Specifying Intersystem Relations

Requirements, Strategies and Issues

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CLASSIFICATION AT A CROSSROADS  
multiple directions to usability  
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Overview

- Initial situation
- Information retrieval and knowledge exploration
- Relational Structures in an international comprehensive KOS
- Characteristics and functions of intersystem relations
- Inventories of intersystem relations
- Specifying intersystem relations
- Conclusion
Initial situation

- Heterogeneity of knowledge organization systems
- Need for integrated solutions for interconnected systems
Focus

- Machine-assisted reasoning
- Cognitive interpretation of relations
- Importance of a differentiated semantic structure for exploration and retrieval
- Combination of information retrieval and knowledge exploration
IR and knowledge exploration

Individual term

Concept B

Concept C

Concept E

Concept D

Concept X

Concept F
Differentiated knowledge exploration

Concept A
- Concept B
- Concept K
- Concept X

Concept Y

Concept V

Concept C
- Concept J

Concept H

Relation Type 1
Relation Type 2
Relation Type 3
Intersystem relations

- Intersystem relations without any specified semantic content
- Relation types that are similar to those within individual concept schemes (equivalent, hierarchical, associative)
- Relation types exclusively used for the description of intersystem relations
  - Project specific relation types (e.g. degrees of determinacy in CrissCross)
Information in typed intersystem relationships

- Semantic content denoting kind of relation
  - Designed for cognitive interpretation

- Logical characteristics
  - Machine-readable information designed to support automatic processes like search expansion
  - Closely related to the semantic content (e.g. broader/narrower might imply transitivity)

- Formal specification of intersystem relations
Development of an inventory of relations

- Inductive approach / Bottom-up strategy
  - Starting with the development of a highly specific inventory
  - Subsumption of relations to more general and more applicable types

- Deductive approach / Top-down strategy
  - Starting with an existing set of relations (e.g. common relations in thesauri or classifications)
  - Gradual specification of relations and expansion of inventories.

- Inventories of relations have to be arranged in a well-structured, comprehensive array which can be handled intuitively. This can be guaranteed by a hierarchical modeling of relations.
Specifying intersystem relations (I)

- **Bottom-up** strategy starting with observations concerning characteristics of mapping relations before adopting relationships

- Data Basis: Linkages created within the CrissCross project
  - Directional deep-level one-to-many conceptual mapping

<table>
<thead>
<tr>
<th>Subject Headings of the German Subject Heading Authority File (SWD)</th>
<th>Notations of the Dewey Decimal Classification (DDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>post-coordinated usage; concepts context-free</td>
<td>precombined classification; classes context-sensitive</td>
</tr>
</tbody>
</table>
Specifying intersystem relations (II)

- Reference points

- SWD heading
- Conceptual Mapping
- DDC class
- Concept

SWD heading

SWD heading

SWD heading
Specifying intersystem relations (II)

Reference points

- Zoologie [zoology]
- Tiere [animals]

1. Class as a whole
   - Little leeway for typing
   - Difficulties in handling concepts that are mapped to several classes
   - In applications class headings are used as reference points

Limited expressivity
Limited functionality
Specifying intersystem relations (II)

- Reference points

- More expressivity
- More functionality

- Concepts emphasized in class heading
  - Possibility of differentiated typing
  - Concepts that are mapped to several classes can be handled
  - In application class headings are used as reference points

- Discipline-object relation?

- Zoologie [zoology]

- Tiere [animals]

- zoology
- animals
- wildlife
- 590: Animals
- Descriptive biology-animals

- Equivalent?
Specifying intersystem relations (III)

- Differences in respect to context

**Context-free**

- Papageien [parrots]
  - 636.6865: Parrots
    - Parrots as pets
  - 598.71: Psittaciformes
    - Parrots from a biological point of view

**Context-sensitive**
Specifying intersystem relations (III)

- Differences in respect to context

Characteristics of relation:
1. Kind of hierarchical relation in reference to main topic of class
2. Specific context

636.6865: Parrots

598.71: Psittaciformes

Papageien [parrots]
Specifying intersystem relations (III)

- **Differences in respect to context**

  1. Adopting specific relation type described by Svenonius (2001): Perspective hierarchies that indicate a specific point of view is provided

  2. Defining a general relation type indicating change in perspective = perspective relation
Specifying intersystem relations (IV)

- Additional issues that might be considered
  - „Places of unique definition“ (cf. e.g. DDC)

Parrots from an interdisciplinary point of view

Can this be ignored?

Parrots from a biological point of view

Papageien [parrots]

598.71: Psittaciformes
Specifying intersystem relations (IV)

- Additional issues that might be considered
- Application-oriented aspects

In *CrissCross*, *Degrees of Determinacy (D)* orientate on the topic-class relations inherent in DDC which are application-oriented and that are important to support specific retrieval mechanisms.
Conclusion

- Specified intersystem relations
  - must reflect the specificity of mapping relations
  - must be complemented by expressive interconcept relations
  - are an integral functional element of a comprehensive international KOS

- Specifying intersystem relations is not an aim in itself but is directed at enhancing the functionality of knowledge organization systems esp. in respect to comprehensive differentiated knowledge exploration in heterogeneous information spaces.
Thank you for your attention

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