Supporting Creative RE with i*

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EIGHTH INTERNATIONAL i* WORKSHOP

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Country be awesome!

Creativity and Goal Modeling

- Successful software, particularly in business, must be both useful and innovative

- RE has focused mainly on software utility

- Goal-oriented methods aim to systematically ensure that requirements meet user needs

- Little emphasis has been placed on creativity

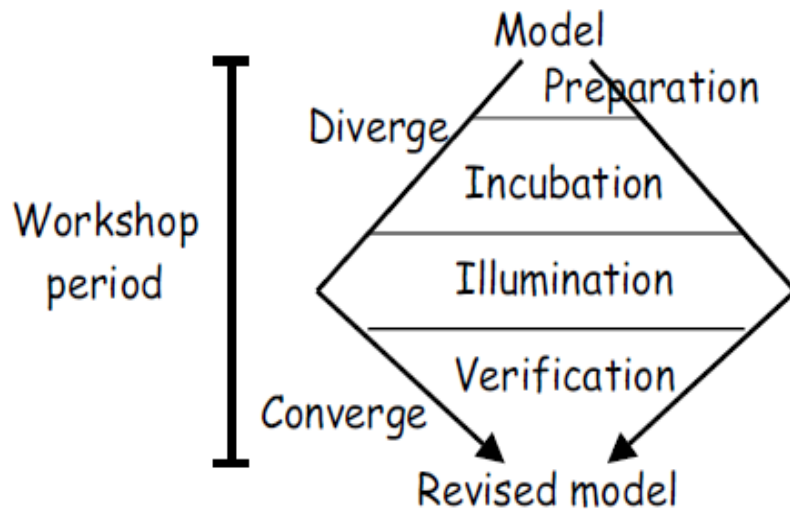 – How do we make sure goal models capture creative ideas and alternatives?
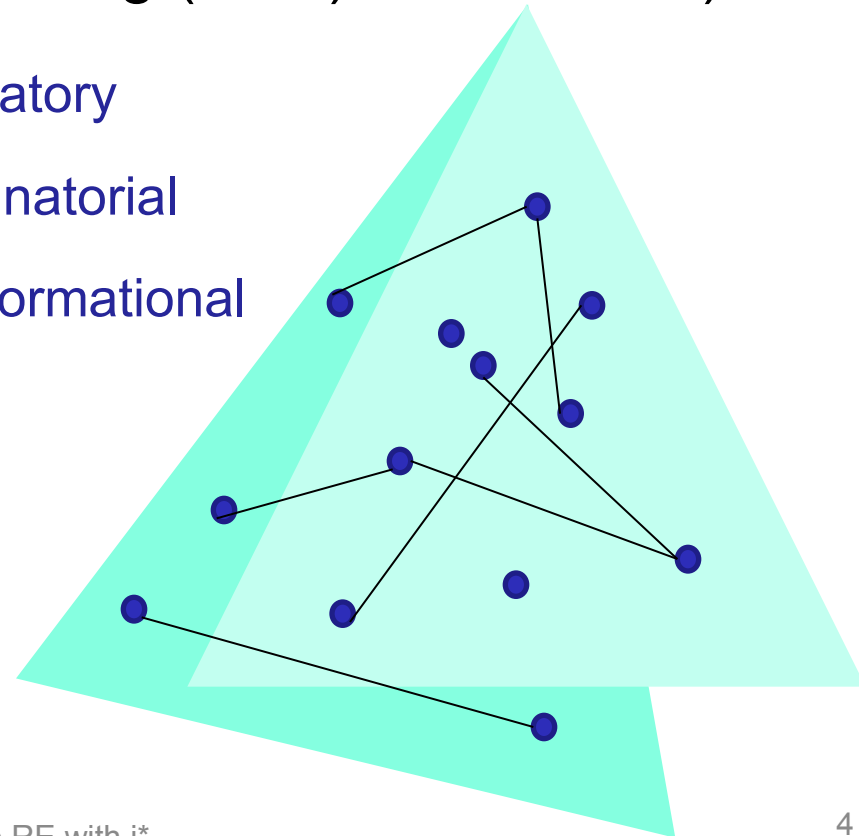
Background: Goal Modeling ☺
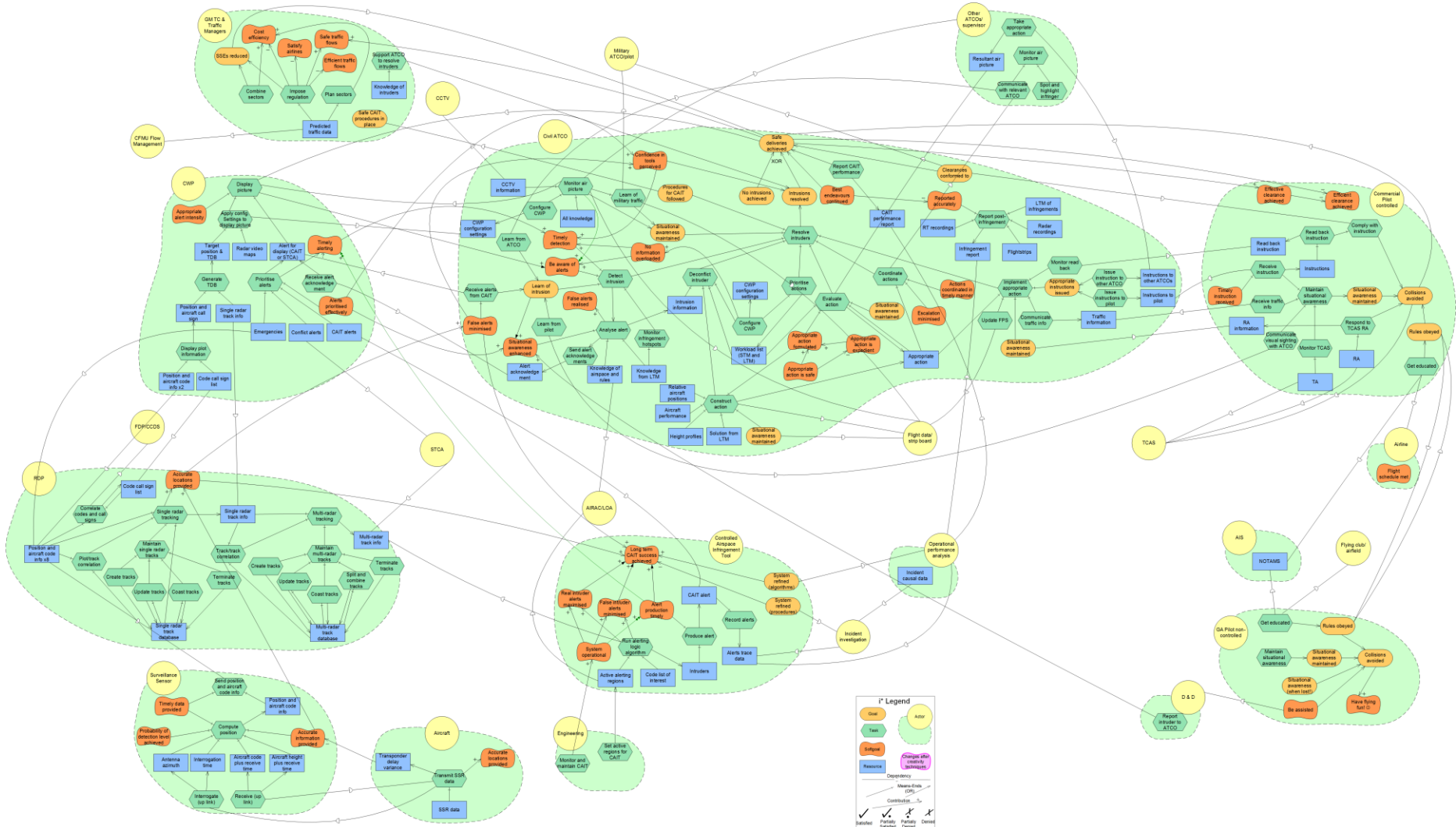
Background: Creativity

- Many people studying creativity outside of RE for 80+ years, much work in the social sciences… (Boden, 1990) (Osborn's Creative Problem Solving (CPS) model 1993)

Exploratory

Combinatorial

Transformational

Maiden et al., IEEE Software 2004

Creativity Activities

http://becreative.city.ac.uk/

Creativity Workshops

- Part of RESCUE process, applied to Air Traffic Control, Food Safety, Work Integrated Learning
- Input: some diagrams (context, rich picture, use case), textual use cases
- Stages:
    - Round Robin (exploratory)
    - Scoping (transformational)
    - Creativity Triggers (exploratory)
    - Constraints (transformational)
    - Ideas from presented design features (exploratory)
    - Storyboarding (combinatorial)
- Output: collages using mappings and pictures, storyboards, idea cards, and mock-ups.
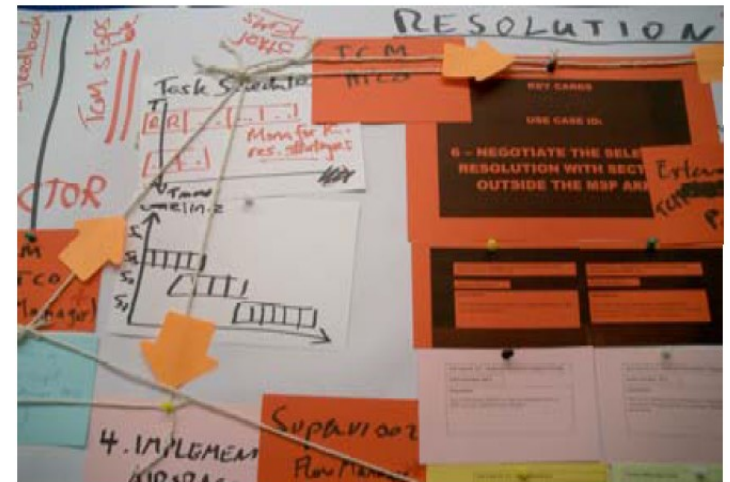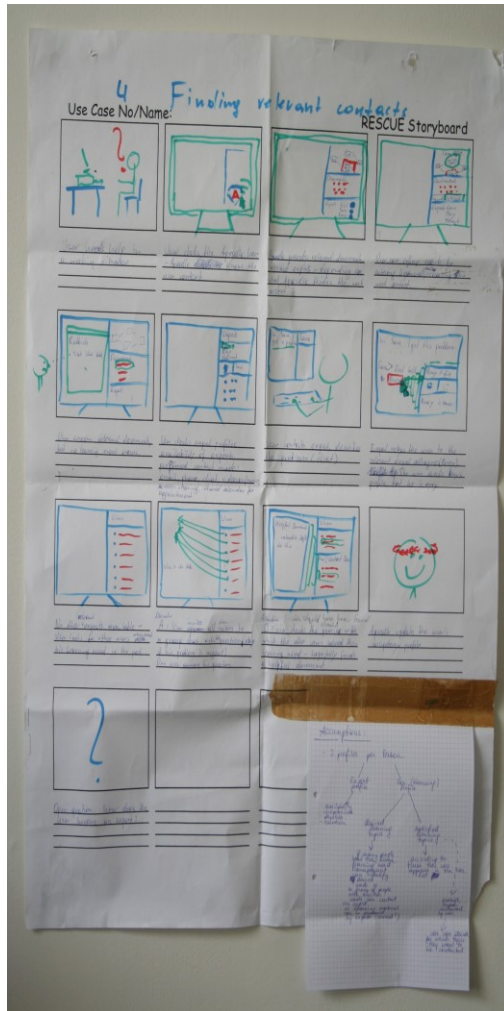
Creativity Workshops

Figure 4. A section of the rich storyboard for the MSP system.

Creativity in RE

- Stakeholders are limited by what they perceive to be possible and influenced by their experiences

- Creative RE is about discovering requirements stakeholders were not aware of
    - Not requirements elicitation, but requirements discovery

Creativity and Goal Modeling Affordances

Goal Modeling for RE	Creativity Approaches for RE
Graphics facilitates communication and shared understanding	Lack of structure means that domain conceptualization may not be well-shared
Emphasizes intentions, motivations, purpose, "why?"	No explicit recording of purpose, goals, rationale
Emphasizes social relationships, "who?", dependencies	Beyond context diagram, techniques don't emphasize "who?", dependencies
Facilitates more completes analysis, visualization helps to find gaps	Difficult to visualize the creative search space, completeness of creative search hard to visualize
Explicitly captures alternatives, allows reasoning over alternatives, ideas, rationale for choices	No explicit support for alternatives, exploring consequences, or rational capture for choices
Reasoning allows to check the sanity of a model, check domain understanding	No reasoning, no checks

Creativity and Goal Modeling Affordances

| Goal Modeling for RE	Creativity Approaches for RE
No explicit support for creativity or innovation.	Participants come up with new and useful ideas – facilitate innovation
Structures means limited expressiveness	Rich pictures allows for high expressiveness
Goal models are viscous (difficult to make large changes)	Rich allow for free flowing and quickly changing conceptualization of the domain
Goal modeling can be difficult to learn and use. Easy to get caught up in language details	Uses easy to learn and use diagrams (context, journey maps), rich pictures. Little distraction from syntax and semantics.

- Techniques are complementary

- In some cases creativity enhances goal models, in other cases goal modeling enhances creativity

- (1) Understand nature and direction of enhancements

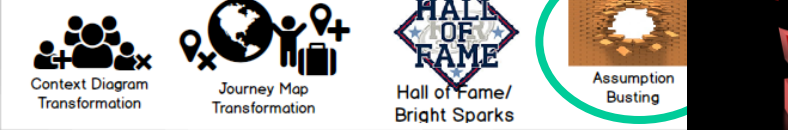- (2) Design method/supporting tool to take advantage

Supporting Creative RE with i*

Tooling/Method (Wireframe!) Prototype

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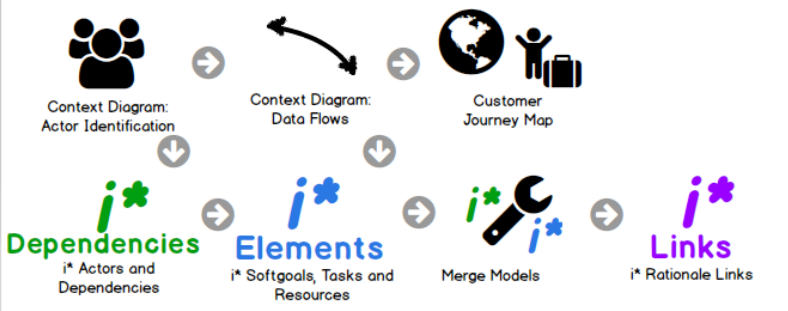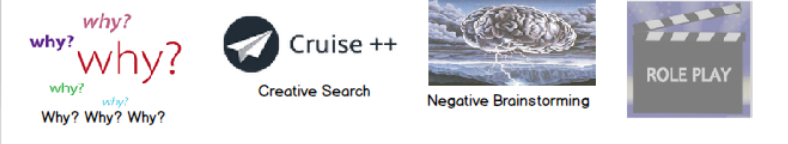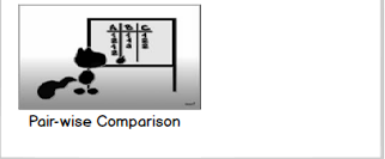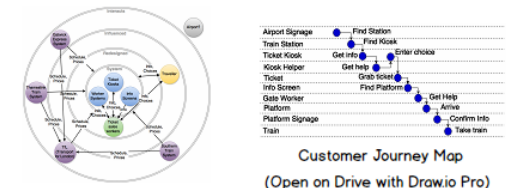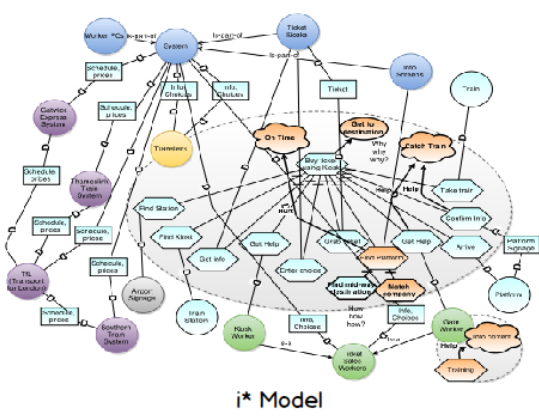
Understanding and Designing Individual Activities

- In order to capitalize on the advantages of each technique:
  - When to use/introduce goal model?
  - How to use goal model?

- Understanding how people do this "naturally"
  - What works and what doesn't
  - Emulate "natural" behaviour with method and tool design
  - Pilot studies for individual techniques
    - First with paper, then using digital models (smart boards)
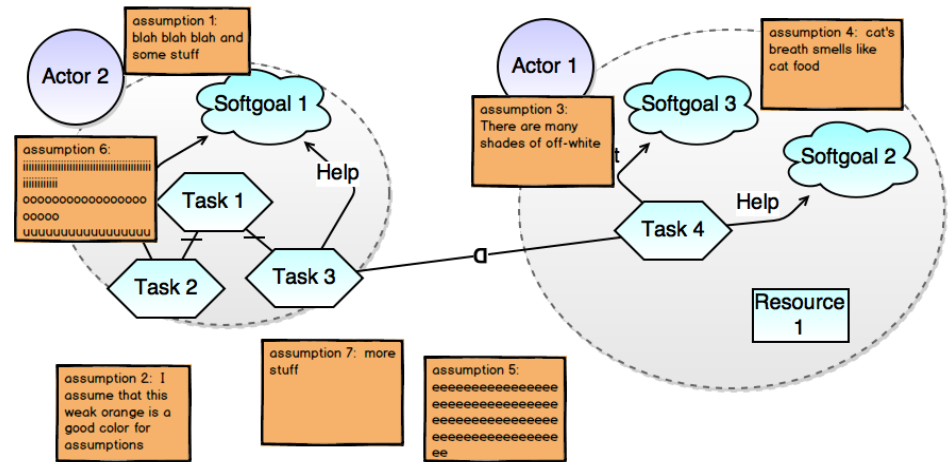 - Looking for participants! horkoff@city.ac.uk or just talk to me ☺

CREATIVITY & GOAL MODELING ACTIVITY EXAMPLES

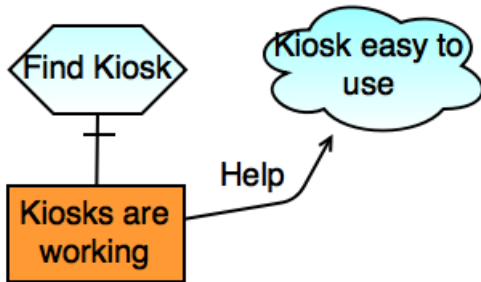# Assumption Busting (Transformational/Exploratory)
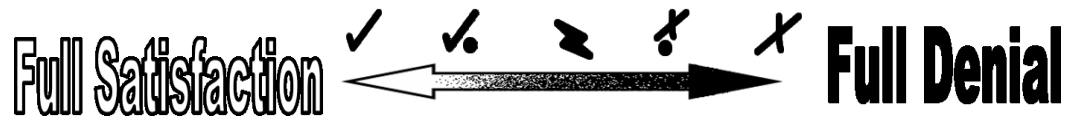
1. Find Assumptions
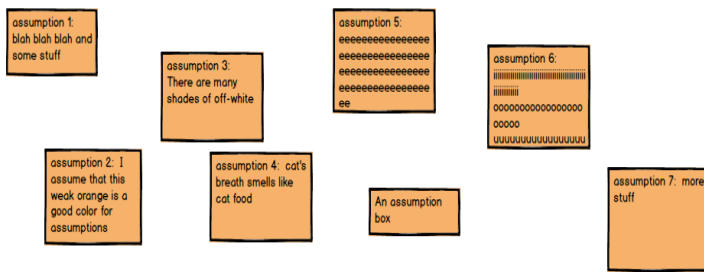
2. Cluster Assumptions

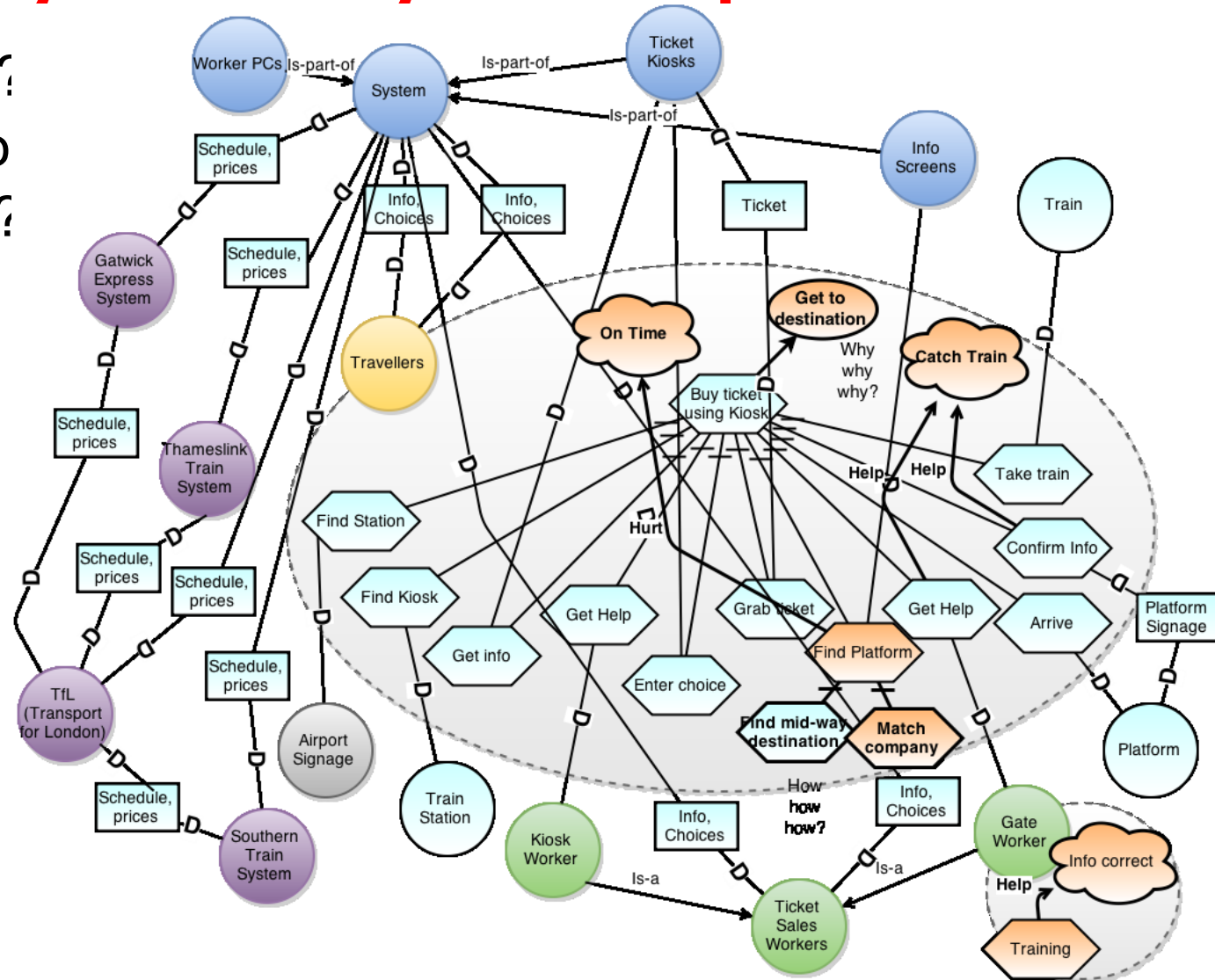## 3. Model Assumptions
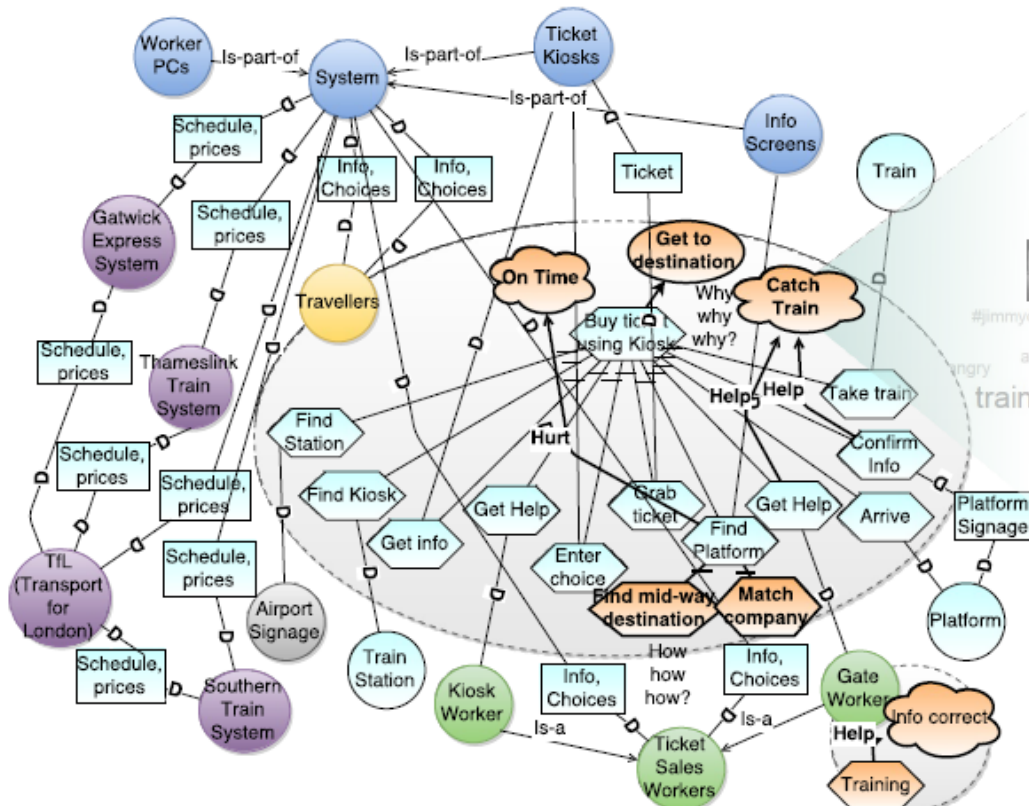

3. Bust Assumptions!

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Exploratory Creativity Techniques

- Why why why? (who who who how how how?

- Negative (positive) brainstorming

- And…
  - BrightSparks
  - Creativity Triggers

(Exploratory) Creative Search

Conclusions

- Goal modeling and creativity have the potential to work well together
- Create method/tool which supports:
  - The discovery of creative requirements
  - In a systematic, visual and structured way
  - Facilitating reasoning over creative ideas

- Studies studies studies
- On paper, digitally with small groups
- Prototype implementation
- In industrial settings

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THANK YOU!

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Creativity Trigger Survey

- Please fill out our (very short!) survey

What makes Innovative solutions Innovative?

Take our survey to find out!
goo.gl/trlUZt