Creativity and Innovation in Requirements Engineering

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Structure

Introduction

- What is creativity?
  - “the ability to produce work that is both novel and appropriate”
- How does it fit into requirements elicitation?
  - “Elicitation” - the word “capturing is avoided”
  - –> discovering, understanding and documenting requirements. In the recent years it is considered that they should be rather invented or envisioned instead of just gathered from them.

Current state in research and practice

- Traditional techniques do not cover gathering requirements in a creative way.
- Typically, problem analysis and system specification is the focus.
- This is embodied into many of the current processes and frameworks such as ___i*___ , **KAOS** or **RUP**.
- In innovation management, there is usually a focus on short-term market trends. Most of them don't focus on a practical elicitation of ideas, but are rather abstract models or recommendation for the higher management.

Why dös it mätter

- Requirements engineering itself is a creative process: In practice, many stakeholders express themselves creatively.
- The industry expects that creative design is expected to increase in the future.
- This is because the analytical, reactive view is considered narrow and might not provide enough innovation in the long term.
- The assumption that invention is part of the design process is considered outdated.

Why dös it mätter

- The assumption that the generation of requirements depends on the knowledge of individuals is outdated.
- Innovation depends on the gathering of new ideas. Requirements are an abstraction of these ideas. This suggests that the creative process is a part of the requirements elicitation process.
- There is also a broad range of stakeholders that could be leveraged for the innovation process. The restriction of design to the design phase limits innovation.

Why dös it mätter

- To conclude: Creative requirements engineering techniques and idea gathering are important for the innovation of a product, project or company. The biggest issues are lack of available methods, awareness and risk-aversity. We will now introduce two techniques that aim at eliciting new, innovative requirements.

We introduce two processes:

RESCUE

Background

- Inspired by scientific approaches from creativity theory
- Concurrent engineering process with different modelling and analysis techniques.
- Focus on system goal and use-case modelling.

RESCUE

Principles

- Based on creativity workshops to support three different models from creativity theory

1. Designed to support divergence and convergence on ideas
2. Each workshop encourages three different types of creativity: exploratory, combinatorial ans transformational
3. Support four different creative processes: Preparation, Incubation, Illumination and Verification.

RESCUE

Experience

- The model was tested using six iterations of workshop series.
- The first one was considered successfull and created 200 ideas and requirements.
- The second and subsequent workshops were all successfull. This led to refinements in the structure, which were then tested in a workshop with MSP (??).
- Existing use-cases provided the basis for the workshop.
- Different activites took place over the days of the workshop.
  - Brain storming, Constraint identification and removal
  - Analogical mappings to other domains were achieved by listening to experts from other domains.
  - Expert presentation on visualization

RESCUE

Experience

Findings:

- First iteration:
  - 200 ideas were invented by 20 people. 50 of them were found to be useful.
  - Important learnings and improvements were made to the structure, such as running the workshops early in the project.
  - The existing creativity theories are not sufficient for requirements elicitation. Dedicated techniques might need to be invented.

RESCUE

Experience

Findings:

- Last iteration:
  - Brainstorming generated more ideas than analogical reasoning.
  - Combining ideas was most effective when done during storyboard development
  - Removing constraints provided more ideas than presenting knowledge from the solution-space.
  - Reassured to run workshops after a first scope was defined
  - They did not find issues with runninng one-day workshops instead of two

Star Search

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Comparison/Conclusion of the two