

Requirement Engineering

Lecture 9: Tool Support

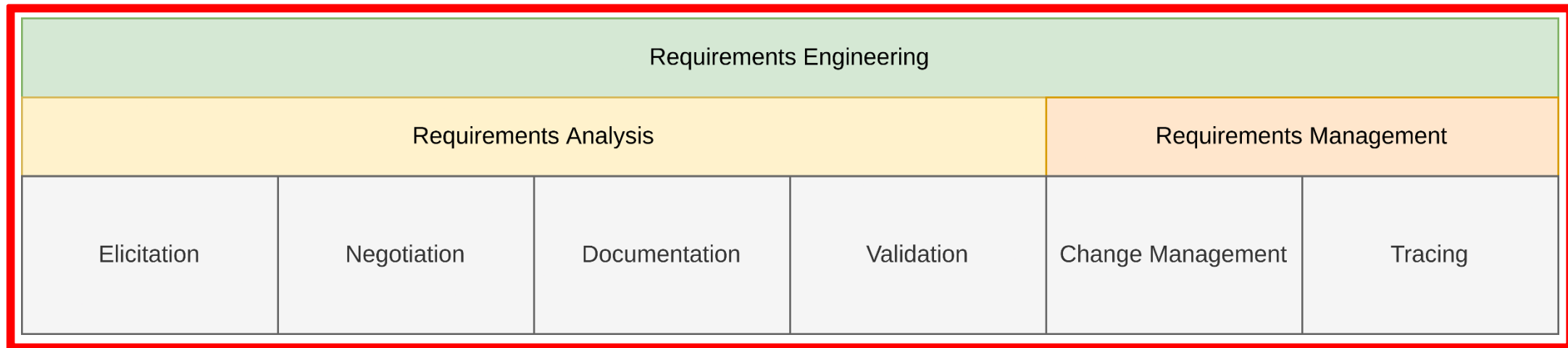
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Course Evaluation – QR Code and Link

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General Requirements Engineering Process Overview



Lecture 9: Tool Support

Content

1. Tool Support in General
2. Requirements Management Tools
3. Introducing and Evaluating Tools

TOOL SUPPORT IN GENERAL

Tool Support in General

Motivation

- Integrate and process already existing information
- Information from requirements engineering
 - Natural language requirements, models, ...
- Information that is the basis of requirements
 - Minutes, goal documents, stakeholder lists, ...
- In practice mostly support of requirements management

Tool Support in General

Traceability between Tools

- Usually, multiple tools are used
- Interfaces for integration and traceability required
 - Should be either available or easy to create
- Should allow tracing changes
- Should allow managing the traces
- Vital to know where changes are propagated to

Tool Support in General

Reuse of Tools from System Development

- Tools for development can often be used for requirements engineering
 - Often offer ability to manage requirements
 - Examples:
 - Test management tools
 - Bug tracking tools
 - Configuration management tools
- Advantage
 - Requirements automatically integrated with developed artifacts
 - Interface between requirements management tool and development tool not required

Tool Support in General

Wikis in Requirements Engineering

- Wikis offer a simple to use and easy to access opportunity for collaboratively working on documents
- Interesting for glossaries
 - Each wiki page defines a glossary term
- Well suited if a lot of different stakeholders are involved

Tool Support in General

Visualization Tools

- Mind mapping tools to support brainstorming sessions
 - Presentation tools can help guide through meetings and for describing rough analysis
- GUI modeling tools for prototyping user interfaces
- Flow charting tools to depict processes and work-flows

Tool Support in General

„Everyday“ Tools

- Mail clients, chat software, address books, online calendars vital for communication
- Project management and controlling tools also required for managing the requirements engineering process
- Help stakeholders with the coordination of tasks

REQUIREMENTS MANAGEMENT TOOLS

Requirements Management Tools

Properties

- Manage different types of information
 - Natural language requirements
 - Conceptual models
 - Sketches
 - Test plans
 - Change requests
- Manage logical relationships
 - Traceability
- Allow unique identification
 - Unique Ids for every artifact

Requirements Management Tools

Properties

- Editors for managed information
 - Multi-user access
 - Access control
 - Configuration management
 - Version management
- Different views on information
 - Developer view
 - Tester view
 - View on partial systems

Requirements Management Tools

Properties

- Organization of managed information
 - Grouping
 - Hierarchical structuring
 - Assigning attributes
 - Annotation with additional information
- Generation of reports and summaries
 - Reports of change requests
 - Reports on state of the requirements implementation
- Generation of appropriate outputs
 - Requirements document for a system release

Requirements Management Tools

Special Purpose Tools

- Comprehensive list:
 - <http://www.volere.co.uk/tools.htm>
- Examples
 - Enterprise Architect (Sparx Systems)
 - HP Quality Center
 - IBM Rational DOORS

Requirements Management Tools

Standard Office Tools

- Word processors, spreadsheet calculators
- Used in many projects due to multiple reasons
- Advantages
 - Are already available
 - No additional training required
 - Versatile
 - Well-suited for natural-language requirements
 - Adapted for requirements management, e.g., by using templates and predefined document formats
 - Allow traceability to some degree through hyperlinks

Requirements Management Tools

Standard Office Tools

- Disadvantages
 - Do not offer version control on the level of requirements
 - Do not directly support requirements engineering, e.g., traceability links often have to be maintained manually
- Drawbacks can be worked around
 - Still, the efficiency is lower than with a dedicated tool

INTRODUCING AND EVALUATING TOOLS

Introducing and Evaluating Tools

Before Introducing Tools

- Tools support existing processes
 - Process needs to be in place
 - Responsibilities must be clear
 - Techniques must be known
 - People must be able to follow all this

→ „Automating chaos just gives faster chaos“ (Dorothy Graham)

Introducing and Evaluating Tools

Before Introducing Tools

- Choice and introduction of tool costs resources
 - Licensing costs
 - Training costs
 - Customization costs
 - Support costs
 - Not only current, but possible future efforts
 - Adaption of already existing artifacts may further increase the costs

Introducing and Evaluating Tools

Before Introducing Tools

- Introduction into already started projects difficult
 - Structure in place
 - Existing concepts would have to be replaced
 - Effort and risk can be estimated
 - Often underestimated due to multiple factors
- Employee resistance
- Tool deficiencies

Introducing and Evaluating Tools

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Instead →

Introducing and Evaluating Tools

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Instead → pilot project

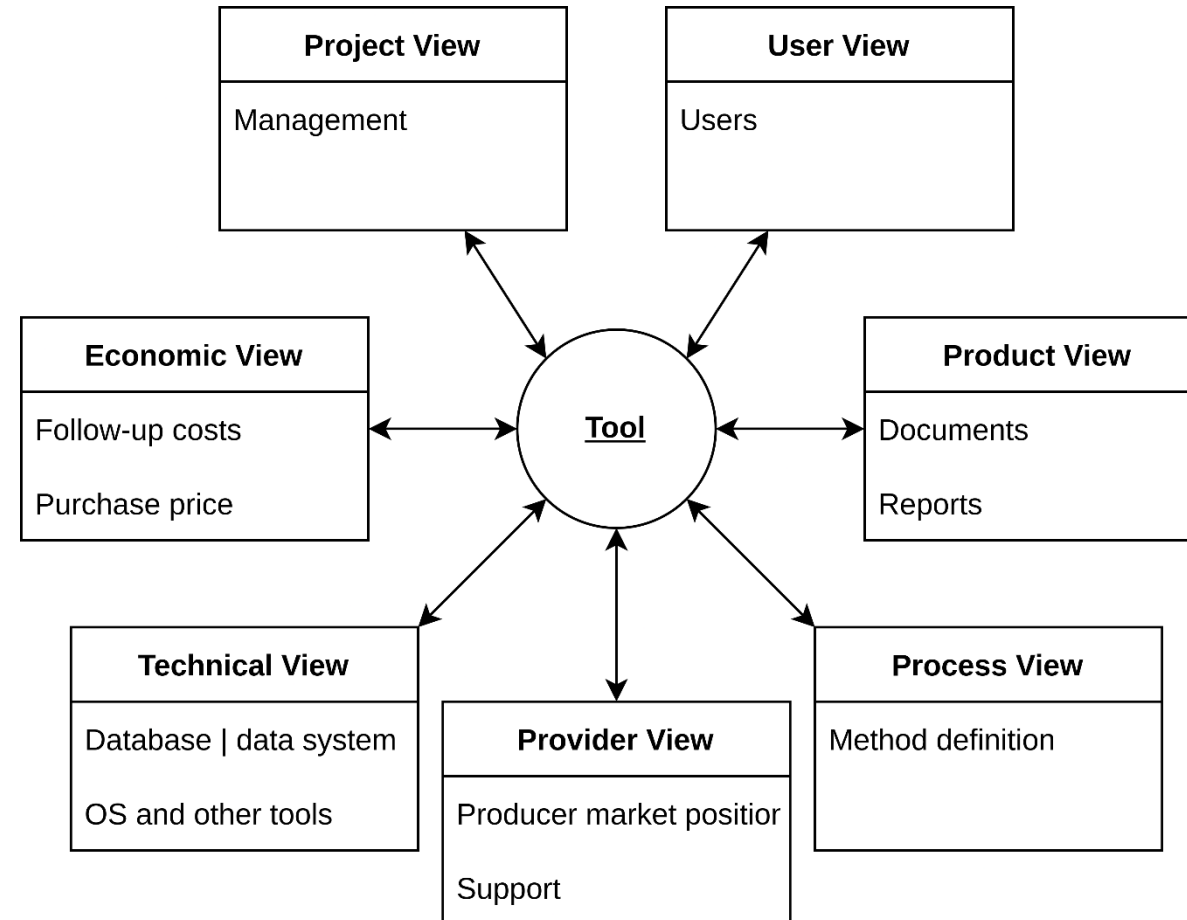
Introducing and Evaluating Tools

Evaluation of Tools

- Different perspectives matter for tools
 - Project view
 - User view
 - Product view
 - Process view
 - Provider view
 - Technical view
 - Economic view
- Should be taken into account when evaluating tools
 - Criteria for all views should be defined

Introducing and Evaluating Tools

Views on RE Tools



Introducing and Evaluating Tools

Views on Tools: Project View

- Extent to which a tool can support a project
- Project preparation
 - Definition of project-specific information types
 - Definition of project-specific document formats
- Project planning
 - Scope of milestones
 - How information managed by the tool pertains to milestones
- Project execution
 - Project control, e.g., completion of requirements

Introducing and Evaluating Tools

Views on Tools: User View

- Tool requirements from the user's perspective
- Tool usage
 - Access to appropriate functions required
- Mapping of roles
 - Stakeholders mapped to roles through user management and access rights
- Support of group work
 - Multiple users should be able to work collaboratively

Introducing and Evaluating Tools

Views on Tools: Product View

- Concerned with the functionalities possessed by a tool
 - For example, for different documentation types

- Considerations
 - Supported document types
 - Views on requirements
 - Reports that can be generated
 - Traceability

Introducing and Evaluating Tools

Views on Tools: Process View

- From the perspective of method support
 - How does a tool support the application of a specific technique?
- Ability to document activities
- Method guidance
 - Strict and restrictive guidance (e.g., wizards)
 - Lenient guidance (e.g., suggestions and hints)
- Project-specific process model definition
 - e.g, phases

Introducing and Evaluating Tools

Views on Tools: Provider View

- Market position and services offered by the tool manufacturer
- Brand awareness and reputation often important criteria
- High costs and required long-term support require strong commitment

Introducing and Evaluating Tools

Views on Tools: Technical View

- Considers technical context
- Ability to integrate the tool with existing tools
 - Evaluate APIs
- Performance of the tool
 - Evaluate how long importing/exporting data takes
- Scalability
 - Maximum number of users/objects
- Hardware and software requirements

Introducing and Evaluating Tools

Views on Tools: Economic View

- Considers costs
 - Due to acquisition
 - Introduction
 - Maintenance
 - Integration costs
 - Operation costs
 - Method tailoring

SUMMARY

Summary

- Different kinds of tools available
 - Special RE tools vs. general purpose tools
- A good process comes before a good tool
- Whatever the tool, its use must be fitting for the process
- New tools should be introduced in a pilot
 - Evaluating new tools is time consuming

Questions?