Expertise Management

an human-oriented, brain-inspired approach

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Introduction

Knowledge Management (KM) comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences.

Source wikipedia: knowledge management

Know how: Expert skill, information, or body of knowledge that (1) imparts an ability to cause a desired result, (2) is not readily available, and is (3) outside the public domain.

Source BusinessDictionary.com: know how

The "purpose" of human memory is to use past events to guide future actions: the basic idea of the Memory Prediction Framework
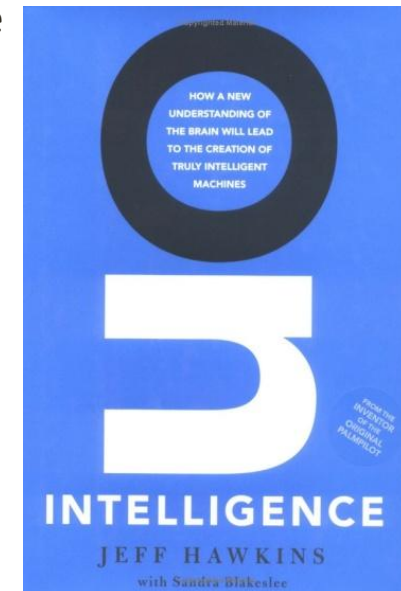
Short term/working memory
- Reasoning, decision making, 7 ± 2 slots

Long term memory
- Explicit/declarative memory (*knowing what*)
  - Semantic memory (concepts & facts), episodic memory
- Implicit memory (*knowing how*)
  - Skills, tasks, conditioning

We want to capture both *knowing what* and *knowing how* knowledge
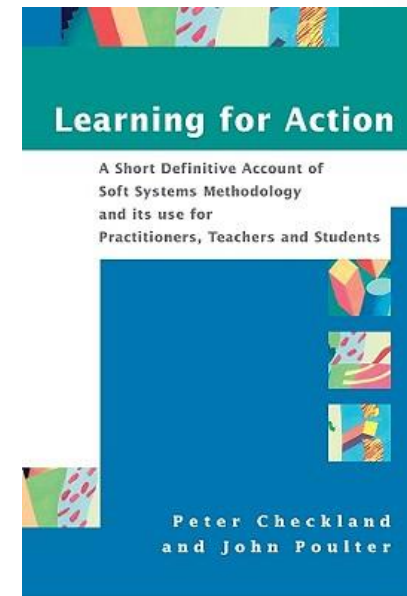
Managing expertise

Soft System Methodology
- System theory
- Action research

Basic philosophy
- We are living in a complex society with "messy" situations that can be improved somehow
- People want to act purposefully according to their worldviews
- Approach
  - First, explicate these individual worldviews
  - Next, discuss and debate
  - Finally, take action to improve a situation
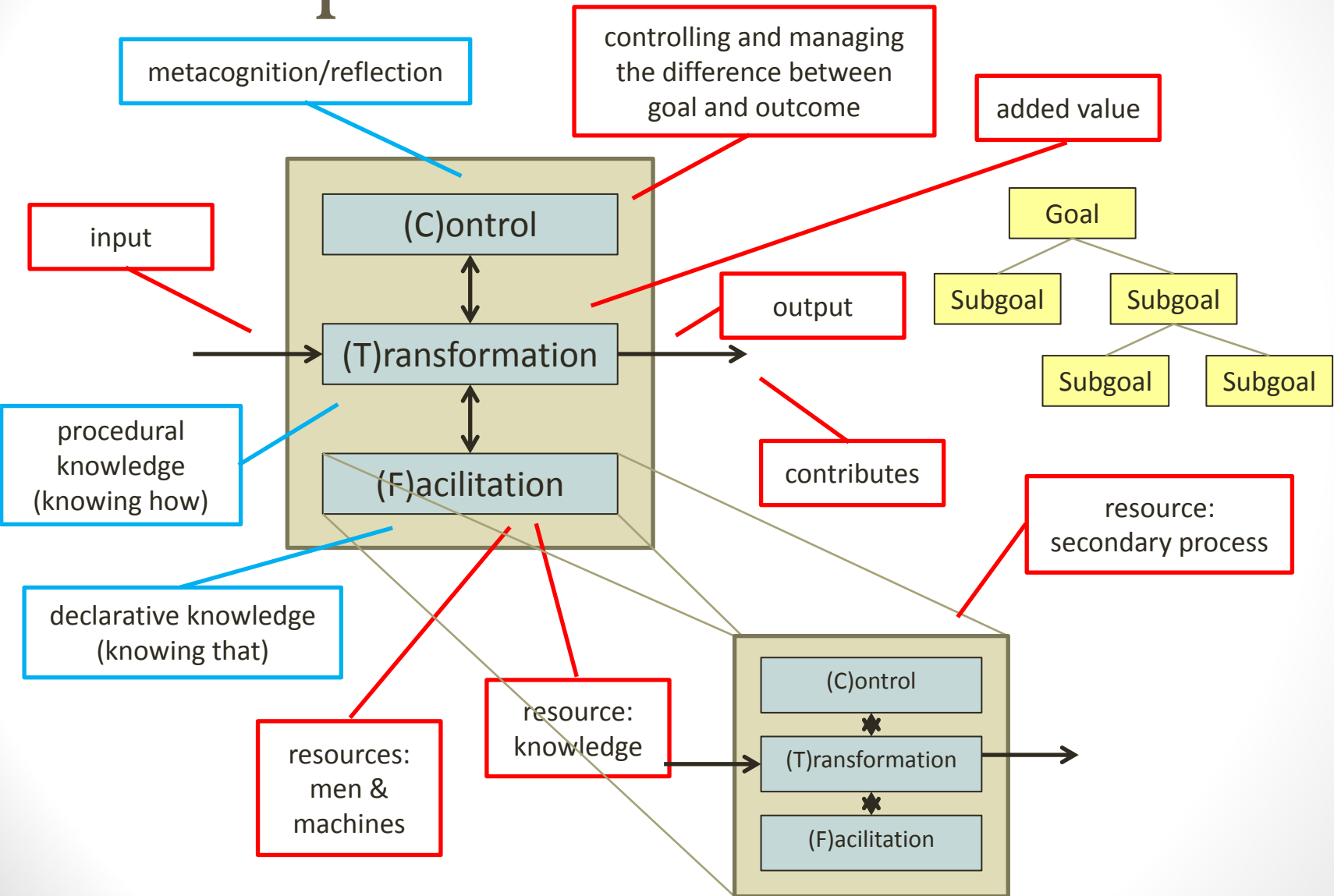
Expertise Management Method
- In search of (not yet discovered) good and bad practices, by valuing and sharing insights
- In essence, this is a group learning process

Learning for Action

A Short Definitive Account of Soft Systems Methodology and its use for Practitioners, Teachers and Students

Peter Checkland and John Poulter

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Expertise Management Ontology (EM$_{ont}$)

- Mimicking long-term memory
- It is no expert system:
  - it is up to the users to reason about the captured knowledge (working and short term memory functions)
  - The process of sharing and valuating expertise – i.e., group learning – is grounded in SSM (transferring expertise to long term memory)

- Features:
  - Capturing both "knowing that" and "knowing how" knowledge
  - Flexible building block approach
  - Making use of standards:
    - User Requirement Notation (URN)
   - Simple Knowledge Organization System (SKOS)

Conceptual model: CTF blocks

metacognition/reflection

controlling and managing the difference between goal and outcome

added value

input

(C)ontrol

(T)ransformation

(F)acilitation

output

Goal

Subgoal

Subgoal

Subgoal

Subgoal

procedural knowledge (knowing how)

contributes

declarative knowledge (knowing that)

resource: secondary process

resources: men & machines

resource: knowledge

(C)ontrol

(T)ransformation

(F)acilitation

Contexts

(based on User Requirement Notation)

- Knowledge is context-dependent
- What is in a context?
  - The worldview of an *actor*
  - *Beliefs* (starting conditions)
  - *Goals*
  - *Activities* for achieving goals
 - Relationships: *contributes*, *depends*, *decomposes*.
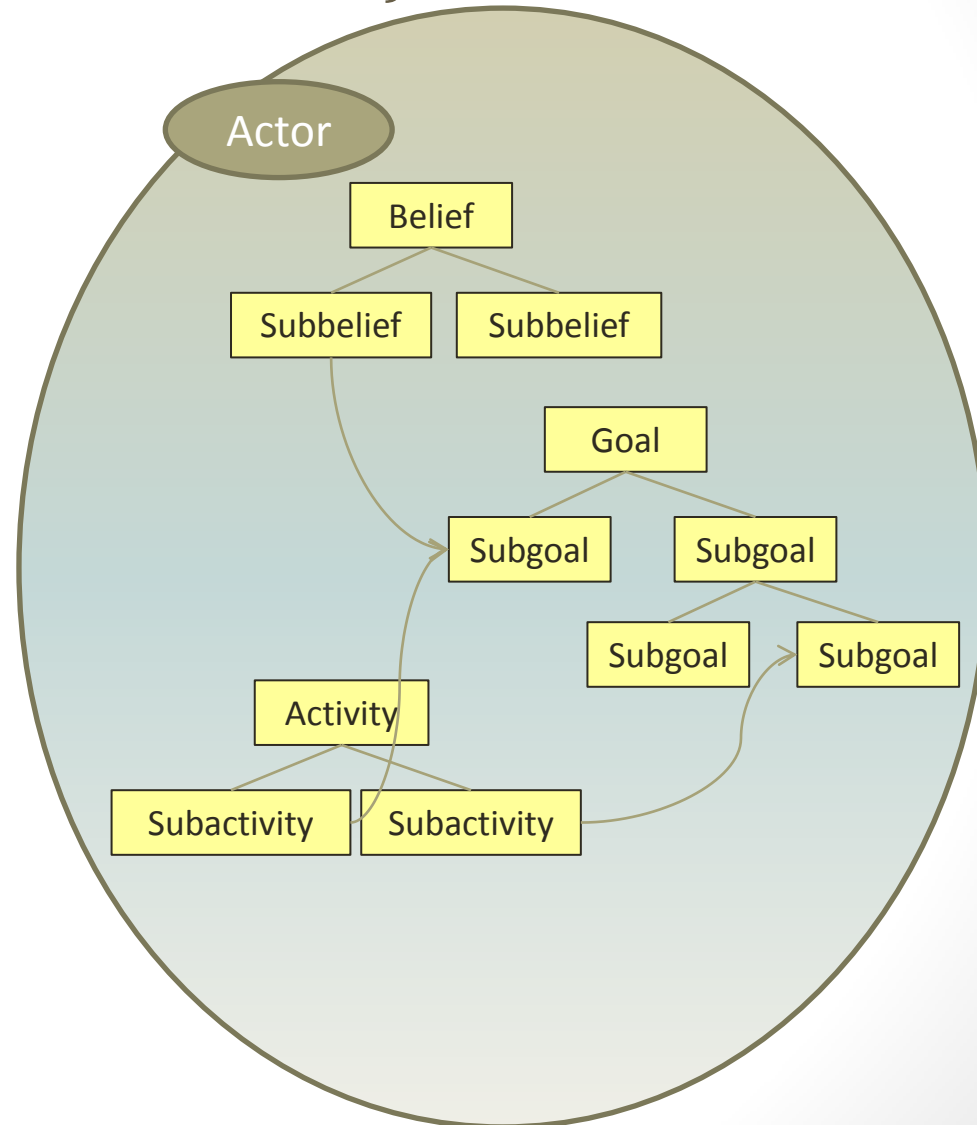
Cognitive coherence

- Thagard proposes that many cognitive functions, including perception, analogy, explanation, decision-making, planning etc., can be understood as a form of (maximum) coherence computation.

- The model posits that coherence operates over a set of representational elements (e.g., beliefs, goals, emotions, etc.) which can either fit together (cohere) or resist fitting together (incohere)
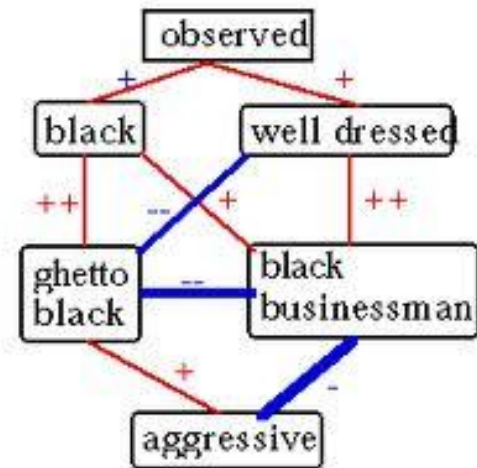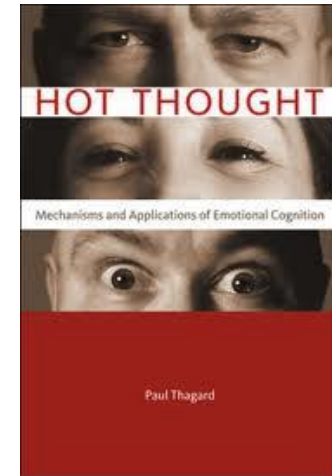
Practices and experiences

From practice to experience: reducing the degrees of freedom
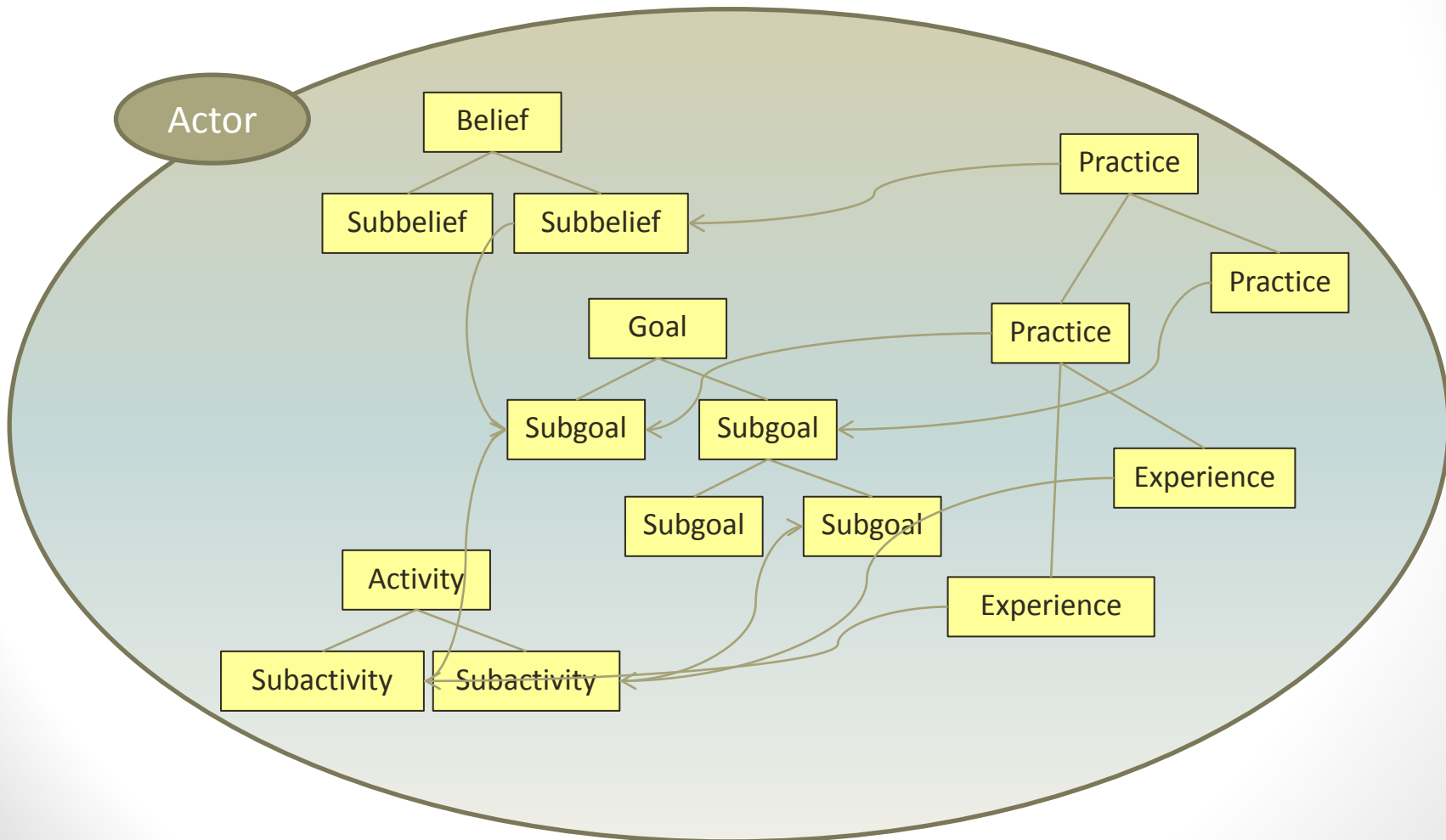
Concept maps

- A concept map is a diagram showing the relationships among concepts. It is a graphical tool for organizing and representing knowledge:
    - Provides insight in a domain (very useful in education)
    - First step in formalizing a domain (ontology building)
- Visual Understanding Environment (VUE) (vue.tufts.edu)
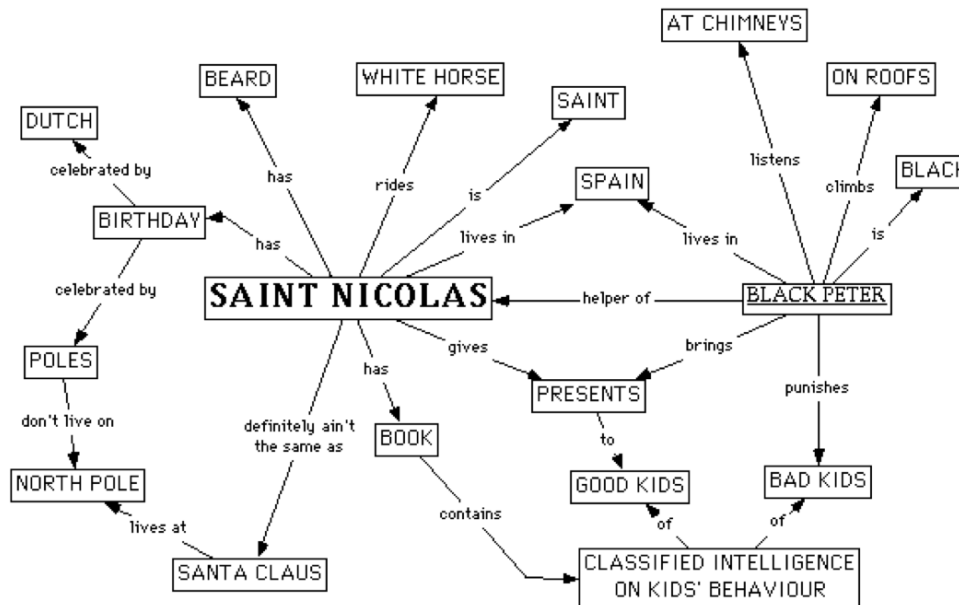
Semantic Wiki

- Wiki's are well suited for dissemination
    - User generated, moderated articles
    - Articles are connected through static links
    - Easy to use

- Wiki's are great, but it can be even greater: semantic Wiki:
    - Articles annotated with properties
    - Other articles may contain query's based on properties: dynamic links, always up-to-date
    - Querying the semantic-web with Sparql

    → A semantic Wiki makes information and expertise accessible in a structured way

- Take a look at: www.zeeweringenwiki.nl

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