Pragmatic Requirements Communication: The Handshaking Approach

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Simplified and Stylized Structure of Product Development

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Requirements Communication (from Product Manager to Development Team)
Project Milestone „Agree on Requirements and Project Plan“

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• **Project Customer:**
  • How do I assure that the project team delivers an acceptable solution, already with the first attempt?

• **Project Team (Supplier):**
  • How do I get the needed inputs for architecting and designing an accepted solution, even if requirements are of low-quality or not even existing?

• **Steering Committee:**
  • How long is it going to take?
  • How much do we need to invest?

Project Milestone „Agree on Requirements“

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The interface between marketing and development is the most critical in terms of challenges and criticality for success!

Requirements communication is the process of conveying needs from a given customer to a given supplier that enables the supplier to implement a solution that is accepted by the customer.

Requirements Communication

Push: High-Quality Requirements Specification

Customer

Specification

Supplier

Will he ever understand? Let’s pray…

Is she really so passive?

Customer

Supplier

Do things really need to be so complicated?
Reactive Balanced: Agile Development

How can you scale up if you implement first?

Customer

Supplier

Specification

Software

Requirements communication should:

• allow both customer and supplier to be *proactive*,
• be *agile* (simple, flexible, and incremental),
• allow to *agree on requirements before implementation*. 
Contents

• Requirements Communication Problem
• Pragmatic Requirements Communication
• Empirical Evaluation
  • Case Study: Evolution of Requirements Understanding
  • Multi-Case Study: Real-World Feasibility and Usefulness
• Summary and Outlook
“[…] to ascertain the meaning of an intellectual conception one should consider what practical consequences might conceivably result […] and the sum of these consequences will constitute the entire meaning of the conception.”

Charles Sanders Peirce (1905)

Interpretation for Requirements Communication:
• The meaning of requirements is visible in the design that results from interpreting these requirements.
• Ambiguity can be reduced by choosing the right design from all possible alternatives.

Formation of a Customer-Supplier Agreement

Handshaking with Implementation Proposals

Implementation Proposal

Theme: Event Logging

Requirements: RID-110 Log User Activities, RID-130 Event Subscription, RID-190, RID-200, RID-230

Design: System structure to the right.
Event Logger interface:
  Function_EL1, Function_EL2.
Host application support functions:
  Function_HA1, Function_HA2.
Event Logger behavior: (process chart).

Optional Attribute Groups:
- Negotiation Support
- Planning Support
- Acceptance Testing Support

Use of Implementation Proposals

Understood requirements (design, effort, etc.)

Requirements

Design

Implementation Proposal

Implementation Proposal

Scope and priority decisions
• Requirements Communication Problem
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Interdependency of Requirements and Design

Questions
• Does understanding of requirements influence design?
• Does understanding of design influence requirements?
• How can requirements understanding be measured?

Operation (ABB and University of Zurich)
• PO1: product manager specifies requirements
• HO: product manager hands requirements off to development
• PO2: development performs requirements and system analysis
• NE: both review implementation proposals
• CO: both document negotiation results

Requirements and Design Volatility

Effect of proposed design on requirements

Effect of improved requirements

Evolution of Perceived and Measured Requirements Understanding

Predicting the Quality of a Development Project

R-Cov: coverage of requirements with ImP

Repeatability Measurement

Subjective Measurement

perceived ability to implement

Achieved Results

Product Release

Initial Operational Capability

Construction

Transition

Unified Process

I1 I2 E1 E2 C1 C2 Cx Cy T1 T2

Inception Elaboration

Life-Cycle Objectives

Life-Cycle Architecture

Implementation Proposal

Implementation Proposal

Requirements

Design

fulfil

Industrial Evaluation

Questions
• Does handshaking work in practice?
• How does handshaking compare with requirements hand-over?
• How sustainable is handshaking?

Operation (10 projects at ABB and Danaher Motion)
• Introduce and train handshaking to product management and development organization
• Prepare measurement system
• Let practitioners perform handshaking
• Measure handshaking effects
• Reflect with practitioners on lessons-learned

Correlation of R-Cov with Project Planning Accuracy (5 Projects)

Lessons Learned (10 Projects)

Strengths
• “Enforced” improvement of requirements.
• Improved identification, analysis, and selection of alternatives.
• Deep, agreed requirements understanding.
• More information for decision-making and better defense of effort estimates.

Limitations
• Some requirements could not be communicated because they have not sufficiently been justified.
• Authoring implementation proposals requires domain knowledge.
• Requirements understandability for external people not improved.

Sustainability: Evolution of Handshaking Practice

- Project 1:
  Initiation (learning, tool selection and support)
- Projects 2-3:
  Calibration (adjusting to good-enough)
- Projects 4-5:
  Quality decrease (return to previous practice)
- Project 6:
  Correction (return to Handshaking practice)
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Summary

- Summary of the project, including goals and requirements.
- High-Quality Image: Reliable Products.
- Use Unicode Text Fonts: Partially Implement GUI Configurator.
Outlook (1/2):
Call for Collaboration

Result Measurement

Requirements Covered by Implementation Proposals (Pre-Planning)

R-Cov Measurement

Project Delay Relative to Plan

0% 20% 40% 60% 80% 100%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Outlook (2/2): Call for Collaboration

Market-driven Requirements Engineering
Domain Requirements Engineering
Handshaking
Team Problem Solving
Component Selection