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LearnSafe
from an "academic" point of view

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Objectives

The main objective of the LearnSafe project is to create methods and tools for supporting processes of organisational learning at the nuclear power plants (NPP).

their decisions, approaches and attitudes

The focus of the project is senior managers at NPPs and power utilities who are responsible for strategic choice and resource allocation.

The LearnSafe project will develop methods and tools, which can be used in the management of change, and in ensuring an efficient organisational learning.

My interpretation:

(1) To develop methods and tools to support senior managers in management of change.
(2) To develop methods and tools to efficient organisational learning (but by whom?).

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Perceived challenges

What are the perceived, emerging challenges (in the management of NPP)?

Economic pressure (maintain competitiveness)
Human resource management (maintaining competency of NPP staff)
Nuclear know-how (maintain competency among vendors)
Rules and regulations (maintain open communication with regulator)
Focus and priorities (maintaining own capability to meet goals)
Ageing, modernisation and new technologies (maintain plant technical condition)
Public confidence and trust (maintain social acceptability of nuclear power)
Organisational climate and culture (maintain motivation and safety culture)

How do senior managers cope with the emerging challenges?

Money
People
Technology
Practices
Environment (social)

Question?
Are these independent?
What is the criterion of efficiency?
How does learning take place, and how can it be enhanced?

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Important balances

	Safety ⇔ Efficiency
	Tradition ⇔ Renewal
Management:	Formal ⇔ Informal
	Self-confidence ⇔ Willingness to listen
Decision making:	Centralized ⇔ Distributed
Procedures and practices:	Discipline ⇔ Flexibility and innovation.
	Maintain overview ⇔ Not loose details.
Priorities:	Short term ⇔ Long term.

One of the hypotheses in the project is that an efficient identification and management of these balances is one of the root causes of good performance in nuclear power plants.

Question?
How are the balances maintained?
How do they influence each other?
How can their management be supported?

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Model(s) of system

Money
People
Technology
Practices
Environment (legal, social)

Political-economic environment
Workforce
Technology
Organisation of NPP/utility

Technology
Individuals
Group
Organisation
  administrative view
  political view
  cultural view
Environment

Question?
How many levels?
How are the models related?
What do the models model?
Can the models be independently verified?

ORFA project

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Safety performance indicators

Safety can be characterised by an absence of risks, which means that threats are known and have been acted upon in a proper way.

List of event "forerunners" with potential impact on plant hardware & performance.

- Annual rate of safety-significant errors (i.e., reportable violations of technical specifications) by plant personnel, contractors, and others.
- Annual rate of maintenance problems (defined as maintenance rework or overdue maintenance).
- Ratio of corrective versus preventative maintenance work requests (MWRs) on safety equipment.
- Annual rate of problems (deviations/failures) with repeated root cause (i.e., a cause previously identified by a vendor, the plant, another plant, the regulator, etc., for a similar plant or group of plants, or for similar components).
- Annual rate of plant changes that are not incorporated into design-basis documents by the time of the next outage following the change.

Safety is a dynamic non-event (Karl Weick)

Questions:
Which are the safety performance indicators identified by the project?
How can they be used to support (efficient) organisational learning?

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Organisational learning

The generic schema of organizational learning includes some informational content, a learning product, a learning process which consists in acquiring, processing, and storing information and a learner to whom the learning process is attributed.

Organizations as information-processing brains (Simon)
Organizational knowledge base (Pautzke)
Single-loop, double-loop learning (Argyris)

A big problem thereby lies in the measurement of organizational learning, in making it operational and completing the transformation of organizational knowledge base.

Structural aspects	Overlapping steps of implementing structural features
Dynamic aspects	Requisite psychological characteristics of the organisation and its staff promoting organisational learning
Procedural aspects	(?)

Barriers to organisational learning:
36 barriers found in the literature.

Questions:
How can knowledge about barriers be turned around to support (effective) learning?
How do the barriers relate to the system model (levels)?

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Conclusions?

n-level system
Balances
Barriers?
Safety indicators?

Models ⟷ Methods

Content analysis,
(meta)Fuzzy set analysis
- Methods for managers?

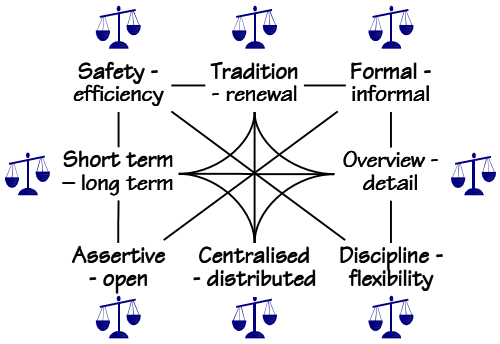
Interview guidelines
Metaplan sessions
Analysis?
Organisational learning?

Is (efficient) management of change the same as (efficient) organisational learning?

How can the balances be (efficiently) managed? (and modelled?)

How do they relate to safety?

How can (organisational) learning be supported?



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Components of safety?

Requisite variety

The controlling systems must have (at least) as much variety as the target system.

Solution 1: increase the variety of the controlling system ("prepare for the unexpected")

Solution 2: reduce the variety of the target system

Is safety one or the other - or both?

Unsafe organisation ⇨ (Many) Accidents

NOT [Unsafe organisation] ⇨ NOT [(Many) Accidents]

Safe organisation ⇨ Few accidents

Since the last statement does not follow logically from the first, then how should safety be defined?

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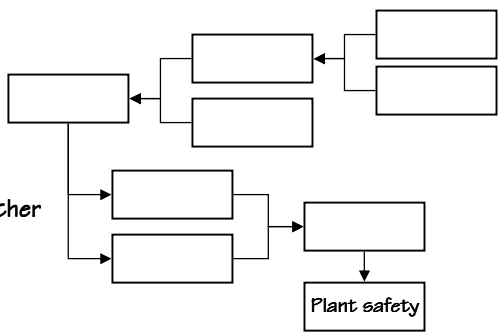
Other issues

THE USE OF TIME:

Shortage of time is important - both at the sharp end and the blunt end
To compensate for lack of time, people make a trade off between thoroughness and efficiency.

Question: If time is so important, why is it not part of the models?

Influence diagram:



Question: Why is it linear rather than non-linear?

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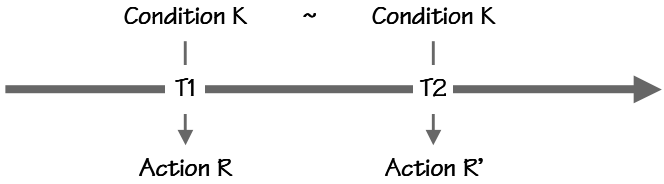
What is learning?

The effect of learning means that a system (individual, organisation) acts (responds) differently to the same condition. The difference can be either positive or negative.



$\Delta T = T2-T1$ — How large must ΔT be before learning takes place? How fast do we expect the effects of learning?

$\Delta R = R'-R$ — How large must ΔR be to show learning? What are the indicators of learning?

How small can ΔK be for two conditions to be "the same"?

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Models of learning?

What learning IS?
(structural view)

What learning DOES?
(functional view)