ГОСУДАРСТВЕННАЯ КОРПОРАЦИЯ ПО АТОМНОЙ ЭНЕРГИИ «РОСАТОМ»

Knowledge Management: Applications for Nuclear Facilities

Eduard Volkov

Project office “Safety Culture Development”,
Principal manager, Rosatom CICET

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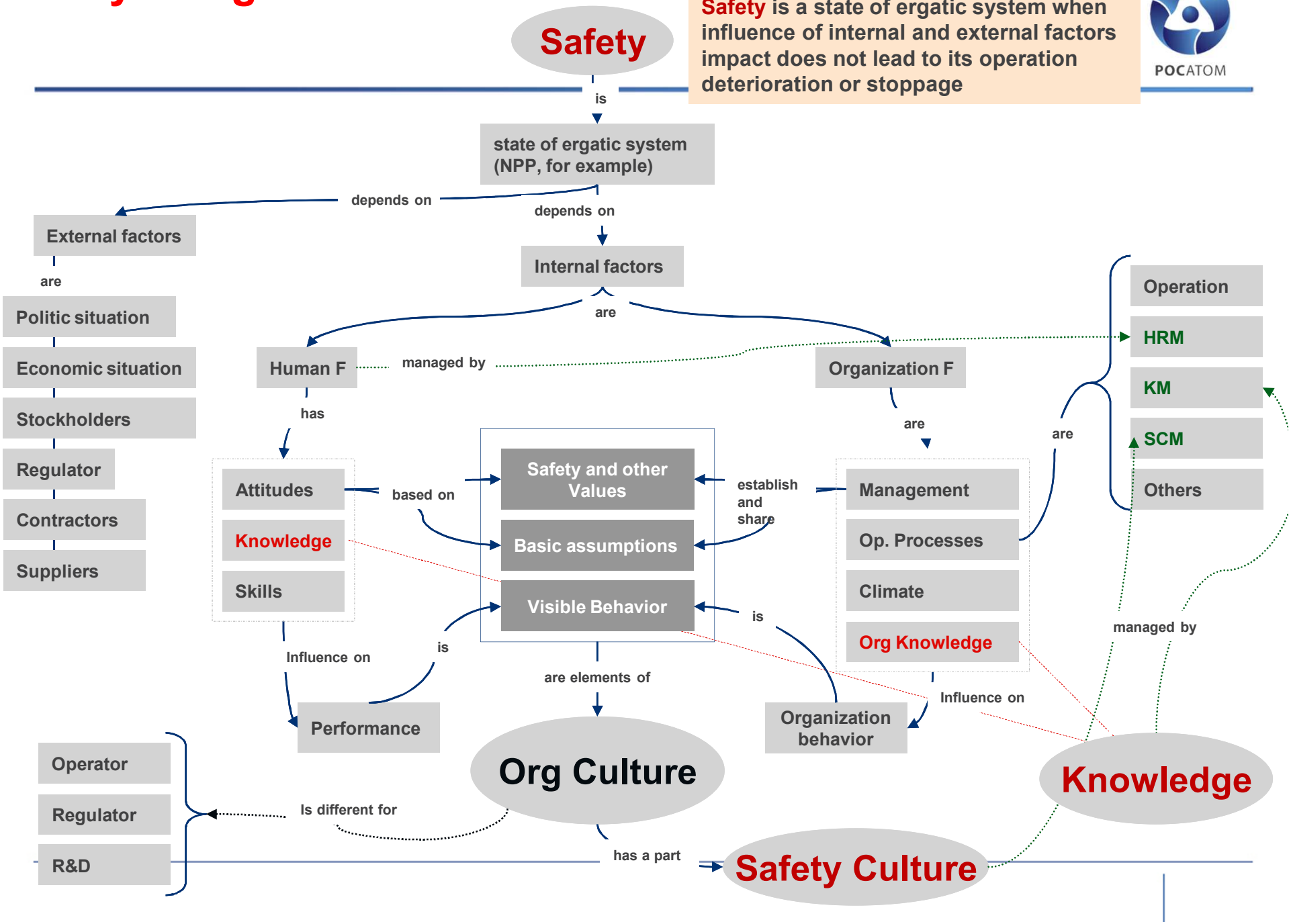
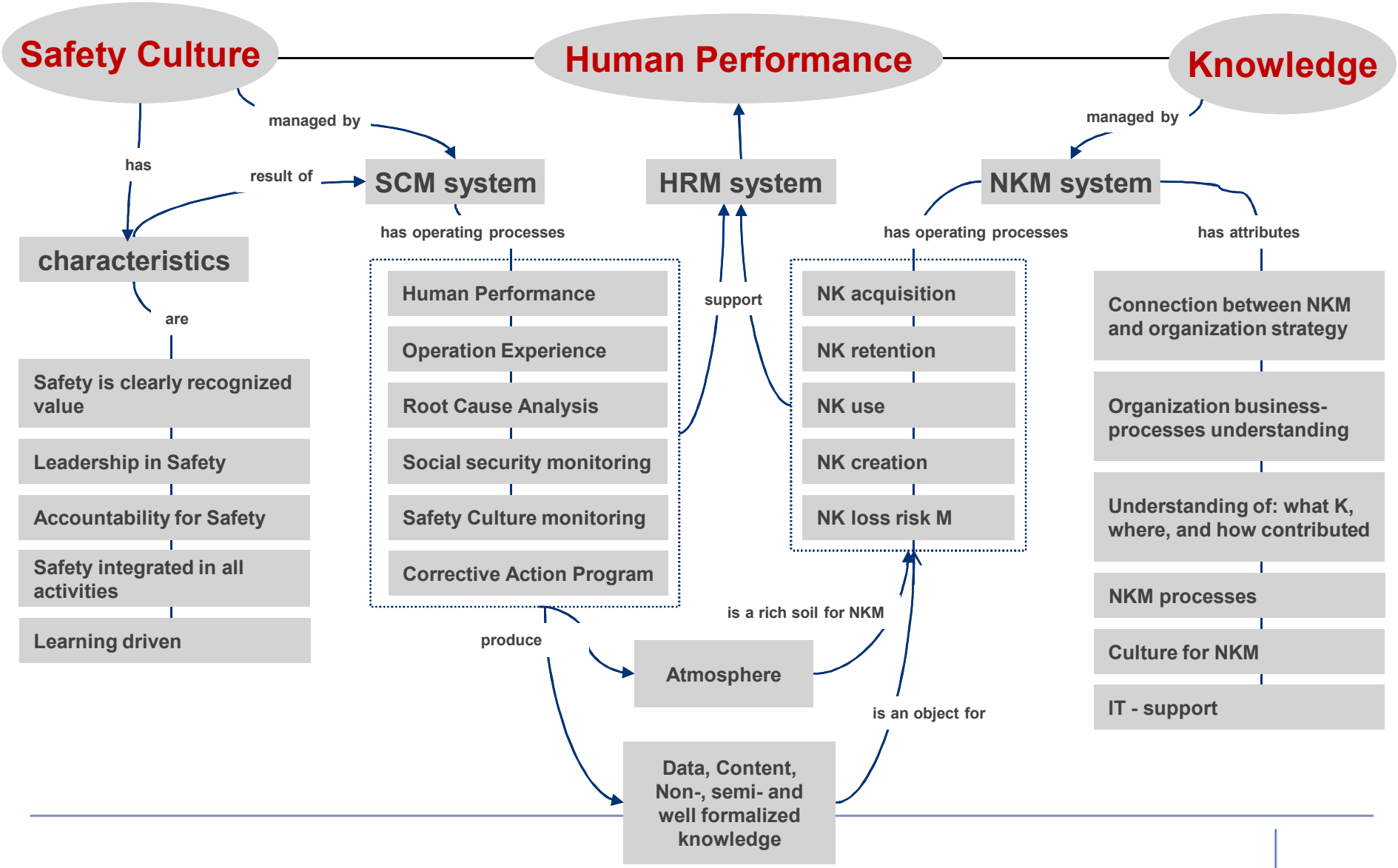
Safety – Org Culture interface

Safety is a state of ergatic system when influence of internal and external factors impact does not lead to its operation deterioration or stoppage



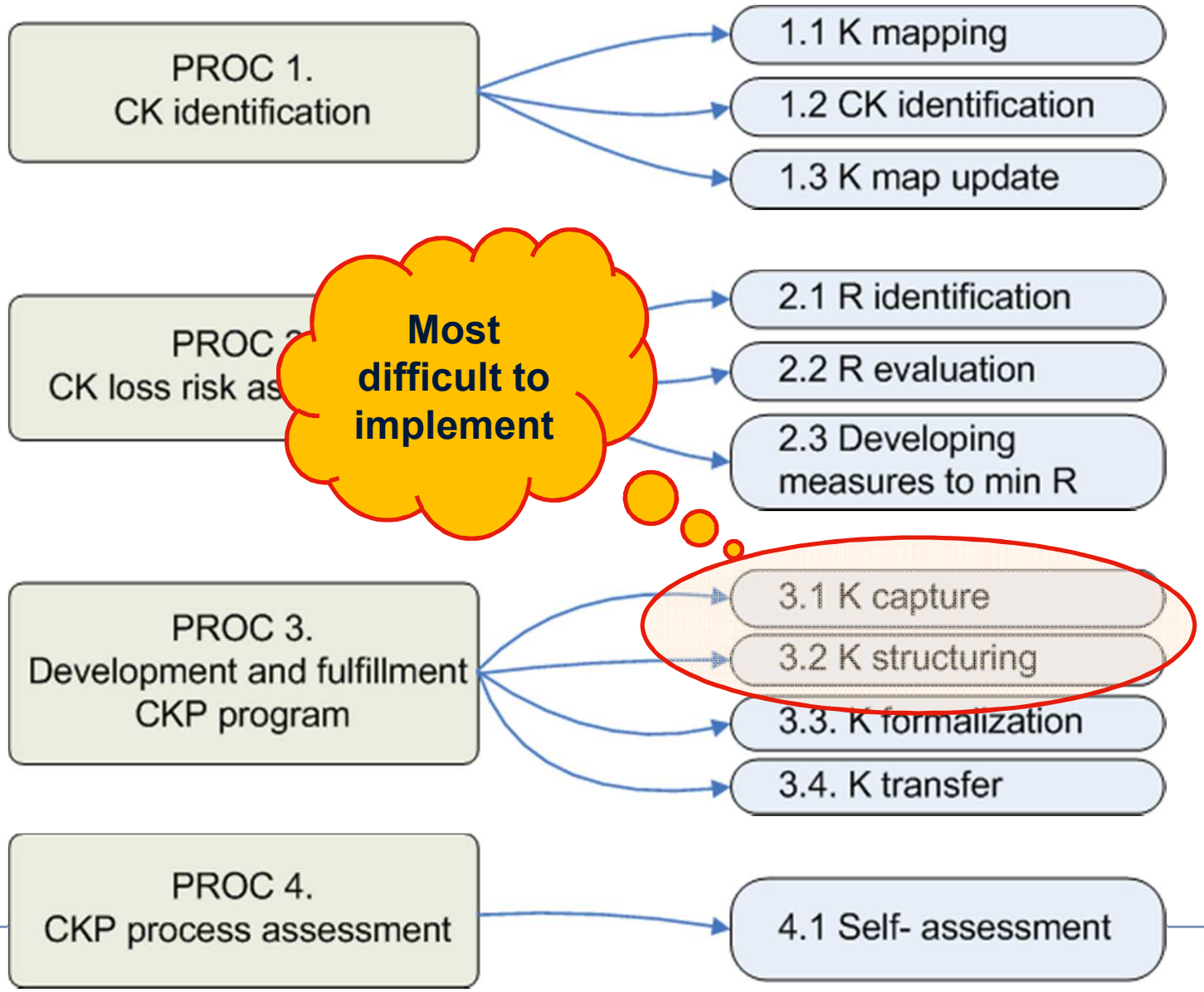
Safety Culture-Human Performance-Nuclear Knowledge Management interface



Critical Knowledge Preservation Process description

Object	Subject	Inputs	Outputs
Critical Knowledge	CK owners, knowledge management specialists, young specialists	**Primary input:** KM plan **Secondary input:** Report on CK loss risk assessment; K map; K portal; capture, structuring and formalization tools.	**Primary output:** preserved CK, transferred CK **Secondary output:** changes in K map, K formalization results, training materials, innovation product.

Critical Knowledge Preservation Process decomposition



Critical Knowledge criteria

- lack of key personnel in certain field of knowledge to realize project or fulfill investigation;
- perspective for the field of knowledge to be closed or transferred to external organization within next fife years;
- irregularity in the work implementation in the field of knowledge;
- need of high expertise to implement work;
- importance of the developed field of knowledge for the organization to reach goals;
- when knowledge is used practically in all compartments of the organization;
- possibility to improve the organization activity effectiveness at the expense of knowledge preservation, sharing and use;
- high level of risk to lose knowledge because knowledge mediums leave the organization;
- danger of unauthorized knowledge use consequence.

Knowledge Capture

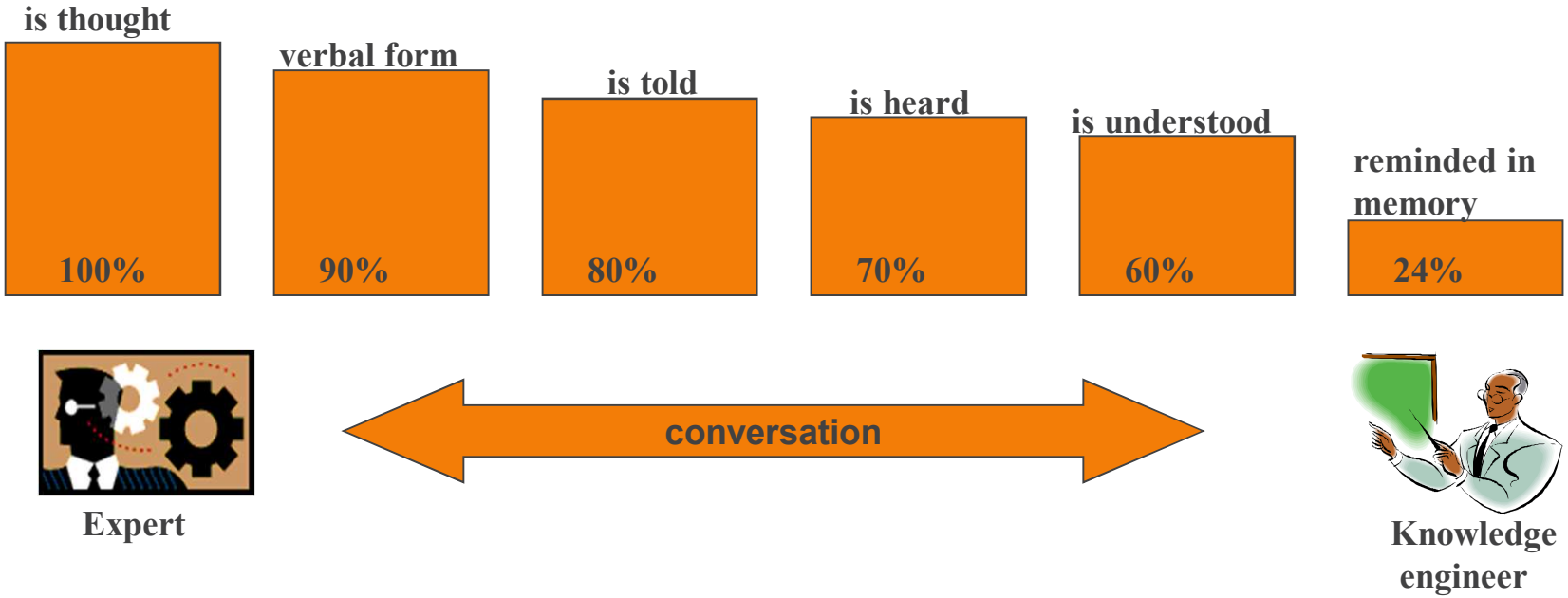
Knowledge capture it is a interaction between knowledge engineer and expert to reveal expert's process of reasoning when decision making and a structure of expert's understanding of the domain.

! Expert – specialist who has extensive knowledge in professional domain, knowledge of heuristic rules, metaknowledge, skills ensuring success of professional activity.

Knowledge structuring – analysis of an information obtained from knowledge source and encoding the information to certain structures

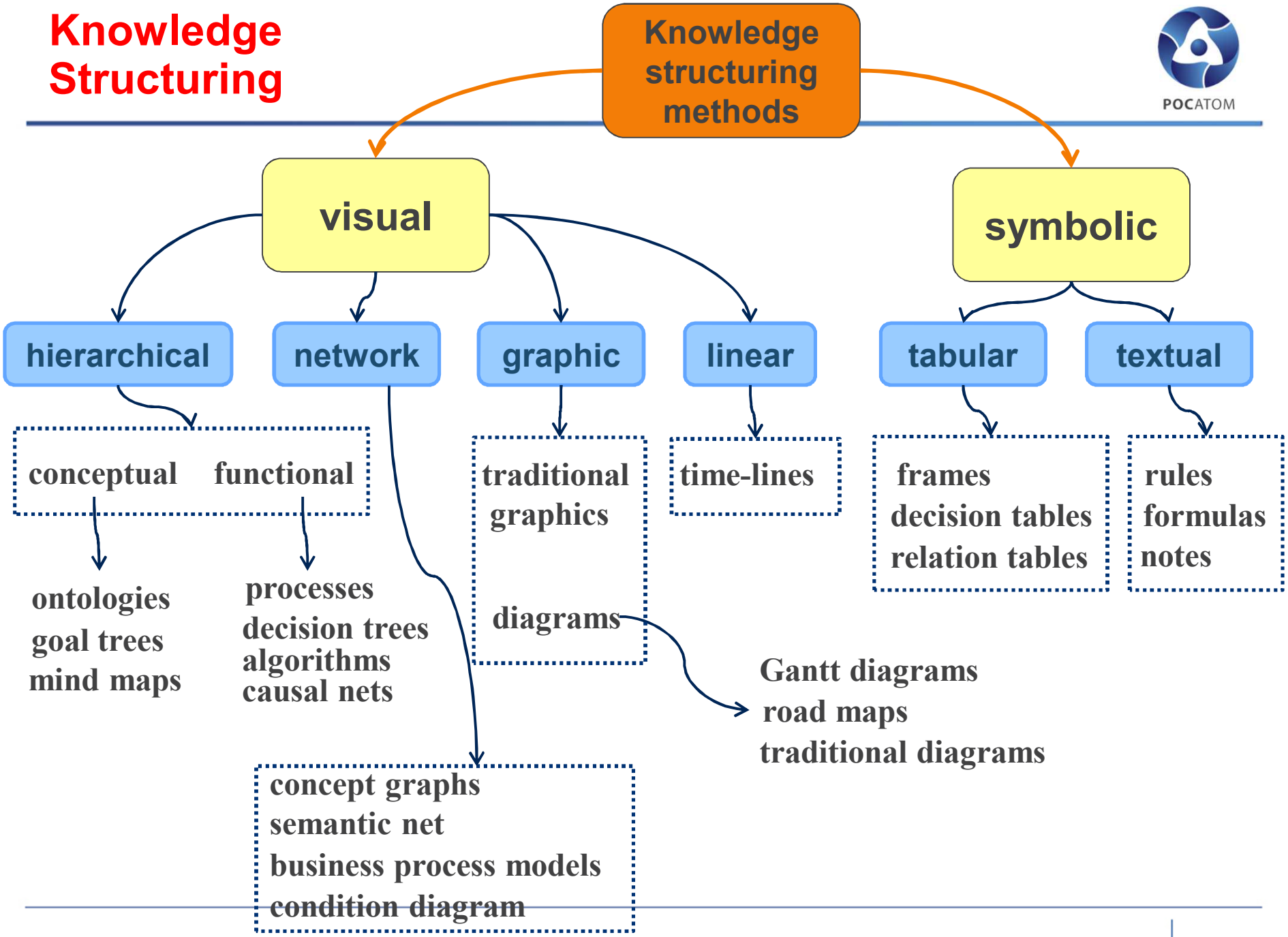
Goal of Knowledge structuring - to create adequate virtual, or logical mapping of real object.

Difficulties in knowledge capture:



- troubles of verbalization
- expert could underestimate an importance of some knowledge
- experts have special form of knowledge structure in comparison with beginners
- high speed of expert's professional tasks decision
- volume of short-term memory is limited
- expert's mechanism of cognitive defence
- psycho-linguistic problems are existing
- experts are busy

Knowledge Structuring



Knowledge engineer tasks and skills:

1. Facts describing and generalization

- Тщательно и полно собирать информацию во время ведения протоколов извлечения знаний, пунктуально делать «домашнюю работу» над ними
- Придерживаться принципов объективности и системности
- Стараться сразу же классифицировать собранные факты, готовясь к этапу структурирования

2. Identification logical and mathematical links, deduction and induction of lows

- To reveal expert's inferences structure
- To know and apply modern theories of thinking (logical, associative, geschtalt and so on)
- To use and mark out the following expert's tools:

- definition
- comparison and recognition
- analysis
- abstracting
- generalization
- classification
- categorization
- judgment making
- inference
- syllogisms making and so on

Knowledge engineer tasks and skills:

2. Identification logical and mathematical links, deduction and induction of lows

To use following operations:

- ❑ **work with associations acquired on base of different relations**
- ❑ **recall past experience**
- ❑ **work with habitual («automatic») reactions**
- ❑ **mark out main fragment influencing on other components**
- ❑ **Occam principle**

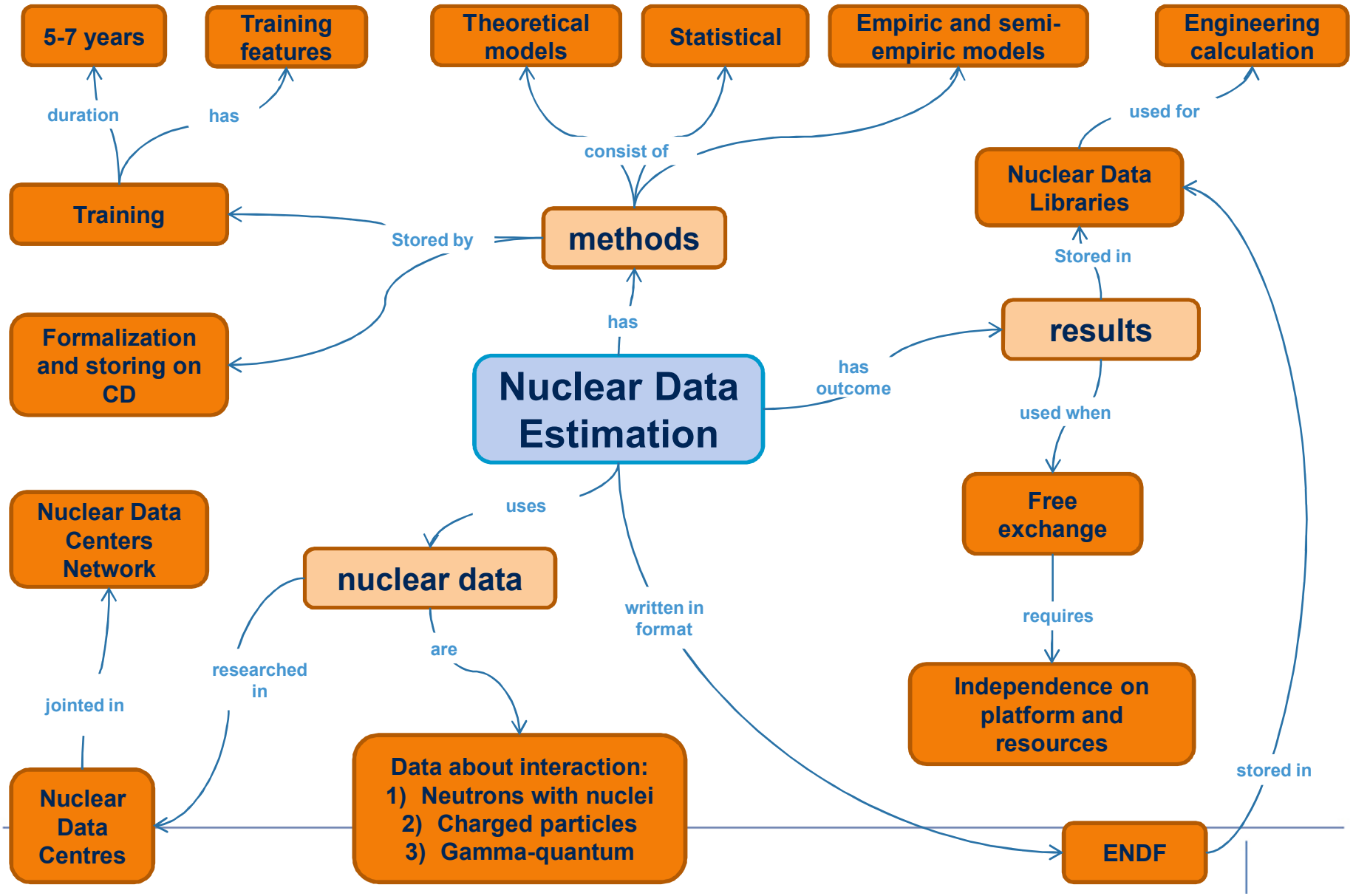
3. Formation an idealized model

To form an idealized model knowledge engineer must have:

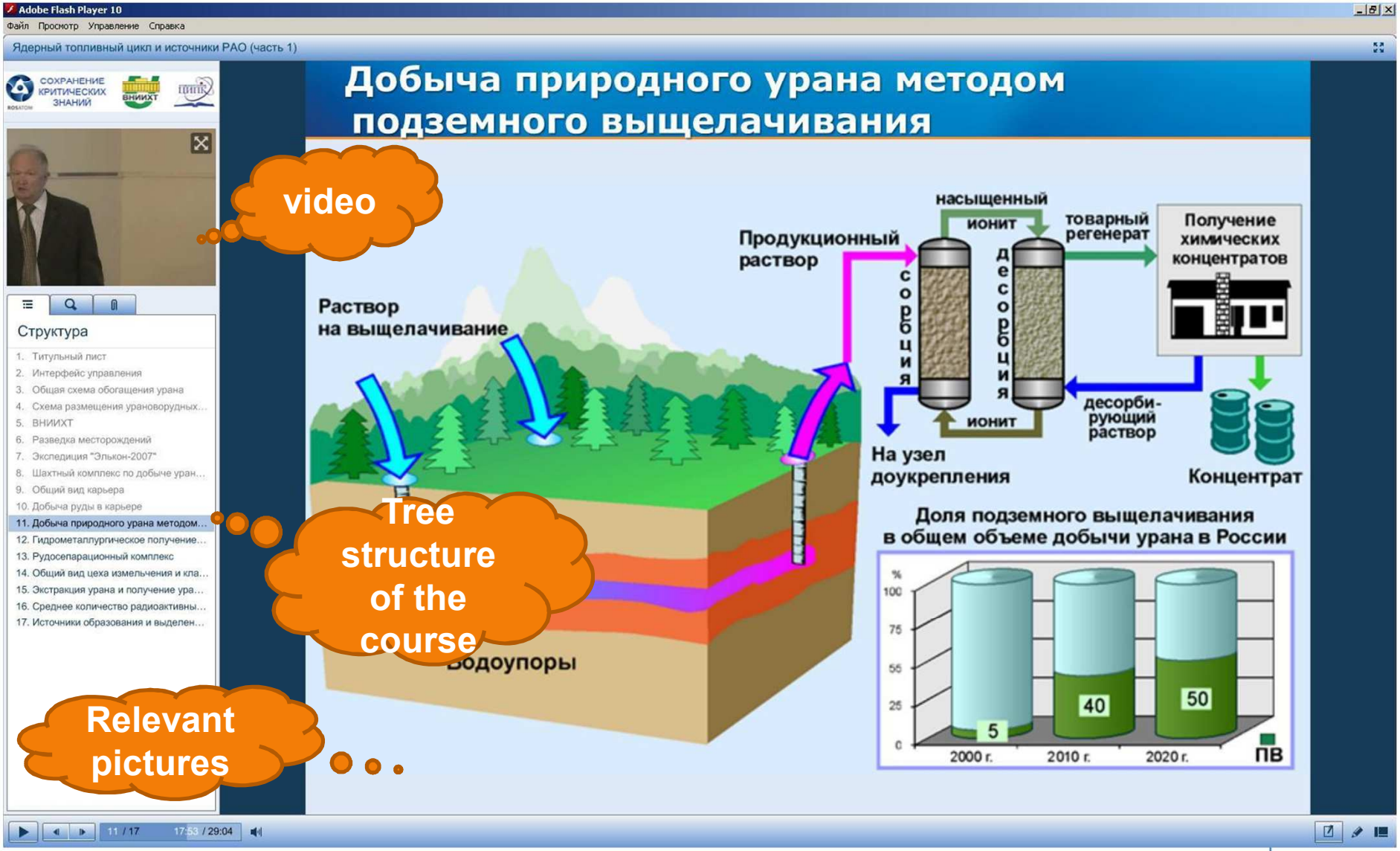
- ❑ **skill to use special language to describe and construct those idealized models which are arising during thinking**
- ❑ **skills in idealization, posterization and abstracting methods, which allow to reproduce lows in more simplified form**
- ❑ **critical attitude to rightness of judgments**

4. Explanation and prediction of phenomena

Knowledge Structuring example: Concept map “Nuclear data estimation”



Knowledge Formalization example: video module “Uranium mining. Underground leaching method”



Thank you
for
the attention!