

Mapping Knowledge Organization Systems with coli-conc infrastructure

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What is coli-conc?

coli-conc.gbv.de

- A free service of the Head Office of the Common Library Network, GBV Germany
- It offers **an integrated system for the collection, management, and mapping of KOS**
- **It provides**
 - free and uniform access to KOS and their mappings
 - a tool for creating and editing mappings with the mapping tool **Cocoda**
 - storage of KOS metadata, KOS content, and mappings between the KOS
 - free software to import and export KOS and mapping data
- Funding of **the German Research Foundation** (2015-2019, 2021-2023)

Partners



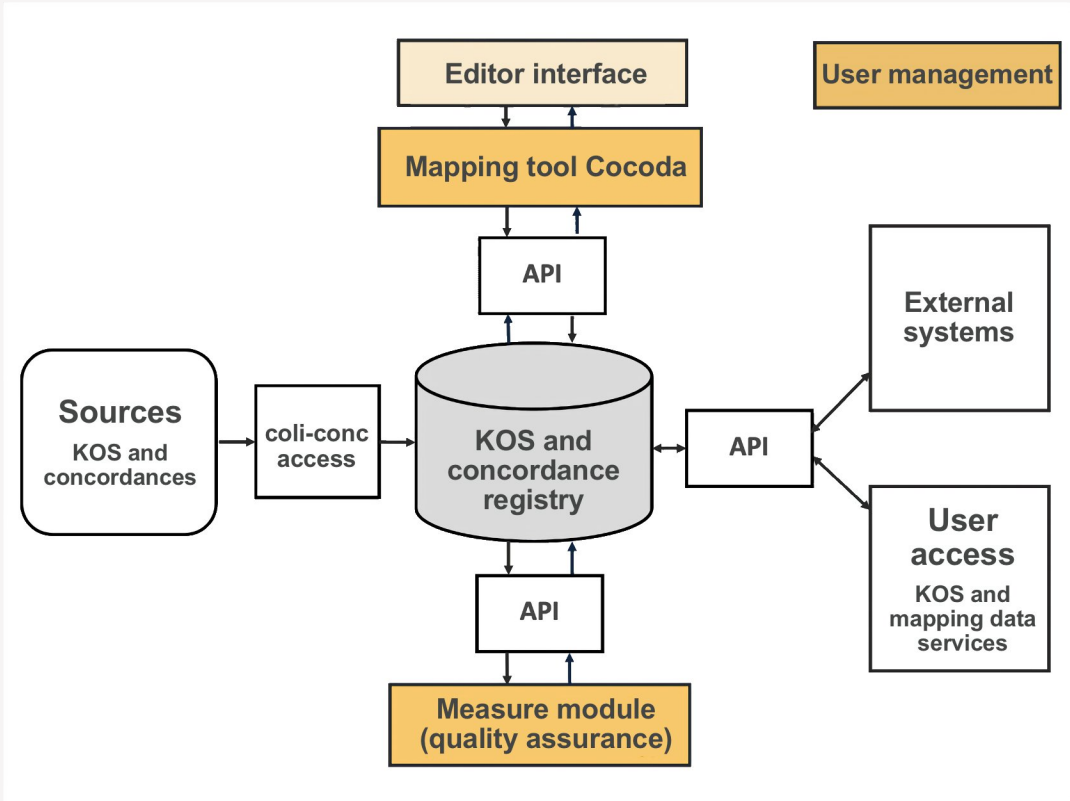
Obiectives



- Facilitate KOS sharing
- Develop & establish standard format
- Manage heterogeneity and create semantic network of KOS and serve as a knowledge base
- Enhance the quality of mappings
- Catalog enrichment based on mappings (coli-rich in K10plus)

coli-conc Infrastructure Overview

- Modular system
- Components can be used individually and integrated into existing systems and software
- Based on uniform data format JSKOS and JSKOS API



Elements of the System Architecture

Cocoda web-based application

- User and editor interface for KOS, concordances, and mappings
- Developed in JavaScript (Vue framework)
- Open Source and public development

Backend Services

- Terminology Services (DANTE API, BARTOC, Skosmos, MarcXML...)
- Mapping Services and Database (collected concordances)
- Mapping Suggestions (co-occurrences and queries)

coli-conc Components

- JSKOS data format
- KOS registry and concordance registry (databases)
- Mapping tool Cocoda
- Web-based user interface
- coli-rich catalogue enrichment
- Connection to cataloguing clients

JSKOS data format

Facilitate representation, use, and exchange of KOS and mappings

Requires

- An easy-to-use data format (JSKOS)
- An easy-to-use access method (JSKOS-API)

JSKOS is

- based on JSON(-LD) ⇒ compatible with SKOS/RDF
- can represent concordances, mappings, KOS, and KOS data
- has extra features (confidence level of mappings, elements for concepts and co-occurrences, mappings with multiple concepts and ordered lists)
- **Specifications:** <http://gbv.github.io/jskos/>

```
{
  "from": {
    "memberSet": [
      {
        "uri": "http://dewey.info/class/200/e23/"
      }
    ]
  },
  "to": {
    "memberSet": [
      {
        "uri": "http://uri.gbv.de/terminology/thema/QRA"
      }
    ]
  },
  "fromScheme": {
    "uri": "http://bartoc.org/en/node/241"
  },
  "toScheme": {
    "uri": "http://bartoc.org/en/node/1043"
  },
  "creator": [
    {
      "uri": "https://github.com/stefandesu",
      "prefLabel": {
        "en": "Stefan Peters"
      }
    }
  ],
  "type": [
    "http://www.w3.org/2004/02/skos/core#exactMatch"
  ],
  "created": "2021-10-01T08:25:51.542Z",
  "modified": "2021-10-01T08:26:07.817Z",
  "uri": "https://coli-conc.gbv.de/api/mappings/22cb5fdc-196c-4fb0-ad73-9c157cd4b4e9"
}
```


KOS Registry



- **BARTOC.org**
- Different kinds of KOS in 20 different languages
- Enriched with metadata
- Uniform access in JSKOS
- Offers link to mapping tool Cocoda

Concordance Registry

- Contains currently concordances between different KOS, such as GND-DDC, STW-GND, DDC 1000-RVK, BC-DDC, GND-RVK, RVK-BC, MSC-BC, DDC-LCSH,...
- Large number of mappings and concordances from different sources, continuously new mappings/concordances are added
- Wikidata mappings
- Stored in JSKOS format and accessible in various formats

<http://coli-conc.gbv.de/terminologies/>

<http://coli-conc.gbv.de/concordances/>

Mapping Tool Cocoda

Freely accessible at:

<https://coli-conc.gbv.de/cocoda/app/>

The screenshot displays the Cocoda Mapping Tool interface, which is used for mapping between different classification schemes. The main window is titled "Mapping Editor" and shows a mapping between "DDC" (Dewey Decimal Classification) and "THEMA" (Thema subject classification scheme).

Left Panel (DDC Dewey Decimal Classification):

- Search: Number theory
- Results: 512.7 Number theory (selected), 512.705 Number theory, 512.72 Elementary number theory, 512.73 Analytic number theory, 512.74 Algebraic number theory, 512.75 Number theory, 512.76 Algebraic number theory, 512.77 Number theory, 512.78 Algebraic number theory, 512.79 Number theory, 512.80 Number theory, 512.81 Number theory, 512.82 Number theory, 512.83 Number theory, 512.84 Number theory, 512.85 Number theory, 512.86 Number theory, 512.87 Number theory, 512.88 Number theory, 512.89 Number theory, 512.90 Number theory, 512.91 Number theory, 512.92 Number theory, 512.93 Number theory, 512.94 Number theory, 512.95 Number theory, 512.96 Number theory, 512.97 Number theory, 512.98 Number theory, 512.99 Number theory.

Right Panel (THEMA Thema subject classification scheme):

- Search: Number theory
- Results: PBH Number theory (selected), PBH Mathematics, PBH Algebra, PBH Groups and group theory, PBH Pre-calculus, PBH Calculus and mathematical analysis, PBH Geometry, PBH Topology, PBH Probability and statistics, PBH Optimization, PBH Combinatorics and graph theory, PBH Applied mathematics, PBH History of mathematics, PBH Science: general issues, PBH Astronomy, space and time, PBH Physics, PBH Chemistry, PBH Biology, life sciences, PBH Philosophy and Religion.

Mapping Editor:

- DDC 512.7 Number theory = THEMA PBH Number theory
- Concordances: 512.7 Number theory (DDC) = 512.705 Number theory (THEMA), 512.72 Elementary number theory (THEMA), 512.73 Analytic number theory (THEMA), 512.74 Algebraic number theory (THEMA), 512.75 Number theory (THEMA), 512.76 Algebraic number theory (THEMA), 512.77 Number theory (THEMA), 512.78 Algebraic number theory (THEMA), 512.79 Number theory (THEMA), 512.80 Number theory (THEMA), 512.81 Number theory (THEMA), 512.82 Number theory (THEMA), 512.83 Number theory (THEMA), 512.84 Number theory (THEMA), 512.85 Number theory (THEMA), 512.86 Number theory (THEMA), 512.87 Number theory (THEMA), 512.88 Number theory (THEMA), 512.89 Number theory (THEMA), 512.90 Number theory (THEMA), 512.91 Number theory (THEMA), 512.92 Number theory (THEMA), 512.93 Number theory (THEMA), 512.94 Number theory (THEMA), 512.95 Number theory (THEMA), 512.96 Number theory (THEMA), 512.97 Number theory (THEMA), 512.98 Number theory (THEMA), 512.99 Number theory (THEMA).
- Search: 512.7 Number theory
- Navigator: 512.7 Number theory (selected), 512.705 Number theory, 512.72 Elementary number theory, 512.73 Analytic number theory, 512.74 Algebraic number theory, 512.75 Number theory, 512.76 Algebraic number theory, 512.77 Number theory, 512.78 Algebraic number theory, 512.79 Number theory, 512.80 Number theory, 512.81 Number theory, 512.82 Number theory, 512.83 Number theory, 512.84 Number theory, 512.85 Number theory, 512.86 Number theory, 512.87 Number theory, 512.88 Number theory, 512.89 Number theory, 512.90 Number theory, 512.91 Number theory, 512.92 Number theory, 512.93 Number theory, 512.94 Number theory, 512.95 Number theory, 512.96 Number theory, 512.97 Number theory, 512.98 Number theory, 512.99 Number theory.

Bottom Panel (Hierarchy):

- 512.2-512.5 Subdivisions of abstract algebra
- 512.6 Category theory, homological algebra, K-theory
- 512.7 Number theory (selected)
- 512.9 Foundations of algebra
- 513 Arithmetic
- 514 Topology
- 515 Analysis
- 516 Geometry
- 518 Numerical analysis
- 519 Probabilities and applied mathematics
- 520 Astronomy
- 530 Physics
- 540 Chemistry
- 550 Earth sciences & geology
- 560 Fossils & prehistoric life
- 570 Biology
- 580-590 Natural history of plants and animals

coli-rich: Automatic Enrichment of the K10plus

- Existing KOS → Mappings → Enrichment of further indexing systems/KOS

- Example

045F=5010 \$a549

DDC 549 Mineralogy

DDC 549 → BC 38.30

Available Mapping in the database

045Q/01=5301

Additional PICA-Field with the Source Information

\$a38.30

\$Acoli-conc DDC-BC

\$Ahttps://coli-conc.gbv.de/api/mappings/af8ac88b-f7ab-427a-8e06-9e091d281bdc

More Information : <https://github.com/gbv/coli-rich>

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CONC

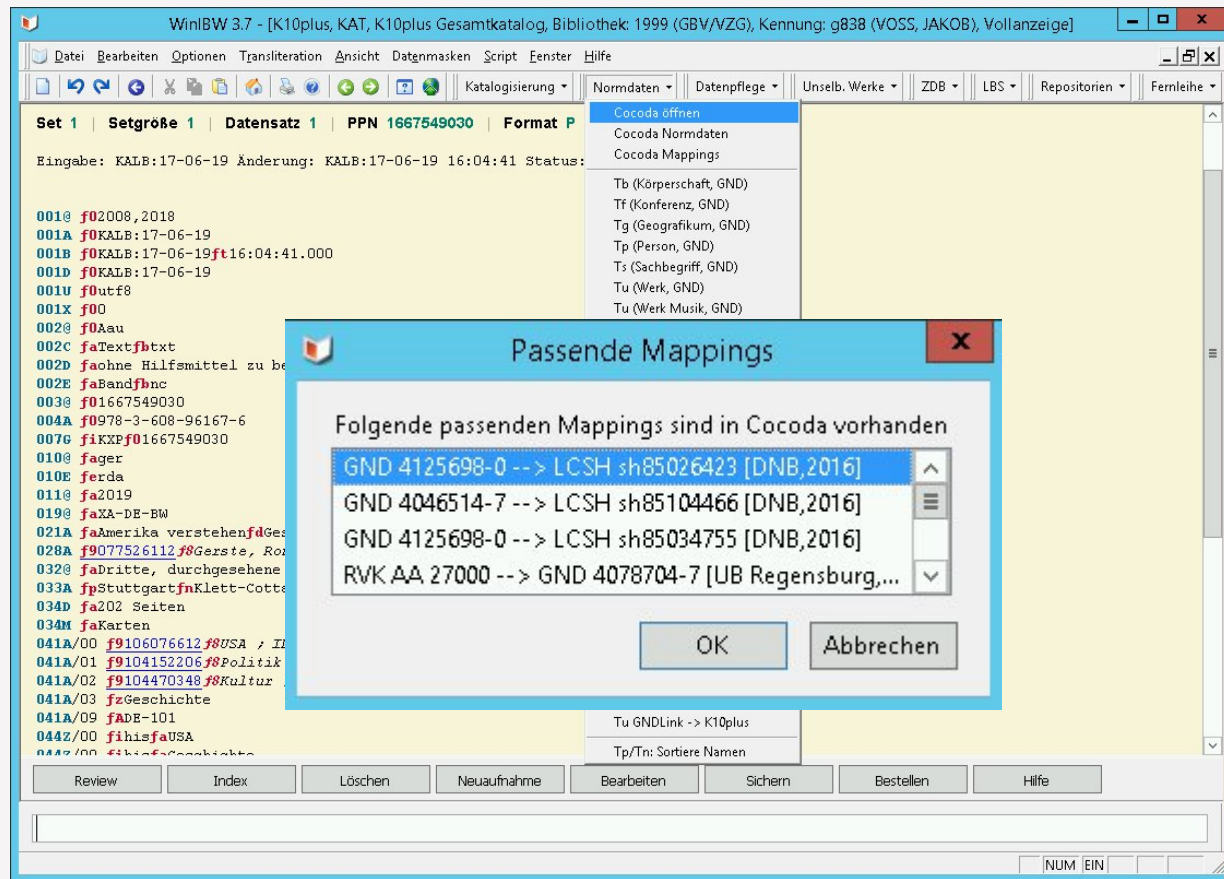


Connection to the external cataloguing and subject indexing systems

Digitaler Assistent (DA-3)

WinIBW: Proof of Concept

<https://github.com/gbv/cocoda-winibw>



Cocoda - Live Demo and Tutorial

Mapping tool Cocoda Components

A single-page Web application. **Four main components:**

- **KOS representation:** Concept browser
- **Mapping editor:** Create and modify mapping candidates and assign mapping type
- **Mapping browser:** Browse existing mappings and mapping suggestions
- **Quality measures:** Feature for evaluation and confidence level

KOS Representation – Concept Browser

- Dropdown menu for KOS selection
- Display of top concept hierarchy
- Hierarchical navigation and detailed display of the concepts
- Display of intra-KOS structural content
(scope notes and linked relative index terms, etc.)
- Display of mapping candidates from different sources
- Deep links into catalogues and other sources

Mapping Browser: Mapping Suggestion Module

Task: For a caption in the source KOS (e.g. DDC)

find the best mapping in the target KOS (e.g. THEMA or LCSH)

Automated recommendation services:

- **Mapping database** with the Dewey notation
- **Implicit mappings from the Union catalog** for records with the Dewey notation that also have THEMA or LCSH notation (co-occurrences)
- **Search the target system** with the Dewey captions/relative index and additional terms using query term expansion using other KOS and knowledge bases (such as Wikipedia or mapped GND terms (German Subject Headings))


Mapping Editor Module

- Create, edit, save, delete mappings and assign mapping type
- Export mappings JSKOS and CSV


DDC


Mapping Editor

THEMA


512.7 Number theory 


=


PBH Number theory 


 saved


± 0













no concordance  

Steps for building mappings in Cocoda

- Login with ORCID ID or Wikimedia account
- Select Source and Target KOS using the drop down menu
- Select/search source concept
- Use search links / catalog links for concept understanding or browse through hierarchy
- If necessary, use a synonym as a search term
- Look for existing mappings in the coli-conc registry
- Analyze displayed mapping candidates by coli-conc recommendation service (string match)
- Equate and match the terms using mapping editor
- Save the selected mappings in the coli-conc registry

Thank You!

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You like to collaborate and
become a partner?
Just e-mail us :-)