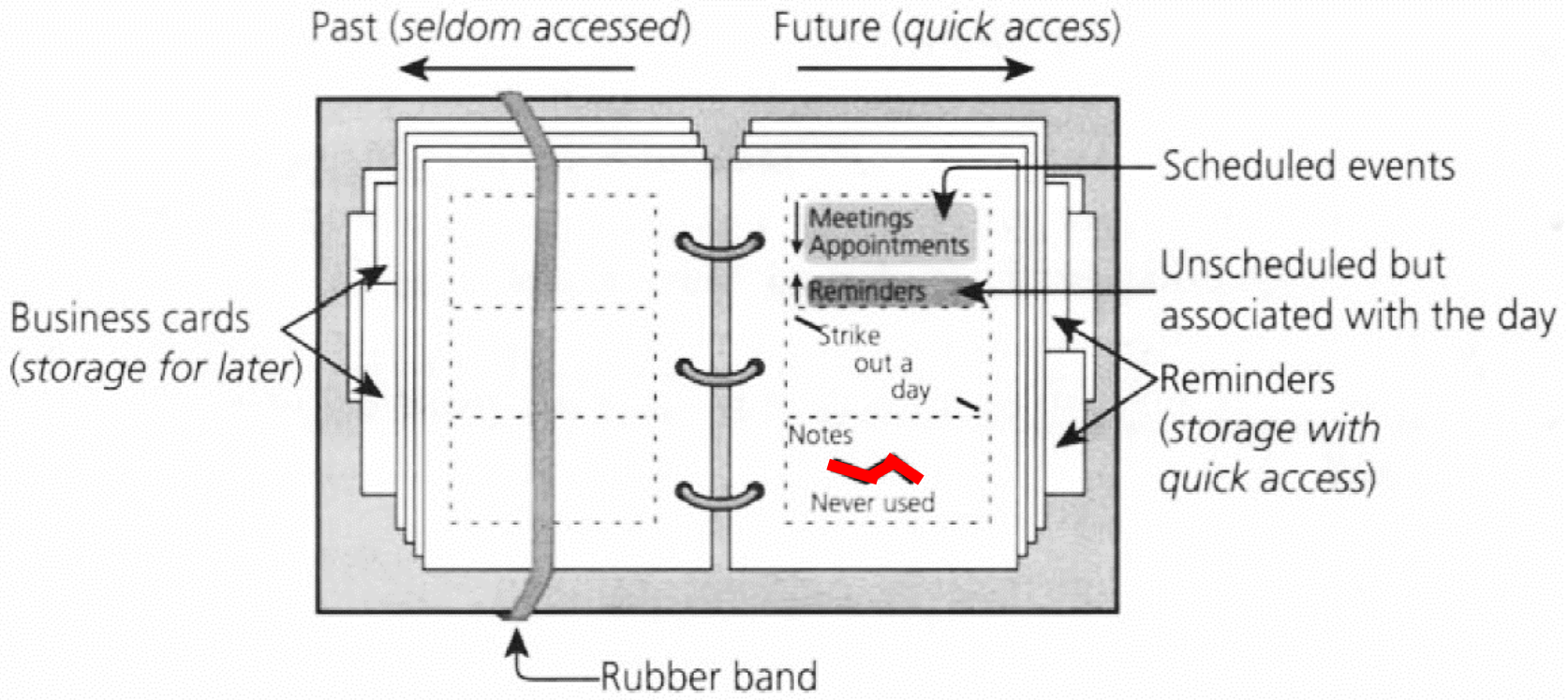
Artefact (Design) Model



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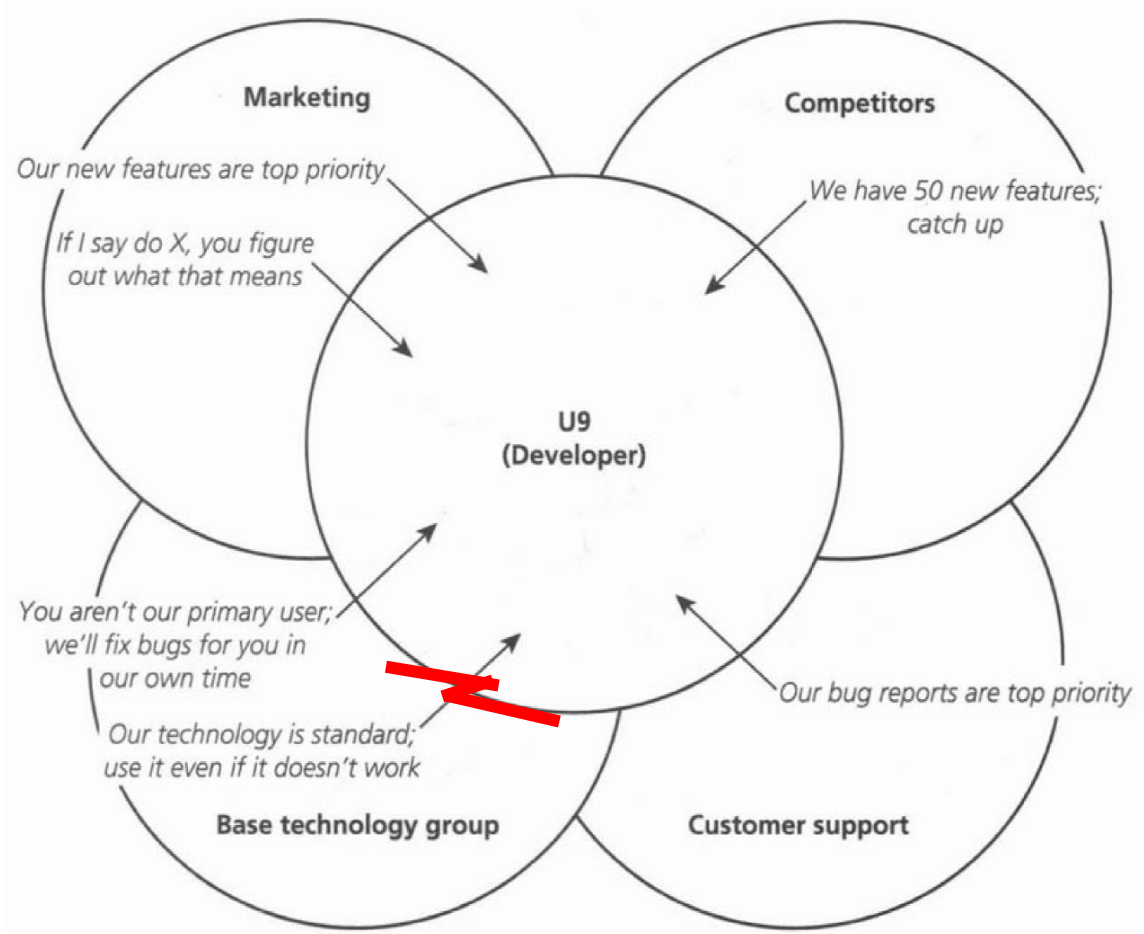
Cultural (Influence) Model



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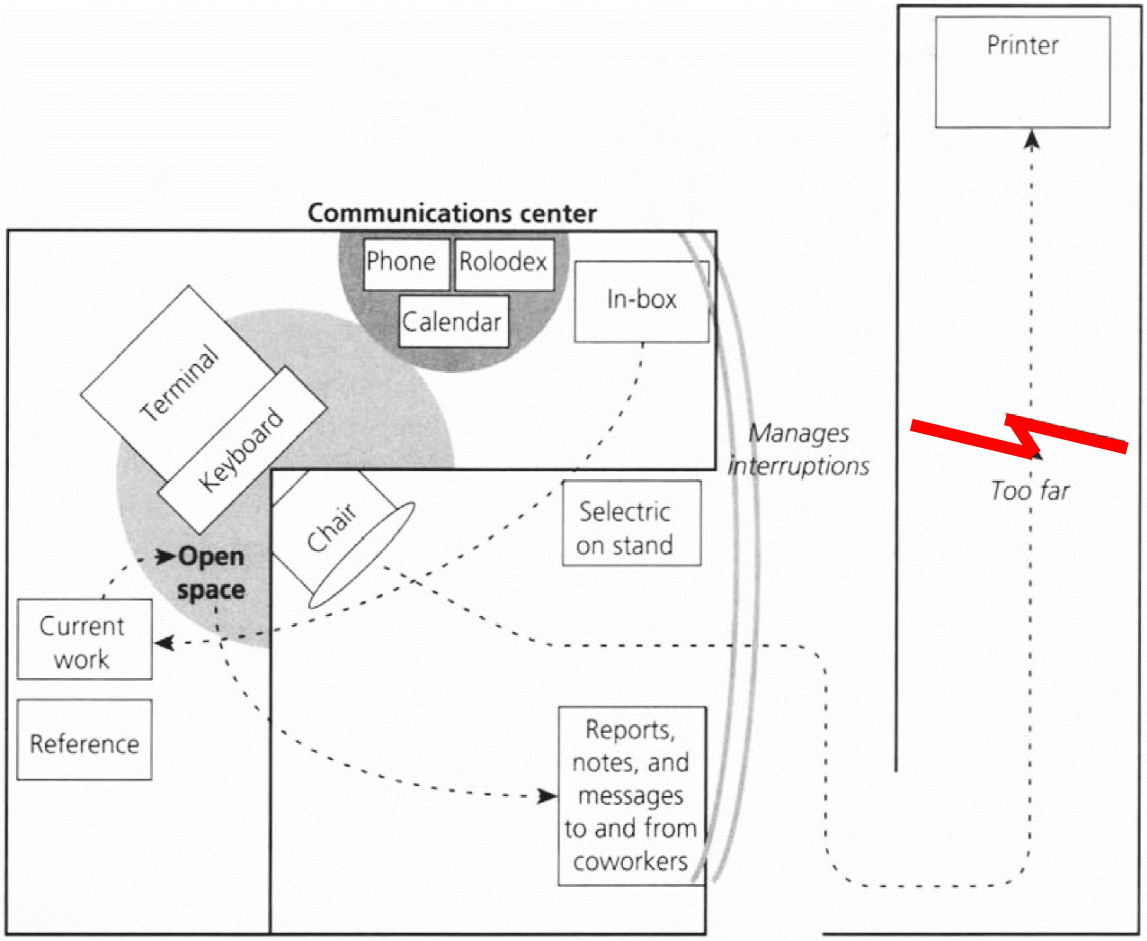
Physical (Layout) Model



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Vision of the Diabetes Diary

Problem Statement

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Position Statement

For	patients, next-of-kin (e.g. relatives), physicians, and nurses
Who	train, monitor, and consult an empowered Diabetes patient
The (product name)	Diabetes Share System (DSS) is a FI-STAR cloud solution
That	enables mobile recording of health and biometrical parameters, remote counselling, and comparison with other patients' anonymous observations
Unlike	in-clinic treatment based upon manually recorded or lacking health parameters
Our product	increases evidence to support treatments, increases the patient's knowledge base, assists in maintaining a healthy lifestyle, reduces the number of in-person appointments, and improves the patient's diabetes condition, wellbeing, and health

www.fi-star.eu > Deliverables > D1.1

Exercise: Document the Usage Context of the Diabetes Diary

https://www.youtube.com/watch?v=6i8Irqk-jD0

Handling Stakeholders: the Requirements Engineer…

Manages the RE process
- brings method expertise
- Structures the schedule and coordinates

Learns
- speaks the language of the stakeholders
- becomes thoroughly familiar with the application domain
- allows stakeholders to demand properties that make the system user friendly and simple

Offers consultancy
- ensures that the system satisfies the functional and qualitative demands of the stakeholders
- presents her ideas and alternatives as well as their realizations
- is able to get work results across (e.g., by means of diagrams and graphs)

Produces the work results
- creates a requirements document

Makes friends
- maintains a respectful relationship with any stakeholder

Rupp/Pohl -> Section 3.1.2

Handling Stakeholders: the Stakeholder…

Contributes with knowledge and decisions

- introduces the requirements engineer to the application domain
- supplies the requirements engineer with requirements
- prioritizes requirements

Offers feedback

- ~~documents requirements assiduously~~ ensures correctness of requirements
- inspects the requirements that the requirements engineer documents, such as prototypes, etc.
- respects the requirements engineer's estimates of costs and feasibility

Follows the plan he/she has agreed to

- respects the requirements engineering process that has been instated
- makes timely decisions
- communicates changes in requirements immediately
- adheres to the predetermined change process

Rupp/Pohl -> Section 3.1.2

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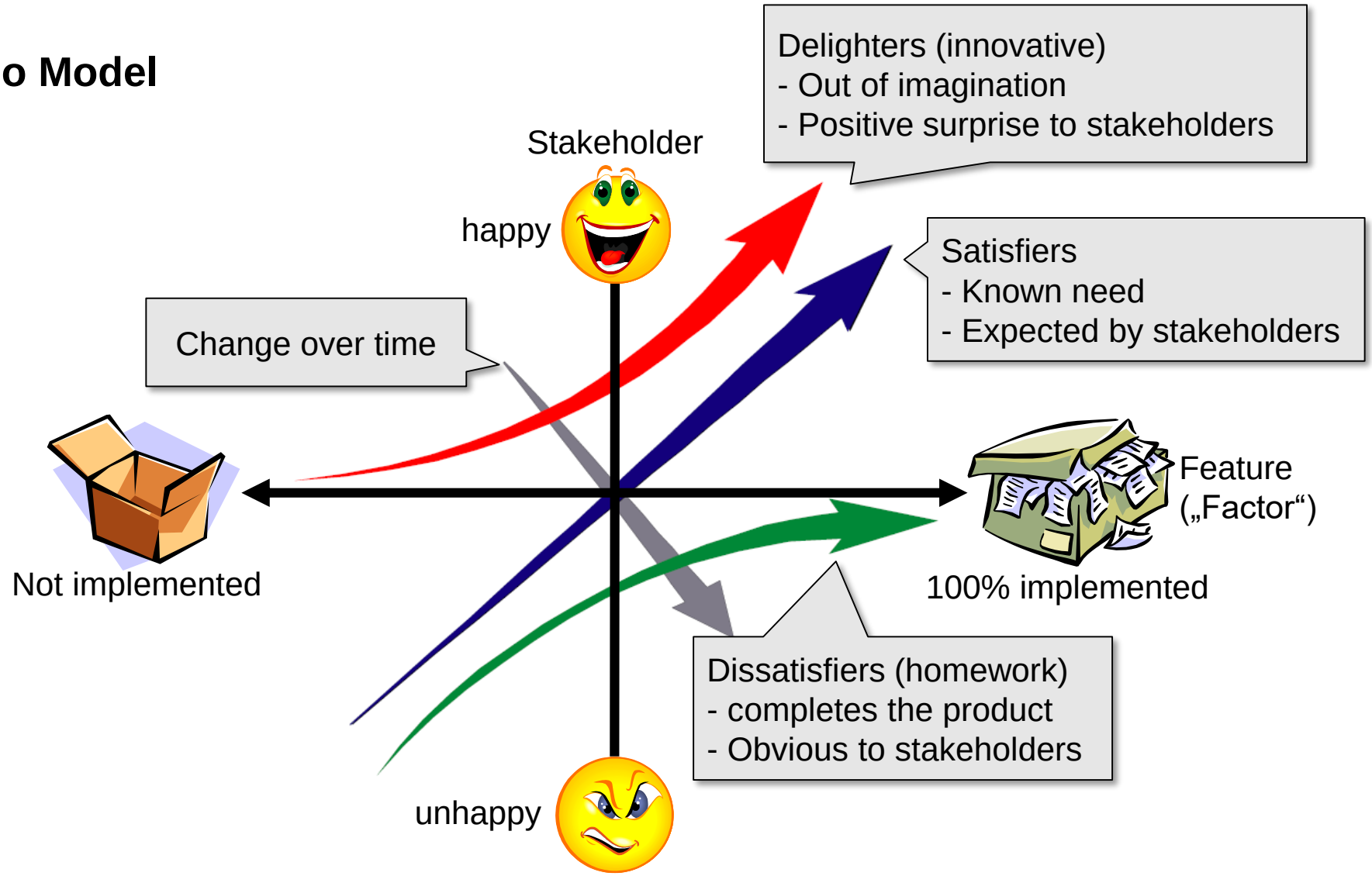
Kano Model



Kano (1984): “Attractive Quality and Must-Be Quality”, Journal of Japanese Society for Quality Control 4:39-48.

Semi-Structured Interviews

Goal: learn background knowledge, interests, and expectations from the interviewee

Preparation

- Questionnaire with interview topics. Expect 10-30 minutes effort per topic.
- Invite with project information, interview goals, agenda, and what the interviewee will get.

Structure

1. Introduction: introduce yourself, explain purpose of interview and what will be done with the results, assure confidentiality, ask for permission to take notes or recordings.
2. Warm-up: get to know the person and why he/she got involved with the systems or context that you are interested in.
3. Main body: ask the questions you have prepared and drill-down on interesting answers.
4. Cool-off: reflect together about the interview and the next steps that should be taken.
5. Closure: thank you and good-bye.

Post-interview

- Make a transcript
- Summarize the interview and share the *minutes of the meeting* with the interviewee
- Exploit the interview results!

Robson (2002): Real-World Research. Backwell Publishing.

Interviews: Selected Advice

General advice

- Listen more than you speak
- Instead of one complicated question use a sequence of simple questions
- Be cautious when you use lead questions (“are you really sure that…?”)
- Use probes (“hmm…”, (pause), (curious gaze), …)
- Summarize frequently what was discussed: “I have understood that…”
- Enjoy the interview (or at least look as though you do)

Questions you should use in many interviews: context-free questions

- Start: how did you get involved in this (kind of) systems?
- Start: what problems does this system solve (for you)? What problems may it create?
- Start: in your eyes, what is a really successful system worth (e.g. in Swiss Francs)?
- Middle: are you the right person to answer my questions?
- Middle: do we discuss the right things? Is there anything else we should discuss?
- End: is there anything else that you would like to recommend me?
- End: whom should I definitely meet to discuss this system?
- End: may I return to you with my notes and our ideas of the system?
- Post-interview: take notes of what you had discussed at the door

Robson (2002): Real-World Research. Backwell Publishing.
Gause, Weinberg (1989): Exploring Requirements: Quality Before Design. Dorset House.