Characteristics of learning organizations

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Introduction

- The project „LearnSafe“ centers on how nuclear organizations may be able to improve their coping with emergent challenges
  Challenges may originate both from within or without the organizations.
- The main mechanism to improve individual or organizational coping with novel challenges is through learning.
  Therefore it seems necessary to reflect on the conditions for learning.
- First I will address the mechanisms by which individuals learn.
  In the second part I shall then extend the lessons from individual learning to organizations.

The organizational learning metaphor

LearnSafe

- Errors are constitutive of human nature (“errare humanum est”).
- Errors are important for individual learning.
- But individual learning does not necessarily imply safer systems.
- Apparently more is needed than individual learning in order to improve systems safety.

People learn from errors

The organizational learning metaphor

- In high hazard systems safety must be considered as the most critical performance parameter.
  There are two basic analytic strategies to optimize this parameter:
  - **Feedforward control** techniques are considered as state of the art and are commonly employed in improving probabilities of safe systems conduct (Rasmussen, 1991; Kirwan 1997) as e.g. Probabilistic Safety Analysis (PSA) or Human Reliability Analysis (HRA).
  - Conceptual notions and pragmatic tools of **feed-back control**, i. e. improved safety control through learning from experience, still remain in dire need of development (Huber, 1991).

The organizational learning metaphor

- Casual observations and systematic studies demonstrate that organizations do retain knowledge of past experience (Walsh & Ungson, 1991).
- Events in an organization's history may thus be attributed to constitute promising material and triggers for organizational learning (Koornneef, 2000).
- The better the organizations understand the factors and their interaction which led to events, the better are the chances to utilize such experience to improve safety.

Organizations learn from events

Events are defined as occurrences of unexpected, undesirable system states.
In nuclear industry we usually call this learning from operational experience.

1. Individual learning

- The term OL is used in a metaphoric sense in analogy to individual learning.
- Learning is generally defined as **change of goal directed behavior based on experience.**
  Special goals of such directed behavior may be to cope with a new challenge.

What then is required for individual learning?

- Required is an organism equipped with
  - sensors to register stimuli from within and outside of the organismic system
  - a sensory afferent apparatus transporting information (processor)
  - a center for storing experience (memory)
  - a center for analyzing stored experience
  - a center for formulating new behavioral goals
  - an efferent apparatus transporting information (effectors)
  - operators implementing the new intended behavior (reactions)
  - afferent feedback to center

Model of individual learning

Somewhat simplified a model of individual learning in terms of information processing and decision making could be represented:

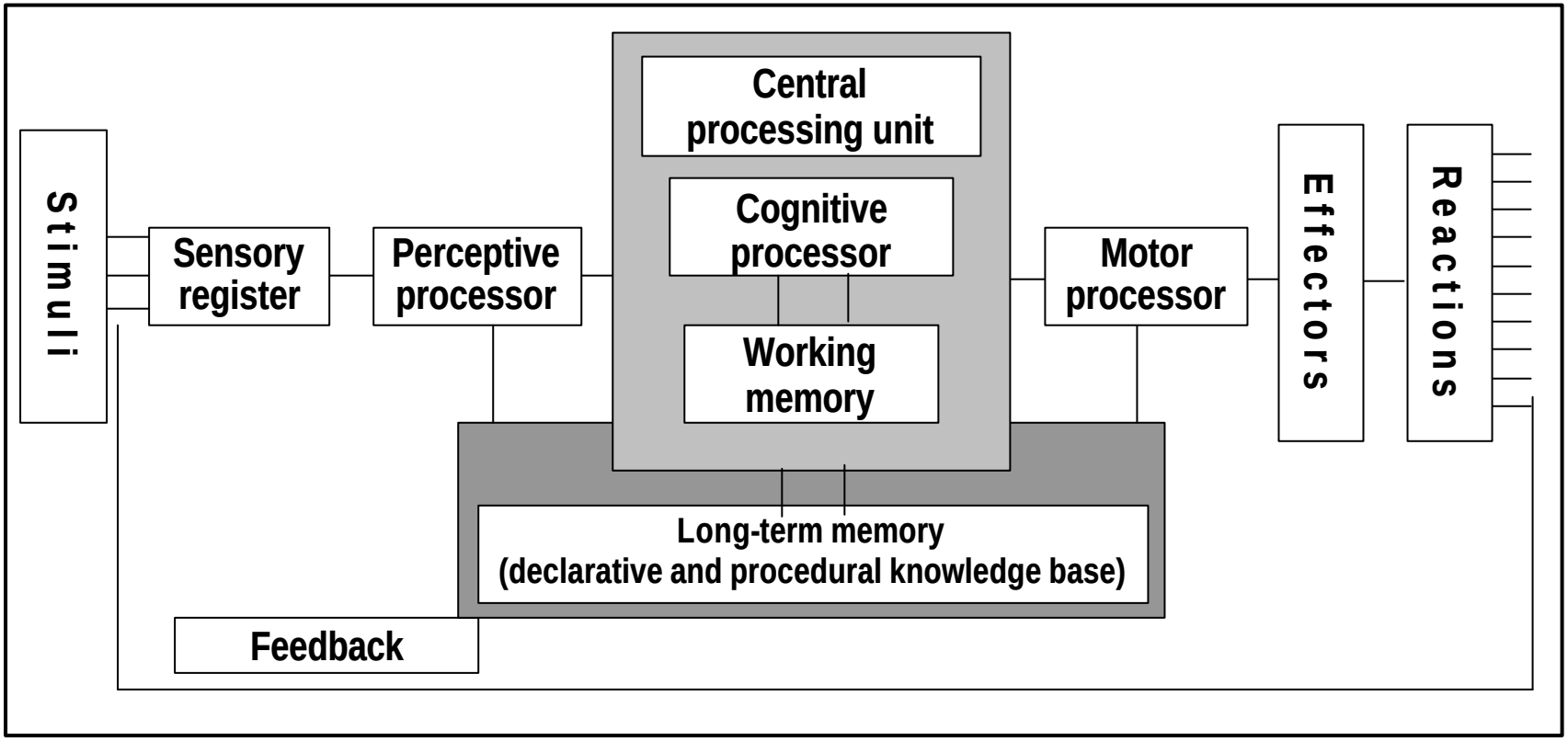

Figure 1: Model of human information processing (Streitz, 1987, p.49)

2. Organizational learning

- The metaphor for organizational learning based on individual learning breaks down when …
  - it comes to many actors (organization members)
  - sharing their individual memories, knowledge and competencies.
- Organizational learning is the development of a commonly shared 'available knowledge' base, that builds on past knowledge and experience.
  The members of an organization act as units/subjects of such learning processes (Pautzke, 1989).
- Organizational learning occurs when individuals within an organization experience a problematic situation (a surprise) and inquire into it on the organization's behalf (Argyris & Schön, 1996)

2. Organizational learning

- Organizational learning is the process whereby organizations understand and manage their experiences.
  This view of organizational learning builds upon the information processing perspective (Simon, 1976).
  - Organizations are described as information processing systems, acquiring, interpreting, distributing, and storing information within the organization
- Organizations with such information processing and decision making are also known as ’learning systems‘.
  ’Learning systems‘ have mechanism, that maintain and institutionalize learning (Shrivastava, 1983).

2. Organizational learning

From the notion of collective knowledge base follows that individual learning is insufficient for organizational learning.

- Individual learning in order to become organizational or even collective needs to be shared.
- And knowledge sharing requires the institutionalization of
  (1) certain structures and
  (2) dynamic processes.

2.1 Structural Aspects

Central characteristics of OL may be considered in terms of different over-lapping steps of implementing structural features in the organization:

(1) The systematic collection of experience through event analyses and analyses of practice inside and outside of the focal organization. This requires the implementation of a systematic analysis method of events and near misses, of malfunctions and the encouragement of voluntary reports of safety relevance.

(2) Regulatory oversight (event reporting systems, periodic safety reviews) with feedback loops into NPPs.

(3) Peer reviews (IAEA, WANO, by representatives of other national NPPs).

(4) The development of a data base which facilitates comparisons of experience, i.e. the classification system of events in the collective data base must have a solid theoretical grounding in order to avoid mixing apples and pears.

(5) A central processing unit (CPU: the brain) which is able to analyze the gathered experience.

2.1 Structural Aspects

(6) A decision making unit (upper management) which evaluates the analyses of the PU and proposes optimization measures.

(7) A feedback system which feeds the decisions of the decision making unit back to relevant groups within and outside the organization who are able to execute the decision.

(8) The implementation of the optimizing measures.

(9) Procedures of evaluating the effectiveness of optimization measures.

(10) A feedback system back to step 1.

2.1 Structural Aspects

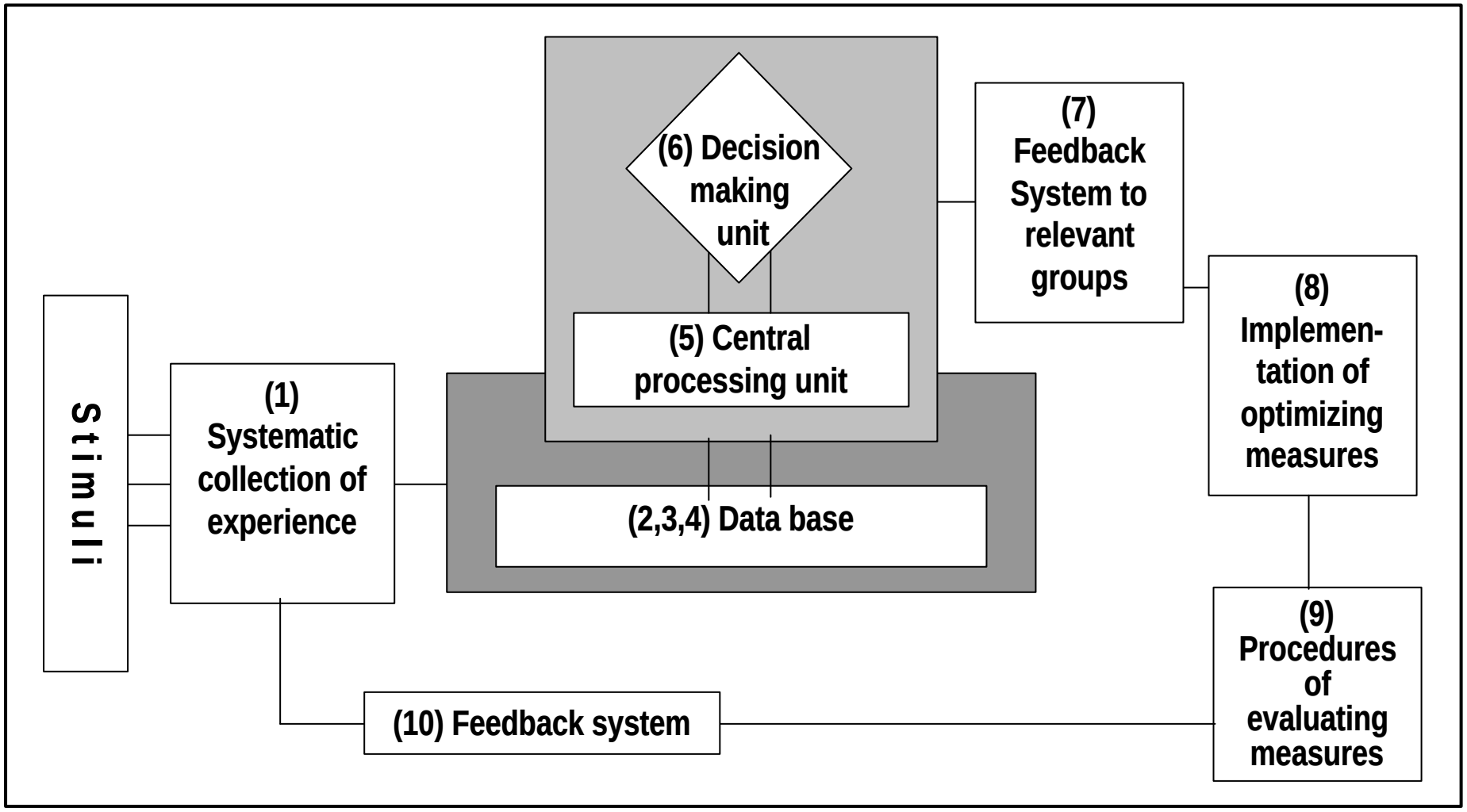

Figure 2: Model of structural aspects of organizational learning

2.1 Structural Aspects

The parts (1) and (2-4) define organizational learning as the development of a knowledge base (Pautzke, 1989) whereby the organization members use the existing structures for the systematic collection of experience.

Various standardized procedures and methods are available to foster the creation of collective knowledge bases:

- Metaplan-exercizes as used in the LearnSafe project leading to a joint understanding of a particular problem area
- Group problem solving exercises such as mind-mapping which helps a group to identify factors that influence undesirable organizational outcomes (e.g. de-motivated personnel)
- Systematic reviewing of experience by comparing action plans with outcomes, keeping diaries, analyzing video and audio recordings of work processes, peer appraisals

2.1 Structural Aspects

- Parts (6) to (10) build on the models of Simon and of Streitz reconstructing information processing of individuals and organizations.
- Furthermore the different learning forms by Argyris & Schön are included in this model as well to underline the depth of the acquiring, interpreting, distributing, and storing processes.

2.2 Dynamic Aspects

- OL and, as an integral part of it, the learning of individuals, are dynamic processes over time.
- They occur in the context
  - of different and changing environments,
  - of certain cultural characteristics,
  - of organizational strategies and structures.
- Individuals are engaged in processes of interaction, socialization and individuation.

Thus, next to structural aspects we need to consider dynamic aspects.

2.2 Dynamic Aspects

These aspects relate to requisite psychological characteristics of the organization and its staff promoting organizational learning, such as:

(1) Development and use of a common language among organization members

(2) Mutual trust among members in the organization

(3) An adequate error culture (no blame culture)

(4) Willingness to challenge old practices on all levels

(5) A thorough and shared understanding of the needs of the company and industry

(6) Analytical skills to predict how challenges will influence the organization

(7) Identifying and removing existing blocks and hindrances to learning and the sharing of knowledge

(8) Intellectual mobility or flexibility to think across divisions and functions

2.2 Dynamic Aspects

Mumford (1992) highlights some of the conditioning features of individuals for organizational learning:

- The capability of being dissatisfied with current levels of performance, knowledge, skills or attitudes
- The capability of recognizing that activities can have more than one purpose
- The belief that it is possible to learn by planned direction rather than only by accident
- The belief that the culture in which they work, and particularly their boss, will give them some support and some reward
- The belief that recognizing learning opportunities will lead to an improvement which they desire to make.

Conclusion

If all these aspects which we have mentioned so far should remind you of features which we usually associate with the notion of safety culture, this effect is entirely intended.

Thank you for your attention