State of Practice of User-Developer Communication in Large-Scale IT Projects

Results of an Expert Interview Series

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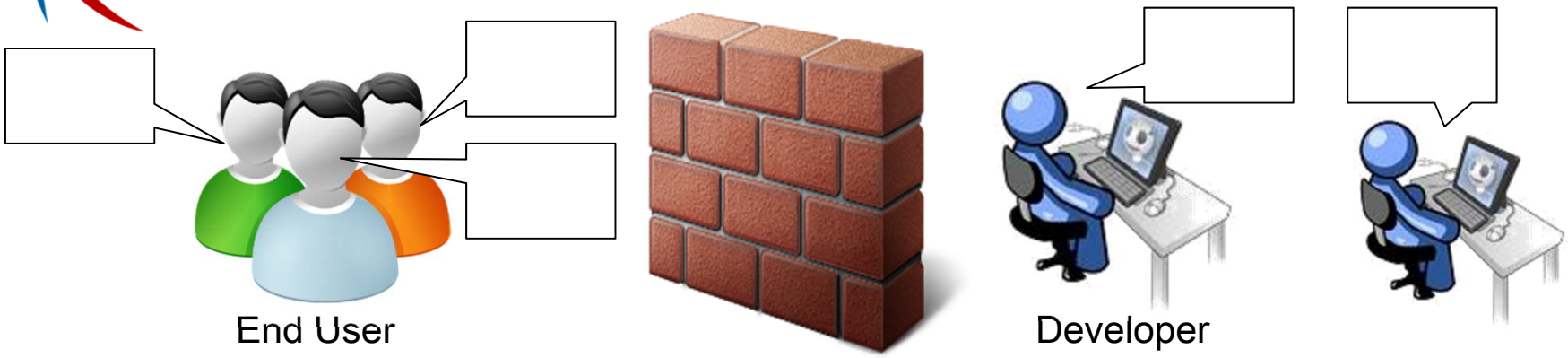
Agenda

- Motivation
- Research Questions
- Research Method
- Results
- Conclusion

Source: IT project team

Motivation – Missing User-Developer Communication



Issues of users[1]

- Users do **not feel integrated** in the project
- Users do not **recognize their requirements** in the acceptance phase
- Users have **low motivation to participate** in IT projects

Consequences for project[2]

- **Low acceptance** of the system in large-scale IT projects
- **Frustration and inefficiency** between users and developers

Source: 1 (Doll & Torkzadeh, 1989) 2 (Bjarnason, et al 2011)

Research Questions

- *RQ 1: Do **users and developers communicate** in large scale IT projects?*
- *RQ 2: What are possible **organizational obstacles** that prevent large-scale IT projects from implementing UDC?*
- *RQ 3: What **factors** might cause communication gaps between users and developers and what are the **consequences** of these communication gaps?*
- *RQ 4: What do experienced practitioners **suggest to overcome the obstacles for the implementation** of UDC and to eliminate the factors that cause communication gaps?*

Research Method

- Interview series with **12 experts** from Oct. - Dec. 2012
- Qualitative **semi-structured interviews** based on questionnaire
  (ø time 90 min, 4 in person, 8 via telephone)
- **Identification of experts** through role descriptions
  - Leading role in the coordination of Business and IT
  - 7 consultants, 4 internal IT departments, 1 SW provider
  - Widespread educational background
  - More data on projects in the paper
- **Data Analysis**
  - Recorded 18 hours of interview time
  - Transcribed interviews + validated & approved by experts
  - Coded the interviews based on RQs and analyzed with MaxQDA
- **Mapping to Literature**
  - Post interview mapping of ideas of experts with existing literature

	Role in Company	Perspective (Industry)	Educational Background	# of Proj.
1	Project manager	Internal IT (Pharma)	Mathematics	15
2	Business project manager	Management consulting	Business Administration and Engineering	6
3	Developer, architect, requirements engineer	IT consulting	Computer Science	3
4	Business project manager	Management consulting	Mechanical Engineering	3
5	Developer, head of research department	IT consulting	Computer Science	5
6	IT project manager	IT consulting	Information Technology	6
7	Business project manager	Internal IT (Insurance)	Mathematics	2
8	Head of IT Strategy	Internal IT (Public Sector)	Computer Science	3
9	IT project manager	IT consulting	Computer Science	4
10	CEO	Management Consultant and Software Company	Physics	14
11	IT project manager	IT consulting	Apprenticeship as Bank Clerk	5
12	Head of IT Strategy	Internal IT (Insurance)	Information Technology	3
			Sum / Average	69 / 6
			Min -- Max	2 -- 15

Threats to Validity (based on Runeson)

- *Construct validity*
  - both sides could influence the direction of the discussion, i.e not pose all questions explicitly.
  - Visual cues prevented via telephone → mitigated through the recording of all interviews
- *Internal validity*
  - Relied on our personal relationships for the identification of experts, therefore they might be biased → but majority of the experts did not know the interviewer
- *External validity*
  - Only interviewed twelve experts but diverse backgrounds and experience
- *Reliability*
  - Interviews and coding of the interviews were conducted by one person → ensures consistency, but interpretation might be biased

Direct communication between developers and users (RQ 1)

Existence of UDC (Descriptive Code)	# of Int.
Communication between software coders (i.e. developers) and users	3*
No communication between software coders (i.e. developers) and users	11
Other forms of communication with users	
Communication between IT consultant and users	3
Communication between architect and users	2
Communication between requirements engineer and expert user	2

The **main findings**

- direct communication between developers and users **does not exist** in most large-scale IT projects
- Most of the communication is done either in the **early** or **the late activities of software development** which shows a lack of communication in the middle of the development, i.e. in **the design and implementation activity.**
- Implementation of methods from research is **limited in practice**.

*Two of these three experts also participated in projects where no direct communication between those parties existed

Organizational obstacles for implementing communication with users (RQ 2)

ID	Organizational Obstacles	# of Int.
O1	Different opinions between user groups	2
O2	Get the right user representatives for large-scale projects	2
O3	No access to users/users unknown	1
O4	Lack of local mediators	1

The **main findings**

- Different user groups or business units force **developers to mediate** between these groups
- **Key users are hard to get** as they are very important for the business operations and thus will not be released to fulfill tasks within IT projects.
- Initiation of user-developer communication comes from a **few key members** who control information flows

Factors for and consequences caused by communication gaps (RQ 3)

ID	Factors for communication gaps	# of Int.
F1	Lack of motivation of developers or users	4
F2	Lack of common language between Business and IT	4
F3	Lack of appreciation between Business and IT	1
	Consequences caused by Communication Gaps	**# of Int.**
C1	Misunderstanding of requirements	8
C2	Ad-hoc changes required due to unclear requirements	3
C3	Increased implementation cost	3
C4	Increased test effort due to rework	1

The **main findings**

- **Misunderstandings** and ad-hoc changes have an impact **on cost and schedule** of the project.
- **Missing appreciation** has **not** been **described so far** and is interesting, as the required actions to improve appreciation between IT and Business are different from overcoming barriers of a common domain language
- Experts stated a **clear connection** between **communication gaps** and increased **implementation costs** and a higher **test effort.**

Ideas to overcome obstacles or factors for communication gaps (RQ 4)

Category	Ideas (Descriptive Code)	# of Int	Literature	Addressed Factor/Obstacle
User-centered approaches	Presentation of (UI) prototypes or proof of concepts to users	3	[14, 28, 29]	Get the right user representatives for large-scale projects
	House tours in different business units with running SW	1	[17, 30]	Lack of common language between business and IT
	Description of added value to users to increase acceptance	1	n/a	
	Incentive system for the participation of business users	1	[31]	Lack of motivation of developers or users
				Get the right user representatives for large-scale projects
	Involvement of users in the organization of rollout and change management	1	n/a	Get the right user representatives for large-scale projects
Developer-centered approaches	Developers must mediate between different user groups	2	[13]	Different opinions between user groups
				Lack of local mediators
				Lack of common language between Business and IT
				Lack of appreciation between Business and IT
	End-to-end feature responsibility of developers	1	n/a	Lack of common language between Business and IT
	Developer writes informal description of how to implement requirements.	1	n/a	
	Obligation to justify all technical decisions with functional need	1	n/a	
Organizational approaches	Usage of test data early in project	2	[32]	n/a
	Agile methods e.g. frequent review meetings	2	e.g. [17, 33]	
	Definition of usability guidelines to avoid detailed UI discussions	1	n/a	

The **main findings**

- Experts' ideas **address all factors** for communication gaps & organizational obstacles expect the "lack of access to users"
- Six ideas **could not be mapped to literature**, such are particular interesting
- Experts did **not report** of a **successful, sustainable solution** to overcome the communication gaps in large-scale IT projects.

Conclusion

- **Contributions for the community:**
  - **Increased empiricial evidence** that **direct communication** between developers and users **does not exist** in most large-scale IT projects
  - Identified organizational **obstacles, factors** for **and consequences** of missing communication in **large-scale IT projects** from **real life practitioners**
  - Identified **six new ideas from practice** that could not been linked to literature
- **Future Work**: Use results in our method to enhance user-developer communication in the design and implementation activity of large-scale IT projects