

PXL – Digital 42TIN1280 Software analysis - Requirements Elicitation

Week 07 – semester 01

Luc Doumen

Nathalie Fuchs



**DE HOGESCHOOL
MET HET NETWERK**

Elfde-Liniestraat 24, 3500 Hasselt, www.pxl.be



Content

- Introduction: little exercise
- Requirements elicitation
 - What is ... ?
 - The Kano model
 - Elicitation process
 - Elicitation techniques
 - PE – which elicitation techniques?
 - SWOT Analysis of some elicitation techniques
 - Exercises & quizzes
- Key learning points
- Questions & answers

A close-up photograph of a person's hands writing in a notebook with a blue pen. The person is wearing a grey ribbed turtleneck sweater and a black and silver watch on their left wrist. The background is blurred, showing other people and what might be a book fair or exhibition.

Introduction: little exercise

Introduction: little exercise

- Perform an interview,
sitting back to back
 - How does your living room look like?
 - Draw a picture



A close-up photograph of a woman with dark brown hair and glasses, resting her chin on her hand and looking thoughtfully at the camera.

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”

Because

- Designing an information system without knowing customers' organization operations (business processes) is a recipe for **failure**
- A technically correct product can be developed, but it will not succeed because of being **useless** for their users

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 (development) phase



Why Not Requirements Gathering?

Requirements Gathering



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

Requirements Elicitation



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

versus

Elicitation problems (1)

Selfstudy

- Requirements elicitation is mainly a *social*, more than technological, activity
- The nature of the usual problems are therefore *psychological* and *social*, more than technical



Elicitation problems (2)

Selfstudy

- **Articulation problems**

- Difficulty to express needs clearly
- Not being aware of own needs
- Not understanding how technology can help
- Being afraid of appearing incompetent for technological ignorance
- Not taking decisions because of not being able neither to foresee the consequences, nor to understand the alternatives, nor to have a global vision
- Not listening to customers & users properly

Elicitation problems (3)

Selfstudy

- **Communication problems**
 - Different culture and vocabulary
 - Different interests on the system to be developed
 - Inappropriate communication media (i.e. diagrams that customers & users do not understand)
 - Personal or political conflicts
- **Cognitive limitations**
 - Not understanding the problem domain
 - Making assumptions about the problem domain
 - Making assumptions about technological aspects
 - Excessive simplifications

Elicitation problems (4)

Selfstudy

- **Human behavior**
 - Conflicts and ambiguities about stakeholders' roles
 - Indifference of customers, users or requirements engineers
 - Being afraid becoming unemployed because of new system
- **Technical problems**
 - Problem domain complexity
 - Requirements complexity
 - Changing requirements, the more you see, the more you need
 - Changes in hardware and software
 - Multiple requirements sources
 - Unclear information sources

Eliciting Requirements

Driven by:

- The system context
 - Context diagram
 - BUC model & description
 - Domain model
- 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 documents, branch / organisation specific documentation, from preceding/current systems (requirements docs, designs, CR's), etc.



Eliciting Reqs - Existing documents

- Documents – 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



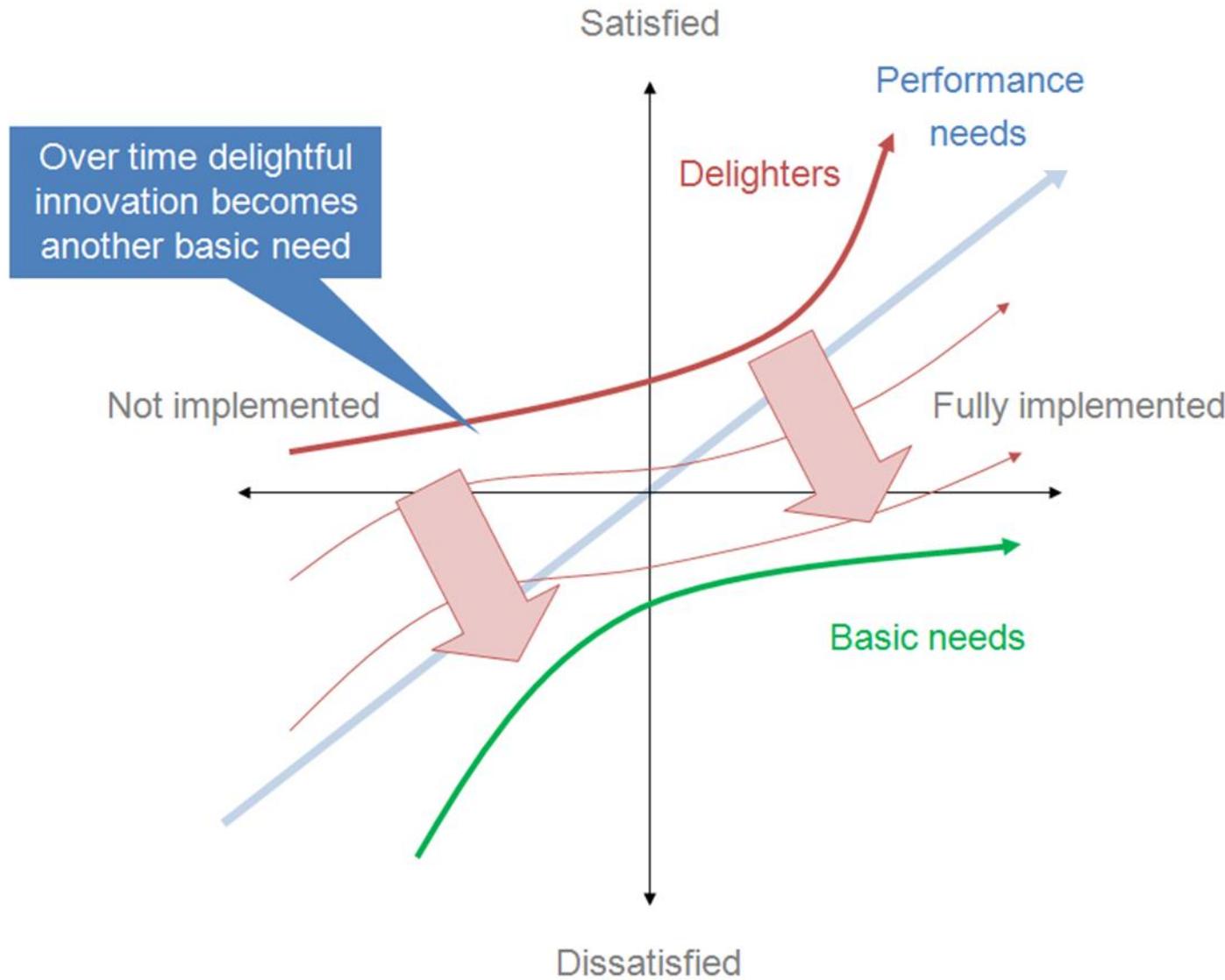
A close-up photograph of a woman with dark hair and glasses, resting her chin on her hand and looking thoughtfully at the camera.

Requirements Elicitation – Kano Model

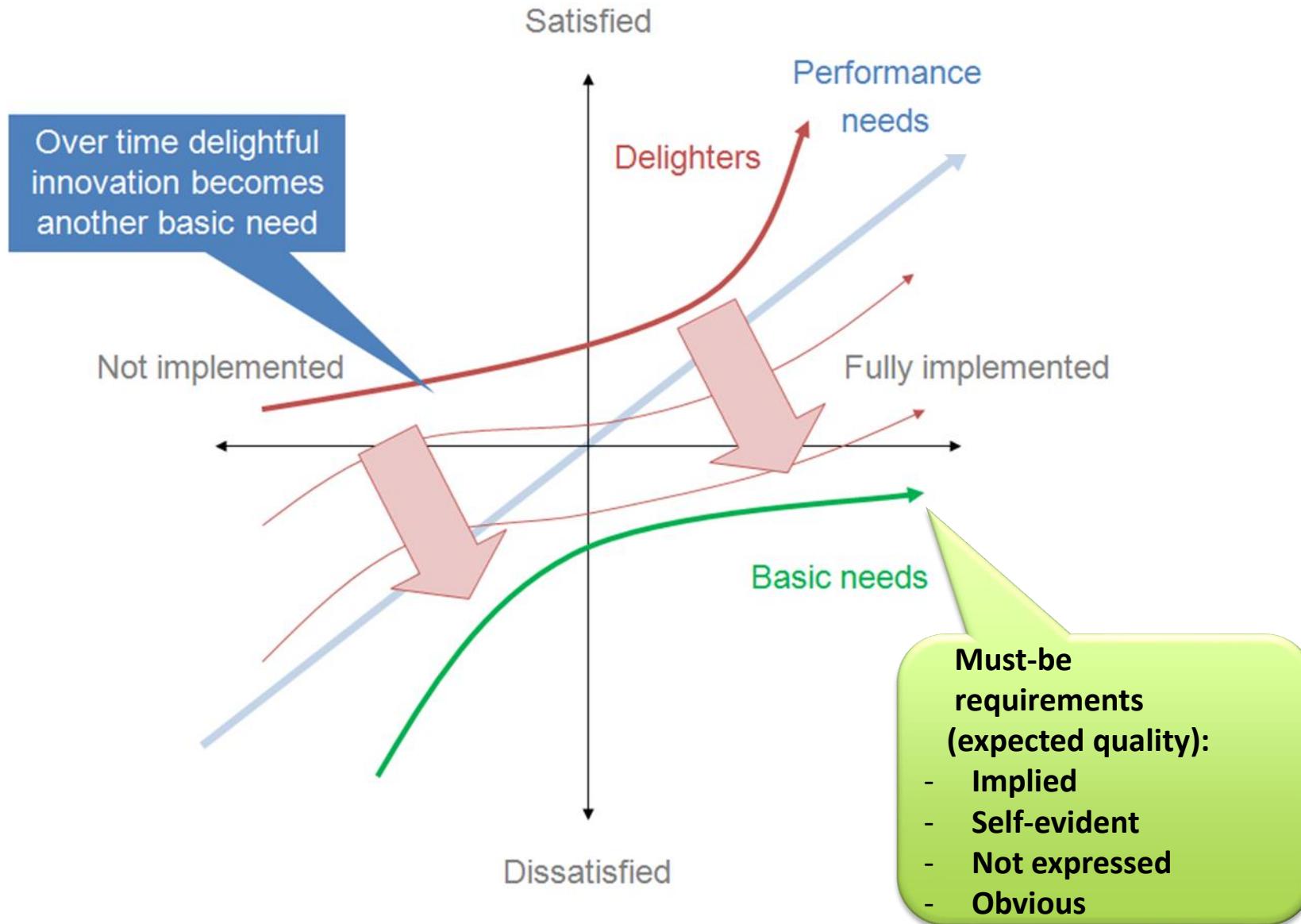
Categorization of Requirements

- 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, pdf file:
“... What Delights Your Customers - Use the Kano Model to Find Out ...”

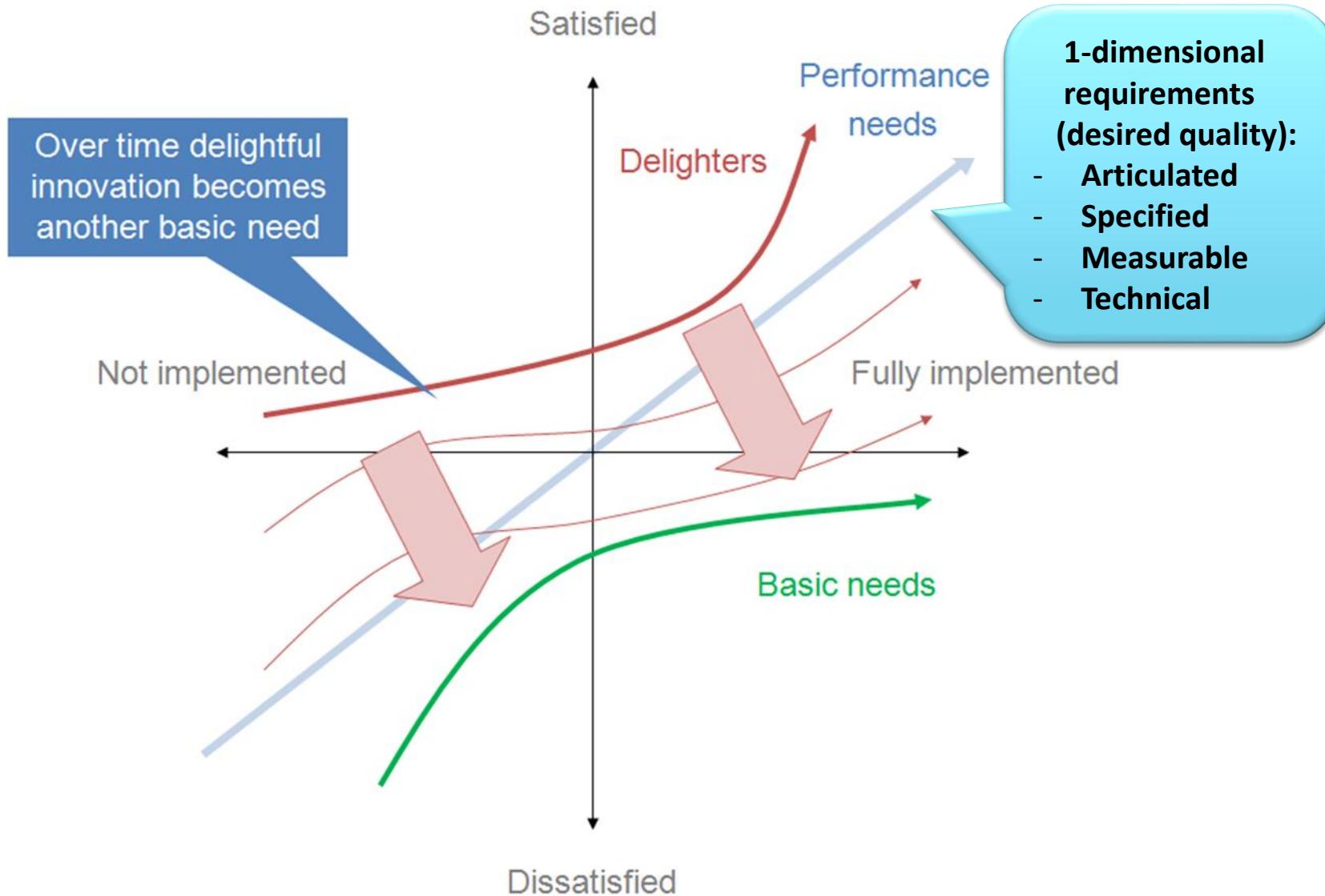
Kano Model – What? (1)



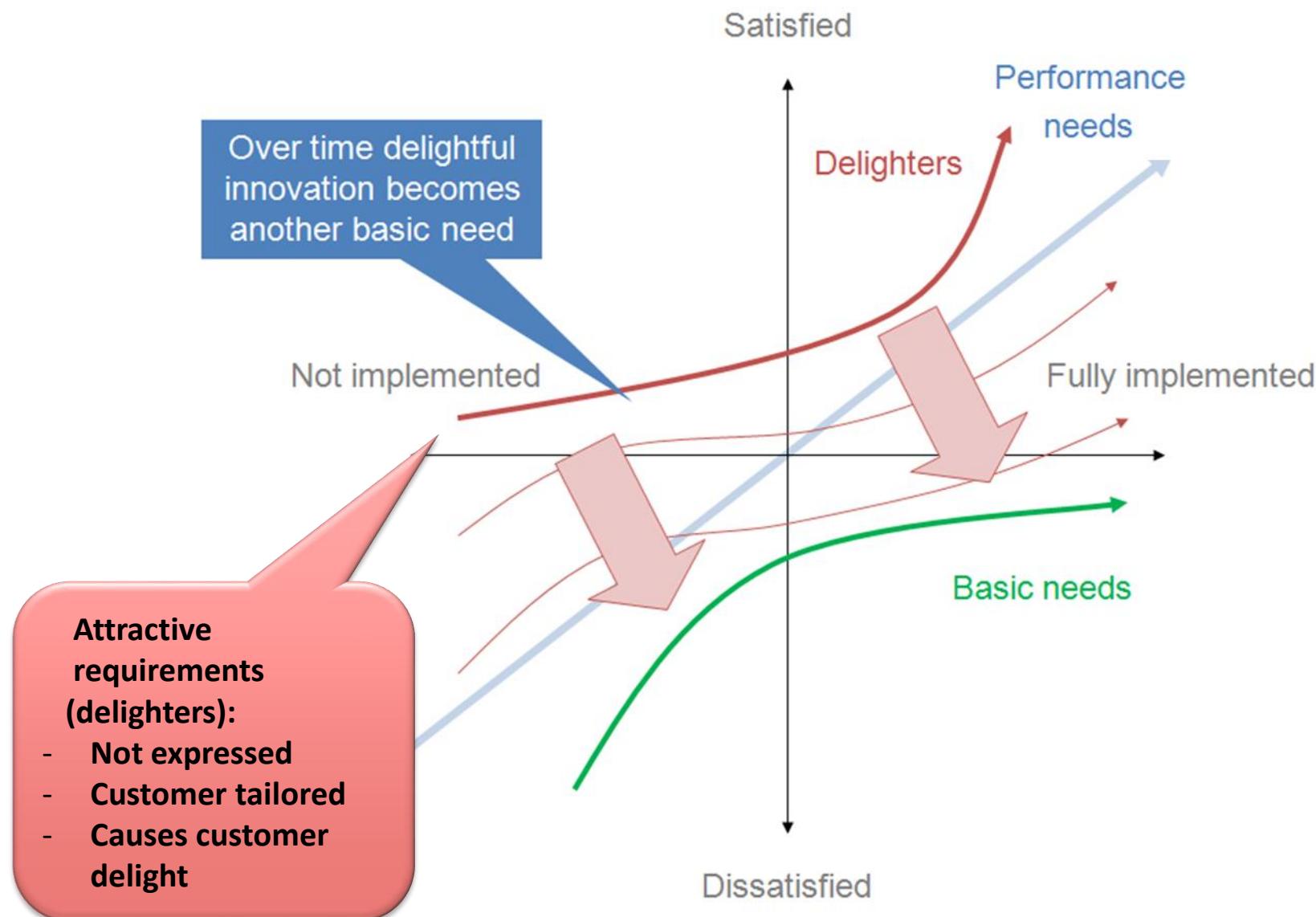
Kano Model – What? (2)



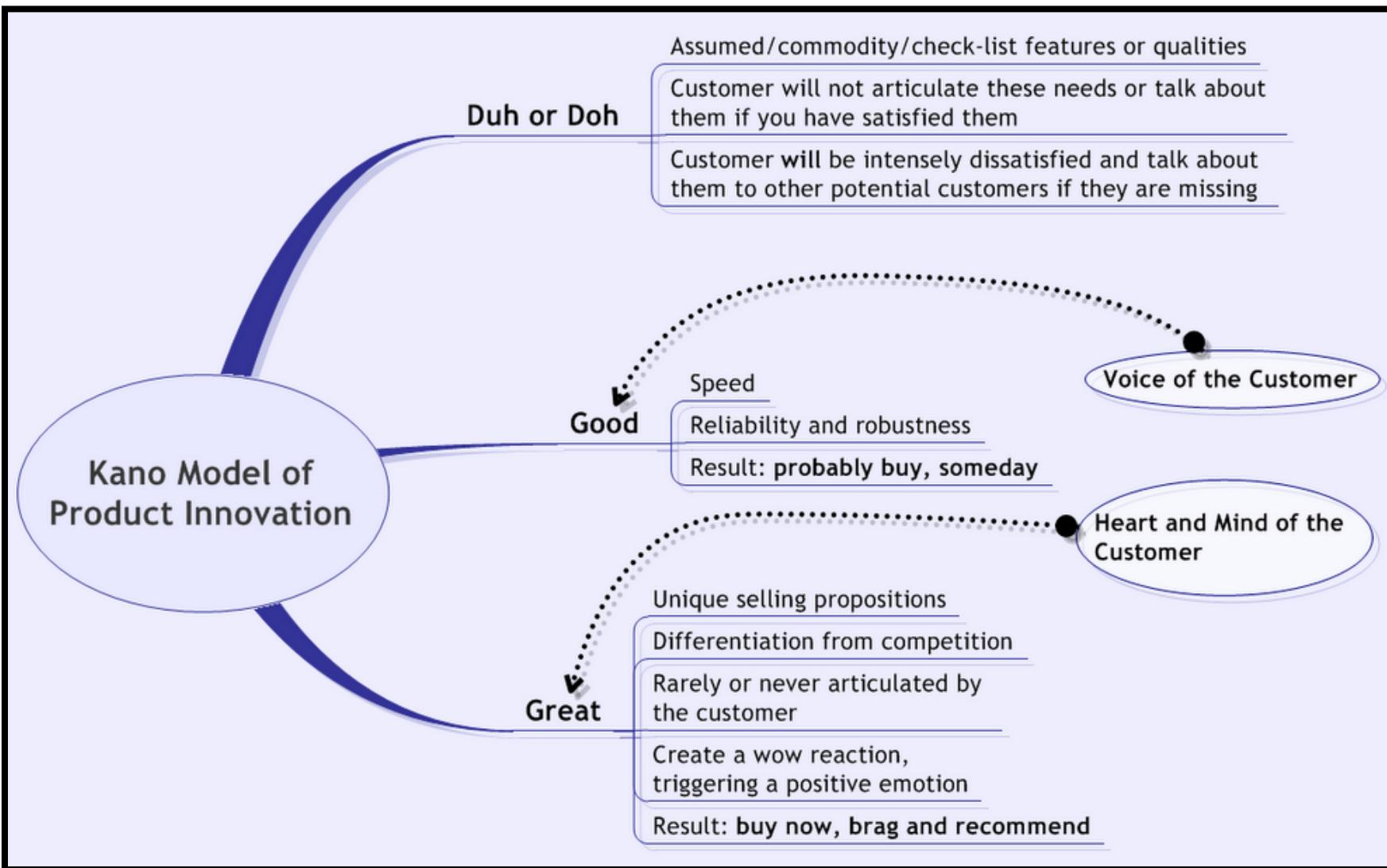
Kano Model – What? (3)



Kano Model – What? (4)



Kano Model – What? (5)



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

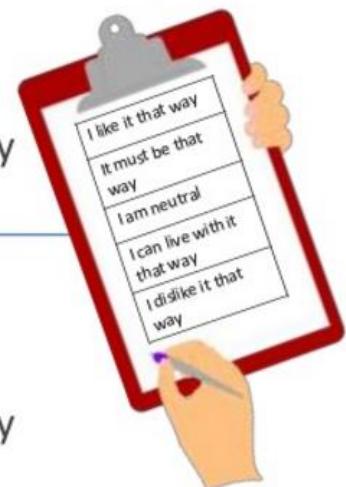
If you have to wait for more than 2 minutes before the customer service rep answers your call, how do you feel?

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

www.xserve.in

contact@xserve.in



Kano Model – Evaluation Table

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



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 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

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
 - Elaborate a questionnaire (functional and dysfunctional form) for the following features
 - Fill out the questionnaire for each team member
 - Evaluate the questionnaire
 - Create the table of results for your team
 - Use excel “Kano Model” spreadsheet on Blackboard



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 (PE !!!)

- PE assignment: based on the information about elicitation techniques:
 - Reader, blended learning materials on BB, the Kano model, this presentation, other ...
- Prepare in MS Word,
 1. A list of elicitation techniques you will use within your team. Explain why.
 2. A list of interview questions
 3. A survey with different kinds of questions you can choose a tool

Remark: the result of these 3 questions need to be added in Confluence as annex later in the project



Requirements Elicitation Techniques (1)



© Scott Adams, Inc./Dist. by UFS, Inc.

Requirements Elicitation Techniques (2)

- 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
 - ...



Requirements Elicitation Techniques (3)

- 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 ...

Requirements Elicitation Techniques (4)

- 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
 - E.g. use glossary of terms
 - 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 (5)

- Avoid culturally biased questions
- Example
 - Interviewer: “Where is your mother?”
“What does your mother do?”
 - Interviewee: “She’s dead”
 - Interviewer: “Ah, she’s dead ...
“OK, euhm good, next question ...”

Interviews (6)

- Open Item
 - question in which interviewee can decide what to say and how to say it
- Example
 - Interviewer: “What do you think about the proposal that ... ?”

Interviews (7)

- Questions should **not** be **complex** and confusing, nor should they ask more than one thing at a time
- Example
 - Interviewer: “Would you prefer a short, non-award course (3, 4 or 5 sessions) with part-day release (e.g. Wednesday afternoon) and one evening per week attendance with financial reimbursement for travel or a longer, non-award course (6, 7 or 8 sessions) with full day release, or the whole course designed on part-time release without evening attendance?

Interviews (10)

- Can be conducted



Interviews (11)

- Strengths and weaknesses of tape-recording and note-taking

Instruments	Strengths	Weaknesses
Tape recording	<ul style="list-style-type: none">Preserves actual languageNaturalisticObjective recordInterviewer's contributions recordedData can be reanalyzed after the event	<ul style="list-style-type: none">Possibility of data overloadTime-consuming to transcribeContext not recordedPresence of machine off puttingCore issues masked by irrelevancies
Note taking	<ul style="list-style-type: none">Central issues/ facts recordedContext can be recordedEconomicalOff record statements not recorded	<ul style="list-style-type: none">Recorder biasActual linguistic data not recordedEncoding may interfere with interviewStatus of data may be questioned

Interviews (12)

- 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 2 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/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)
 - So combine advantages of the 2 types of questions

Survey/Questionnaires (3)

- Similar to structured interviews especially the closed-ended items
- Can be broadcasted or analyzed easily with the help of technology → tool support
- Avoid ambiguous and unclear questions

Survey/Questionnaires (4)

- Consider the following questions and determine which **quality attributes** are influenced by the answers?
 - Cf. ISO 25010

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 (5)

2. Does the system have 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 (6)

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



Survey/Questionnaires – Examples (7)

- Yes/No questions

6. Within the life-cycle, do/did you do any prototyping?

- Yes
- No

If your answer is No, please go to question 8

- Rating scales

16. The following statements are indicators for Software Quality and Software Productivity. Please rate these statements by clicking one box with the following scales

Software Quality and Productivity	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree	Not Applicable
Capabilities of the finished product fitted well with customer or user needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End-users found the finished product was easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project costs were within budget estimates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The duration of the project was within schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey/Questionnaires – Examples (8)

- Numerical scales

#	Question	Survey Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree				
1	I have easy access to the supplies and equipment I need to do my work on this unit.	1	2	3	4	5
2	The support services to this unit respond in a timely way.	1	2	3	4	5

- Guided items

2. What is most important to you in customer service?

- Patience
- Chat service
- Speed and reaction
- Other

Survey/Questionnaires – Examples (9)

- Structured items

*If there was 1 thing that would have convinced you to upgrade your [Product Name] account, what would it be?

*We all have something we can change, if there was one thing you would change about [Product Name], what would it be?

*If you were the CEO of [Product Name], what would you do to make it better?

Survey/Questionnaires – Examples (10)

- Multiple choice items

Multiple Choice

1. Would you recommend Opinio to other users in your business?

Yes, absolutely
 Possibly
 No, not at this time

2. Which of the following Opinio features did you find most useful?

The flexible questionnaire design
 The skip logic functionality
 The email invitation functions
 The reporting module
 The possibility of multilingual surveys
 Other

Finish

Survey/Questionnaires – Examples (11)

- Rank order items

Note the things you found most difficult about completing this writing exercise.
(Indicate 1 for the most difficult and 5 for the least difficult)

Finding a topic

Researching the information

Making a plan or outline

Deciding where different information should go

Developing the arguments

- Open items

1. Please give a short description of new features you would like to see:

One thing I would like to see is |

Finish

Survey/Questionnaires – Reminder (12)

- Questionnaires must be:
 - Constructed
 - Piloted
 - Administered
 - Before collating and interpreting the responses

Requirements Elicitation Techniques (5)

- 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 ...

Brainstorming (1)

- Requirements gathering is invention
- Start with a well-defined, open ended statement of the problem (e.g. context diagram)
- Objective of brainstorming is to be as imaginative as possible, and so generate as many ideas as possible
- List, discuss and group the ideas
 - Initially five items and then discuss, next round ...
- Check the ideas with the project scope
- Later turn them into requirements
- Think about a moderator / facilitator (usually the BA)

Brainstorming (2)

- Watch group size! (ideally 6-8)
- Produce numerous new ideas
- Record an a list visible to everyone
- Be creative, anything is possible!
- Establish criteria for rating the ideas at the end
- Group should agree to avoid debating or discussing and new ideas during brainstorming
- Rate the ideas and distribute the final list
- Can be fun, productive, and motivating



Brainstorming (3) – simple rules

- Wide range of disciplines and experience
- Write every idea down (a piece of paper is never big enough!), without censoring: any idea is a good one!
- Piggyback on each others' ideas
→ do not allow criticism
- Suspend judgment and evaluation
- Define subgroups to elaborate on a subject
- Use a separate section for project issues
- Set a time limit

Change of Perspective (1)

- Adopt different (extreme) point of views
- Thinking out of the box
- For stakeholders that are stuck with their way of thinking
- E.g. Six Thinking Hats of De Bono
 - six different point of views



White Hat

- ✓ Objective
- ✓ Facts

Green Hat

- ✓ Creative
- ✓ Ideas

Yellow Hat

- ✓ Positive
- ✓ Benefits

Black Hat

- ✓ Negative
- ✓ Criticisms

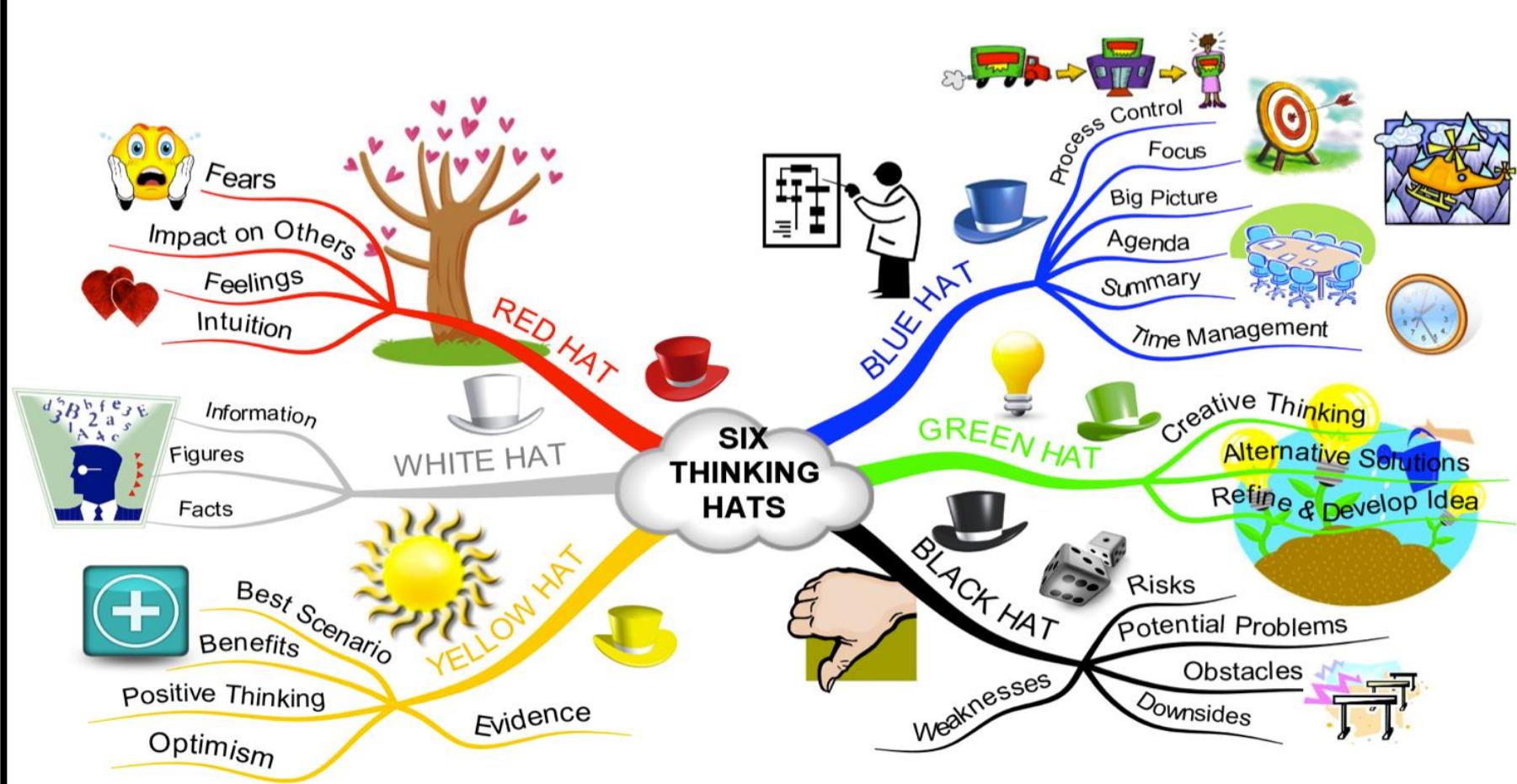
Red Hat

- ✓ Emotional
- ✓ Reactions

Blue Hat

- ✓ Rational
- ✓ Conclusions

Change of Perspective (2)



Requirements Elicitation Techniques (6)

- 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 ...

Apprenticing

- Actually learning & performing current tasks under instruction and supervision of experienced user
- The analyst is taught the operations and business processes by observing, asking questions, and physically doing, rather than being informed of them
- Similar to Role Playing but more involved
- Is very useful where the analyst is inexperienced with the domain, and when the users have difficulty in explaining their actions
- This technique of “Emersion” goes one step further whereby the analyst becomes actively involved in the real life activities of the business



Field observation



- Field observation: study the current situation
- Understanding what we seek to change
- Current system contains many of the needed requirements - often implicit requirements
- Ask “What is right with this system?”
- Draw a model of the current system
- Practice apprenticing “Nobody can talk better about what they do, and why they do it, than they can while in the middle of doing it”



Observation

- Passive/ Invisible:
 - Shadow system users as they do their work
 - Observe silently before asking questions
- Active/visible:
 - Have the user explain what he/she is doing
 - Take detailed notes
- You are learning, so be precise
 - Pay attention to terminology
 - Use the interviewee's terminology
 - Identify synonyms
 - Create a glossary

Observation

- Study a stakeholder's work environment
 - Good when documenting current or changing processes
 - Passive/Invisible
 - observer does not ask questions
 - takes notes
 - generally stays out of the way
- Active/Visible
- dialog with the user
- while they are performing their work
- May be disruptive
- May be time consuming
- May not observe all possible scenarios



Requirements Elicitation Techniques (7)

- 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 ...

System archaeology

- Study of poorly documented or undocumented legacy software implementations
- Includes reverse engineering of software modules, and application of variety of tools and processes for extracting and understanding program structure and recovering design information
- Get information from the documentation and/or implementation of the preceding/ current system



Perspective based reading

- Reading from a specific perspective / point of view, e.g. as a tester or as a developer, to get a more focused analysis of the system
- Each role has scenarios that include questions and activities that tell the reader how to review



Reuse of requirements (1)

- To accelerate time to market & cut development costs, many product teams take requirements written for similar projects and reuse them for a new project
- Allows teams to achieve their time- and cost-saving goals without sacrificing product quality



Reuse of requirements - 6 best practices (2)

1. Document the requirements

- Requirements need to be documented somewhere
- Create separate, searchable repository for reusable requirements, and start building a pool of good candidates to use for future projects

2. Tune up existing requirements

- Unlikely reusing any requirements from past projects without making a few changes
- Examine inventory of existing requirements to how they'll need to be tweaked to become reusable
- Make sure they have the necessary information, such as how exceptions should be handled

Reuse of requirements - 6 best practices (3)

3. Write domain-agnostic requirements

- Requirement too domain-specific → probably not reusable
- Try to keep requirement generic enough so it can apply to many systems
- Don't go too far: if requirement too generic, you won't save much effort because details for the next project to be filled in
- It's a fine line to walk: it can take more effort to write reusable requirements

Reuse of requirements - 6 best practices (4)

4. Avoid excessive granularity

- Answer to generic requirements → document details separately
- Unfortunately → more work in the long run, not less
- The sheer number of requirements made testing a nightmare. Test cases took forever to write, and traceability became impossible to manage

Reuse of requirements - 6 best practices (5)

5. Develop a pattern

- Requirements pattern can help to write highly reusable requirements → cf. requirements in Natural language
- Patterns help to keep critical information from being overlooked
- To write reusable requirements faster and easier
- Requirement pattern can contain background information, advice, or links to other resources

Reuse of requirements - 6 best practices (6)

6. Link the dependencies

- Some requirements need to be reused together.
 - Either they depend on another requirement to work, or they have a requirement (or several) that depends on it to work.
- To ensure dependent requirements don't get missed during reuse, establish links and make the dependents traceable to each other
- Most requirements management tools have ability to link related items, either at the individual requirement level or at the document level
- Document-level links don't provide enough traceability to be very useful, however. If possible, use a requirements management solution that links at the requirement level

Existing Document Analysis – Extra (1)

- Collect hard data and become the expert
 - Analyze forms, Invoices, samples of reports
 - Document details into requirements format
- Important things you want to know:
 - What is used, not used, or missing
 - What works well, what does not work
 - How the system is used (frequency/importance)
 - How it was supposed to be used
 - How would they like to use it

Existing Document Analysis – Extra (2)

- Elicit information from existing documentation
- Helpful when subject matter experts are not available or no longer with the organization
- Use relevant documentation to study and understand relevant details
- business plans, project charters, business rules, contracts, statements of work, memos, emails, training materials, etc



Interface Analysis – Extra (3)

- Interface Types:
 - User Interfaces
 - Reports provided to the user
 - Interfaces to and from external applications
 - Interfaces to and from external hardware devices
- Early identification of interfaces uncovers stakeholders and provides a framework for subsequent analysis of the detailed requirements
- Does not provide insight into other aspects of the solution because you can not see components

Interface Analysis – Extra (4)

- Identify interfaces between solutions and define requirements for them
 - A basis for successful interoperability
 - Clarify boundaries of the applications
 - Identify interfacing stakeholders
 - Define the inputs and outputs of the interface
 - plus validation rules
 - and events that trigger the interactions
- Some types of interfaces
 - to/from external applications
 - to/from internal applications
 - to/from external hardware devices



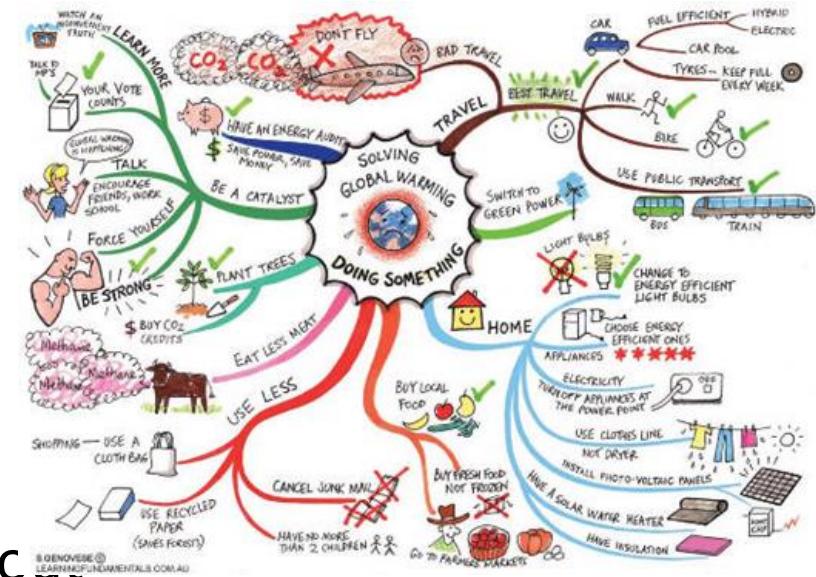
Requirements Elicitation Techniques (8)

- 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 ...

Mind mapping

- Mind maps to explore ideas
- Useful devices to organise your thoughts
- You see the links between the various aspects of the product that have been told about
- Useful during interviewing users and stakeholders and brainstorming
- Improve sharing of thoughts and knowledge
- Lots of tooling available
 - FreeMind, XMind, Pimki (all freeware)



Requirements Workshops (1)

- Effective use of group dynamics
 - Facilitated and directed group sessions to get common understanding and universal buy-in
- Use of visual aids
 - To enhance understanding, e.g., props, prepared diagrams
- Defined process
 - I.e., not a random hodgepodge
- Standardized forms for documenting results
- Preparation
 - Pre-session Planning
 - Pre-work
- Working Session
- Summary
 - Follow-up
 - Wrap-up

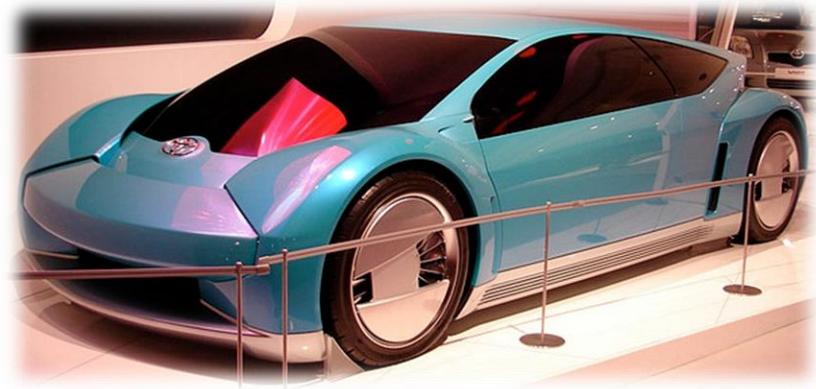
Requirements Workshops (2)

- One the most effective techniques
 - Have an agenda
 - Carefully select attendees
 - Use an experienced, neutral facilitator
 - Use a scribe (not the facilitator)
 - One or a few days in duration
- Elicit information in a short period
 - Too many participants slow it down
 - Too few participants cause gaps
 - Team member availability is an issue
- Combine with other techniques
 - Interviews, Surveys or questionnaires
 - Prototyping for clarity
 - Process modeling for understanding



Prototyping (1)

- For information gathering
- Some requirements are not obvious, or are not fully elaborated yet
- Some users have trouble articulating their desires
- Give users the opportunity to use the requirements
- Restrict the prototypes to most common tasks
- Focus on the product, not the prototype
- Can reduce requirements creep by 10% - 15%



“The truth is hardly ever in the words”

Prototyping (2)

- Visually represent the user interface
 - Good validation measure
 - Great for interaction
 - Supports visual learners
- Focus on the whole solution or just a specific area
- Great for validating requirements and uncovering gaps
- ***Can take lots of time if bogged down in the “hows” instead of the “whats”***

Prototyping (3)

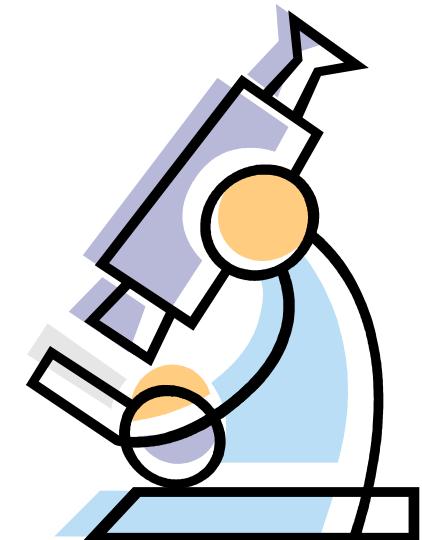
- A software requirements prototype is a mock-up or partial implementation of a software system
 - Models a wide or sometimes deep view of system functionality
 - Helps developers, users, and customers understand the requirements
 - Helps clarify and complete solution requirements
 - Helps find new functionalities, discuss usability, and establish priorities
- Prototyping is effective in resolving uncertainties early in the development process
 - Focus on functionality that is complex or difficult to understand
 - Encourages user participation and mutual understanding
 - A Storyboard portrays the navigation paths across interfaces
 - Screen prototypes elicit data attributes, selection criteria, & business rules
 - Apply organizational guidelines, style guides and design requirements

Focus Groups (1)

- A focus group should meet in the same room
- A focus group is a means to elicit ideas and perceptions about a specific product or service
- A skilled moderator manages the group discussion
- The work is similar to a brainstorming session but more structured, ideas are listed, categorized and then later reviewed and ranked for value.
- A focus group can be utilized during any cycle of the project: exploratory, development, ready-to-launch, production pilot.

Focus Groups (2)

- Elicit information from a select group via a moderator
 - Very formal process
 - More structured
 - Usually has 6-12 attendees
- Requires a skilled moderator
 - Promotes discussion
 - Asks open questions
 - Engages all members
 - Remains neutral
- Saves time and cost from not conducting many individual interviews

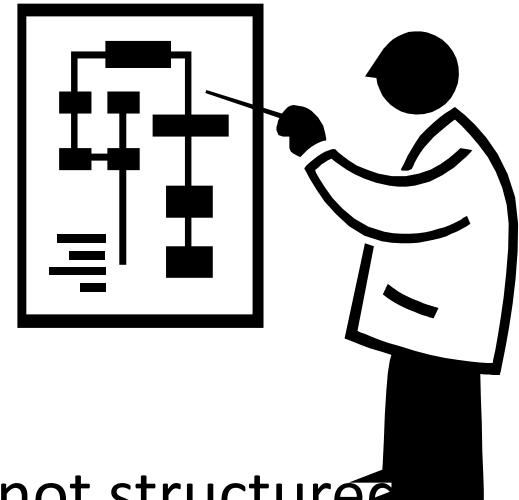


Focus Groups – Interviews (3)

- Structured small group interviews
- An inexpensive, rapid technique
- “Focused” in two ways.
 - First, the interviewees are similar in some ways
 - Second, its aim is to gather information about a particular topic guided by a set of focused questions.
- Participants hear and interact with each other and the leader
- A facilitator guides 7 to 11 people in a discussion of their experiences, feelings, and preferences about a topic
- http://www.youtube.com/watch?v=s_TnX_AUUP0&feature=related

Process Modeling

- Understand work with multiple steps, roles, or departments
 - Initiated by an event
 - Activities to include
 - Manual
 - Automated
 - Combination of both
 - Visual nature may help some people
- Can become complex and unwieldy if not structured carefully
- Complex processes should be broken into their components to aid in understanding



Cf. OLOD BPM – 3SWM

Quiz questions

- Quiz questions about:
 3. Requirements Elicitation



Quiz questions

3.1 What is the best description of a stakeholder?

- A Any person who has an interest in the product and therefore has requirements for it;
- B The person who pays for the development of the product, or who has organisational responsibility for the project;
- C Any persons and/or systems that interact with a product use case;
- D Any person that buys the product;
- E Any person who has responsibility for producing the requirements specification;
- F Any person or system that manipulates the product.

Quiz questions

3.2 Which of the following answers can be used as sources from which requirements can be obtained? (more than one option possible)

- A User manual of a predecessor system being replaced;
- B Standards and specifications, including company policies;
- C Domain specific documentation;
- D Stakeholders;
- E Systems of the competition.

Quiz questions

3.3 According to Kano, requirements can be divided into three categories:

- Basic factors (dissatisfiers)
- Performance factors (satisfiers)
- Excitement factors (delighters)

Which of the following statements are TRUE/FALSE?

True False

- The customer regards performance factors as prerequisites and takes these for granted;
- Excitement factors are factors that increase customer satisfaction if delivered but do not cause dissatisfaction if they are not delivered;

Quiz questions

3.3 (continued)

True False

- Standard and basic factors are the minimum requirements which will cause dissatisfaction if they are not fulfilled, but do not cause customer satisfaction if they are fulfilled.;
- Over time, excitement factors can change into performance factors;
- Over time, basic factors can change into performance factors.

Quiz questions

3.4 Which statements are TRUE/FALSE for using prototypes?

True False

- The stakeholders will get a good impression of the maturity of the product;
- Using prototypes may uncover missing functionality;
- Prototypes make it easier to envisage the system;
- Prototypes are often heavily focused on the user interface.

Quiz questions

3.5 Indicate for each of the following techniques whether it is suitable for the elicitation of requirements

	Suitable	Not Suitable
A observation techniques;	<input type="checkbox"/>	<input type="checkbox"/>
B requirements metrics;	<input type="checkbox"/>	<input type="checkbox"/>
C study of existing user manuals;	<input type="checkbox"/>	<input type="checkbox"/>
D workshops.	<input type="checkbox"/>	<input type="checkbox"/>



Key Learning Points

Key Learning Points

- **Various types** of requirements sources
- **Significance** of requirements sources
- Information **to document** about stakeholders
- **Stakeholder rights and duties**
- The **Kano model**
- **Factors that influence** the choice of elicitation techniques
- **Advantages and disadvantages** of selected elicitation techniques
- **Mastering** and using elicitation **techniques**

Questions & answers

