Knowledge base for subject area of knowledge organization
Issues, challenges, and preliminary outcomes of a research project

Helena Kučerová, Eva Bratková
Institute of Information Studies and Librarianship, Charles University in Prague, Czech Republic

Motivation for the project

- Since the 1980s, no monograph covering the topic of knowledge organization has been published in the Czech language.
- Due to dependence of knowledge organization on the natural language and specific cultural context, the lack of up-to-date resources in mother tongue has been considered as a significant gap within the Czech professional community.

Objectives

The designed knowledge base will **assemble and structure the current body of knowledge for the domain of knowledge organization** and will enable for storing, browsing, and searching of existing knowledge as well as for discovering or inferencing of new knowledge in a defined domain. It is designed according to methodology UPON: Unified Process for Ontology. The knowledge base is based on conceptual model in ontology format, filled in by instances, i.e. by RDF **statements containing assertions and descriptive metadata** about knowledge organization systems, persons, institutions, events, activities, tools, and other relevant resources.

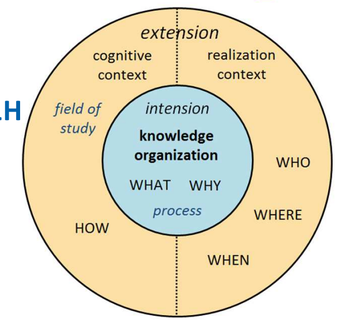
Expected outcomes

- Education and training tool in the field of librarianship and information science.
- Background material for the current scientific monograph and a resource for updating the Czech professional terminology.
- Prototype for domain knowledge bases in other fields.

Methodology

1) Faceted approach to KO definition

Facets: 5W+1H



2) Knowledge acquisition

Interviews with domain experts, literature survey.

3) RDF statements for units of knowledge

From sentences in natural language to formalized expressions of chunks of declarative knowledge.

Assertions:

Facet «325»**[concept]** *is a specific and discrete set of concepts, belonging to one fundamental category, which allows to organize the content according to principle of division set by these fundamental categories* **[definition]**.

Descriptive metadata:

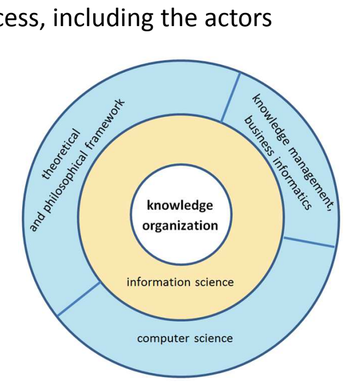
Shiyali Ramamrita Ranganathan «922»**[person]** *is the author of Prolegomena to Library classification (1967)* «172»**[document]** *and creator of the Colon Classification* «046»**[KOS]**, *based on the facet* «325»**[concept]** *principle. His ideas have been followed by CRG (Classification Research Group)* **[institution]**, *established in 1955* **[event]**, *which focused on research and promotion of facet analysis* **[activity]**. *CRG member Jack Mills* «922»**[person]** *is the editor of the second edition of Bliss Bibliographic Classification (BC2)* «045» **[KOS]**, *which became a practical realization of the theories* **[concept]** *of CRG* **[institution]**.

Step 1 – Expression of declarative knowledge through ***sentences in natural language***.
Step 2 – Indexing of detected subjects and objects using Classification System for Knowledge organization Literature (e.g. **«325»** – Facet Analysis).
Step 3 – Finding ***predicates***.
Step 4 – Definition of class–instance relationships between ontological categories and the subjects / objects (e.g. **[person]**) and standardized expression of predicates (e.g. **is creator**).
Step 5 – Generating RDF statements.

Example of inference: Inferred association between Ranganathan and Bliss through the facet priciple of their works.

Results of first year of research

1) Our own unambiguously defined concept of knowledge organization (KO) both as a process and a discipline, based on a concept and process maps
KO as a practical activity – any intentional activity of introducing structure into the existing knowledge in order to facilitate access to it: representation / expression, communication, sharing, recording, publishing, processing (identification, description, content analysis, indexing, transformation), and storage.
KO as a field of study – the science that examines the process of knowledge organization and its context, i.e. resources transformed within the process of organization, and products that are created by this process, including the actors involved – people, institutions, technologies.



2) Concept map of knowledge organization designed by using faceted methodology

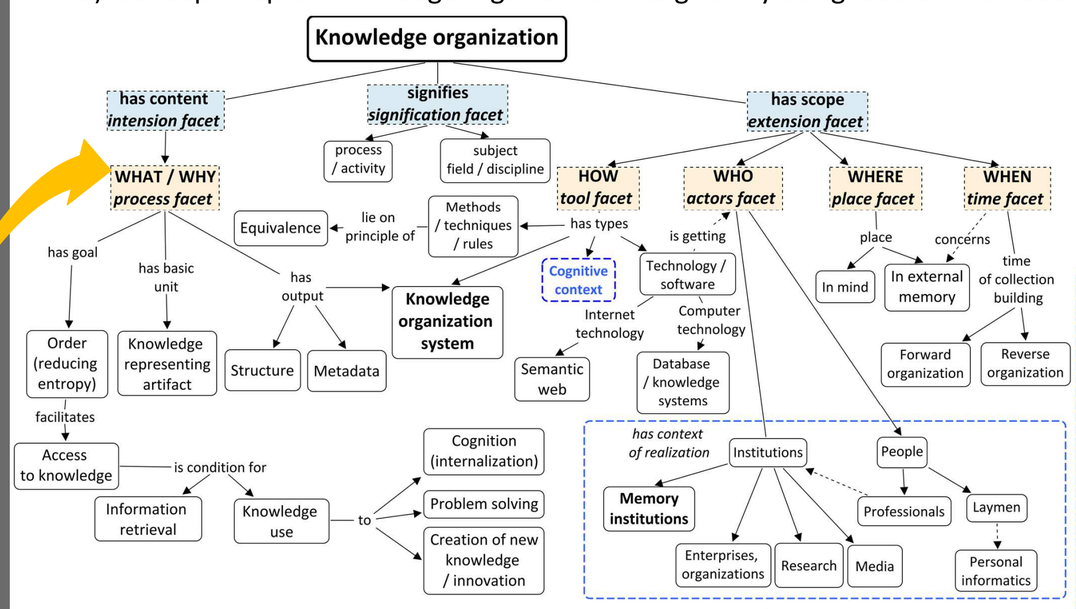


Fig. 1 Concept map of knowledge organization

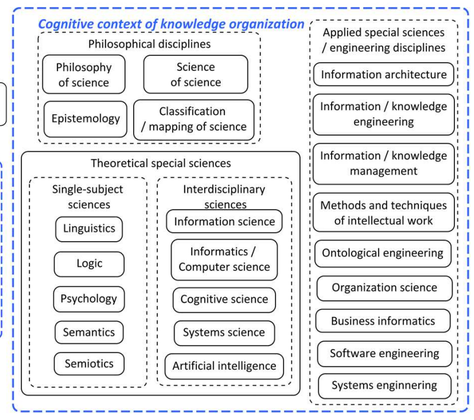


Fig. 2 Cognitive context of knowledge organization

3) Conceptual model / ontology of a knowledge base

4) Prototype of knowledge base

entities (tables)	23
attributes	54
2250 instances/knowledge units	
RDF statements	100
KOS's	150
bibliographic metadata	1000
lexicon (term list)	1000
Platform for storing knowledge units	
LAMP – MySQL database with web interface	

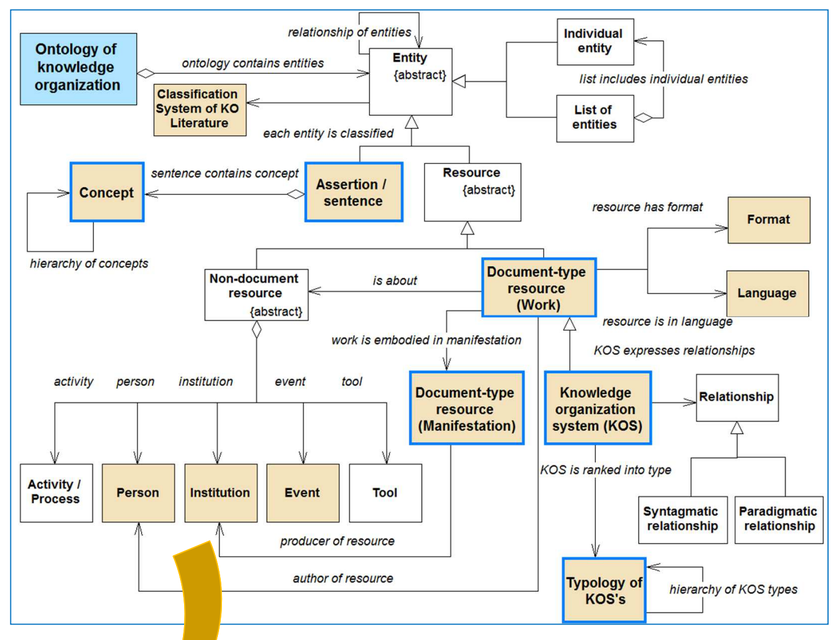
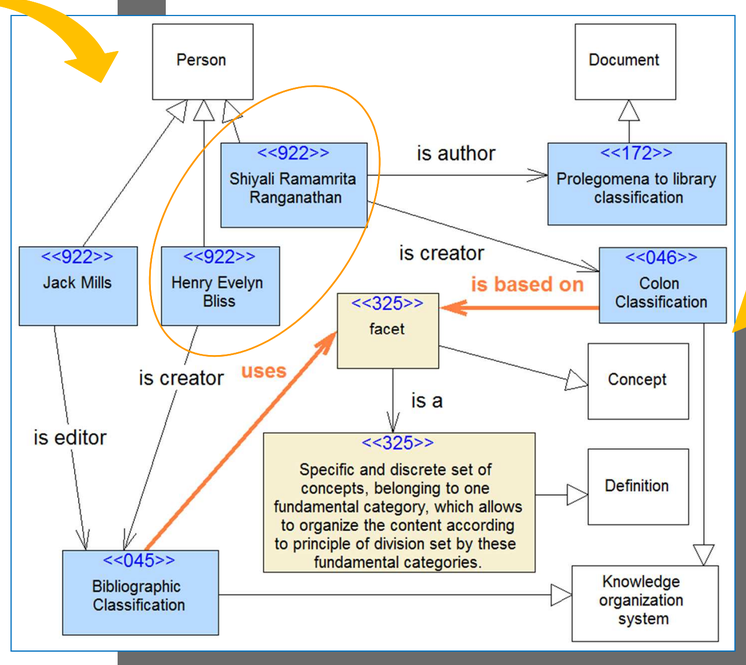


Fig. 3 Conceptual model of knowledge base



Problems and issues

1) Usability of Classification System for Knowledge Organization Literature
2) KOS typology
3) Application of FRBR model on bibliographic entities
4) Applicability of Semantic Web AAA (Anyone can say Anything about Any topic) principle on domain knowledge base
5) Acquisition of procedural knowledge
6) Formalization of assertions

The plans for future research

- Completion of knowledge acquisition through data mining in back-of-the-book subject indexes
- Enhancing the types of knowledge units with procedural knowledge
- Designing an user interface for knowledge base
- Implementation of a knowledge base into knowledge system with inference engine
- Making the knowledge base publicly available online in the form of Linked Open Data

Related resources

Classification System for Knowledge Organization Literature. ©ISKO 2011-2012, last update 2012-04-13. Available from: http://www.isko.org/scheme.php.

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Acknowledgments

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