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Requirements Engineering Technology Transfer

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The Devil's Advocate



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Questions

- Does RE research address the real issues arising in practice?
- What obstacles still exist to transfer RE research results into practice?
- What are the social problems involved in changing practice?
- How could the RE research community reach software developers?



Does RE research address the real issues arising in practice?

- Requirements engineering process definition, measurement, and improvement
- Stakeholder identification, engagement, and management
- Requirements elicitation, analysis, documentation, validation, and verification
- Requirements negotiation, prioritization, and domain ontology construction
- Requirements specification languages and model-driven approaches
- Modeling of requirements, goals, and wider system concerns
- **Requirements management and traceability**
- Evolution of requirements over time, product families, and variability
- Requirements across the entire system lifecycle
- Domain-specific problems, experiences, and solutions
- Requirements in market-driven, service-oriented, and product line environments
- Requirements for highly complex systems on a global scale
- **Requirements for large-scale procurement contracts**
- Social, cultural, global, personal, and cognitive factors in requirements engineering
- Industry and research collaboration, learning from practice, and technology transfer
- Requirements engineering education and training
- **Tool support for requirements engineering**
- **Mostly academic problems!**
 - **Relevance??**



Does RE research address the real issues arising in practice?

- **Industry Practice Papers** report on the application of requirements engineering techniques, methods, and tools on concrete projects within real-world settings. These papers tell a story and relate experiences of success or failure, experiences from which both researchers and practitioners can draw valuable lessons. The focus is on what was undertaken, in what context, and on the lessons learned.
- **Industry Challenge Papers** pose problems or challenges encountered in requirements engineering practice in particular domains, projects, or settings; problems and challenges that are in need of attention by researchers, practitioners, and tool vendors.

What are the obstacles to transfer RE research results into practice



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Survey of Modelling Techniques

- Modelling Enterprises**
 - Goals & objectives
 - Organizational structure
 - Tasks & dependencies
 - Agents, roles, intentionality
- Modelling Information & Behaviour**
 - Information Structure
 - Behavioral views
 - > Scenarios and Use Cases
 - > State machine models
 - > Information flow
 - Timing/Sequencing requirements
- Modelling System Qualities (NFRs)**
 - All the 'ilities':
 - > Usability, reliability, evolvability, safety, security, performance, interoperability,...

Organization modelling:
 i*, SSM, ISAC, BPMN
Goal modelling:
 KAOS, CREWS

Information modelling:
 E-R, Class Diagrams
Structured Analysis:
 SADT, SSADM, JSD
Object Oriented Analysis:
 OOA, OOMethod, UML
Formal Methods:
 SCR, RSML, Z, Larch, VDM

Quality tradeoffs:
 QFD, win-win, AHP,
Specific NFRs:
 Timed Petri nets (performance)
 Task models (usability)
 Probabilistic MTTF (reliability)

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What are the obstacles to transfer RE research results into practice

Redwine/Riddle Maturation Model

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    graph LR
      A[Basic Research  
Recognize problem,  
Invent ideas] --> B[Concept Formation  
Refine ideas,  
publish solutions]
      B --> C[Development & Extension  
Try it out,  
clarify,  
refine]
      C --> D[Internal Exploration  
Stabilize,  
port, use for  
real problems]
      D --> E[External Exploration  
Broaden user group,  
extend]
      E --> F[Popularization  
Propagate through  
community]
  
```

Sam Redwine, Jr. and William Riddle. *Software Technology Maturation*, Proc. ICSE'91, May 1993

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What are the social problems involved in changing practice?

- We are not engineers !
 - Humans



- Lack of interest / motivation
 - Liability / Regulation

How could the RE research community reach software developers?

- Better Marketing
- Charge More





**Thanks
Obrigado
Gracias
Grazie Mile!**

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