Req Elicitation, Documenting Reqs, NatLang Reqs

Lecture 3, DAT230, Requirements Engineering
Robert Feldt, 2012-09-11

Recap

- SWEBOK gives overview of SE field
  - Good for newcomers and if you want to refresh
  - At master level: Good idea to directly to original sources; less need for "textbook" interpretations
- Basic RE terminology in SWEBOK KA number 1
- Stakeholder Identification
- Stakeholder analysis: influence & affected, expectations & interests

What is Req Elicitation?

Requirements elicitation

The process of seeking, capturing and consolidating ↑requirements from available ↑requirements sources. May include the re-construction or creation of requirements.

Synonym: Requirements discovery

What is Req Elicitation?

"The art of determining the needs of stakeholders"

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Synonym: Requirements discovery

What is Req Elicitation?

"The art of determining the needs of stakeholders"

"The process of discovering the requirements for a system by communication with stakeholders and through the observation of them in their domain"

Requirements elicitation	The process of seeking, capturing and consolidating ↑requirements from available ↑requirements sources. May include the re-construction or creation of requirements. Synonym: Requirements discovery

General rules for elicitation

- Genuinely care about your stakeholders' problems
- Focus on stakeholder not on you "looking good"
- Be human - admit weaknesses, become vulnerable, show humor
- Listen - eye contact, don't glaze over
- Expect changes
- Maintain a glossary - many req problems from simple misunderstandings/miscommunication

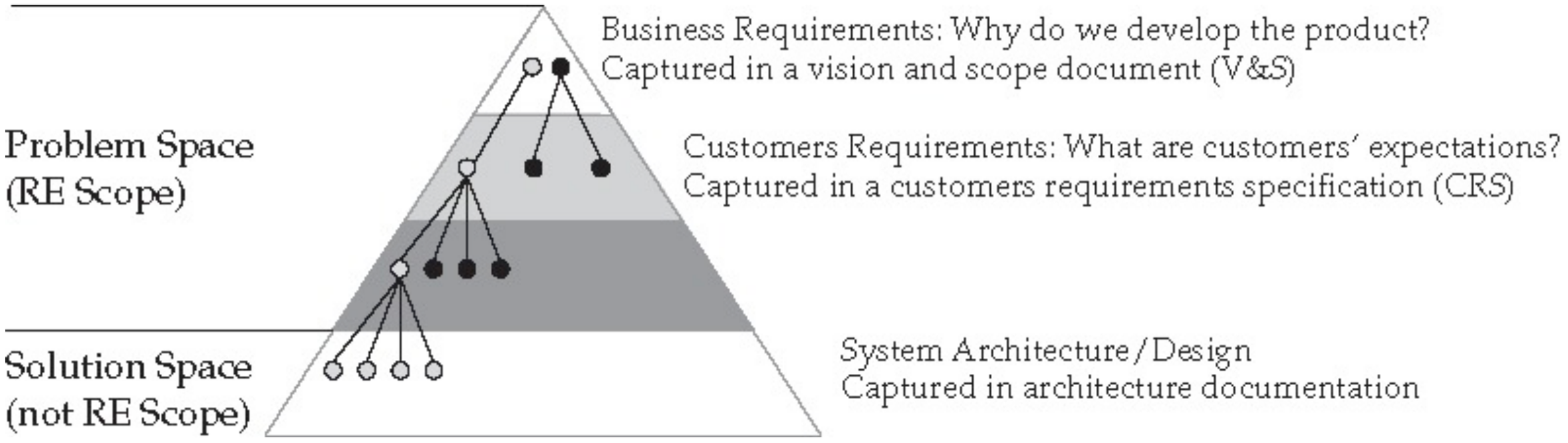
Information to elicit

- Domain description (operating environment)
- Business goals ... Technical goals
- System boundary (“fit into operational environment?”)
- Constraints
- Vocabulary
- Reqs
  - Title, description
  - Rationale, Source, Importance, Benefit, etc...

Different types of elicited reqs

- Discovered: Stakeholder knows req - ReqEng notes it
- Created: ReqEng creates based on own knowledge or only little stakeholder info
- Extracted: ReqEng uses method to find it
- Captured: When verbalized or acknowledged by stakeholder

Differing abstraction levels



Differing abstraction levels

This is an example of two requirements specified on different levels of abstraction and at different levels of detail (i.e. more information is given in the case of Req. 2).

Requirement 1:

TITLE: "Support standardized formats"

DESC: "The system should support standardized formats"

Requirement 2:

ID: "X-11B"

TITLE: "Save output to XML"

DESC: "A user should be able to save output to a file in xml format in order for the data to be exported to the ERP system. Requirement O-7C needs to be implemented before this requirement."

SOURCE: "Kevin Incognito"

Requirements Abstract Model (RAM)

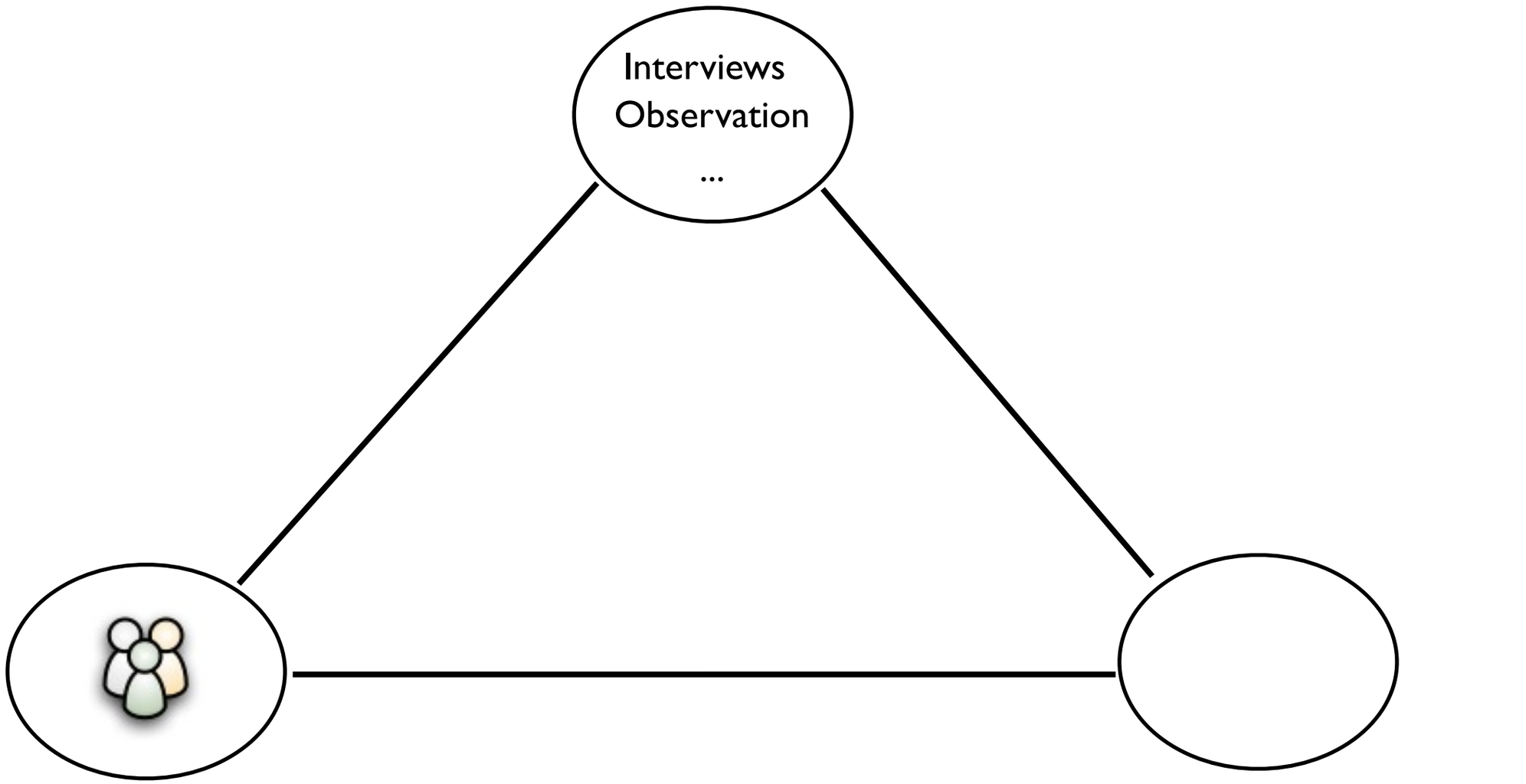
Triangulation

Use multiple things
so that they partly say (and thus supports)
the same conclusions
(or finds the same problems/conflicts)

“things” = methods, info, people,
processes, documents, ...

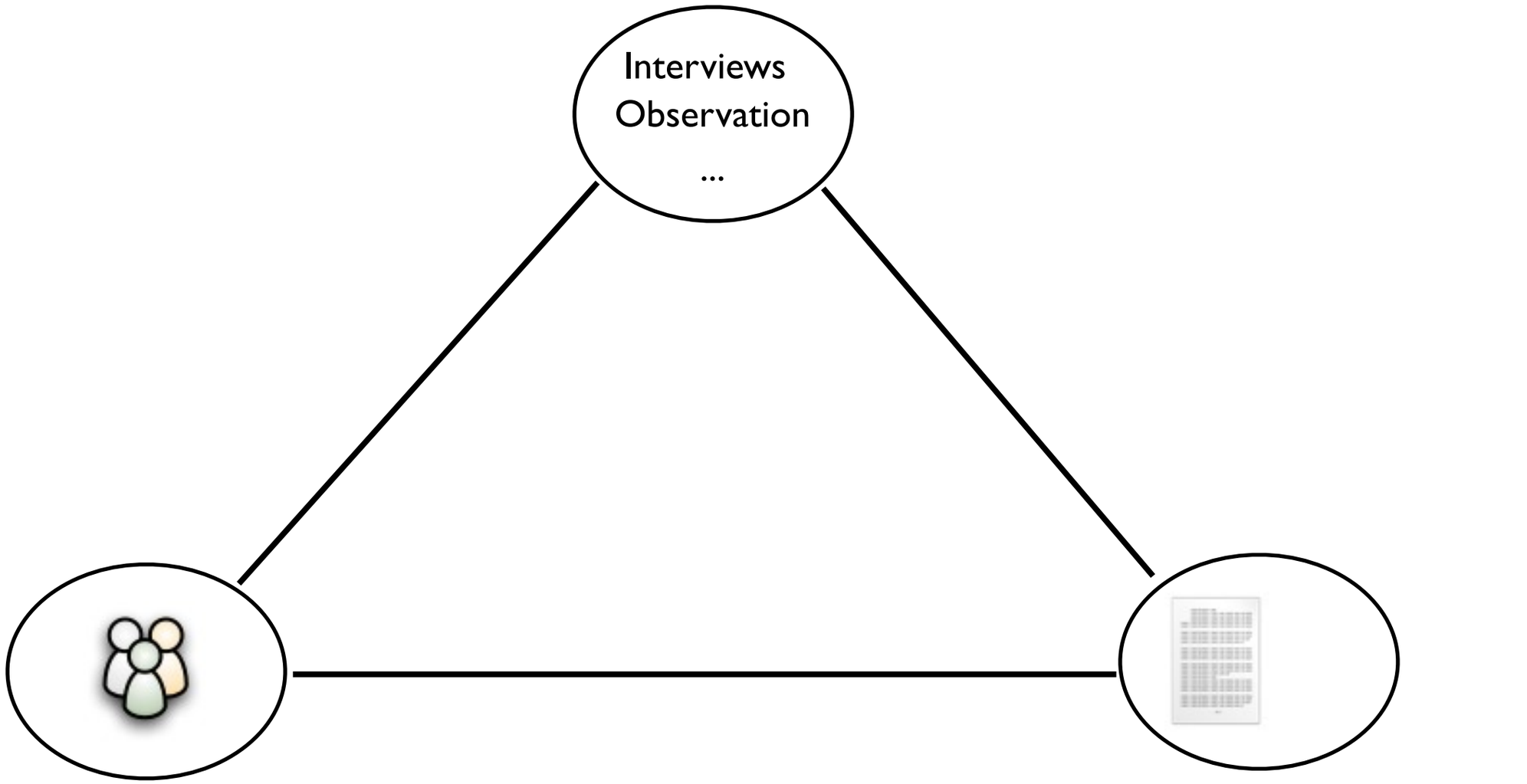
Triangulation

Elicitation Methods



Triangulation

Elicitation Methods



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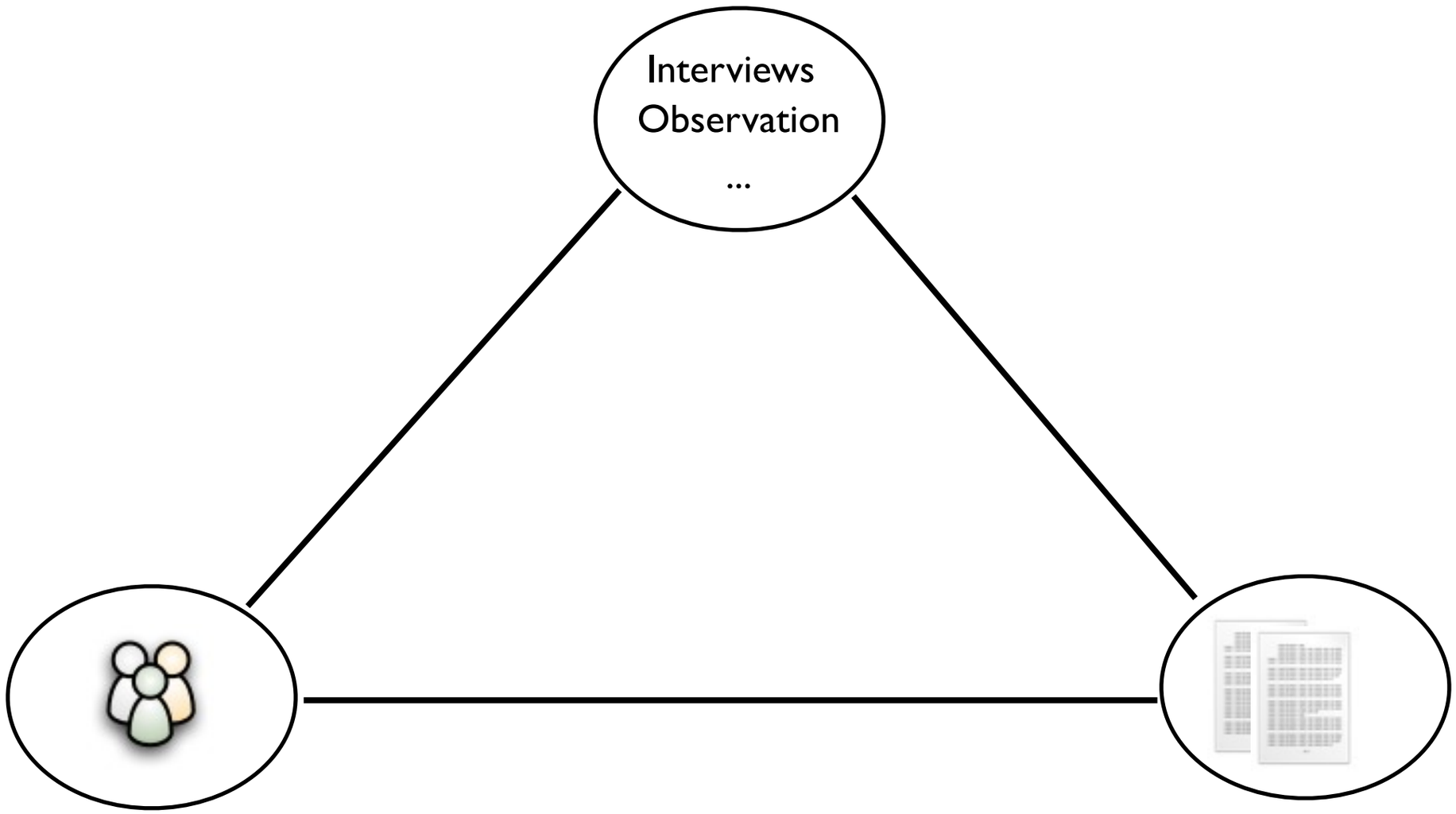

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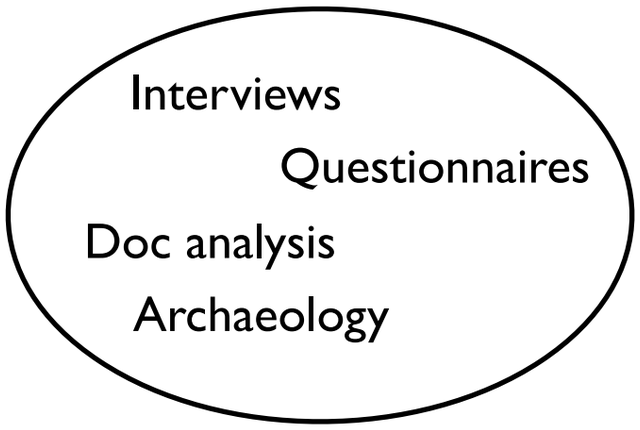
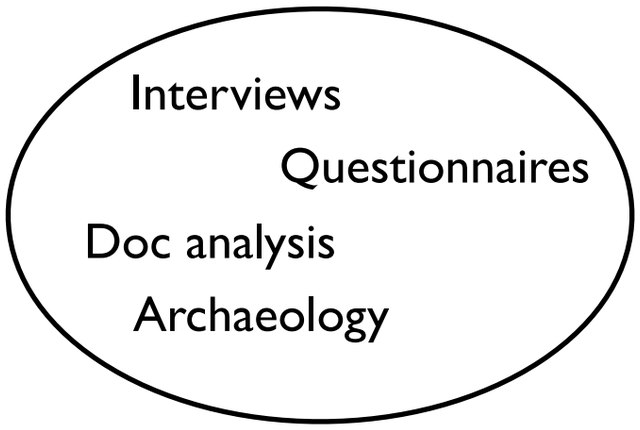


"Traditional"/

Survey

Elicitation methods



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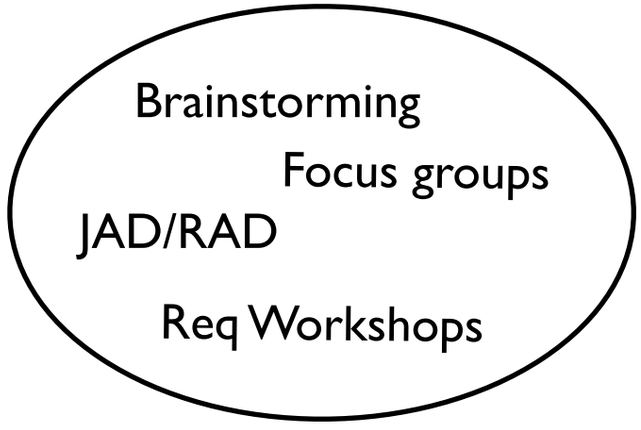
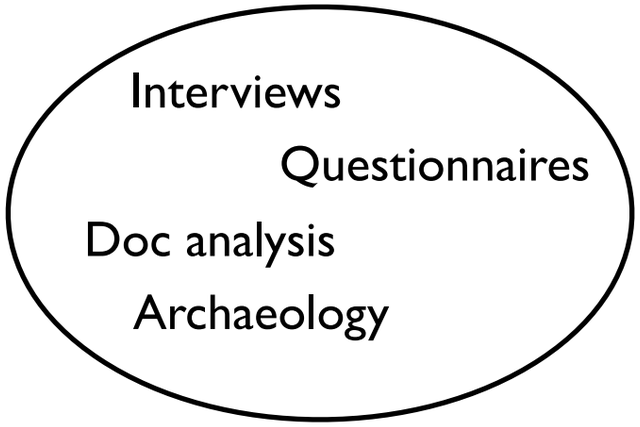


Group-based

Elicitation methods



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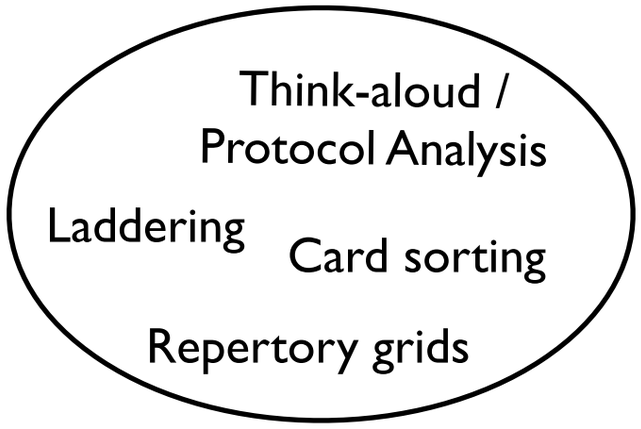
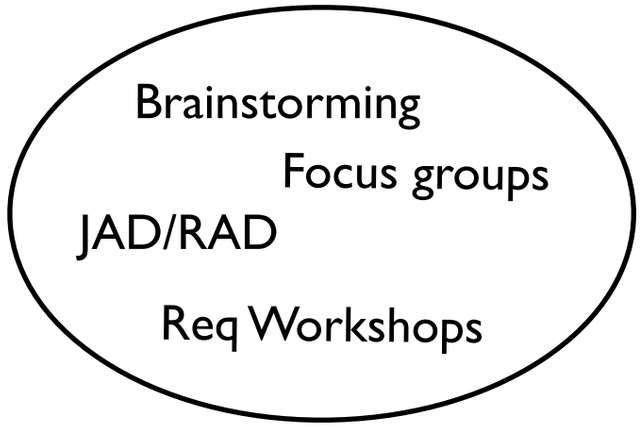


"Cognitive"/ Introspective



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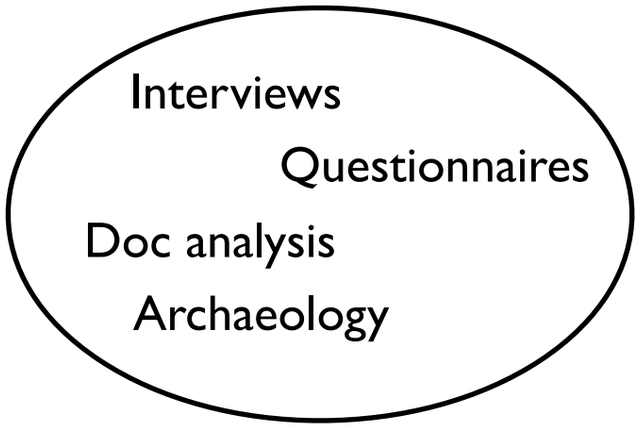

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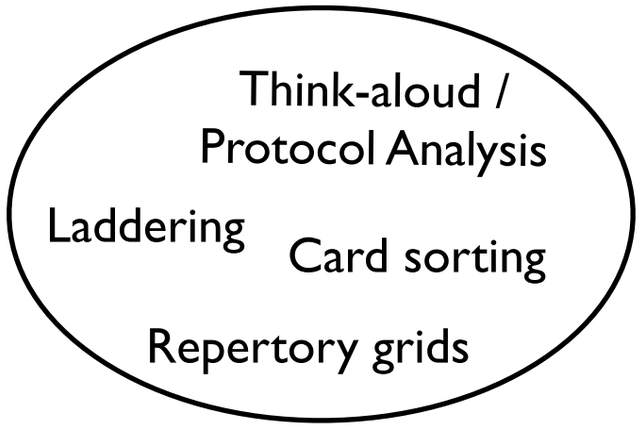

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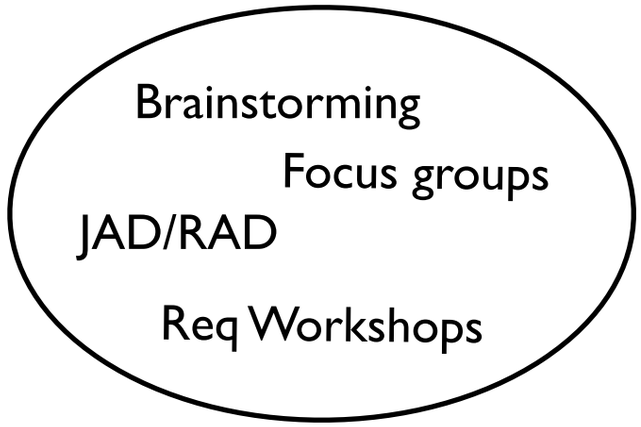

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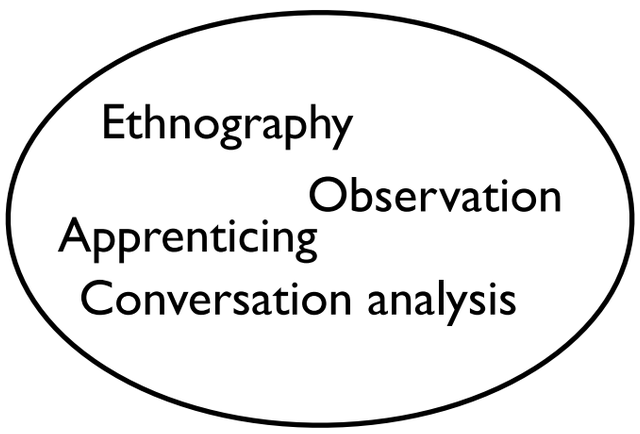
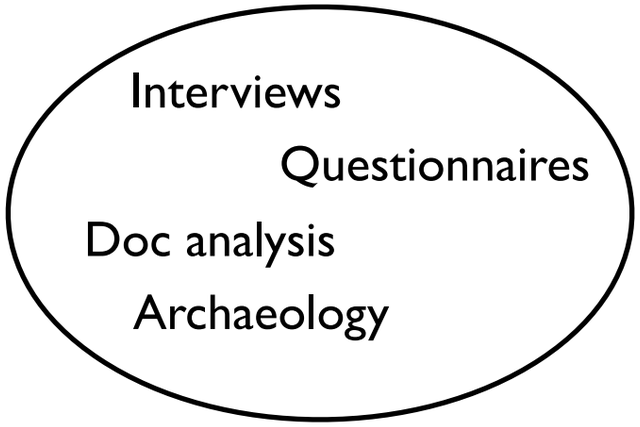


Contextual/ Observation

Elicitation methods



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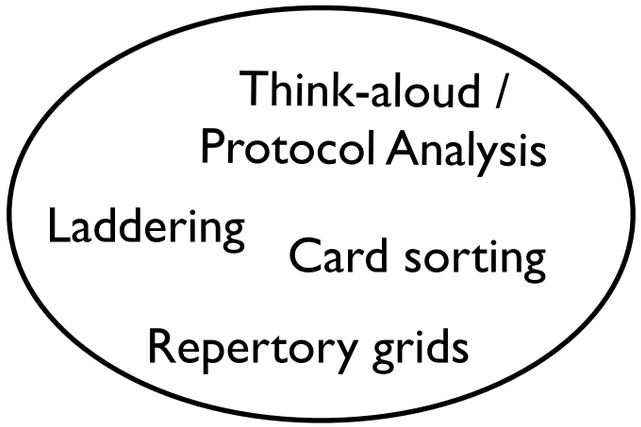

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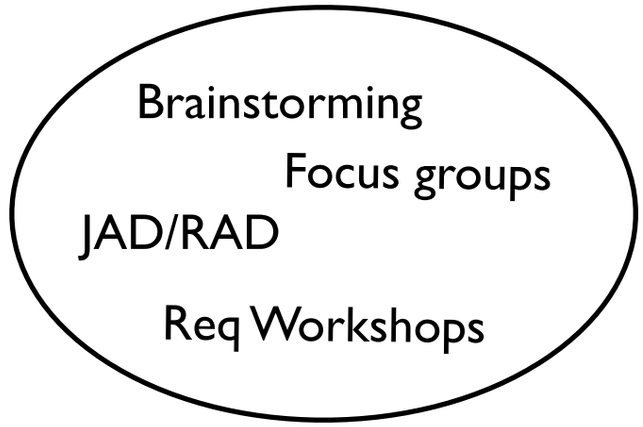

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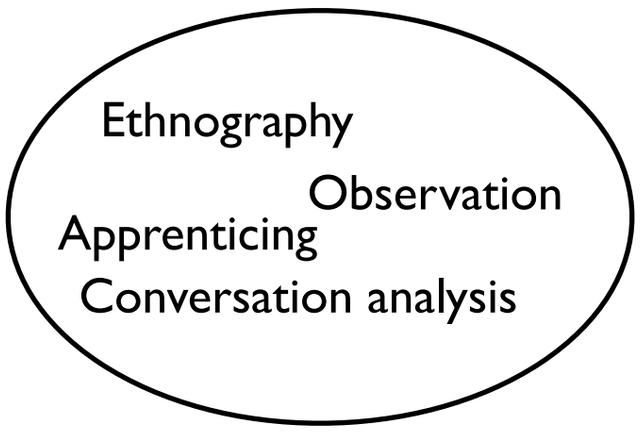

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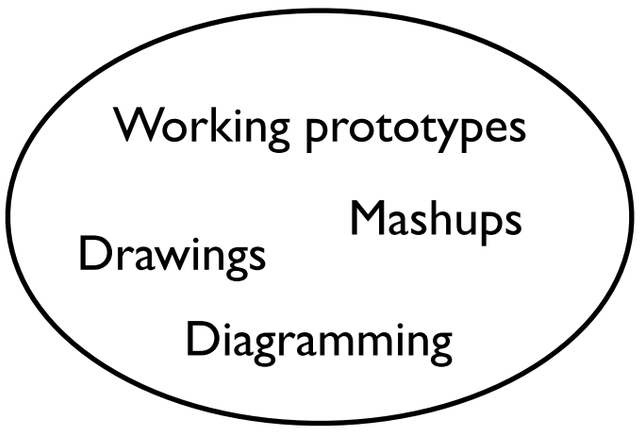
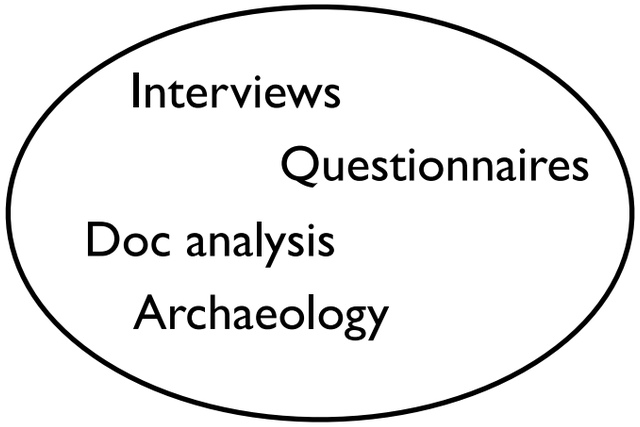


Prototyping

Elicitation methods



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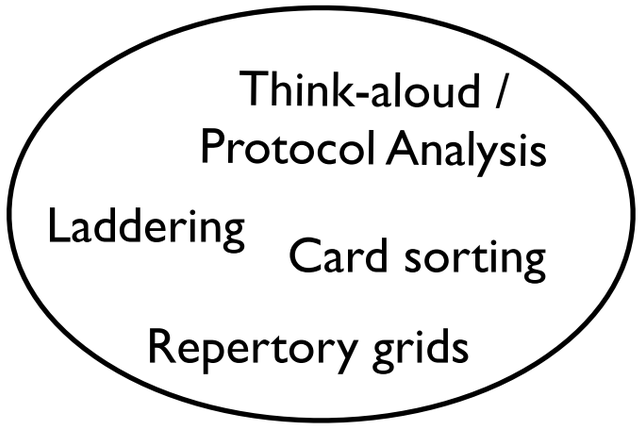

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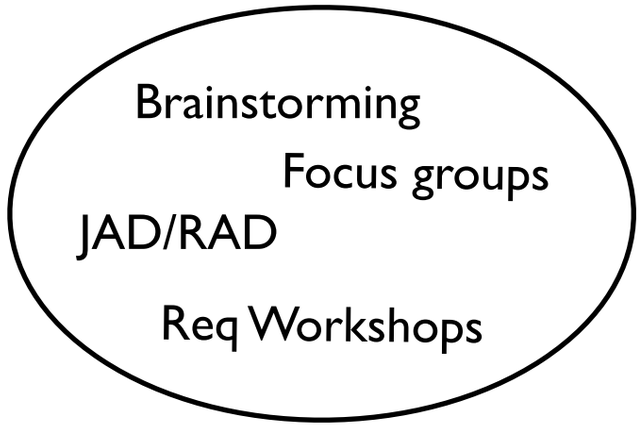

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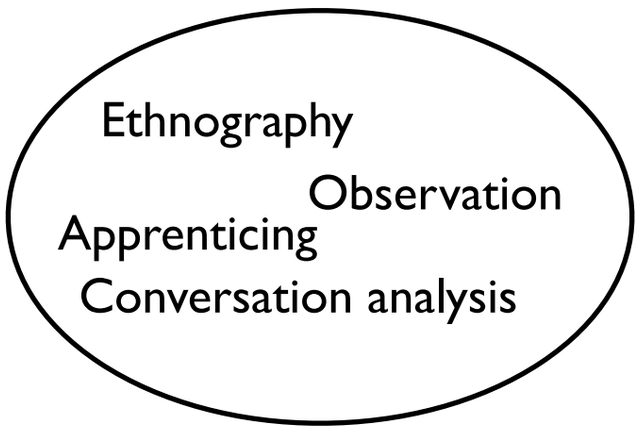

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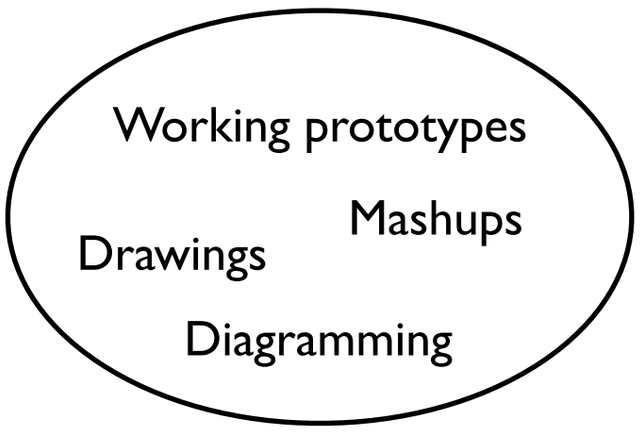

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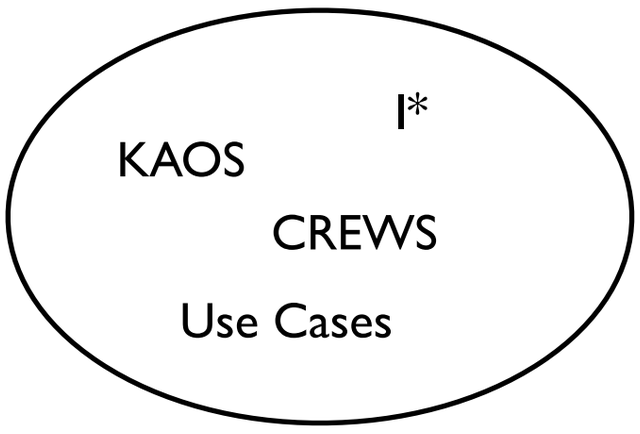
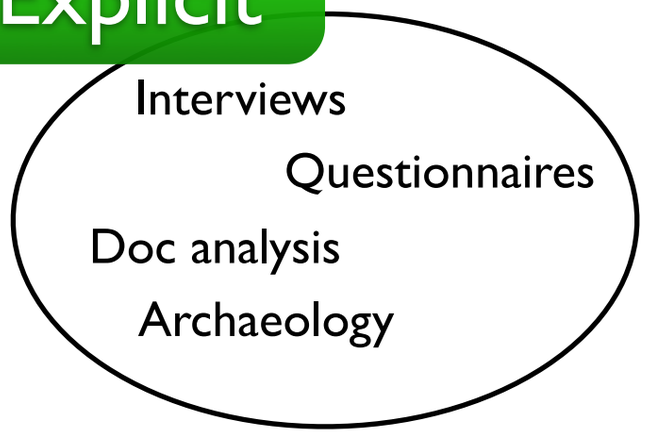


Model- or Spec-driven

Elicitation methods

Explicit



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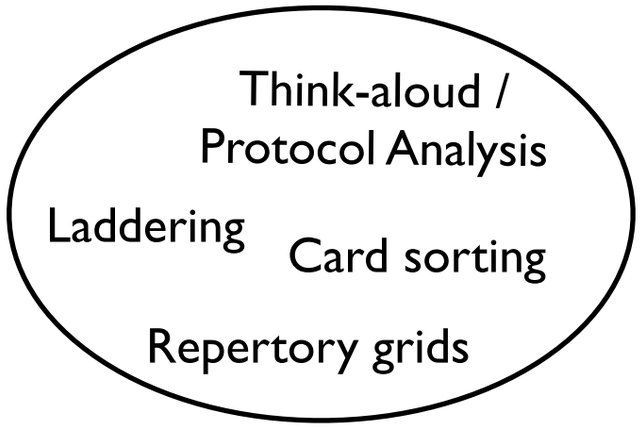

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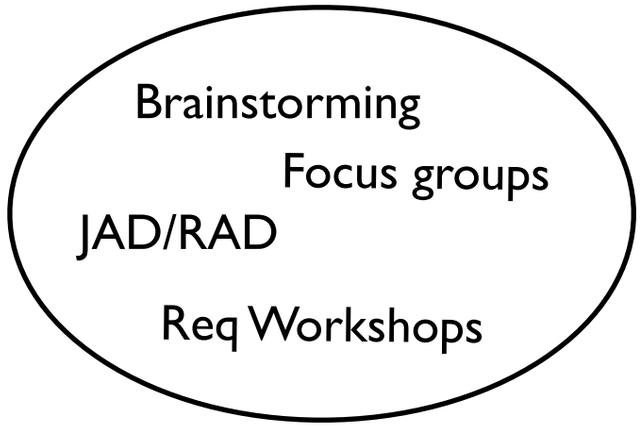

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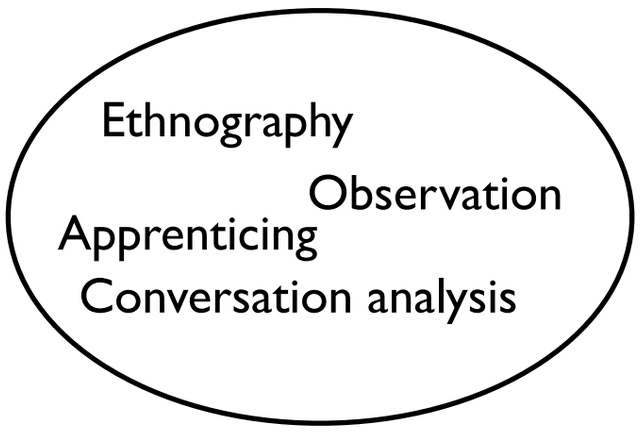

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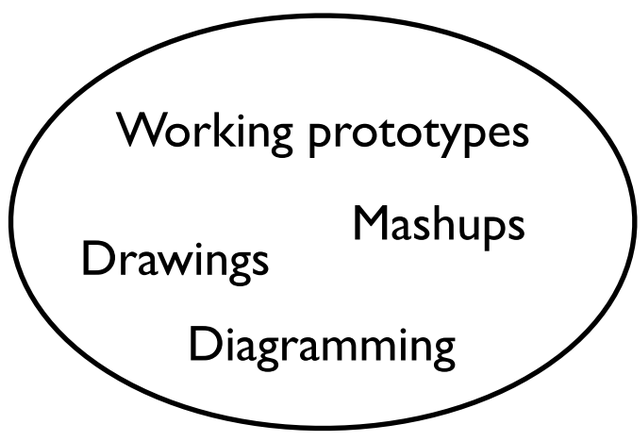

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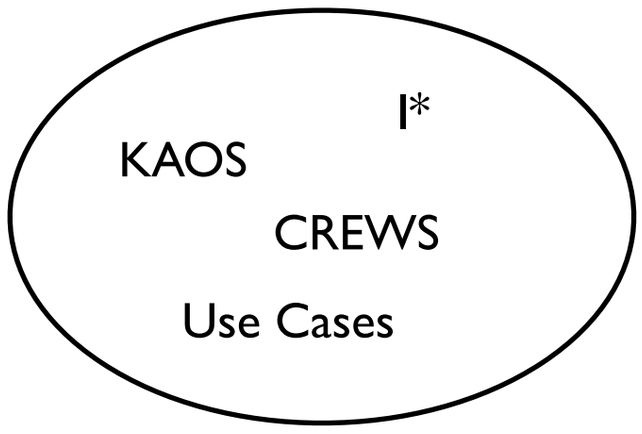

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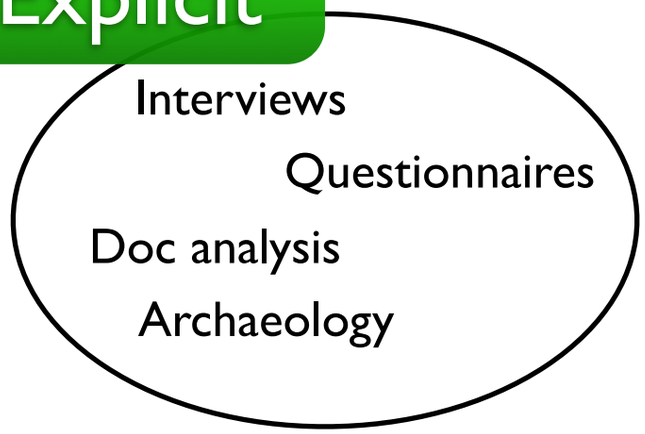

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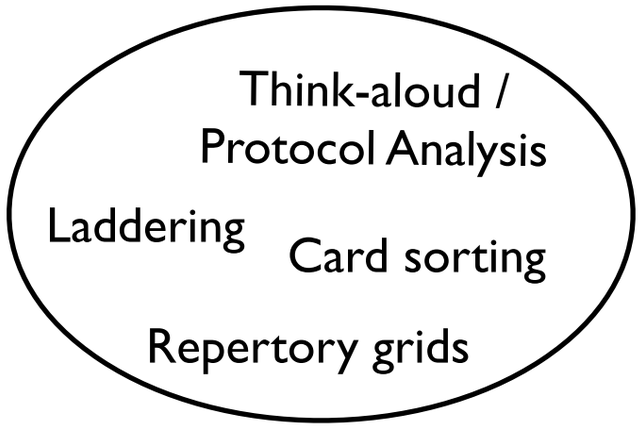

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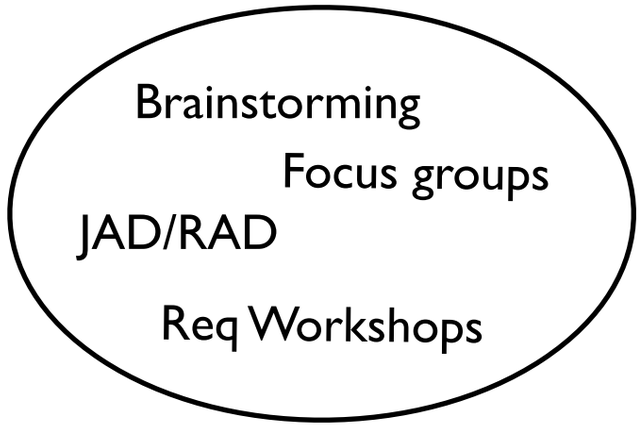

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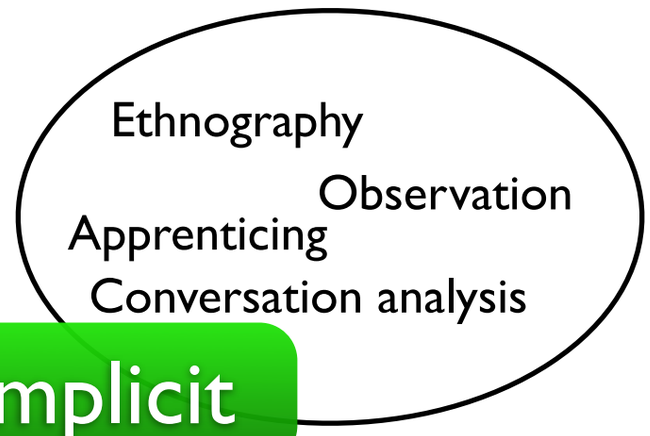

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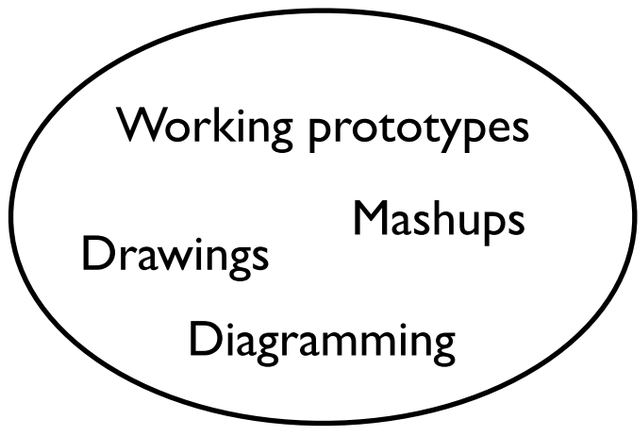

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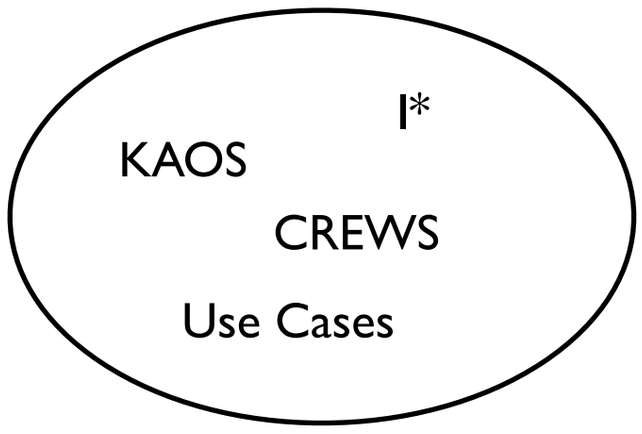

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Reflective

Interviews
Questionnaires
Doc analysis
Archaeology

"Traditional"/ Survey

Think-aloud / Protocol Analysis
Laddering
Card sorting
Repertory grids

"Cognitive"/ Introspective

Brainstorming
Focus groups
JAD/RAD
Req Workshops

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Ethnography
Observation
Apprenticing
Conversation analysis

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Contextual/ Observation

Working prototypes
Mashups
Drawings
Diagramming

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I*
KAOS
CREWS
Use Cases

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Hierarchy of (non-group) Elicitation methods

ELICITATION TECHNIQUES					
INTERVIEWS	Interviewer-guided interview	Unstructured interview	Unstructured interview (as technique)		
			Cognitive interview		
			Critical success factors		
			*Modeling techniques	Data flow diagram	Logical
					Physical
				Diagramming	
				Prototyping	
				Concept map	
			Syntactic interview		
			Semantic interview		
		Domain-independent structured interview	Information-processing oriented	Task-characteristics interview	
				Semantic-structured interview	
			Test-based	Critical decision method	
				Event-based knowledge elicitation	
			Laddering interview		
			*Modeling techniques	Data flow diagram	Logical
					Physical
		Domain-dependent interview			
	Interviewee-guided interview	Twenty Questions			
QUESTIONNAIRES					

INTROSPECTION & OBSERVA-TION	Ideal description		
	Positive imagery		
	Negative imagery		
	Protocol analysis		
	Task analysis		
	Observation		
CONTRIVED TECHNIQUES	Scaling techniques	Repertory grid	
		Multidimensional scaling	
		Hierarchical clustering	
	Sorting techniques	Sorting	Computerized label sort
			Card sort
			Item sort
		Free sorting	
		Ranking	
	Hierarchical structuring techniques	Laddering	Textual
			Graphical
			Computer-supported
		Attribute listing bottom-up	
		Multi-attribute hierarchical top-down	
		Top-down goal decomposition	
PICKING FROM A LIST OF ATTRIBUTES			
PROTOTYPING			
SCENARIO ANALYSIS			
DIAGRAMMING			

Elicitation techniques - early

Technique	**Pro**	**Con**
Interviews	Know the present & future ideas, Uncover conflicts/politics	Goals & critical issues, Subjective
Group interviews/ sessions	Stimulate/complete each other, Many/ Diverse stakeholders	Censorship & domination, Groupthink
Observation	Actual current behavior, processes	Time consuming, misses exceptional/ usability problems

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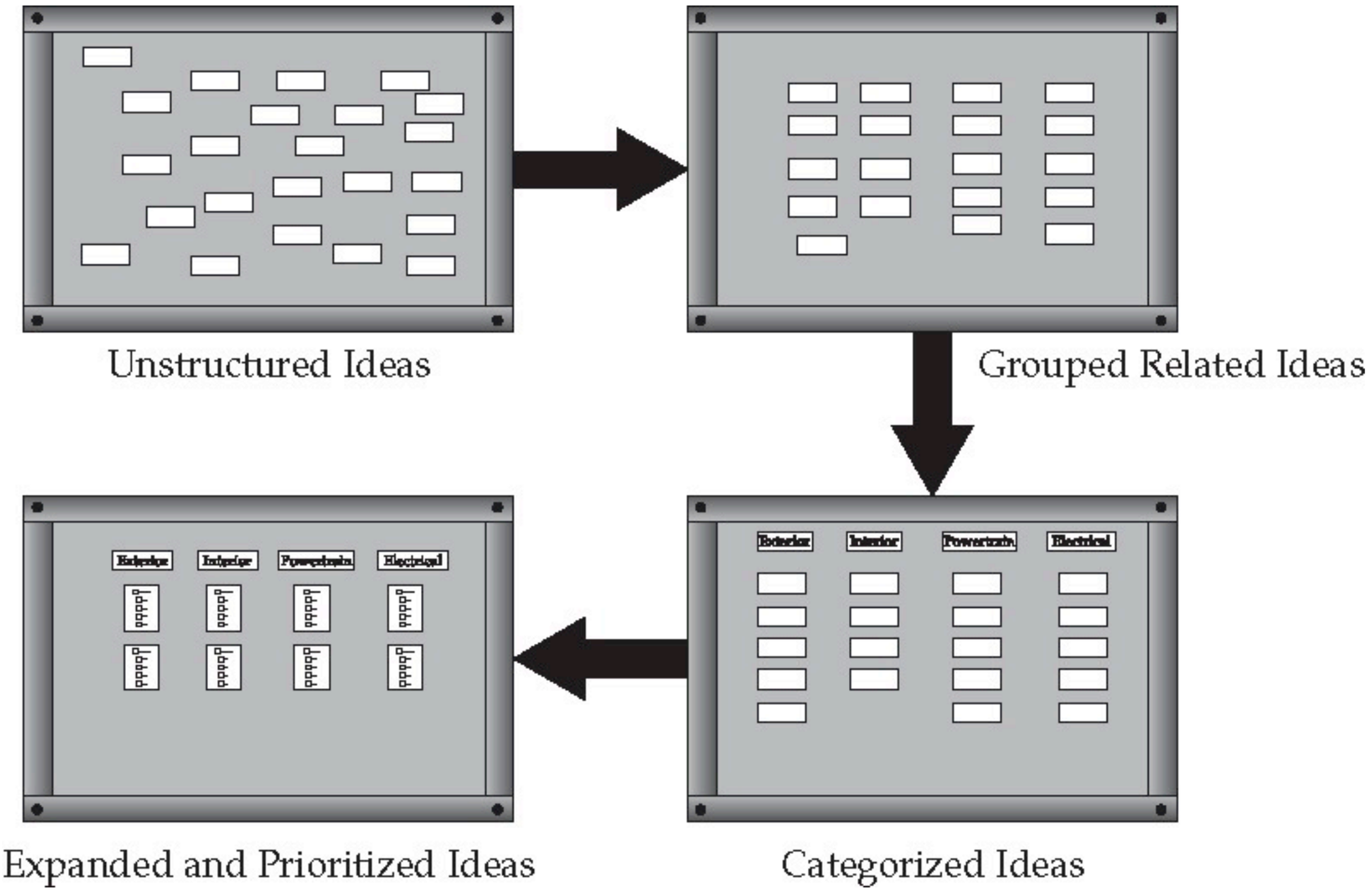
Elicitation techniques - mid

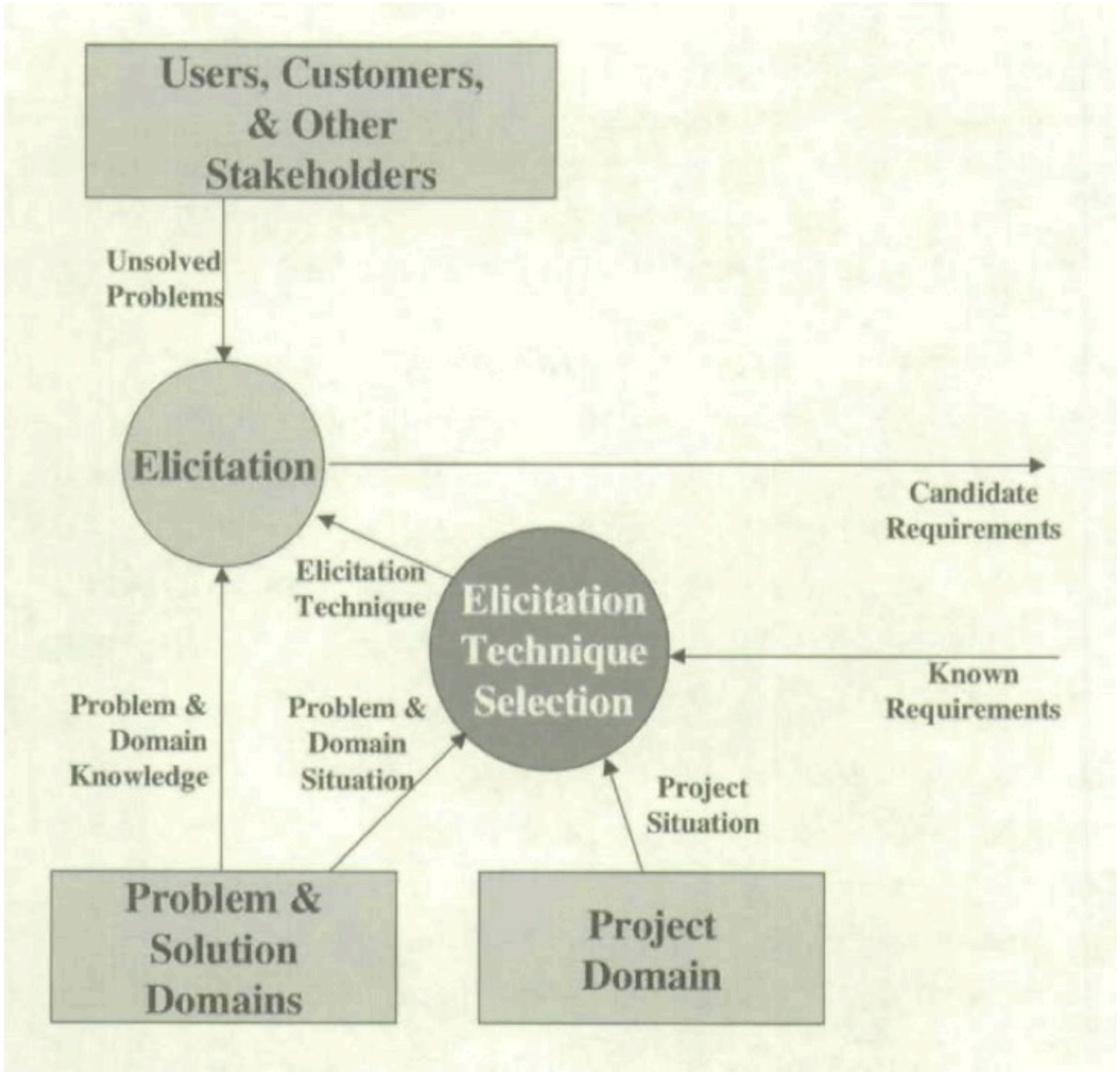
Technique	**Pro**	**Con**
Task demo	Clarify how work done	Presence & Qs influence, Critical issues seldom captured
Questionnaires	Info from many (statistics, views, opinions)	Hard to construct, Interpretation
Brainstorming	Many ideas (none rejected)	Many ideas (prioritization needed), Involvement

Elicitation techniques - late

Technique	**Pro**	**Con**
Use cases / Scenarios	Concentration on specifics => accuracy	Solution-oriented, Premature design
Modeling, Data-flow Diagrams, ...	Communication, Organize info, Uncover missing/ inconsistencies	Require tools, Time consuming, "Cults"
Prototyping	Visualization, Stimulate ideas, Usability centered	Solution-oriented, Premature design, "Already done?"

Brainstorming




Users, Customers, & Other Stakeholders
Unsolved Problems
Elicitation
Candidate Requirements
Elicitation Technique
Elicitation Technique Selection
Known Requirements
Problem & Domain Knowledge
Problem & Domain Situation
Project Situation
Problem & Solution Domains
Project Domain

Research on how to elicit?

[Davis2006]

#	Aggregation result	(1)	(2)	Comments
1	Structured interviews gather more information than unstructured interviews	[3,11,63,67]	---	---
2	Unstructured interviews gather more information than sorting and ranking techniques	[10,16,20,80]	[5]	---
3	Unstructured interviews appear to gather more information than thinking aloud techniques	[13,16,20]	[22]	• The evidence given in [16] is confusing, but suggests that interviews are better than thinking aloud techniques. • The quality of the study [22] can be qualified as being on the low side
4	Elicitation techniques do not appear to provide specific types of information, that is, there is not enough evidence to support differential information access depending on what elicitation technique is used	[10,11,13,22,78]	[16]	• The quality of the study [22] can be qualified as being on the low side.
5	Analyst experience does not appear to be a relevant factor during information acquisition, at least using interviews as an elicitation technique.	[3,63,74]	[34]	---
6	The use of visual aids or prototypes focuses the discussion on the displayed artifact and does not generally help to discover new requirements.	[41,68]	---	• Not a lot of evidence is available as yet, although other studies (not covered by this review), like [30], support this finding.

Elicitation Guidelines

TABLE 13.
GUIDELINES DERIVED FROM AGGREGATION RESULTS

Guideline	Description	Evidence for	Evidence against
G1	Unstructured interviews (although it is reasonable to assume that the same applies to structured interviews), are equally as or more effective than introspective techniques (such as protocol analysis) and sorting techniques.	AG01, AG04, AG05	AG06, AG08
G2	Unstructured interviews (although it is reasonable to assume that the same applies to structured interviews) output more complete information than introspective techniques (such as protocol analysis), sorting techniques and Laddering.	AG28, AG29, AG34, AG30	
G3	Unstructured interviews (although it is reasonable to assume that the same applies to structured interviews) are less efficient than sorting techniques and Laddering, but as efficient as introspective techniques (such as protocol analysis).	AG10, AG11, AG12, AG16, AG17, AG18, AG22, AG23, AG24	
G4	The introspective techniques (such as protocol analysis) are the worst of all the tested techniques in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews), and sorting techniques and laddering.	AG04, AG07, AG10, AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG28, AG31, AG32	AG14
G5	Laddering is preferable to sorting techniques (as well as introspective techniques).	AG06, AG15, AG20, AG21, AG26, AG27, AG23, AG33	AG14

[Dieste2009] Study excluded group techniques!

Elicitation Guidelines

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GUIDELINES DERIVED FROM AGGREGATION RESULTS

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G4	The introspective techniques (such as protocol analysis) are the worst of all the tested techniques in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews), and sorting techniques and laddering.	AG04, AG07, AG10, AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG28, AG31, AG32	AG14
G5	Laddering is preferable to sorting techniques (as well as introspective techniques).	AG06, AG15, AG20, AG21, AG26, AG27, AG23, AG33	AG14

Interviews MORE EFFECTIVE than Introspective techniques & Sorting

[Dieste2009]

Study excluded group techniques!

Elicitation Guidelines

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Interviews MORE EFFECTIVE than Introspective techniques & Sorting

Interviews MORE COMPLETE than Introspective techniques & Sorting

[Dieste2009]

Study excluded group techniques!

Elicitation Guidelines

TABLE 13.
GUIDELINES DERIVED FROM AGGREGATION RESULTS

Guideline	Description	Evidence for	Evidence against
G1	Unstructured interviews (such as open-ended interviews) and structured interviews (such as tured interviews), are equally as or more effective than introspective techniques (such as protocol analysis) and sorting techniques.	AG01, AG04, AG05	AG08
G2	Unstructured interviews (such as open-ended interviews) and structured interviews (such as tured interviews) output more complete information than introspective techniques (such as protocol analysis), sorting techniques and Laddering.	AG28, AG29, AG34, AG30	
G3	Unstructured interviews (such as open-ended interviews) and structured interviews (such as tured interviews) are less efficient than sorting techniques and Laddering, but as efficient as introspective techniques (such as protocol analysis).	AG16, AG17, AG18, AG22, AG23, AG24	
G4	The introspective techniques (such as protocol analysis) are the worst of all the tested techniques in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews), and sorting techniques and laddering.	AG04, AG07, AG10, AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG28, AG31, AG32	AG14
G5	Laddering is preferable to sorting techniques (as well as introspective techniques).	AG06, AG15, AG20, AG21, AG26, AG27, AG23, AG33	AG14

Interviews MORE EFFECTIVE than Introspective techniques & Sorting

Interviews MORE COMPLETE than Introspective techniques & Sorting

Interviews LESS EFFICIENT than Sorting & Laddering

[Dieste2009]

Study excluded group techniques!

Elicitation Guidelines

TABLE 13.
GUIDELINES DERIVED FROM AGGREGATION RESULTS

Guideline	Description	Evidence for	Evidence against
G1	Unstructured interviews (and structured interviews), are equally as or more effective than introspective techniques (such as protocol analysis) and sorting techniques.	AG01, AG04, AG05, AG08	
G2	Unstructured interviews (and structured interviews) output more complete information than introspective techniques (such as protocol analysis), sorting techniques and Laddering.	AG28, AG29, AG34, AG30	
G3	Unstructured interviews (and structured interviews) are less efficient than sorting techniques and Laddering, but as efficient as introspective techniques (such as protocol analysis).	AG16, AG17, AG18, AG22, AG23, AG24	
G4	The introspective techniques (such as protocol analysis) are outperformed in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews), and sorting techniques and laddering.	AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG28, AG31, AG32	AG14
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Interviews MORE EFFECTIVE than Introspective techniques & Sorting

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Interviews LESS EFFICIENT than Sorting & Laddering

Interviews has SAME EFFICIENCY as Introspective techniques

[Dieste2009]

Study excluded group techniques!

Elicitation Guidelines

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Guideline	Description	Evidence for	Evidence against
G1	Unstructured interviews (as well as structured interviews), are equally as or more effective than introspective techniques (such as protocol analysis) and sorting techniques.	AG01, AG04, AG05	AG08
G2	Unstructured interviews (as well as structured interviews) output more complete information than introspective techniques (such as protocol analysis), sorting techniques and Laddering.	AG28, AG29, AG34, AG30	
G3	Unstructured interviews (as well as structured interviews) are less efficient than sorting techniques and Laddering, but as efficient as introspective techniques (such as protocol analysis).	AG16, AG17, AG18, AG22, AG23, AG24	
G4	The introspective techniques (such as protocol analysis) are outperformed in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews).	AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG31, AG32	AG14
G5	Laddering is preferable to sorting techniques (as well as introspective techniques).	AG06, AG15, AG20, AG21, AG26, AG27, AG23, AG33	AG14

Interviews MORE EFFECTIVE than Introspective techniques & Sorting

Interviews MORE COMPLETE than Introspective techniques & Sorting

Interviews LESS EFFICIENT than Sorting & Laddering

Interviews has SAME EFFICIENCY as Introspective techniques

Introspective techniques WORSE than all others

[Dieste2009]

Study excluded group techniques!

Elicitation Guidelines

TABLE 13.
GUIDELINES DERIVED FROM AGGREGATION RESULTS

Guideline	Description	Evidence for	Evidence against
G1	Unstructured interviews (such as open-ended interviews and semi-structured interviews), are equally as or more effective than introspective techniques (such as protocol analysis) and sorting techniques.	AG01, AG04, AG05	AG08
G2	Unstructured interviews (such as open-ended interviews and semi-structured interviews) output more complete information than introspective techniques (such as protocol analysis), sorting techniques and Laddering.	AG28, AG29, AG34, AG30	
G3	Unstructured interviews (such as open-ended interviews and semi-structured interviews) are less efficient than sorting techniques and Laddering, but as efficient as introspective techniques (such as protocol analysis).	AG16, AG17, AG18, AG22, AG23, AG24	
G4	The introspective techniques (such as protocol analysis) are outperformed in all the dimensions (effectiveness, efficiency, completeness), and are outperformed by unstructured interviews (although it is reasonable to assume that the same applies to structured interviews).	AG13, AG16, AG19, AG20, AG22, AG25, AG26, AG28, AG31, AG32	AG14
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Interviews has SAME EFFICIENCY as Introspective techniques

Introspective techniques WORSE than all others

Laddering PREFERABLE to Sorting

[Dieste2009] Study excluded group techniques!

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation
Conditionalizing	Use “if-then” to limit or clarify applicability of an assertion
Elaborating with examples	Asking a user to illustrate a point by providing examples
Hedging	Asking a user to design contingency plans or fallback positions

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation "Describe the most unusual customer you ever had. How did you respond in that situation?"
Conditionalizing	Use "if-then" to limit or clarify applicability of an assertion
Elaborating with examples	Asking a user to illustrate a point by providing examples
Hedging	Asking a user to design contingency plans or fallback positions

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation
Conditionalizing	"If the project is finished as planned, then what does that mean for the customer?"
Elaborating with examples	Asking a user to illustrate a point by providing examples
Hedging	Asking a user to design contingency plans or fallback positions

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation
Conditionalizing	Use “if-then” to limit or clarify applicability of an assertion
Elaborating with examples	“Can you provide some examples of what you mean?”
Hedging	Asking a user to design contingency plans or fallback positions

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation
Conditionalizing	Use “if-then” to limit or clarify applicability of an assertion
Elaborating with examples	Asking a user to illustrate a point by providing examples
Hedging	“What would you do if this action would not give the desired result?”

Strategies for elicitation

Strategy	Description
Scenario Building	Asking a user to imagine or construct a scenario in his domain, and respond as he would in that situation
Conditionalizing	Use “if-then” to limit or clarify applicability of an assertion
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Strategies for elicitation

Strategy	Description
Generating Counterargument	Asking a stakeholder to argue against the conclusion she first reached
Generating Arguments	Asking for more or different arguments favoring a position
Feedback	Asking for or giving feedback, either verbally or in writing / on notes
Summarization	Asking for or giving a summary

Strategies for elicitation

Strategy	Description
Generating Counterargument	"Why might the system not work as well as you say it will?"
Generating Arguments	Asking for more or different arguments favoring a position
Feedback	Asking for or giving feedback, either verbally or in writing / on notes
Summarization	Asking for or giving a summary

Strategies for elicitation

Strategy	Description
Generating Counterargument	Asking a stakeholder to argue against the conclusion she first reached
Generating Arguments	"Can you think of an analogy that would help clarify what you are saying?"
Feedback	Asking for or giving feedback, either verbally or in writing / on notes
Summarization	Asking for or giving a summary

Strategies for elicitation

Strategy	Description
Generating Counterargument	Asking a stakeholder to argue against the conclusion she first reached
Generating Arguments	Asking for more or different arguments favoring a position
Feedback	"Let me recap what I have noted down from our conversation and you can see if you agree?"
Summarization	Asking for or giving a summary

Strategies for elicitation

Strategy	Description
Generating Counterargument	Asking a stakeholder to argue against the conclusion she first reached
Generating Arguments	Asking for more or different arguments favoring a position
Feedback	Asking for or giving feedback, either verbally or in writing / on notes
Summarization	"Can you summarize what you have said so far?"

Strategies for elicitation

Strategy	Description
Generating Counterargument	Asking a stakeholder to argue against the conclusion she first reached
Generating Arguments	Asking for more or different arguments favoring a position
Feedback	Asking for or giving feedback, either verbally or in writing / on notes
Summarization	Asking for or giving a summary

Task Characteristics Prompting

What would your customers want the system to do?
Substantive Prompt

Why would your customers not want to use the system?
Procedural Prompt—Causal Counterargument

What can be done to overcome these negatives?
Procedural Prompt—Causal Counterargument

What would your employees want the system to do?
Substantive Prompt

Summarize everything you want the system to do.
Procedural Prompt—Summarization, Feedback

What must the customer do to use the system?
Substantive Prompt

What must the employees do to use the system?
Substantive Prompt

Can you think of a situation in which the customer would have a problem using the system?
Procedural Prompt—Scenario Building

What can be done to overcome these problems?
Procedural Prompt—Casual Counterargument

Summarize the steps for using the system.
Procedural Prompt—Summarization, Feedback

What people or departments must be involved to support the customer's use of the system?
Substantive Prompt

What people or departments must be involved to support the employees' use of the system?
Substantive Prompt

Describe in detail the tasks that these people or departments must do.
Substantive Prompt

What feedback must the system provide to assist in performing these tasks?
Substantive Prompt

Can you think of a situation in which the customer would have to make a decision or choice when using the system?
Procedural Prompt—Scenario Building

What kinds of things can people do now that they might not be able to do when using the system?
Procedural Prompt—Casual Counterargument

What information must a customer supply to the system to be able to use it?
Substantive Prompt

What information must the system supply to the customer?
Substantive Prompt

What information must the employees supply to the system to be able to use it?
Substantive Prompt

What information must the system supply to the employees?
Substantive Prompt

Semantic Prompting

Goals
What are the system goals?
How is each goal attained?
Why is each goal important?
What indicates that each goal is achieved?

Agents
Can you name a person or department involved with the system?
What role does each play?
What are his or her goals?
What agent has opposing goals?

Actions
Can you name the actions involved in the system?
How does a person perform each action?
What prevents a person from being able to perform each action?
What goal(s) does each action satisfy?

Events
What events affect the system?
What are the consequences of each event occurring?
What causes each event to occur?
What goal does each event fulfill?

States or Conditions
What states or conditions affect the system?
What causes or enables each state?
What are the consequences of each state being present?
What goal does each state support?

Modernist vs Post-Modernist Perspective

[Easterbrook2004]

Modernist vs Post-Modernist Perspective

[Easterbrook2004]

Modernist vs Post-Modernist Perspective

"Rationality is the highest form of mental functioning"

[Easterbrook2004]

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"There is a universal truth and science uncovers it"

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"Identify and Question the Grand Narrative"

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"Identify and Question the Grand Narrative"

"Find Mini-Narrative and DO NOT claim universality, truth or stability"

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Modernist vs Post-Modernist ReqEng

"All observation is value-laden"

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A Modernist Perspective

"Build consistent model & validate it is correct"

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Modernist vs Post-Modernist ReqEng

A Modernist Perspective

"Build consistent model & validate it is correct"

Tools that test completeness and consistency

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Reviews to show model is valid ...

"All observation is value-laden"

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Modernist vs Post-Modernist ReqEng

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Use stakeholder involvement so they "own" the models

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Use stakeholder involvement so they "own" the models

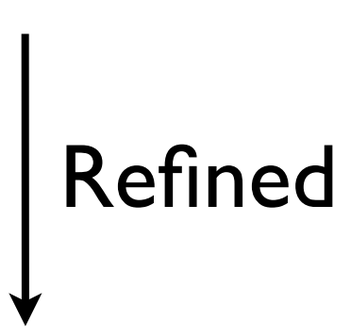
Use ethnographic techniques to understand viewpoints

Documenting requirements

- Many both Internal and External needs:
  - Communication between roles/parties
  - Handle complexity of large systems & many requirements
  - Document decisions
  - Communication over time - a memory of decisions
  - Help ensure good requirements are elicited - avoid risks
  - Legal or contract disputes
  - Stability over time (Accessibility) - if people quit or move

SRS Structures

Quite common in industry to have
at least two levels of SRSes:



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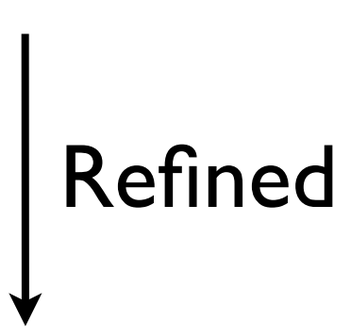

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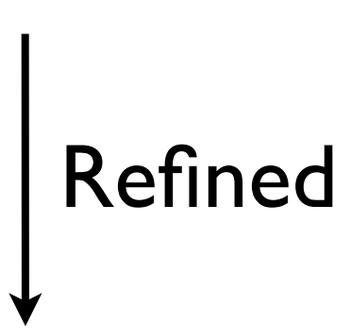

IEEE standard 830-1998

http://www.cse.chalmers.se/~feldt/courses/reqeng/examples/srs_example_2010_group2.pdf

Natural Language Requirements

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Pro	Con

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Easiest to understand, requires “no” training	Interpretation is often ambiguous

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Flexible & adaptable to the context	No built-in support for completeness & Q criteria

Natural Language Requirements

Pro	Con
Easiest to understand, requires "no" training	Interpretation is often ambiguous
Can be used directly with customers	Harder to separate different concerns
Flexible & adaptable to the context	No built-in support for completeness & Q criteria
Most common => most people used to it	Harder to use in later development stages

NatLang Ambiguities

1. Nominalization:
Turns complex processes into single events

Example:
"In case of a system crash,
a restart of the system shall be performed"

NatLang Ambiguities

2. Nouns without reference:
Vague nouns that are insuffiently specified.

Example:
“The output should be presented to the user in a graph”

NatLang Ambiguities

3. Universal quantifiers:
Applying too general statements to
too many objects of some set. Missing quantities and frequencies.

Example:
“The system shall show all data sets in every graph view”

NatLang Ambiguities

4. Incompletely specified conditions:
Reqs often only hold under certain conditions,
which are often not identified clearly enough.

Example:
"The restaurant system shall show all beverages
to a guest over the age of 20."

NatLang Ambiguities

5. Incompletely specified verbs:

Passive verb forms often allow for info to be missing. Try to use active voice!

Example:

“To log a user in, the login data is entered.”

instead

“The system must allow the user to enter user name and password using a keyboard.”

References

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[Davis2006], Davis, A. and Dieste, O. and Hickey, A. and Juristo, N. and Moreno, A.M., "Effectiveness of requirements elicitation techniques: Empirical results derived from a systematic review", 14th IEEE International Conference on Requirements Engineering, pp. 179-188, 2006.

[Easterbrook2004] Steve Easterbrook, "Requirements engineering lecture slides" University of Toronto, 2004.