Phenomenon-based vs. disciplinary classification: possibilities for evaluating and for mapping

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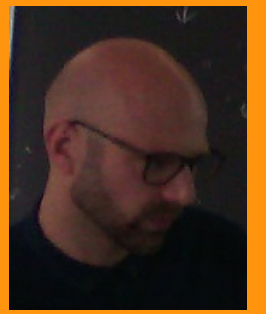

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Disciplines

Most bibliographic classifications are based on **disciplines**: philosophy, sociology, linguistics, chemistry…

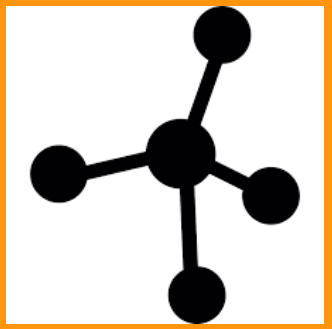
This may:

- be an obstacle to interdisciplinary research
- leave out leisure, e-commerce, e-government...

Phenomena

The alternative is classification by **phenomena:**

communities, languages, chemical substances…



Phenomena

Phenomena are a more general unit of knowledge

Disciplines can be defined as phenomena

(e.g. linguistics = study of languages)

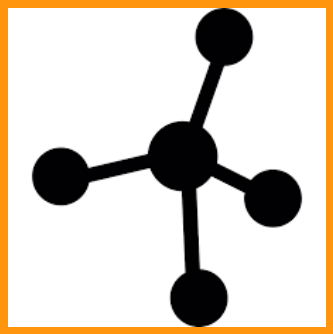
Classification by phenomena

Phenomena have a **place of unique definition** [Farradane 1950]:

f "chemical substances"

fe "oxides"

febb "water"

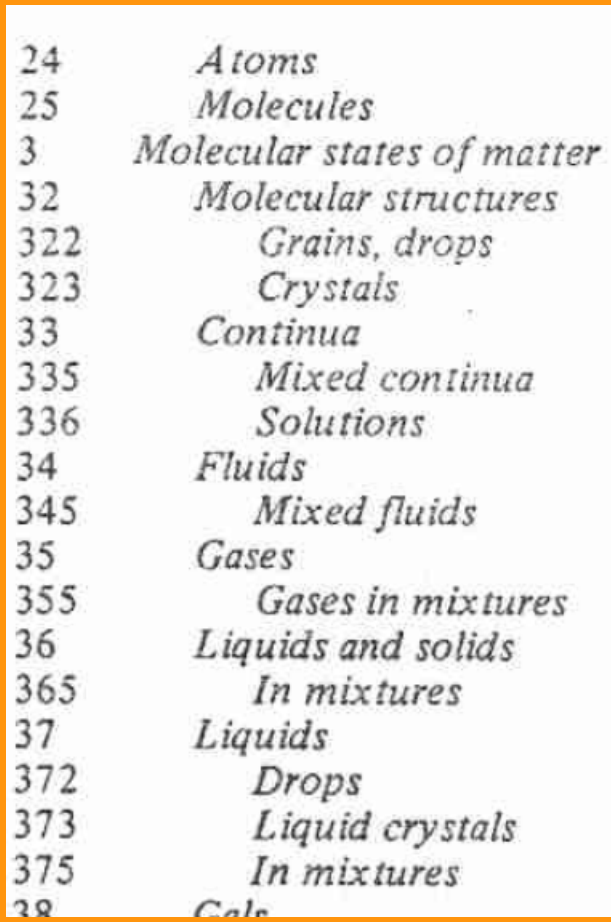


and can be combined with any other concept:

wkf7febb "fortifications, with water"

Phenomenon-based classifications

- JD Brown's Subject Classification (1906)
- Classification Research Group's draft for NATO (1969)
- Integrative Levels Classification (2004-) developing, currently 9200+ classes

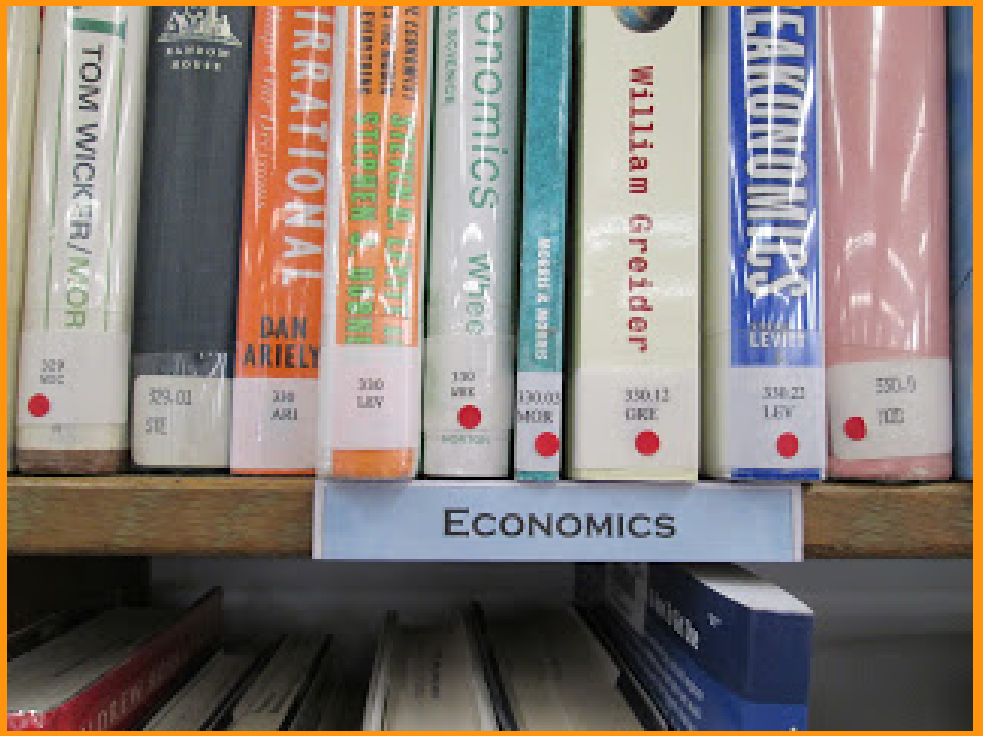


24	*Atoms*
25	*Molecules*
3	*Molecular states of matter*
32	*Molecular structures*
322	*Grains, drops*
323	*Crystals*
33	*Continua*
335	*Mixed continua*
336	*Solutions*
34	*Fluids*
345	*Mixed fluids*
35	*Gases*
355	*Gases in mixtures*
36	*Liquids and solids*
365	*In mixtures*
37	*Liquids*
372	*Drops*
373	*Liquid crystals*
375	*In mixtures*
38	*Gels*

Disciplines vs. phenomena

Most libraries and collections use disciplinary classifications (DDC, UDC, LCC…)

comparison, mapping…

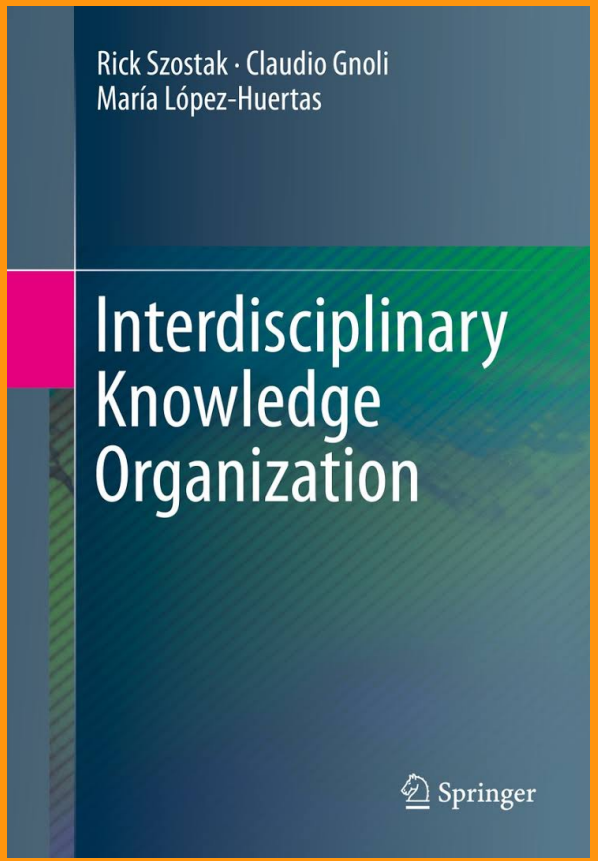


http://bradleybeachlibrary.blogspot.it

Disciplines vs. phenomena

- Disciplines: DDC
- Phenomena: ILC

First comparison:
books on nature conservation
held at Uni Pavia ecology library
(Szostak et al. 2016, 104-106).



BARTOC.org

Basel Register of Thesauri, Ontologies & Classifications

BARTOC essential prerequisite:

- whole spectrum of knowledge (**000-999≈a-z**)
- only broad classes needed

BARTOC.org

Basel Register of Thesauri, Ontologies & Classifications

Full terminology registry

- Directory of thousands of KOSs
- SKOS vocabulary browser
  for millions of concepts & terms

Every KOS is assigned 1+ DDC classes and EuroVoc terms

We added ILC classes to first 200 Top-Rated KOSs
+ all KOSs in the health care domain

ILC1 used, ILC2 planned

TITLE	RATING	DDC	ILC	EUROVOC
Universal Decimal Classification	3,656 points	001 Knowledge	V: general class, sgl: libraries	document indexing
International Classification of Diseases	3,607 points	616 Diseases	mq30: diseases, sh: health care	illness
Thesaurus of Clinical Signs	3,080 points	616 Diseases	mq30: diseases, sh: health care	illness
International Classification of Primary Care	2,860 points	610 Medicine and health	sh: health care, mq30: diseases	health care
EuroVoc	2,608 points	001 Knowledge	V: general class, tUE: European	politics, European Union

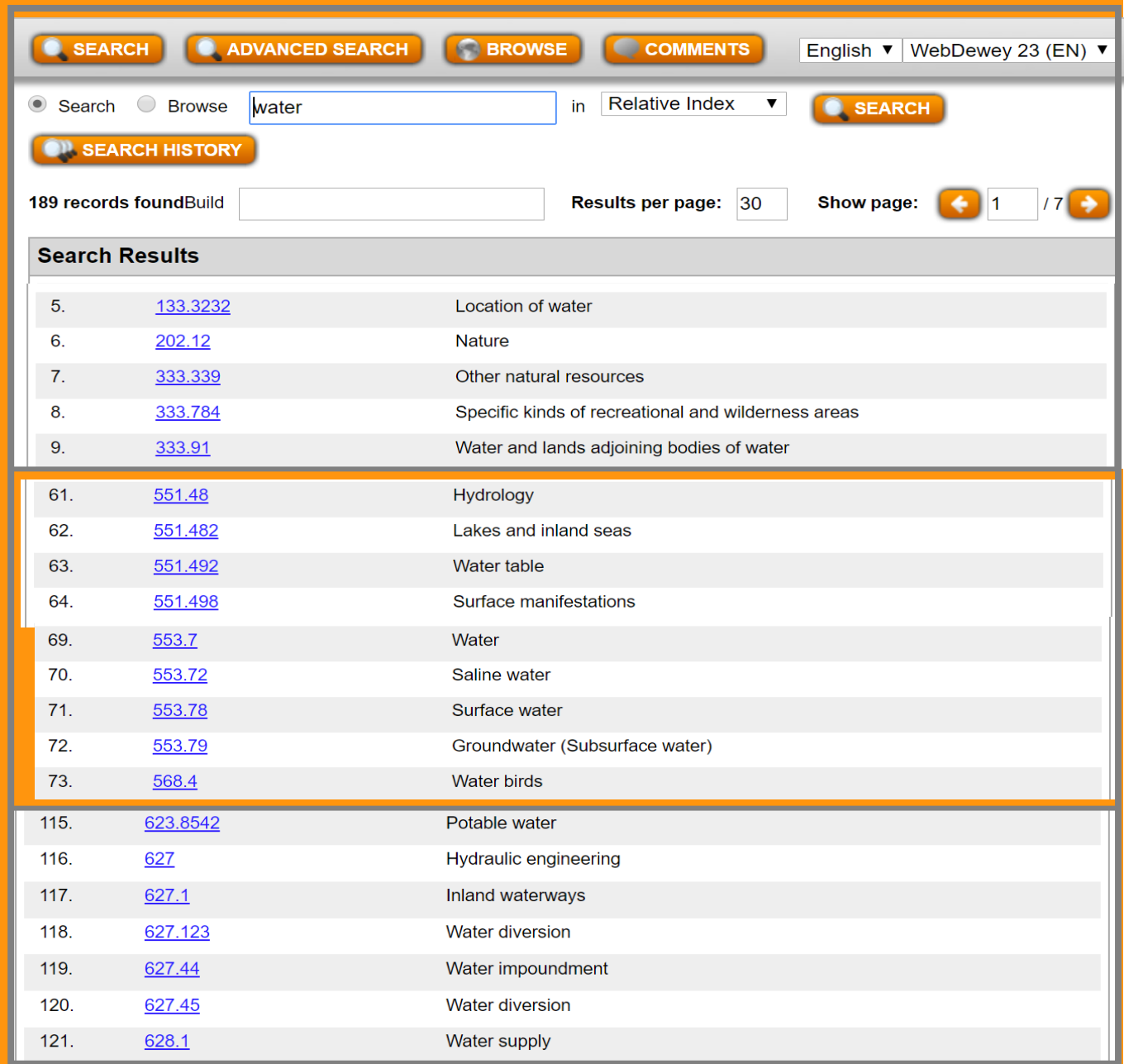
Topics in DDC

"identifying equivalence and hierarchical relationships between Relative Index headings, one of the steps required to fully implement a **topic-based data model** for the DDC" [Green 2014]

“topics” ≈ phenomena

Topics in DDC

In DDC,
the topic “water”
is in many
disciplines:



“Interdisciplinary” DDC numbers

354.36 “water--public administration”

553.7 “water” [interdisciplinary number]

714 “water--landscape architecture”

…

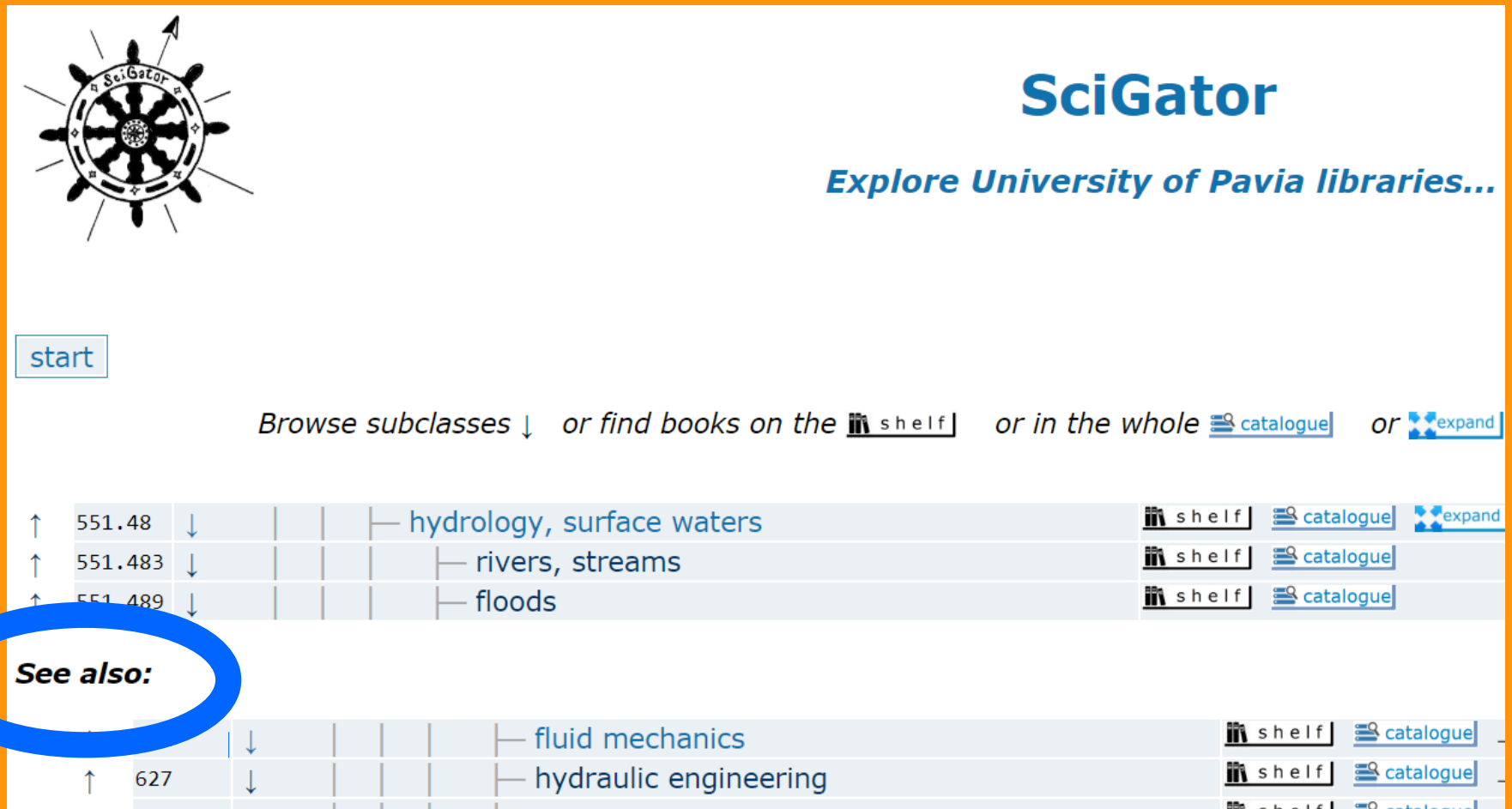
Also used to map DDC and Nuovo Soggettario

(**553.7** is part of discipline Earth sciences)

Cross-references by phenomena

Topics are implicit basis for “see-also” refs in DDC

Can be exploited in browsing interfaces [Lardera et al. 2017]:



SciGator

Explore University of Pavia libraries...

start

Browse subclasses ↓ or find books on the shelf *or in the whole* catalogue *or* expand

↑	551.48	↓	├ hydrology, surface waters	shelf	catalogue	expand
↑	551.483	↓	├ rivers, streams	shelf	catalogue	
↑	551.489	↓	├ floods	shelf	catalogue	

See also:

↑	532	↓	├ fluid mechanics	shelf	catalogue
↑	627	↓	├ hydraulic engineering	shelf	catalogue

Implicit phenomenon: “water”

Could be formally linked to WebDewey Relative Index

Mapping DDC and ILC

- DDC main classes **000–900** mapped to ILC
- ILC main classes **a–z** mapped to DDC

notation	foci	example	verbal	synonyms	description	description_s	discipline	factors	notes	ilc1map	ddcmap
lk		0	bacteria	eubacteria							
kv		0	viruses				virology				0
meWl		0	protists	protista, unicellular eukaryotes							0
mp94		0	afftected by		disease	pest	plant pathology, phytopathology				2
m		0	organisms	eukaryote organisms, eukaryotes				l k	strictly speaking, also prokaryotes are organisms		570 2

Comparison. 1

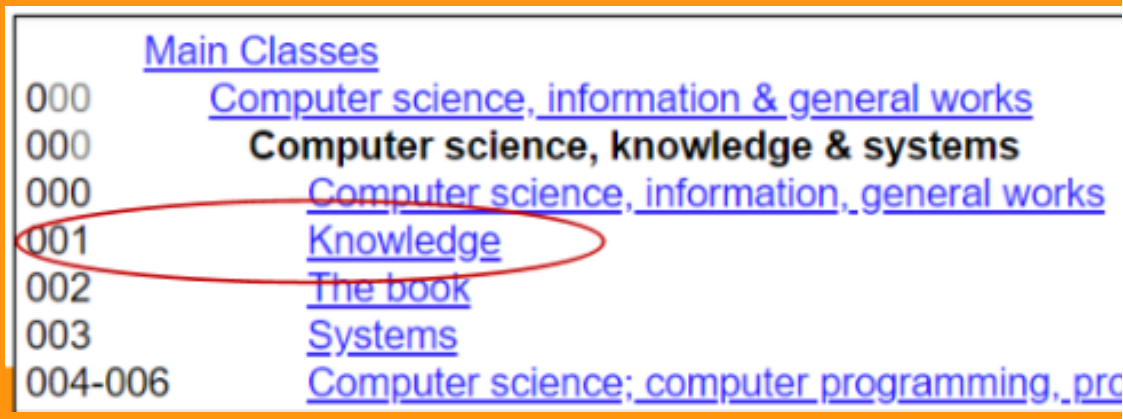
ILC: ontological order of integrative levels

y “knowledge”

DDC: epistemological order of Baconian faculties

001 “knowledge”

030 “dictionaries”



By ILC main classes

a math' objects ≈	*510, 160*
b spacetime	*530.1*
c branes	*539.7258*
d energy	*539.7*
e atoms	*541*
f molecules	*540*
g continuum bodies	*530.4*
h celestial bodies	*520*
i minerals and rocks	*550*
j landforms	*910*
k genes	*576.5*
l bacteria	*579.3*
m organisms	*570*
n populations	*577*
o instincts	*591.5*
p consciousness	*150*
q language	*400, 410*
r rituals	*200*
s communities	*300*
t polities	*320*
u enterprises	*330*
v technologies	*600*
w artifacts	*620*
x artworks	*700*
y public knowledge	*001*

Among 25 main classes of ILC
: 0XX(1), 1XX(1), 2XX(1), 3XX(3), 4XX(1), 5XX(14), 6XX(2), 7XX(1), 9XX(1)

By DDC main classes

...

500 ≈ bWo nature [natural sciences]
510 ≈ a math' objects [maths]
520 ≈ h celestial bodies [astronomy]
530 ≈ b spacetime
540 ≈ f molecules [chemistry]
550 ≈ i minerals and rocks [geology]
560 ≈ m91y fossils
570 ≈ m eukaryote organisms
580 ≈ mp plants [botany]
590 ≈ mq animals [zoology]
600 ≈ v technologies [applied sci's]
610 ≈ sph health care [medicine]
620 ≈ w artifacts, tools
630 ≈ vaWp agriculture
640 ≈ vq cooking [food science]
650 ≈ u50 corporations
660/680 ≈ vt industry

690 ≈ wh home appliances
700 ≈ x artworks [aesthetics, art criticism]
710 ≈ wl settlements [town planning]
720 ≈ wk buildings [architecture]
730 ≈ xd ceramics
730 ≈ xb sculptures
740 ≈ xg drawings
750 ≈ xf paintings
770 ≈ xh photographic art
770 ≈ xs film
780 ≈ xm music [musicology]
790 ≈ xx sport, games
800 ≈ xl literature [philology]
910 ≈ t92 jurisdictions [political geography]
910 ≈ j landforms [physical geography]
920 ≈ pY persons, individuals
930 ≈ t91d Antiquity [ancient history]
940/990 ≈ t91 historical periods [history]

Comparison. 2

main ILC classes are subclasses in DDC:

d “particles and waves” ≈ **539.7**

l “prokaryotes, bacteria” ≈ **579.3**

Main DDC classes are subclasses in ILC:

800 “literature” ≈ **xl**

410 “English language” ≈ **qvemi**

Comparison. 3

ILC classes mapped to several DDC classes:

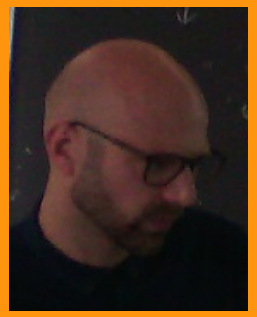
190, 140	**≈**	**yy99m**	modern Western philosophy
230/280	**≈**	**rt**	Christianity
400/410	**≈**	**q**	languages, idioms
510, 160	**≈**	**a**	forms, mathematical objects
660/680	**≈**	**vt**	industry
740, 760	**≈**	**xg**	drawings
800/890	**≈**	**xl**	literature
900, 940/990	**≈**	**t91**	historical periods

Conclusions

- Both DDC and ILC can be used in postcoordinated way
- But general orders of classes are different
- Evaluation by more formal methodology planned
- Topics and interdisciplinary numbers can be exploited in more formal ways

...Thanks!

@BARTOC_UBBasel



@scritur

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