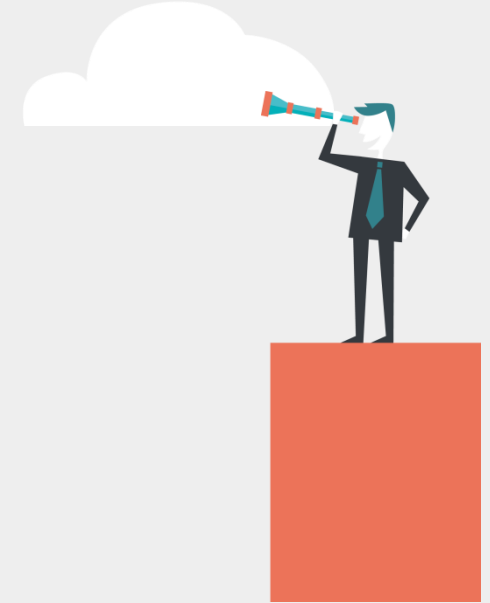
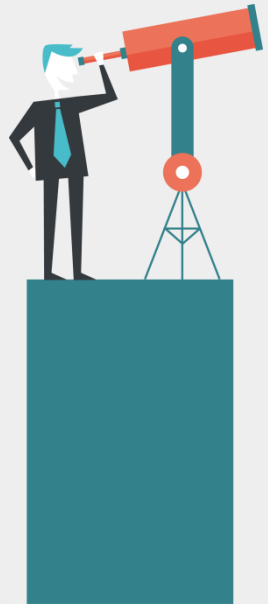


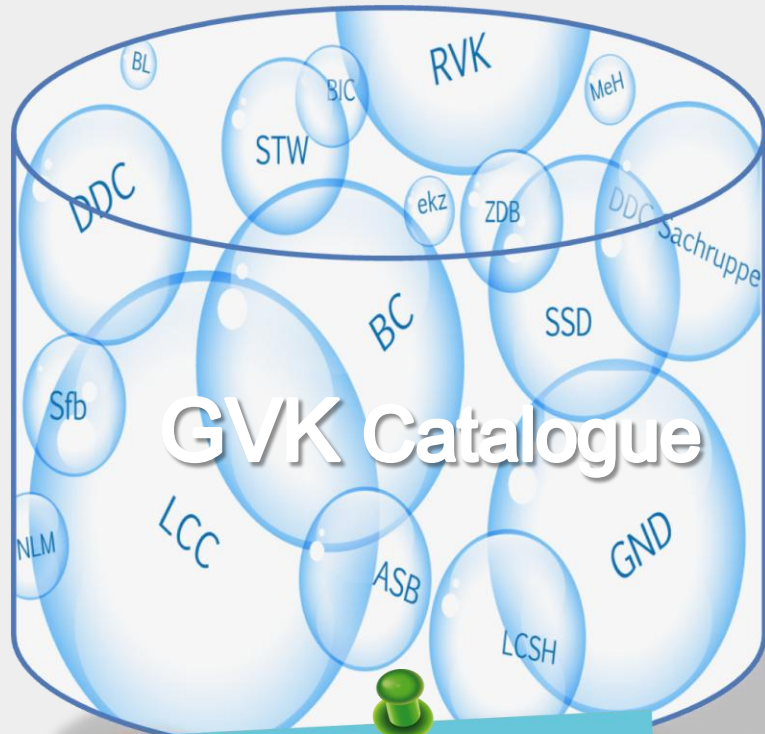
14th European Networked Knowledge
Organization Systems (NKOS) Workshop
18th September 2015, Poznań

The Cocoda Mapping Tool

U. Balakrishnan, J. Voß
Verbundzentrale des GBV (VZG)

- Background of Project coli-conc
- Focus of the Project
- Issues related to DDC-RVK Mapping
- Methods of Mapping
- Course Correction
- Introduction to the Software
 - Demands on the Tool
 - Web Layout
 - Software Concept





Aim

Creation of exhaustive concordances between Dewey and other library classification schemes

Classification systems in German speaking regions	
Universal Classification Systems	No. of classes
UDC (Universal Decimal Classification)	ca. 65.000 classes (English version)
DDC (Dewey Decimal Classification)	over 44.000 classes with 10 main classes
RVK (Regensburg Classification)	850.000 classes with 33 main classes
BC (Basic Classification)	2100 classes with 89 main classes
LCC (Library of Congress Classification)	21 main classes
Subject classification	No. of classes
DDC-Sachgruppen der DNB	10 main classes with 94 subclasses
MSC (Mathematics Subject Classification)	87 main classes
PACS (Physics and Astronomy Classification Scheme)	10 main classes
FKDigBib (Subject classification for digital library)	10 main classes
KfM (Classification for music library)	ca. 800 classes
Subject Classification at the Universities	No. of classes
TUM-classification (Science and technology classification of the TU Munic)	52 classes each with 999 notations
Subject classification of the University library Duesseldorf	45 classes
Bremer classification of the State and University library Bremen	ca. 57 main classes
GOK (Goettingen Online Classification)	ca. 33 main classes
Standard-Thesaurus Wirtschaft von der ZWB	6.000 Terms and notations
Subject classification University library Trier	36 main classes
Technical University Dortmund	28 main classes
University library Paderborn	26 main classes
University library Marburg	35 main classes
University library Bonn	24 main classes
University library Heidelberg	22 main classes
Subject classification and nomenclature of individual languages Library of the Institute of General Linguistics at the Uni Münster	23 main classes
Subject Classification at the public libraries	No. of classes
SEB (Scheme for protestant libraries)	
SKB-E (Scheme for catholic public libraries)	
KfKJ (Scheme for children and youth libraries)	Less than 1.000 classes
ASB (General classification for public libraries)	ca. 2.200 classes with 23 main classes
ÖSÖB (Austrian classification for public libraries)	
SfB (Classification for libraries)	ca 14.400 classes with 30 main classes
KAB (Classification for general libraries)	ca. 2.700 classes
SSD (Classification of the city library Duisburg)	
ESSB (Single classification for South Tyrolean)	16 main classes

Why RVK?

- wide-spread in Germany
- Local needs are better covered
- Legacy data transfer
- DDC is subject to licence

RVK

- 850.000 classes
- 33 main classes
- Granularity varies in different subject fields
- Synthesized notations are prebuilt and integrated into the online system

DDC

- ca. 46.000 classes
- 10 main classes
- not all synthesized notations/numbers are represented in the online system

Structural difference DDC : RVK

Notational Building Sequence „Medicine & health”

614.4273
Diseases--humans--
incidence—United States, ...



614.42
Incidence (from
Main Schedule)



73
United States
(from Table T2)

RU 10585
Spreading of diseases
and influence of the
geographical
environment
(Geomedicine)



R
Geography

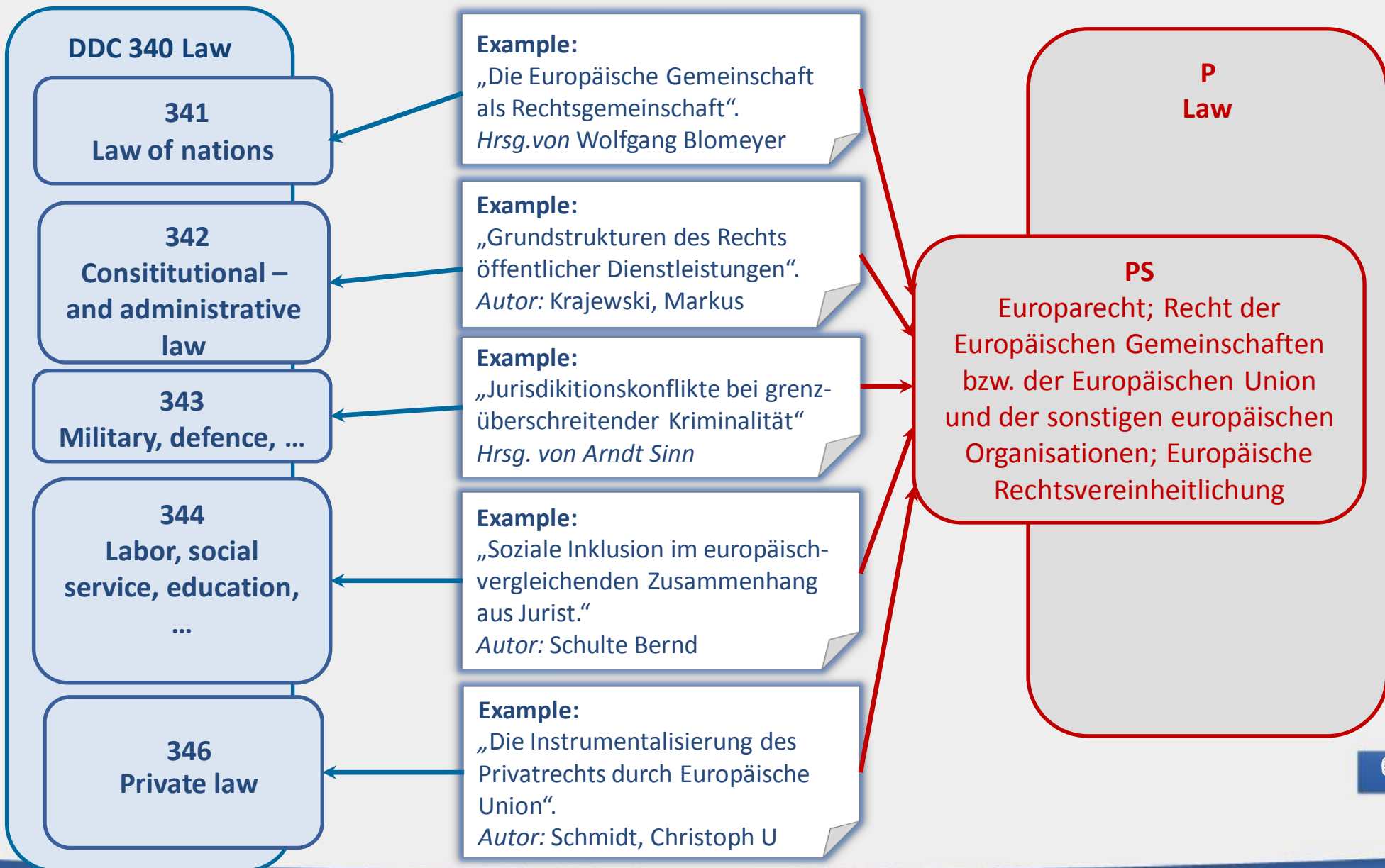


RU 10000
USA



585
Subject index for
Geography -S1R
Spreading of
diseases and
influence of the
geographical
environment
(Geomedicine)

Conceptual differences (1)



Conceptual differences (2)

615
Pharmacology and therapeutics

DDC 610
Medicine and health

616.024
Domestic medicine

Topic: Pharmacology

Example:
„Essentials of Pharmacology“
Author: Oldham, Frances, k.
RVK notation: **XI 1400**
DDC notation: **615**

Topic: Toxicology

Example:
„Toxicology in the use, misuse and abuse of food, drugs and chemicals“
Author: Chambers, Philipp L.,...
RVK notation: **VT 5308**
DDC notation: **615.9**

Topic: Drugs

Example:
„Aspirin and other Salicylates“
Author: Vane, John, R.,...
RVK notation: **XI 4000, VW 5100**
DDC notation: **615.783**

Topic: Domestic Medicine

Example:
„Selbstmedikation für die Kitteltasche,...“
Author: Lennecke, Kirsten
RVK notation: **VR 5800**
DDC notation: **616.024**

RVK: WW-XV
Medicine

XI
Pharmacology and Toxicology

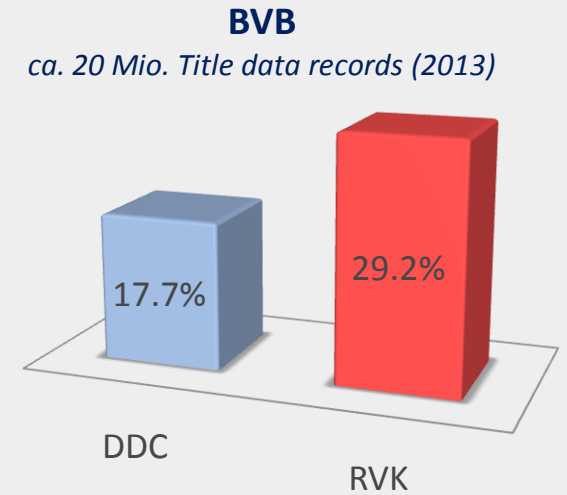
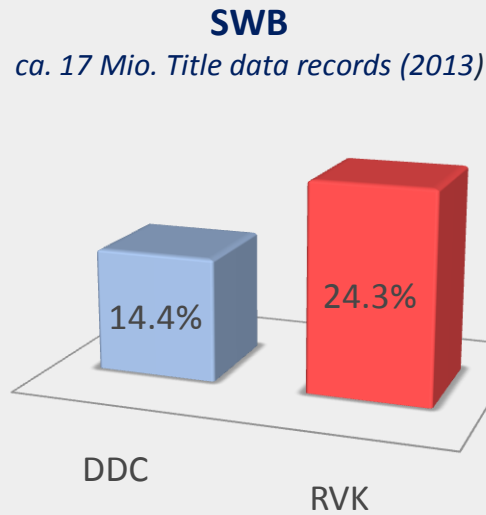
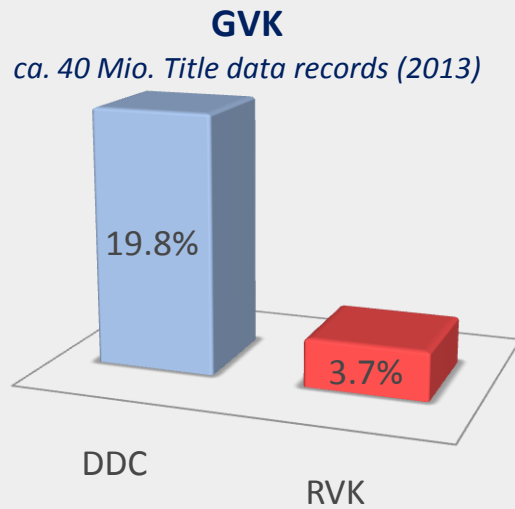
RVK: V
Chemistry and Pharmacy

VT
Pharmacology and Toxicology

VW
Pharmaceutical Biology

VR
General Pharmacy

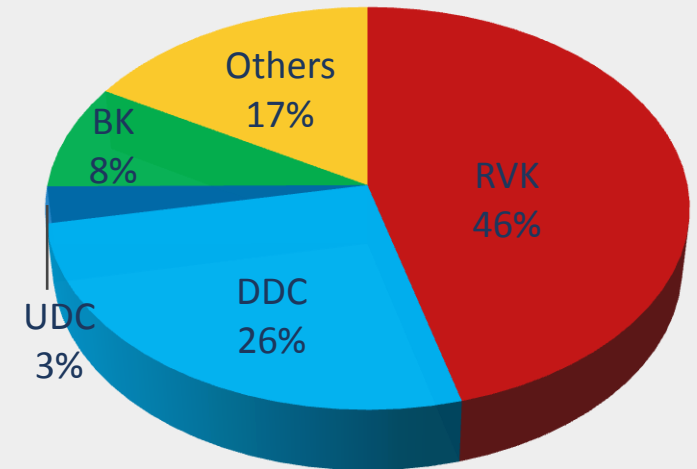
Percentage of DDC and RVK in the Union Catalogues



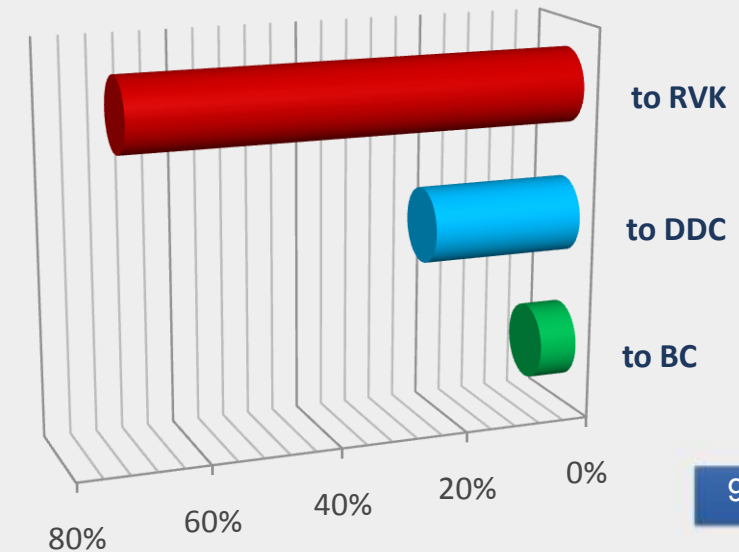


- Current status of DDC-X-concordance
- Field of application and the reasons for the use of DDC
- Methods & Problems in building a DDC-X concordance
- Interest in a DDC - RVK concordance

Existing Mapping works		
Concordance	Subject area	Contact
DDC – BK	Chemistry	TUB TUHH
	Politics	SUB Hamburg
	The thousand classes of the third summary	VZG
DDC – EZB	41 EZB-Fachgruppen	VZG
DDC – RVK	Library- and Information science	HdM Stuttgart
	Social science	UB Greifswald
	Medicine & Health, Law, the thousand classes of the third summary level	VZG
RVK – DDC	Biology, Chemistry, Geology, Paleontology, Physics, Mathematics	GESIS
	Psychology	SLUB Dresden
RVK – BK	German literature, Politics, Law	UB Wien
RVK – MSC	Mathematics	UB Regensburg
RVK – PACS	Physics	UB Regensburg
SWD – DDC		DNB
	Library- and Information science	HdM Stuttgart
SWD-RVK	Library- and Information science	HdM Stuttgart
RVK-BK-MSK-PACS	Mathematics, Physics	ULB Tirol
DDC-MSK-BKL	Mathematics	TIB Hannover



Classification schemes in the libraries that participated in the survey



Shift to other classification schemes

Mapping Methods



3 Decision Making
Experience
Expertise



Work done so far:

Complete concordance

- DDC - EZB
- DDC - BK for the thousand classes of the third summary of the DDC
- DDC - RVK for the thousand classes of the third summary of the DDC
- DDC - RVK for the DDC subject area Medicine & Health
- DDC - RVK for the DDC subject area „Law“

Partial Cocordance

- DDC - RVK for the DDC subject area „Philosophy“ (ca. 14% of the current DDC-classes)

Statistical Inference -

Title data records
Catalogues and databases
e.g. GVK, SWB

1 Classification system based search
Term definition
Synonym search

Course Correction

Facilitate exchange and use of concordances and KOS

- Collection of the existing mappings and KOS
- Provision of the above

Enhance the speed of building concordances between library KOS and ease their management

- Develop a mapping tool
- Make the concordances and KOS easily accessible
- Draft algorithms for automatic generation of mapping candidates

Improve the quality of the concordances

- Develop and implement measures for quality control
- Involve and expand the user groups



Demands on the tool

Integration of Data from different sources

Allow validation and storage of data



Presentation of Data and mapping candidates on a single screen

Multi-user web based open source tool

Easy access to and exchange of information
Serve as collaboration platform

Clear overview of the context of the selected term through display of

- the hierarchical structure of the classes
- scope notes
- Register Index Entries
- linked vocabularies and
- synonym suggestions

Mapping suggestions through

- evaluation of the co-occurrences of assigned notations/terms in the title data records
- automatic generation of mappings
- integration of the concordance database
- inclusion of the results of a manual mapping



Web Interface Cocoda Prototype

Cocoda

[Log in](#)

Source Scheme: DDC ▾

Search Options

Search by: **Term** Notation

Search by terms (typeahead)

- none
- DDC ▾
- GND
- RVK
- Wikidata

Top Concepts >

Source Scheme

Active Mapping

No concepts selected for mapping

Mappings

Target Scheme: RVK ▾

Search Options

Search by: **Term** Notation

Search by terms (typeahead)

- none
- DDC ▾
- GND
- RVK
- Wikidata

Top Concepts >

Target Scheme

Web Interface Cocoda Prototype

Cocoda

Log in

Source Scheme: DDC ▾

Search Options ▾

Search by: **Term** Notation

Leukozyten (Weiße Blutkörperchen)

612.112 Leukozyten (Weiße Blutkörperchen)

- ↳ Blut
- ↳ Biochemie
- ↳ Biophysik
- ↳ Anzahl und Auszählung

Leukozyten--Humanphysiologie

Weiße Blutkörperchen--Humanphysiologie

Map → Look up database all ▾

Active Mapping

No concepts selected for mapping

Target Scheme: RVK ▾

Search Options ▾

Search by: **Term** Notation

Search by terms (typeahead Wikidata)

- none
- DDC
- GND
- RVK
- Wikidata

Top Concepts →

Top Concepts ▾

- 0 Informatik, Informationswissenschaft & allgemeine Werke ⓘ
- 1 Philosophie & Psychologie ⓘ
- 2 Religion ⓘ
- 3 Sozialwissenschaften ⓘ
- 4 Sprache ⓘ
- 5 Naturwissenschaften ⓘ
- 6 Technik, Medizin, angewandte Wissenschaften ⓘ
- 7 Künste und Unterhaltung ⓘ
- 8 Literatur ⓘ

Web Interface Cocoda Prototype

Cocoda

Log out

Source Scheme: DDC -

Search Options

Search by: **Term** **Notation**

Leukozyten (Weiße Blutkörperchen)

612.112 **Leukozyten (Weiße Blutkörperchen)**

- ↳ Blut
- ↳ Biochemie
- ↳ Biophysik
- ↳ Anzahl und Auszählung

Leukozyten--Humanphysiologie

Weiße Blutkörperchen--Humanphysiologie

Map ↗

Look up database

all

Top Concepts

- 0 Informatik, Informationswissenschaft & allgemeine Werke ⓘ
- 1 Philosophie & Psychologie ⓘ
- 2 Religion ⓘ
- 3 Sozialwissenschaften ⓘ
- 4 Sprache ⓘ
- 5 Naturwissenschaften ⓘ
- 6 Technik, Medizin, angewandte Wissenschaften ⓘ
- 7 Künste und Unterhaltung ⓘ
- 8 Literatur ⓘ

Active Mapping

No concepts selected for mapping

Target Scheme: RVK -

Search Options

Search by: **Term** **Notation**

Blutkörperchen (Erythrozyt, Leukozyt), Häm

WW 8840 - WW 8879 **Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin**

- ↳ Blut und Blutbestandteile
- ↳ Allgemeines
- ↳ Einzelne biologische Disziplinen
- ↳ Systematische Spezifizierung

Add +

Replace all ↗

Top Concepts

- A Allgemeines ⓘ
- B Theologie und Religionswissenschaften ⓘ
- CA - CK Philosophie ⓘ
- CL - CZ Psychologie ⓘ
- D Pädagogik ⓘ
- E Allgemeine und vergleichende Sprach- und Literaturwissenschaft. Indogermanistik. Außereuropäische Sprachen und Literaturen ⓘ
- F Klassische Philologie. Byzantinistik. Mittellateinische und Neugriechische Philologie. Neulatein ⓘ

Web Interface Cocoda Prototype

Cocoda

Log out

Source Scheme: DDC -

Search Options

Search by: **Term** **Notation**

612.112

612.112 Leukozyten (Weiße Blutkörperchen)

- ↳ Blut
- ↳ Biochemie
- ↳ Biophysik
- ↳ Anzahl und Auszählung

Leukozyten--Humanphysiologie

Weiße Blutkörperchen--Humanphysiologie

Map → Look up database all ▾

Top Concepts

- 0 Informatik, Informationswissenschaft & allgemeine Werke ⓘ
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- 2 Religion ⓘ
- 3 Sozialwissenschaften ⓘ
- 4 Sprache ⓘ
- 5 Naturwissenschaften ⓘ
- 6 Technik, Medizin, angewandte Wissenschaften ⓘ
- 7 Künste und Unterhaltung ⓘ
- 8 Literatur ⓘ

Active Mapping

612.112 ⓘ 🗑️



WW 8840 - WW 8879 ⓘ 🗑️

WW 8720 - WW 8999 ⓘ 🗑️

Clear all ✕ Show mapping object

Mapping Candidates

Catalog Occurrences

Used notation: 612.112
Used database: GVK/SWB
Results (total) for 612.112: 42
Corresponding notations in RVK:

Notation	Hits	% of total
WW 8840 ⓘ+	22	52.4 %
YC 2500 - YC 2599 ⓘ+	11	26.2 %
WF 9895 ⓘ+	8	19.0 %
XG 6700 - XG 6728 ⓘ+	1	2.4 %

Suggested Target Concepts

- WW 8840 - WW 8879 Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin ⓘ+
- WW 8720 - WW 8999 Blut und Blutbestandteile ⓘ+
- WW 8845 - WW 8879 Systematische Spezifizierung ⓘ+

Concordance database

Target Scheme	Concept	Creator ↕	Date ↕	Relevance ↕
RVK	Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin ⓘ+	VZG	2012	
GND	Leukozyt ⓘ+	CrissCross	2010	high (0.8)
GND	Alkalische Leukozytenphosphatase ⓘ+ Blutlymphozyt ⓘ+ Granulozyt ⓘ+ Leukozytenadhäsion ⓘ+	CrissCross	2010	medium (0.5)

Target Scheme: RVK -

Search Options

Search by: **Term** **Notation**

ww 8840

WW 8840 Allgemeines

↑ Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin

Add + Replace all →

Add + Replace all →

Top Concepts

- A Allgemeines ⓘ
- B Theologie und Religionswissenschaften ⓘ
- CA - CK Philosophie ⓘ
- CL - CZ Psychologie ⓘ
- D Pädagogik ⓘ
- E Allgemeine und vergleichende Sprach- und Literaturwissenschaft. Indogermanistik. Außereuropäische Sprachen und Literaturen ⓘ
- F Klassische Philologie. Byzantinistik. Mittellateinische und Neugriechische Philologie. Neulatein ⓘ

Web Interface Cocoda Prototype

Cocoda

Log out

Source Scheme: DDC -

Search Options

Search by: **Term** **Notation**

612.112

612.112 Leukozyten (Weiße Blutkörperchen)

- ↳ Blut
- ↳ Biochemie
- ↳ Biophysik
- ↳ Anzahl und Auszählung

Leukozyten--Humanphysiologie

Weiße Blutkörperchen--Humanphysiologie

Map [↗](#) Look up database all ▾

Top Concepts

- 0 Informatik, Informationswissenschaft & allgemeine Werke ⓘ
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- 6 Technik, Medizin, angewandte Wissenschaften ⓘ
- 7 Künste und Unterhaltung ⓘ
- 8 Literatur ⓘ

Active Mapping

612.112 ⓘ 🗑️



WW 8840 - WW 8879 ⓘ 🗑️

WW 8720 - WW 8999 ⓘ 🗑️

Clear all ✕ Create download link ⬇ Save to Database ☁

Mapping Candidates

Catalog Occurrences

Used notation: 612.112
Used database: GVK/SWB
Results (total) for 612.112: 42
Corresponding notations in RVK:

Notation	Hits	% of total
WW 8840 ⓘ+	22	52.4 %
YC 2500 - YC 2599 ⓘ+	11	26.2 %
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- WW 8840 - WW 8879 Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin ⓘ+
- WW 8720 - WW 8999 Blut und Blutbestandteile ⓘ+
- WW 8845 - WW 8879 Systematische Spezifizierung ⓘ+

Concordance database

Target Scheme	Concept	Creator	Date	Relevance
RVK	Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin ⓘ+	VZG	2012	
GND	Leukozyt ⓘ+	CrissCross	2010	high (0.8)
GND	Alkalische Leukozytenphosphatase ⓘ+ Blutlymphozyt ⓘ+ Granulozyt ⓘ+ Leukozytenadhäsion ⓘ+	CrissCross	2010	medium (0.5)

Target Scheme: RVK -

Search Options

Search by: **Term** **Notation**

ww 8840

WW 8840 Allgemeines

↑ Blutkörperchen (Erythrozyt, Leukozyt), Hämoglobin

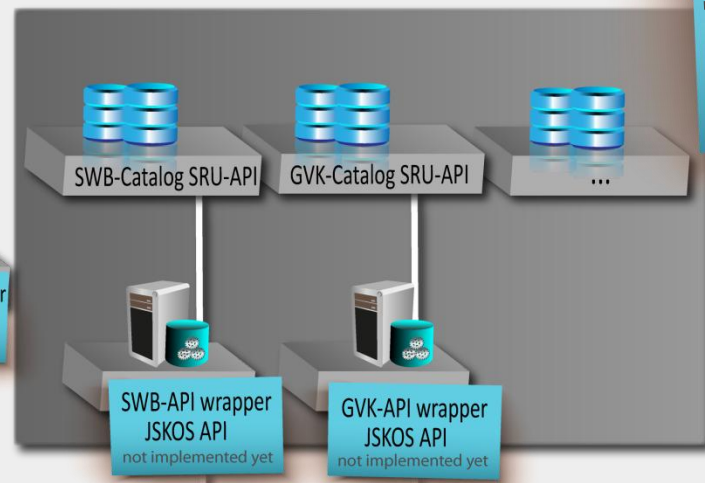
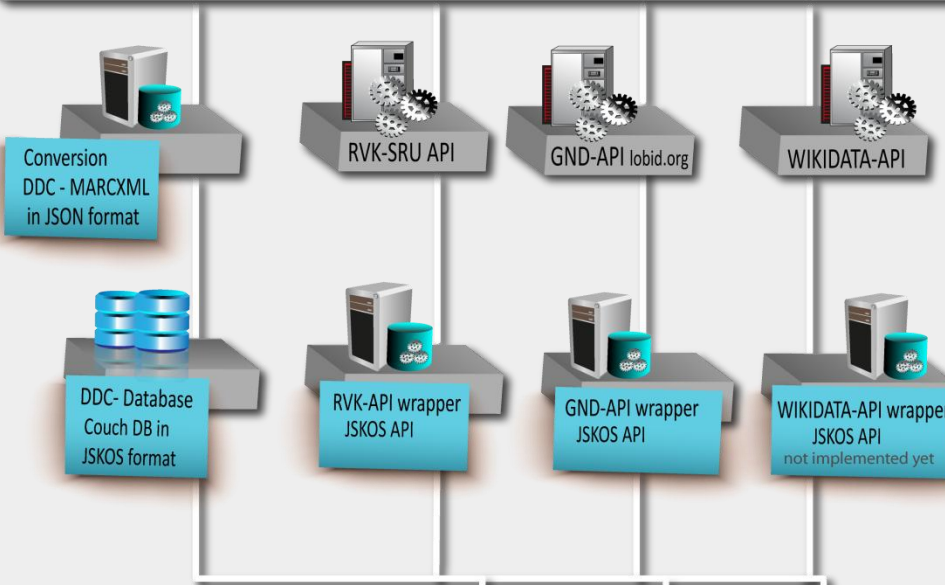
Add + Replace all ➔

Add + Replace all ➔

Top Concepts

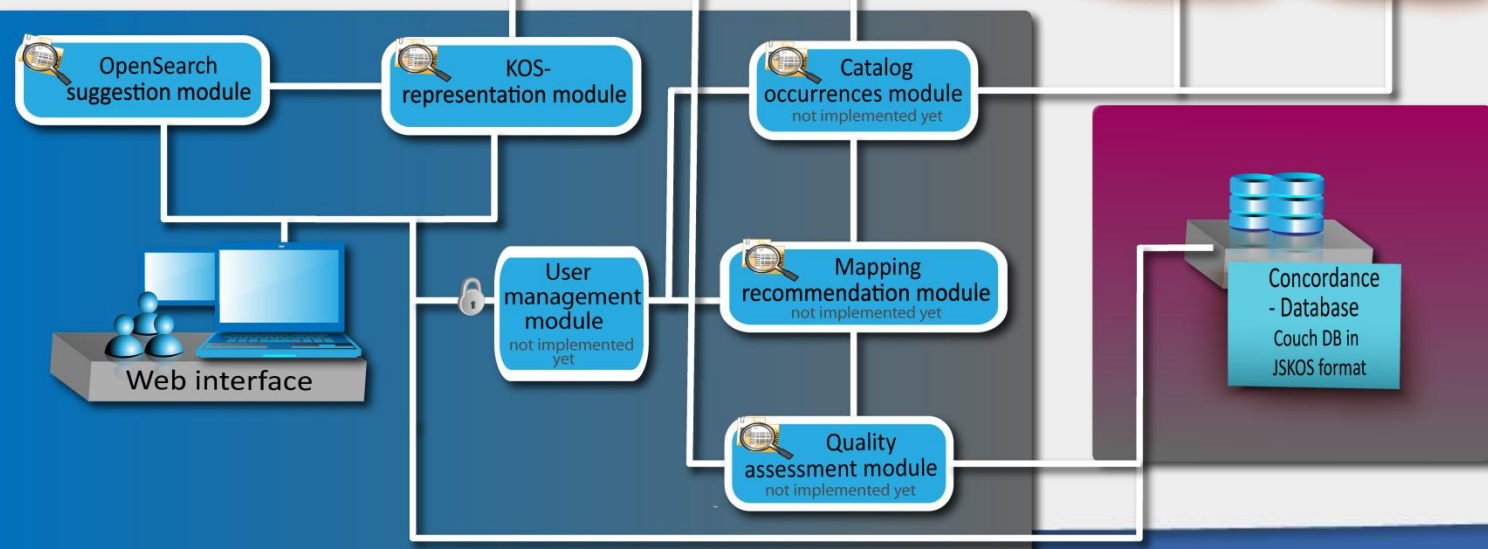
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- B Theologie und Religionswissenschaften ⓘ
- CA - CK Philosophie ⓘ
- CL - CZ Psychologie ⓘ
- D Pädagogik ⓘ
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- F Klassische Philologie. Byzantinistik. Mittellateinische und Neugriechische Philologie. Neulatein ⓘ

Cocoda – Software Concept



Format requirements

- Compatible with SKOS
- Represent both KOS and its mappings
- Simple and easy to use in web application



- Based on SKOS extended with mapping objects
- Application of JSON-LD with consistent fields
⇒ simple JSON with optional mapping to RDF
- Also supports existence statements
 - \nexists : negation (e.g. has no related concepts)
 - \forall : completeness (e.g. has narrower concepts)
- Open Standardization of JSKOS, feedback appreciated: <https://gbv.github.io/jskos/>

JSKOS Example: Concept

```
{  
  "@context": "http://gbv.github.io/jskos/context.json",  
  "type": ["http://www.w3.org/2004/02/skos/core#Concept"],  
  "inScheme": ["http://dewey.info/scheme/edition/e22/"],  
  "uri": "http://dewey.info/class/612.112/e22/",  
  "notation": ["612.112"],  
  "prefLabel": {  
    "en": "White corpuscles (Leukocytes)",  
    "de": "Leukozyten (Weiße Blutkörperchen)"  
  },  
  "narrower": [ null ],  
  "broader": [ {  
    "notation": ["612.11"],  
    "uri": "http://dewey.info/class/612.11/e22/"  
  } ],  
  "related": null  
}
```

Null as array element: existence

Null value: negation

Missing fields: maybe (Open World Assumption)

- Based on JSKOS
- Used in Cocoda with Web Components
- Simple URL queries, possible mapping to LOD-URIs
 - `/mappings?from=DDC&to=RVK¬ation=612`
 - `/concepts?notation=612` \Leftrightarrow `/concepts/612`
- Wrapping other APIs
- Open preview of specification and prototype
 - <https://gbv.github.io/jskos-api/>
 - <https://github.com/gbv/cocoda-db>
 - <http://coli-conc.gbv.de/concordances/>

JSKOS Example: Mapping (*current draft*)

```
{
  "from": {
    "inScheme": ["http://dewey.info/scheme/edition/e22/"],
    "conceptSet": [ {
      "uri": "http://dewey.info/class/612.112/e22/",
      "notation": ["612.112"]
    } ]
  },
  "to": {
    "inScheme": ["http://d-nb.info/gnd/7749153-1"],
    "conceptSet": [ {
      "uri": "http://d-nb.info/gnd/4074195-3",
      "prelabel": { "de": "Leukozyt" }
    } ]
  },
  "mappingType": "closeMatch",
  "creator": "VZG"
}
```

Thank You!

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

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Vectors slide no.9: © NLshop– fotolia.com <https://de.fotolia.com/>

Vectors slide no. 2,3,4,10,12,18: designed by Freepik.com <http://www.freepik.com>

Thanks to Jana Agne for creating the table at the slide no.3