Lecture 10
Communicating the Requirements
Insights from an industrial practice survey

Com S/SE 409/509

Robyn Lutz

rlutz@iastate.edu

Office hours:

Robyn: 11 Tues, 230 Atanasoff; 3 Fri (https://iastate.zoom.us/my/rlutz), & by appointment

Carter: cwunsch@iastate.edu,12 Tues (0112 Pearson); 12 Thurs (https://iastate.webex.com/meet/cwunsch), & by appointment

Arushi: arushi17@iastate.edu, 1 Wed (0112 Pearson) & by appointment

HW 2 due Thurs, Oct. 3

How do companies implement the requirements engineer role?
Slides from study by Franch, Palomares & Gorschek, CACM 6/21

"RE is a critical area in software development, as figuring out what to develop and include in a project is a cornerstone activity which all others depend upon."

Unsuccessful development projects report that lack of RE is often a core contributing factor to their failure

aka

requirements engineer: "a person who—in collaboration with stakeholders—elicits, documents, validates, and manages requirements" [IREB].

- requirements analyst
- business analyst
- system analyst
- analyst

3 main questions

1. Does the role of "requirements engineer" exist in your company?

2. Is this role played by some designated person or instead it is a hat that a person wears at some moment, and later this very person may become, for example, tester?

3. What are the main responsibilities of this role?

Interviewed
24 IT professionals,
all doing RE,
at 12 companies, on
Projects: 4 months - years
Personnel: 2 - thousands

	Respondent			Project	Company		
R-ID	Highest Educational Background	Years in Industry	Job Position	Method	C-ID	Size*	Main business area
S1	BSc in Computer Science	15	Business Analyst	Waterfall	A	Large	IT Department
S2	MSc in Computer Science	15	Project Manager	Waterfall			
S3	Technical BSc	20	System Analyst	Agile	B	Large	Software Consultancy Company
S4	BSc in Computer Science	13	Requirement Analyst	Agile			
S5	MSc in Computer Science	25	Requirement Analyst	Waterfall	C	Medium	Software House
S6	Technical BSc	20	System Manager	Agile	D	Large	Software House
S7	MSc in Computer Science	18	System Manager	Agile			
S8	BSc in Computer Science	15	Senior Project Manager	Waterfall	E	Very Large	Software Consultancy Company
S9	Technical BSc	20	Senior Business Consultant	Waterfall			
S10	MSc in Computer Science	16	Senior Developer	Agile	F	Small	Software Consultancy Company
S11	Technical MSc	17	Consultant Manager	Agile			
S12	Other MSc	12	Solution Designer	Waterfall	G	Large	Software Consultancy Company
S13	BSc in Computer Science	23	Business Analyst	Waterfall			
S14	Other Ph.D.	10	System Engineer	Waterfall	H	Very Large	IT Department
S15	Other MSc	10	System Engineer	Waterfall			
S16	Technical BSc	25	Product Manager	Agile	I	Very Large	Software House
S17	Technical MSc	8	System Engineer	Waterfall			
S18	Technical MSc	9	Project Leader	Waterfall	J	Very Large	IT Department
S19	Technical MSc	3	Lead Engineer	Waterfall			
S20	Other Ph.D.	23	Software, Manufacturing an Electrical Engineer	Waterfall			
S21	MSc in Computer Science	21	Senior Consultant	Waterfall	K	Large	Software Consultancy Company
S22	Technical BSc	9	Senior Consultant	Agile			
S23	Technical BSc	15	Assignment Manager	Waterfall	L	Large	Public Administration
S24	BSc in Computer Science	26	Requirements Engineer	Waterfall			

* The meaning of the categories is: Small – up to 100 employees; Medium – up to 500 employees; Large – up to 10,000 employees; and Very Large – over 10,000 employees.

Table. Respondents, their projects, and their companies.

1. Does the role of "requirements engineer" exist in your company?

Yes. Most confirmed the existence of the role of requirements engineer in their organizations, dedicated mainly to RE-related tasks

Most projects in which more than one person was assigned as requirements engineer were Agile development

2. Is the requirements engineer **a designated person** *or* **a hat that a person wears at some moment?**
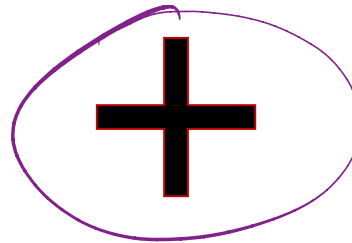
- Who is assigned to do requirements engineering?
  - Some organizations assign a specific person, such as the systems or business analyst, as requirements engineer on every project
  - Some assign someone as the requirements engineer or "requirements lead" on a case-by-case
  - Some clients provide the requirements engineer
  - Some organizations split role into business requirements (across all products) and product/technical requirements (project owner)

Product family/
Product line

3. What are the main responsibilities of the RE role?

the usual RE-related activities:

elicitation, negotiation, documentation/specification, validation and change management

their usual job:

"when a system architect or a developer is assigned as requirements engineer, they still need to design the architecture or develop new software, while participating as requirements engineer when required" (not so in very large companies)
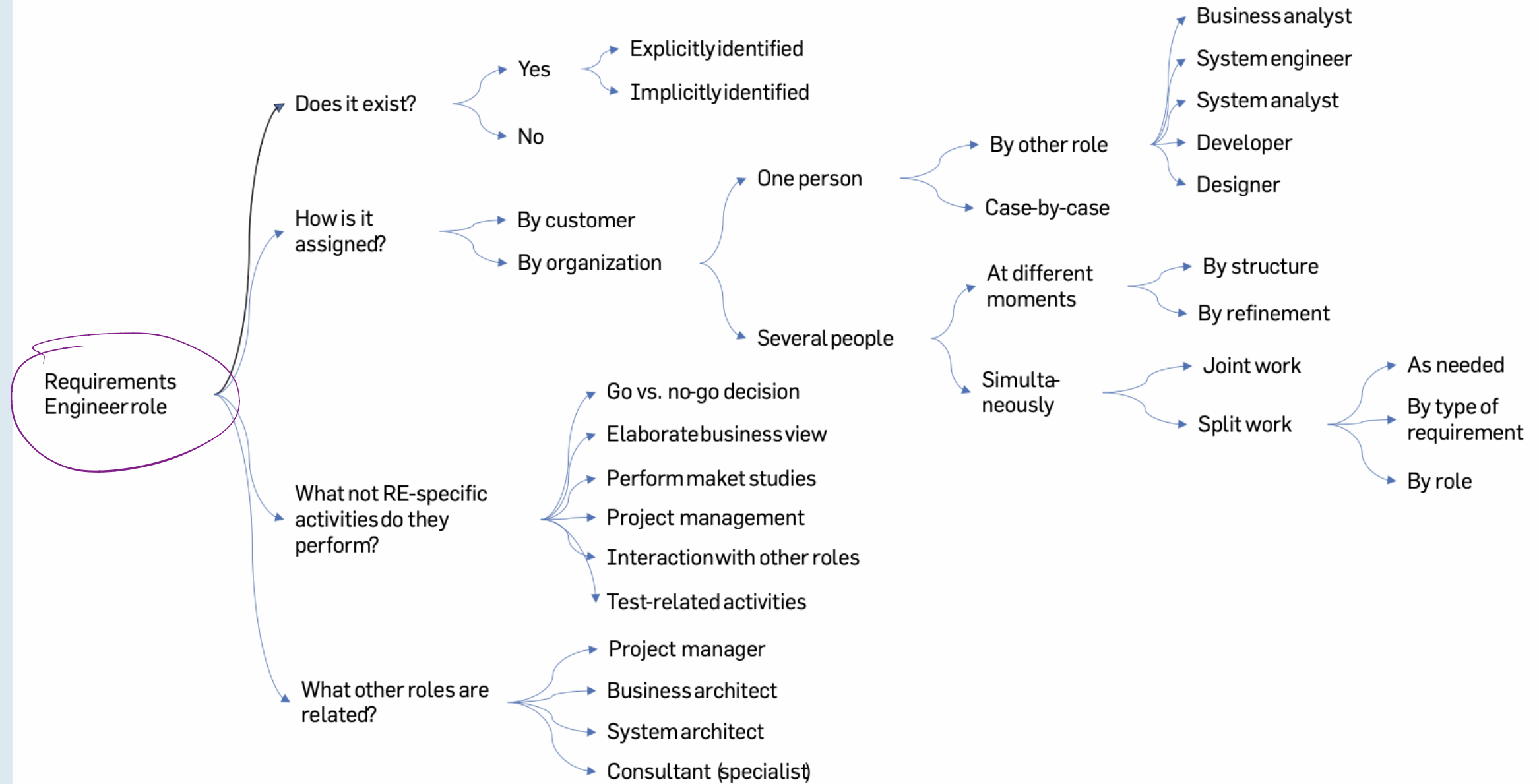
Making a go vs. no-go decision

Determining ROI (Return On Investment) of requirements

Project management tasks

Talking to other groups to get input or data necessary from other systems

Test-related activities as part of their RE responsibilities

Requirements Engineer role

- **Does it exist?**
  - Yes
    - Explicitly identified
    - Implicitly identified
  - No
- **How is it assigned?**
  - By customer
  - By organization
    - One person
      - By other role
        - Business analyst
        - System engineer
        - System analyst
        - Developer
        - Designer
      - Case-by-case
    - Several people
      - At different moments
        - By structure
        - By refinement
      - Simultaneously
        - Joint work
        - Split work
          - As needed
          - By type of requirement
          - By role
- **What not RE-specific activities do they perform?**
  - Go vs. no-go decision
  - Elaborate business view
  - Perform maket studies
  - Project management
  - Interaction with other roles
  - Test-related activities
- **What other roles are related?**
  - Project manager
  - Business architect
  - System architect
  - Consultant (specialist)

Communication risks

- "there were requirements missing at the end (incompleteness) and some misunderstandings (ambiguity). Especially the problems were with the communication between the two roles related to requirements, as the interaction designers were using the requirements specified by the requirements analysts to create a new more detailed version of the requirements."

- " a challenge reported by respondents, namely the suboptimal quality of requirements documents: at the end, some requirements may be missing, or their quality may be inadequate (in terms of, say, ambiguity or incompleteness)."

- "The level of specification [of the requirements] was good enough for developers, because they participated in the discussions around require-ments, but not for testers. More information or details were missing so tes-ters were not able to completely understand the requirements."
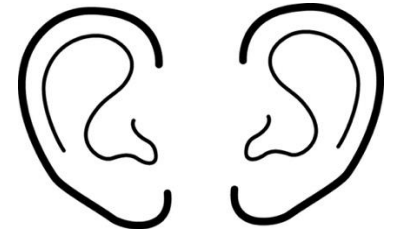
Key Insights [Franch, et al., CACM '21]

- **Organizations nominate requirements engineers in virtually all of their projects, but there is a large diversity in their assignment, from a single person playing the role to several people that collaborate during the project.**

- **Besides RE-specific tasks, requirements engineers may perform other activities, ranging from project management to testing, often as a consequence of requirements engineers playing multiple roles.**

- **In our study, the requirements engineer role is better delimitated in large companies. No other influencing factors were identified, particularly, the development method adopted in the company does not have impact on the requirements engineer role.**

We can automatically generate code from the requirements.

Practicing EARS

Write the functional requirements for the FINDER software* in EARS.

* https://www.youtube.com/watch?v=M1E3DLwGHF4