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**CHALMERS**



UNIVERSITY OF GOTHENBURG

# **DIT045 H17 Requirements and User Experience**

## **Elicitation**

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# Requirements Elicitation

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- Where do requirements come from?
  - The users (or other stakeholders)
  - Constraints on the system
- Right, but how do we get them?
  - Ask?
  - “What are your requirements?”
  - ...
  - “What is a requirement?”



# Requirements Elicitation circa 1999 ☺

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- [https://www.youtube.com/watch?v=n3Sle\\_o1bcs](https://www.youtube.com/watch?v=n3Sle_o1bcs)

# Why is Elicitation Difficult

- Thin spread of domain knowledge (Easterbrook)
  - It is rarely available in an explicit form (i.e. not written down)
  - ...distributed across many sources
  - ...with conflicts between knowledge from different sources
- Tacit knowledge (The “say-do” problem)
  - People find it hard to describe knowledge they regularly use
  - Limited Observability
  - The problem owners might be too busy coping with the current system
  - Presence of an observer may change the problem
- Bias
  - People may not be free to tell you what you need to know
  - People may not want to tell you what you need to know
    - The outcome will affect them, so they may try to influence you (hidden agendas)

# Example: Loan Approval

- Loan approval department in a large bank (Easterbrook)
  - The analyst is trying to elicit the rules and procedures for approving a loan
- Why this might be difficult:
  - Implicit knowledge:
    - There is no document in which the rules for approving loans are written down
  - Conflicting information:
    - Different bank staff have different ideas about what the rules are
  - Say-do problem:
    - The loan approval process described to you by the loan approval officers is quite different from your observations of what they actually do
  - Probe effect:
    - The loan approval process used by the officers while you are observing is different from the one they normally use
  - Bias:
    - The loan approval officers fear that your job is to computerize their jobs out of existence, so they are deliberately emphasizing the need for case-by-case discretion (to convince you it has to be done by a human!)

# Stakeholder Identification

(Berenbach et al.)

- Who are the stakeholders that are relevant to the problem?
- “All the relevant stakeholders must be identified if requirements are to be properly defined and prioritized”
- Missing stakeholders means missing requirements, view, goals, qualities, conflicts...
- Wrong stakeholders:
  - Is the expert speaking for the entire organization?
  - Are there differences of opinion regarding functionality or issues that have not been resolved?
  - Are the stakeholders knowledgeable about the domain under discussion?

# “Smart Ignoramus”

(D. Berry, 1995, 2002)

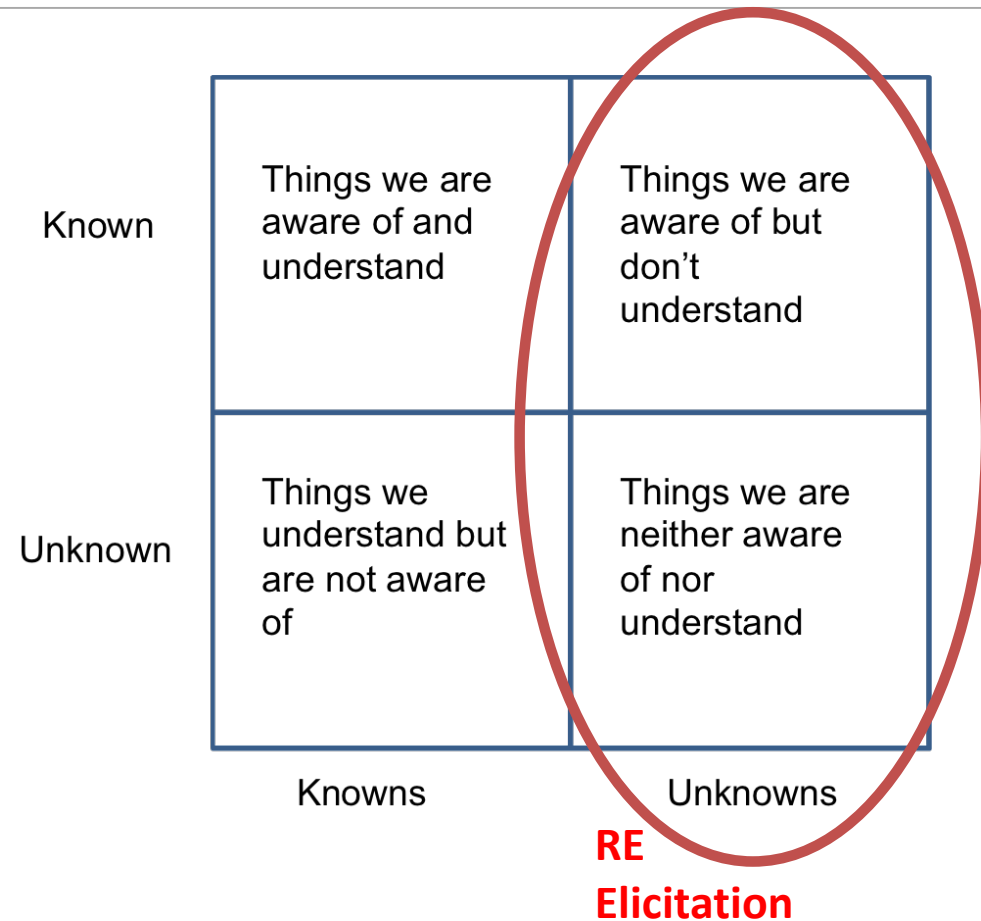
- You want a requirements engineer (systems analyst) who is generally smart, has good tech knowledge, can follow explanations, but who is ignorant of the specific domain
- Smart vs. ignorant:
  - Ask questions which are smart but ignorant (in the domain)
- Examples
  - What do you mean by sales?
  - What is a transaction?
  - Who can submit a report?
  - What is a customer in this context?
  - What do you mean by danger? Error? Failure?
  - What happens when this (normal path) doesn't happen?



# Known and Unknown Unknowns

Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know. And if one looks throughout the history of our country and other free countries, it is the latter category that tend to be the difficult ones.

- United States Secretary of Defense Donald Rumsfeld, 2002



<https://dojo.ministryoftesting.com/lessons/not-sure-about-uncertainty>

# (a selection of) Elicitation Techniques

- **Traditional Techniques** (Easterbrook)
  - Documentation
  - Data Sampling
  - Interviews
  - Surveys/Questionnaires
- **Collaborative Techniques**
  - Focus groups
  - Prototyping
- **Contextual (social) approaches**
  - Participant Observation
  - ...
- **Cognitive techniques**
  - Think aloud protocol
  - ...

# Documentation

- Any paper or electronic documentation used in the system to be modified or replaced:
  - Reports, screens, printouts, forms, instruction manuals, receipts, user documentation, internal documentation....
- Can be used to better understand the current system and the need for a new/modified system
- Benefits
  - Can read on your own time
  - Don't need stakeholder resources
- Drawbacks:
  - May reflect an ideal version of reality
  - May be out of date
  - May have lots of domain-specific vocabulary and be hard to understand

# Example

- (Office Template)

Expense Report		Tailspin Toys 123 South Main Street, Ocean View, MO 12345				EXPENSE REPORT TOTAL				\$1,290.70
Name:	Mike Gragg	Purpose:	Annual Sales Seminar	Mileage Rate:	\$0.50/mile	HOTEL	TRANSPORT/MILEAGE			
Dept:	Sales	Start Date:	4/5/2016	Meal Rate:	\$30.00/day	\$445.00	\$745.70			
Position:	Managing Director	End Date:	4/8/2016	Hotel Rate:	\$200.00/night	MEALS	OTHER			
Manager:	Janine Mendoza	Approved By:	Janine Mendoza			\$75.00	\$25.00			
Date	Account	Description	Hotel	Meals	Transport	Start	End	Mileage	Other	Total
5/4/2017	Sales & Marketing	Drive to airport/flight			\$428.00	11,378.5 mi.	11,456.2 mi.	\$38.85		\$466.85
5/4/2017	Sales & Marketing	Hotel (2 nights)	\$445.00		\$225.00					\$670.00
5/4/2017	Sales & Marketing	Convention Fees							\$25.00	\$25.00
5/4/2017	Sales & Marketing	Meals		\$30.00						\$30.00
5/5/2017	Sales & Marketing	Meals & Taxi		\$30.00	\$15.00					\$45.00
5/6/2017	Sales & Marketing	Meals		\$15.00						\$15.00
5/7/2017	Sales & Marketing	Drive from airport				11,456.2 mi.	11,533.9 mi.	\$38.85		\$38.85

# Example

- [https://support.formtitan.com/faq/formbuilder/How\\_do\\_i\\_use\\_the\\_Paper\\_Form\\_Mapping](https://support.formtitan.com/faq/formbuilder/How_do_i_use_the_Paper_Form_Mapping)

## Field Trips Transportation Authorization Form

The Child's Name \_\_\_\_\_

From Grade \_\_\_\_\_ From Class \_\_\_\_\_

\_\_\_\_\_ I give my permission

\_\_\_\_\_ I do not give my permission

This authorization applies to Field trips transportation of pupils  
from "Fountain" elementary school by "Dan Transport" LTD.

Date \_\_\_\_\_

Parent name \_\_\_\_\_

Parent Signature \_\_\_\_\_

# Data Sampling

- Take a sample of facts and figures (Easterbrook)
  - Forms, invoices, financial information
  - Reports
  - Survey results, marking data
  - Transactions, sales
  - Click data, navigation data
- Sampling – select a representative set from a population
- Sample size
  - Balance between cost of data collection and required significance
- Process:
  - Select data to sample
  - Select population (whole set of possible samples)
  - Sample (pick subset)
  - Choose sample size

# Interviews

- Types of interviews:
  - Structured: strict set of questions
  - Semi-structured: set of questions, but with allowance for divergence
  - Open-ended: no set of questions, open agenda
- Advantages
  - Rich source of data
  - Can probe interesting areas, ask follow-up questions
  - Get individual perspectives
- Disadvantages
  - Hard to analyze large amount of qualitative data
  - No convergence between interviewees
  - Sometimes hard to conduct

# Questionnaires (Surveys)

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- List of set questions, usually conducted online
- (Hopefully) a large number of people fill it out
- Advantages
  - Lots of responses
  - Can have statistical significance
  - Can be used remotely (you don't have to be there)
- Disadvantages
  - Have to be very carefully designed, piloted, proofread
  - If questions are misunderstood, no chance to clarify
  - No chance to ask follow-up questions
  - Broad but shallow
  - Hard to get people to answer, hard to get long answers



# Group Elicitation Techniques

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- **Examples:**
  - Focus groups
  - Creativity Workshops (will cover in next lecture)
- **Advantages:**
  - Interesting discussions and convergent thinking
  - Saves time to talk to many stakeholders at once
- **Disadvantages:**
  - Group think: people tend to follow, not diverge
  - Power dynamics: some may be afraid to speak
  - Some are just quiet, hard to involve everyone

# Group thinking

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# Observation

- Spend time watching the stakeholder perform their daily tasks
  - Can be for a short or long time
  - Longer, more data gathered
- Advantages
  - Maybe see how things are really done (see things people won't tell you)
  - Really get to know the working environment
  - Spent time, maybe gain trust?
- Disadvantages
  - Takes a lot of time
  - Bias: observer may act differently when being observed
  - May not be possible

# Agile Elicitation

- Work very closely with stakeholder
- A stakeholder is part of your team
- They write the user stories
- Are available for conversations to flesh out user stories
- Benefits:
  - Frequent feedback
  - Joint ownership of requirements and development process
    - “we” are doing this
- Challenges:
  - In really your stakeholders are often too busy to do this
  - What if you get the wrong stakeholder? Can one speak for many?

# Models as Elicitation Technique

- All the models we draw can be used for elicitation
  - Show completed models to the stakeholder, walk them through them
  - Create the model interactively with the stakeholders, ask them questions
- Advantages
  - Find gaps in knowledge
  - Makes tacit knowledge explicit
  - (When done collaboratively) stakeholders “own” the models, are more comfortable with them
- Disadvantages
  - Stakeholders have to learn some of the modeling language
  - Time consuming
  - Maybe hard to convert to model to requirements
  - Not everyone likes models ☺ Some people think visually, some do not.

# Social Media

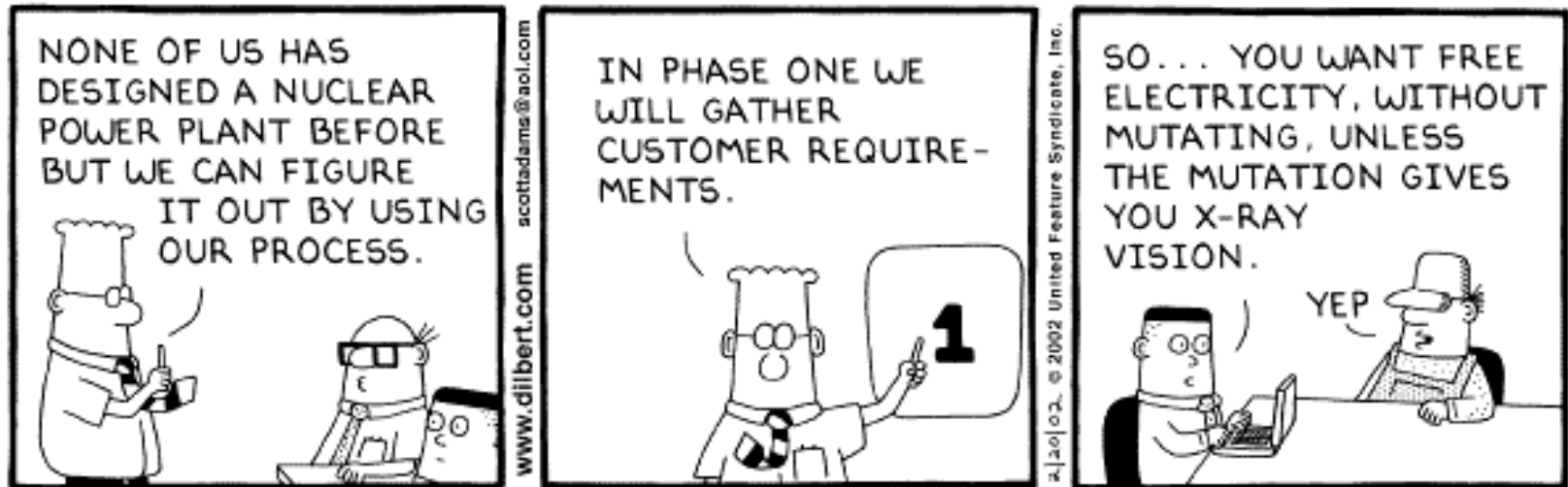
- Mine requirements from:
  - Tweets
  - Facebook posts
  - Discussion forums
  - Reviews, etc.
- Can also mine sentiment (do they like it? Are they happy?)
- Advantages
  - Much available data
  - Easy access to user opinions
- Disadvantages
  - Computational linguistic techniques still imperfect, can get data with a certain degree of accuracy
  - Users may not be representative
  - Hard to follow-up with feedback questions

# Reading

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- Sutcliffe, Alistair, and Pete Sawyer. "Requirements elicitation: Towards the unknown unknowns." *Requirements Engineering Conference (RE), 2013 21st IEEE International*. IEEE, 2013.
- In GUL

# Questions?



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# Sources

- Easterbrook, Eliciting Requirements  
<http://www.cs.toronto.edu/~sme/CSC340F/slides/07-elicitation.pdf> (Slides)
- Sutcliffe, Alistair, and Pete Sawyer.  
"Requirements elicitation: Towards the unknown unknowns." *Requirements Engineering Conference (RE), 2013 21st IEEE International*. IEEE, 2013.
- Berry, Daniel M. "The importance of ignorance in requirements engineering." *Journal of Systems and Software* 28.2 (1995): 179-184.

