PXL – IT
42TIN1280 Software Analysis
Requirements elicitation

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Content

- Recap Requirements Engineering
- Requirements elicitation
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  - Elicitation techniques
  - SWOT Analysis of some elicitation techniques
  - Exercises & quizzes
- Key learning points
- Questions & answers

Recapitulation of requirements engineering - mindmap

Recap Requirements Engineering

- Make the mindmap of RE
- Discuss in class
- 5 minutes

What is Requirements Elicitation?

Requirements Elicitation

"One of the key objectives of business analysis is to ensure that requirements are *visible* to and *understood* by all stakeholders"

Requirements Elicitation

- To elicit is to
  - draw forth or bring out
  - call forth or draw out
- Requirements elicitation is an active effort to **extract information** from stakeholders and subject matter experts
- Elicitation is not a step or a task you do at a certain point. It is a set of techniques you apply, appropriately, during the requirements phase

Why Not Requirements Gathering?

Requirements Gathering

- Like collecting sea shells
- Take what you see
- More reactive, less proactive

versus

Requirements Elicitation

- Like archeology
- Planned, deliberate search
- More proactive, less reactive

Eliciting Requirements

Driven by:

- The system context
- The various sources for requirements
  - Stakeholders
  - Existing documents
  - Legacy systems

Forgotten sources → Forgotten requirements!

Eliciting Requirements - Stakeholders

- Remember the **stakeholders** checklist:
  - Name, role, contact information, availability, relevance, knowledge areas, personal goals, etc.
- Stakeholders should be actively involved in the project
- You might need an agreement about their jobs, responsibilities, authority, etc.

Eliciting Reqs - Existing documents

- Documents
  - Standards, legal **<u>documents</u>**, branch / organisation specific documentation, from preceding/current systems (requirements docs, designs, CR's), etc.

Eliciting Reqs - Existing documents

- **<u>Documents</u>** – Example change request

CHANGE REQUEST 24093-D

Type: AZB → vehicle interior → air bags **ID**: 24093-D
Deadline: ASAP **Priority**: high
Customer:
*__direct__: customer service (internal)
*__indirect__: (future) owners of car type AZB (external)

Abstract: Air bags of car type AZB automatically inflate on long distances. This is a severe issue that must be repaired at all cost. Probable cause is a misconfiguration of the car's electric circuit on Board 13-C. A repair plan for dealers should be created and the production department needs an updated design.

Related documents:
*Problem report C253087
*Lab test AE13

Eliciting Reqs - Existing systems

- **Legacy Systems**
  - Preceding/current systems, systems from competitors

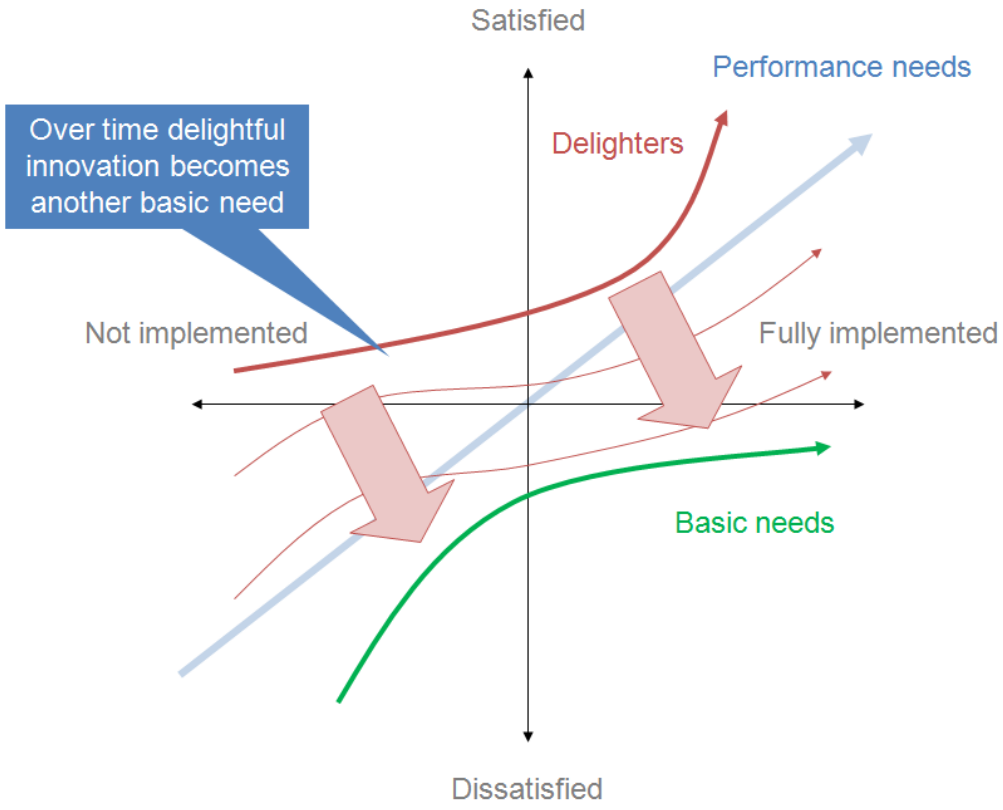
Requirements Elicitation – Kano Model

Categorization of Requirements

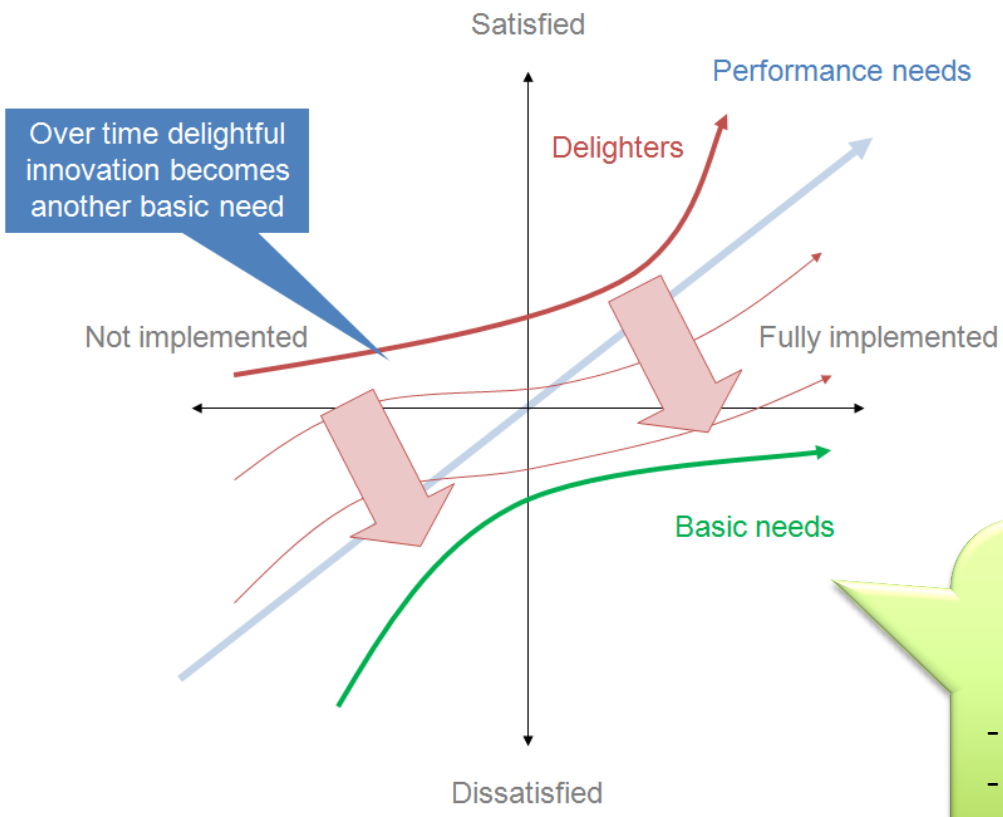
- Question to be asked
  - ***Which requirements are most important to achieve customer satisfaction?***
  - These are the ones we want to find, to define

- Kano Model
  - Developed by prof. Noriaki Kano in the 80's
  - To help proactively uncover, classify, and integrate 3 types of requirements which influence customer satisfaction
  - Check pdf for background reading: "What Delights Your Customers - Use the Kano Model to Find Out.pdf"

Kano Model


Satisfied
Performance needs
Over time delightful innovation becomes another basic need
Delighters
Not implemented
Fully implemented
Basic needs
Dissatisfied

Kano Model

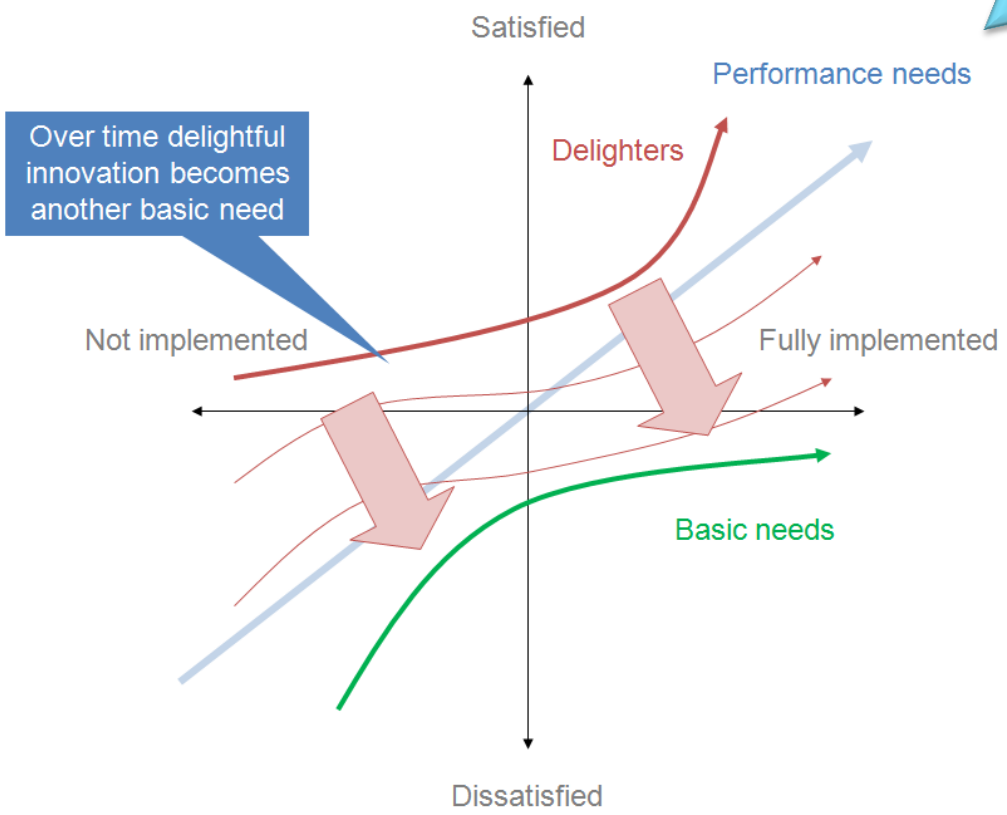


Must-be requirements (expected quality):

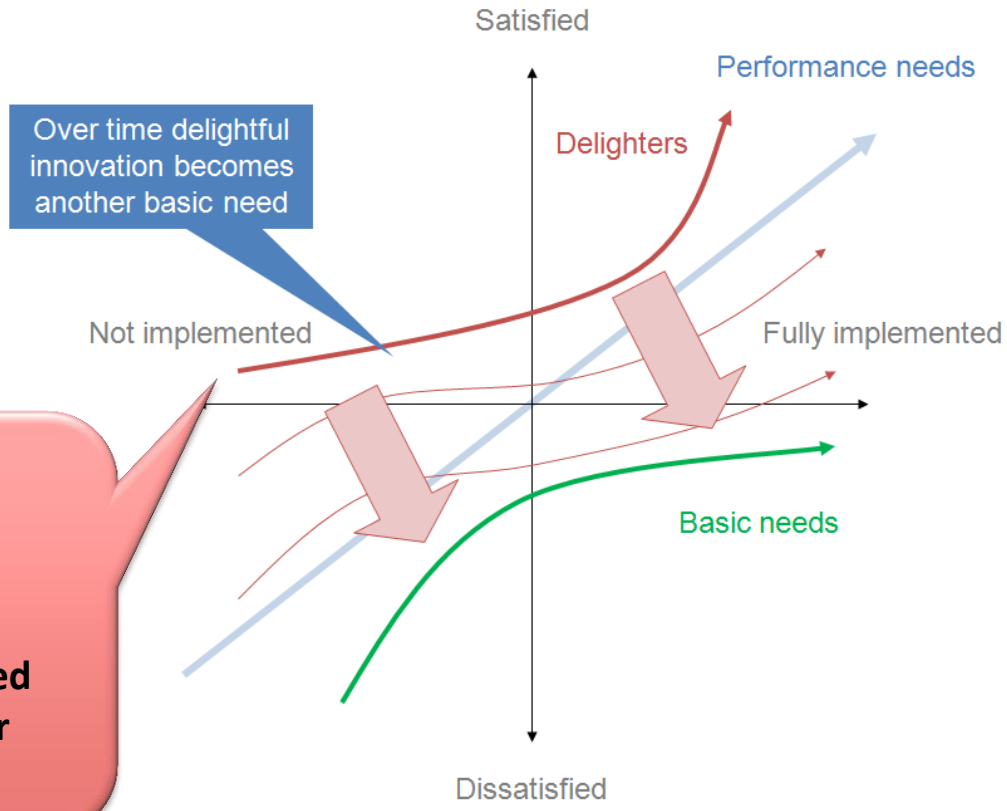
- **Implied**
- **Self-evident**
- **Not expressed**
- **Obvious**

Kano Model

1-dimensional requirements (desired quality):
- **Articulated**
- **Specified**
- **Measurable**
- **Technical**



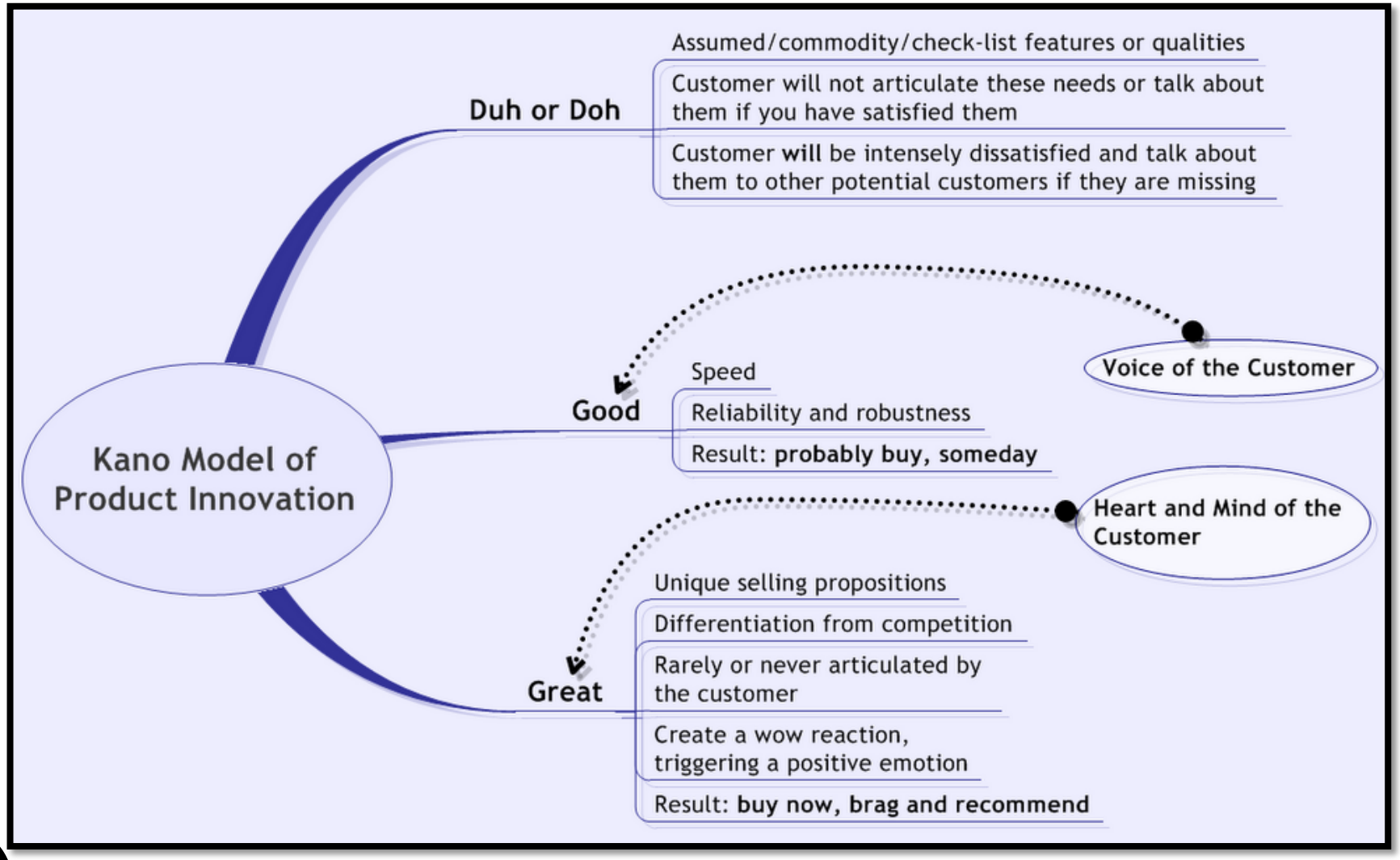
Kano Model



Attractive requirements (delighters):

- **Not expressed**
- **Customer tailored**
- **Causes customer delight**

Kano Model


Kano Model of Product Innovation
Duh or Doh
Assumed/commodity/check-list features or qualities
Customer will not articulate these needs or talk about them if you have satisfied them
Customer will be intensely dissatisfied and talk about them to other potential customers if they are missing
Good
Speed
Reliability and robustness
Result: probably buy, someday
Voice of the Customer
Heart and Mind of the Customer
Great
Unique selling propositions
Differentiation from competition
Rarely or never articulated by the customer
Create a wow reaction, triggering a positive emotion
Result: buy now, brag and recommend

Kano Model - questionnaire

Customer needs can be classified for analysis by means of a questionnaire. For each product feature, a pair of questions is formulated to which the customer can answer in one of five different ways (refer to the table given below).
The first question concerns the reaction of the customer if the product has the feature (functional form of the questions). The second concerns the reaction if the product does not have the feature (dysfunctional form of the question).

Functional form of the question	
If you have to wait for less than 2 minutes before the customer service rep answers your call, how do you feel?	1. I like it that way 2. It must be that way 3. I am neutral 4. I can live with it that way 5. I dislike it that way
If you have to wait for more than 2 minutes before the customer service rep answers your call, how do you feel?	1. I like it that way 2. It must be that way 3. I am neutral 4. I can live with it that way 5. I dislike it that way
Dysfunctional form of the question	

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Kano Model – evaluation table

By combining the two answers in the evaluation table given below, product features can be classified into six categories:

A	Attractive	O	One Dimensional
M	Must-be	Q	Questionable
R	Reverse	I	Indifferent

Evaluation Table

Customer Requirement		Dysfunctional (Negative) Question				
		1.Like	2. Must be	3. Neutral	4. Live with	5. Dislike
Functional (Positive) Question	1.Like	Q	A	A	A	O
	2. Must be	R	I	I	I	M
	3. Neutral	R	I	I	I	M
	4. Live with	R	I	I	I	M
	5. Dislike	R	R	R	R	Q

Kano Model – evaluation categories

There are 6 categories of product attributes based on the Kano Model:

Category (Attribute Perception)	When attribute is present	When attribute is absent
One-dimensional (O)	Satisfied	Dissatisfied
Must be (M)	No feeling	Dissatisfied
Attractive (A)	Satisfied	No feeling
Indifferent (I)	No feeling	No feeling
Reverse (R)	Dissatisfied	Satisfied
Questionable (Q)	Normally answers do not fall into this category. Q signifies that either the question was phrased incorrectly or the customer misunderstood the question. Customer may have selected a wrong answer by mistake	

Kano Model – evaluation questionnaire

Example: Speed of answer by customer service rep

Step 1: Questionnaire

If you have to wait for less than 2 minutes before the customer service rep answers your call, how do you feel?	1. X I like it that way 2. It must be that way 3. I am neutral 4. I can live with it that way 5. I dislike it that way
If you have to wait for more than 2 minutes before the customer service rep answers your call, how do you feel?	1. I like it that way 2. It must be that way 3. I am neutral 4. X I can live with it that way 5. I dislike it that way

Step 2: Evaluation Table

Customer Requirement		Dysfunctional (Negative) Question				
		1	2	3	4	5
Functional (Positive) Question	1				X	
	2					
	3					
	4					
	5					

Step 3: Table of Results

Product requirement	A	O	M	I	R	Q	Total	Category
Speed of Answer	1							
Resolution								
Rep communication								

- Frequency of answers based on all responses is the easiest way to evaluate and identify categories for product attributes.
- Category with the highest frequency is the final category for the product attribute

Kano Model – table of results

- Example of a call center

Product Attribute	A	O	M	I	R	Q	Total	Category
Speed of answer (2 min)	21	9	11	1	1	0	43	A
First call resolution	8	26	8	1	0	0	43	O
Able to understand the service rep	6	13	19	5	0	0	43	M

Kano Model – exercise Jack's steakhouse

- Subject: Jack's steakhouse performance
  - Elaborate a questionnaire (functional and dysfunctional form) for the following features

The food is served hot and fresh
The menu has a good variety of items
The quality of food is excellent
The barbecue/steak was tasty and flavorful
My food order was correct and complete
I was served promptly
Availability of sauces, utensils, napkins, etc., was good
Employees are friendly and courteous
The side dishes complemented the entrée
The service is excellent
The food is a good value for the dollar
I was warmly greeted at the door by the hostess
The manager personally thanked me
I enjoyed the complimentary corn bread
I enjoyed the supervised Steakhouse playground for kids

Kano Model – exercise Jack's steakhouse

- Subject: Jack's steakhouse performance
  - Fill out the questionnaire for each team member
  - Evaluate the questionnaire
  - Create the table of results for your team

The Requirements Elicitation Process

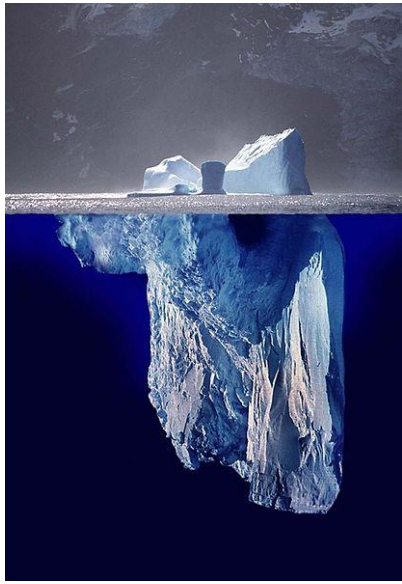
Elicitation Process

> "Computers are good at following instructions, but not at reading your mind."
>
> *Donald E. Knuth (1938–), computer scientist*

Requirements Elicitation Techniques

Elicitation Techniques (1)

- Finding conscious, unconscious and subconscious requirements
- Choice depends on:
  - Risk factors
  - Experience of the requirements engineer
  - Time & budget
  - Availability stakeholders
  - Granularity and the degree of detail needed
  - …



Elicitation Techniques (2)

- Survey techniques
  - Interviews, questionnaires
- Creativity techniques
  - (paradox) Brainstorming, change of perspective, analogies, role playing
- Observation techniques
  - Apprenticing, field observation
- Document-centric techniques
  - System archaeology, perspective based reading, reuse of requirements
- Supporting techniques
  - Mind mapping, Workshops, Prototyping, Use case modeling, Audio/video, CRC cards

Combining different techniques for the best result …

Interviews (1)

- Interviewing the stakeholders
  - Not the sole technique
  - Users don't know all the requirements …
- Open questions start with words like How… Why… When… Where… What… Who…
  - Are more likely to extract information
- Closed questions start with words like Do… Is… Can… Could… Will… Would… Shall…
  - These usually get yes/no answers (confirmation)
- Use answers from questions to ask new ones

Interviews (2)

- Types of interviews:
  - **Structured interview**: pre-defined list of questions
  - **Unstructured interview**: discuss topics using open ended questions

- Three main objectives:
  - **Record** information to be used as input to requirements analysis and modeling
  - **Discover** information from interviewee accurately and efficiently
  - **Reassure** understanding of the topic has been explored, listened to, and valued

Interviews (3)

- Process consists of four important steps:
  - Planning and preparation
  - Interview session
  - Consolidation of information
  - Follow-up

- Remarks
  - Set goals and objectives for the interview
  - Acquire background knowledge of the subject matter
  - About the domain (terminology, existing problems...) but also about the interviewee (work tasks, etc.)

Interviews (4)

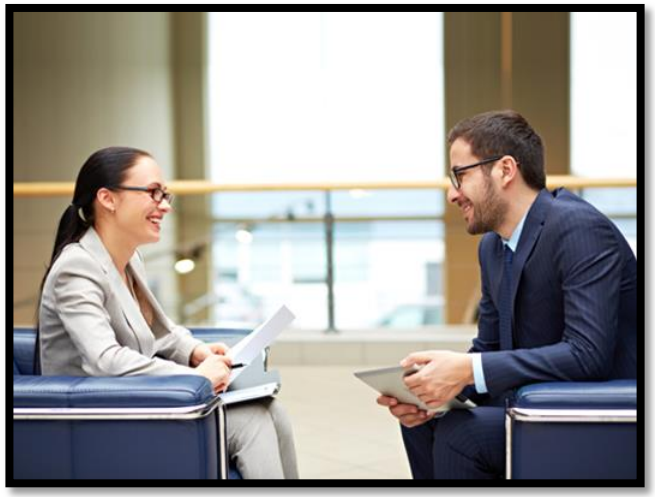
- How will you know that you have been successful? What do you want to achieve?
  - Prepare a checklist of topics to be discussed
- Plan the venue of the interview: ideally the stakeholder's workplace
- Plan the boundaries (scope) of your interview (and make this clear at the beginning)
- Ask yourself: why should the stakeholder care about this interview?
- At the end, of course, thank the stakeholder and tell what you will do with the information …

Interviews (3)

- How would you perform an interview?

Interviews (6)

- Can be conducted



Interviews (7)

- Success depends on
  - Knowledge of interviewer and interviewee(s)
  - Experience of the interviewer
  - Skill in documenting discussions
  - Readiness of interviewee to provide information
  - Relationship between the parties

- **Not a good way to reach consensus**

Survey/Questionnaires (1)

- Survey questions come in two types
  - Closed questions with canned responses that can be easy to analyze
  - Open-ended questions that provide more detail but require interpretation
- Preparing the survey
  - Define the purpose of the survey
  - Choose the audience and sample size
  - Write the survey questions
  - Test the survey questions

Survey/Questionnaires (2)

- Usage considerations
  - Advantages of the two types of questions
  - Advantages/disadvantages of surveys or questionnaires
    - Open and/or closed questions
    - On paper, on-line
    - Fast, cheap
    - Disadvantage: you can only ask what you know or suspect
    - Can be used to translate business characteristics into requirements (e.g. quality requirements)
    - Example: tool structured questionnaire

Survey/Questionnaires (3)

- Consider the following questions and determine which ***quality attributes*** are influenced by the answers?

1. What's the number of systems to be sold in a certain market area?

- 1 – 1000
- 1000 – 10.000
- more than 10.000

Survey/Questionnaires (4)

2. Does the system has to interact with different systems / applications?

- Yes
- No

3. What is the average age of the users?

- Under 25
- 25 – 40
- older than 40

Survey/Questionnaires (5)

4. What's the expected life time of the system?

- 1 - 2 years
- 3 – 5 years
- more than 5 years

5. Does the supplier offer a maintenance contract to the customer?

- Yes
- No

Questions & answers