

How ILC works

A guide to using the Integrative Levels Classification developing version (ILC3)

edited by Claudio Gnoli

with Marcin Trzmielewski, Douglas Tudhope, Emanuela Valenzano

Published since 2023, update 2024.12.02

(See also [ILC1](#) and [ILC2 versions](#) of this guide)

See also video tutorials:

[1: Main classes](#)

[2: Subclasses](#)

(more planned)

Table of contents

[1: Introduction](#)

[2: Classes](#)

[3: Matrix classes](#)

[4: Themes](#)

Facets:

[5: Free facets](#)

[6: Parallel facets](#)

[7: Bound facets](#)

[8: Common vs. special facets](#)

[9: Passive facets](#)

[10: Citation order of facets](#)

[11: Subfacets](#)

Deictics:

[12: Conjunctions and spans](#)

[13: Typical or favoured classes and special schemes](#)

[14: Referring to ranks and the absolute class](#)

[15: Referring to present, unspecified or actual objects](#)

Dimensions:

16: Perspective facets and dimensions

17: Document facets

18: Collection and information need facets

Application:

19: Indexing fiction

20: Indexing images

21: Indexing specimens

1: Introduction

This document illustrates how the third edition of the Integrative Levels Classification (ILC), currently under development, can be used to index the subject content of any document (a book, an article, a blog post, a video, a picture, a museum specimen, etc.). ILC is a knowledge organization system (KOS)¹, aimed at providing an intellectual guide to browse and navigate knowledge in general, as well as particular collections of documents². Its previous edition (ILC2) is also published in SKOS format for purposes of digital data exchange³.

Illustration and examples below start from the most basic structural elements of ILC, then continue to show increasingly sophisticated constructions. However, the first sections are

¹ Fulvio Mazzocchi, "Knowledge organization system (KOS)", in *ISKO Encyclopedia of Knowledge Organization*, edited by Birger Hjørland and Claudio Gnoli, [isko.org/cyclo/kos](https://www.isko.org/cyclo/kos) 2017, also in *Knowledge organization*, 45: 2018, n. 1: 54-78.

² Claudio Gnoli, "Integrative Levels Classification (ILC)", in *ISKO encyclopedia of knowledge organization*, eds. Birger Hjørland - Claudio Gnoli, <https://www.isko.org/cyclo/ilc>, 2020.

³ Ziyong Park - Claudio Gnoli - Daniele Pascal Morelli, "The second edition of the Integrative Levels Classification", *Journal of data and information science*, 5: 2020, n. 1, p. 39-50; Ceri Binding - Claudio Gnoli - Gabriele Merli - Marcin Trzmielewski - Douglas Tudhope, "Integrative Levels Classification as a networked KOS: a SKOS representation of ILC2", in *Knowledge organization at the interface: proceedings of the Sixteenth international ISKO Conference, July 2020, Aalborg*, eds. Marianne Lykke - Tanja Svarre - Mette Skov - Daniel Martínez-Ávila, Ergon, Baden-Baden 2020, p. 49-58; Ceri Binding - Claudio Gnoli - Douglas Tudhope, "Migrating a complex classification scheme to the Semantic Web: expressing the Integrative Levels Classification using SKOS RDF", *Journal of documentation*, 77: 2021, n. 4, p. 926-945.

enough to use ILC in many applications; the subsequent sections are applicable to specific cases or applications. Several applications are documented already⁴.

2: Classes

Unlike most bibliographic classification schemes, ILC classes do not represent disciplines and their subdivisions, but phenomena of the real world⁵. By *phenomena* we mean any kind of real entity, including e.g. radiation, fluids, plants, friendship, churches, or tales. We humans only know about them through our sense organs, brain skills and learned information, while we don't know the original reality "in itself", that some philosophers have called *noumena*. So ILC has a single, initial class for that undifferentiated absolute reality out there, class A (see below about deictic classes)⁶. While A expresses everything as a whole, humans by their nature perceive reality as many distinct phenomena, and these are

⁴ Claudio Gnoli - Gabriele Merli, "Notazione e interfaccia di ricerca per una classificazione a livelli", *AIDA informazioni*, 23: 2005, n. 1-2, p. 57-72; Enzo Cesanelli, "Classificare il dominio della comunicazione secondo la teoria dei livelli di integrazione", *E-LIS*, <http://eprints.rclis.org/archive/14632/> 2008; Claudio Gnoli - Gabriele Merli - Gianni Pavan - Elisabetta Bernuzzi - Marco Priano, "Freely faceted classification for a Web-based bibliographic archive: the BioAcoustic Reference Database", in *Wissensspeicher in digitalen Räumen: Proceedings der 11. Tagung der Deutschen Sektion der Internationalen Gesellschaft für Wissenorganisation*, Konstanz, 20. bis 22. Februar 2008, eds. Jörn Sieglerschmidt - H.-Peter Ohly, Ergon, Würzburg 2010, p. 124-134; Andreas Ledl - Claudio Gnoli, "Indexing KOSs in BARTOC by a disciplinary and a phenomenon-based classification: preliminary considerations", in *Faceted classification today: proceedings of the International UDC Seminar, 14-15 September 2017, London*, eds. Aida Slavic - Claudio Gnoli, Ergon, Würzburg 2017, p. 109-117; Claudio Gnoli - Douglas Tudhope - Patrícia de Almeida - Romana Barbui - Ceri Binding - Véronique Blot, "Simpler search in a complex world: browsing ethnographic videos by freely faceted classmarks", in *Proceedings ISKO UK Conference 2023*, Glasgow, CEUR, in prep.

⁵ *The Léon Manifesto*, ISKO Italia, <http://www.iskoi.org/ilc/leon.php> 2007, also in *Knowledge organization*, 34: 2007, n. 1, p. 6-8; Rick Szostak, "Transcending discipline-based library classifications", in *The Oxford handbook of interdisciplinarity*, eds. Robert Frodeman - Julie Thompson Klein - Carl Mitcham, Oxford University Press, 2009; Claudio Gnoli, "Classifying phenomena, part 1: Dimensions", *Knowledge organization*, 43: 2016, n. 6, p. 403-415; Rick Szostak - Claudio Gnoli - María López-Huertas, *Interdisciplinary knowledge organization*, Springer, Cham 2016; Claudio Gnoli - Richard Smiraglia - Rick Szostak, "Phenomenon-based classification", *Annual review of information science and technology*, in prep.

⁶ Claudio Gnoli - Patrícia de Almeida - Luís Miguel Oliveira Machado - Riccardo Ridi, "Taiga penguins: expressing existence and fictionality in a phenomenon-based classification", in *Knowledge organization across disciplines, domains, services and technologies: proceedings of the Seventeenth International ISKO Conference, 6-8 July 2022, Aalborg, Denmark*, edited by Marianne Lykke et al., Ergon, Baden-Baden 2022, p. 101-110.

listed in the ordinary classes with lowercase letters, a to y.

The order of classes, subclasses and facets is controlled by an alpha-numerical notation devised in such a way to produce effective sequences⁷. As suggested in the name of the system, classes of phenomena in ILC schedules are listed according to the order of *integrative levels* of reality, that is of increasingly organized systems⁸. This means that phenomena of lower levels, like atoms or molecules, are represented by earlier letters in the alphabet like e, f, while more integrated phenomena, like communities and polities, are represented by later letters such as t, u:

- a forms
- b quantum fields
- c spacetime
- d energy
- e atoms
- f molecules
- g bulk matter
- h celestial objects

⁷ Claudio Gnoli, "Notation", in *ISKO Encyclopedia of Knowledge Organization*, edited by Birger Hjørland and Claudio Gnoli, isko.org/cyclo/notation 2018, also in *Knowledge organization*, 45: 2018, n. 8: 667-684.

⁸ Brian C. Vickery, "Relations between subject fields: problems of constructing a general classification", in *Proceedings of the International study conference on Classification for information retrieval, Dorking, 13-17 May 1957*, Aslib, London 1957, p. 43-49; Douglas J. Foskett, "Classification and integrative levels", in *The Sayers memorial volume*, eds. D.J. Foskett - B.I. Palmer, Library Association, London 1961, p. 136-150, republished in *Theory of subject analysis: a sourcebook*, eds. Lois Mai Chan - Phyllis A Richmond - Elaine Svenonius, Libraries Unlimited, Littleton 1985, p. 210-220; id., "Classification for a general index language", Library Association, London 1970; id., "The theory of integrative levels and its relevance to the design of information systems", *ASLIB proceedings*, 30: 1978, n. 6, p. 202-208; Derek Austin, "The theory of integrative levels reconsidered as the basis of a general classification", in Classification Research Group, *Classification and information control*, Library Association, London 1969, p. 81-95; Claudio Gnoli - Roberto Poli, "Levels of reality and levels of representation", *Knowledge organization*, 31: 2004, n. 3, p. 151-160; Claudio Gnoli, "Levels, types, facets: three structural principles for KO", in *Paradigms and conceptual systems in knowledge organization: proceedings of the Eleventh international ISKO conference, Rome, 23-26 February 2010*, eds. Claudio Gnoli and Fulvio Mazzocchi, Ergon, Würzburg 2010; id., "Ontological foundations in knowledge organization: the theory of integrative levels applied in citation order", *Scire*, 17: 2011, n. 1, p. 29-34; id., "Classifying phenomena, part 2: Types and levels", *Knowledge organization*, 44: 2017, n. 1, p. 37-54; id., "Levels of reality as a fertile ontological model", in *History and memory of the knowledge organization*, eds. Gustavo Saldanha - Tatiana de Almeida, in prep.

- i rocks
- j landforms
- k genes
- l bacteria
- m organisms
- n populations
- o agency
- p consciousness
- q language
- r production
- s services
- t communities
- u polities
- v legal entities
- w customs
- x creative arts
- y scholarship

These 25 levels can be grouped into 5 major levels (roughly corresponding to Nicolai Hartmann's *strata*), expressed by the span indicator –W– connecting the first and last class in the span:

- aWc information
- dWj matter
- kWn life
- oWp cognition
- qWy culture

a “forms” covers the entities of fundamental logic and mathematics, including sets, numbers and functions. The following classes list the elusive entities studied by fundamental physics, including spacetime that is now considered itself as an entity rather than an absolute background in which everything happens. Matter only emerges in d as subatomic particles, that get organized in atoms, molecules and macroscopic bodies in the following classes. Some of these get differentiated into mineral and rocks” (i) and landforms such as mountains, rivers and seas (j). Organic molecules get organized into k genes and genomes, the basic information constituents of life, whose variety is then listed as unicellular prokaryotes such as bacteria (l), plants, animals and other organisms (m) and

higher-order living units, such as populations of a species or ecosystems (n). Notice that human physiology is covered in mU, which comprises mU4 “human diseases” as a natural phenomenon, while their medical treatment is part of services at sh. The agency of animal behaviour, from simple reactions to complex living strategies, is in o, while the subjective conscious experiences including emotions, mood and thought are in p: so persons considered as conscious individuals are px, as opposed to their organic bodies mU. Here we move from the common animal nature to the very special features of humans, first of all q language which is the informational foundation for all the cultural phenomena in the remaining classes. These start with organized production of goods by hunting, breeding, farming and manufacturing (r), and provision of services such as prepared food, lodging, clothes, healthcare, retail and transportation. While these services can also be provided by independent persons, humans increasingly organize themselves in social communities (t) and polities (u) including contemporary nation states (uU). These in turn produce official regulations according to which such legal entities as companies and banks (v) are created and controlled. Customs (w) include rituals, games and sport, celebrations and religious practices and faiths. Finally, the most advanced cultural phenomena are the creative arts (x) and scholarship including the methods and products of the sciences (y).

Further lowercase letters, following that for the main class, mean subclasses: namely, types of the main class. For example, main class m “organisms” includes these subdivisions:

| | |
|-------|-----------------|
| m | organisms |
| mn | mushrooms |
| mo | red algae |
| mp | plants |
| mq | animals |
| mqm | molluscs |
| mqn | annelids |
| mqr | arthropods |
| mqrh | crustaceans |
| mqr i | insects |
| mqv | chordates |
| mqvh | ray-finned fish |
| mqvl | reptiles |

| | |
|------|---------|
| mqvο | birds |
| mqvt | mammals |

In this way, a longer string generally means a more specific phenomenon: that is, the notation is positional, like in many bibliographic classifications since the times of Dewey (an exception being the span classes just above⁹).

The particular letter that identifies a subclass has no special meaning, apart from controlling its position before or after other classes. Where possible, however, it may have been chosen to help memory, like in mqm for molluscs or mqvο for birds as the object of ornithology.

At each rank of specificity, whenever possible, phenomena are listed in a phylogenetic or “genealogical” sequence¹⁰. For example, red algae are listed before plants and animals because they are believed to have appeared before in the evolution of organisms. That is, letters coming earlier in the alphabetical order stand for phenomena appeared before. As we have seen, this also holds for the sequence of levels that are the main classes.

For every class, 25 subclasses can thus be expressed by letters a to y. In some cases, however, more than 25 subclasses of the same class are needed. Zoologists teach that ray-finned fish (mqvh) has more than 25 subclasses. To cope with this, some subclasses

⁹ Span classes are expressed in a similar way by Zygmunt Dobrowolski, *Étude sur la construction des systèmes de classification*, Gauthier-Villars, Paris 1964, according to which the shortest notation should rather be used for middle-rank classes, as these are used more often in indexing.

¹⁰ Claudio Gnoli, “Phylogenetic classification”, *Knowledge organization*, 33: 2006, n. 3, p. 138-152; Claudio Gnoli - Mela Bosch - Fulvio Mazzocchi, “A new relationship for multidisciplinary knowledge organization systems: dependence”, in *La interdisciplinariedad y la transdisciplinariedad en la organización del conocimiento científico: actas del VIII Congreso ISKO-España, León, 18, 19 y 20 de Abril de 2007*, eds. Blanca Rodríguez Bravo - M.a Luisa Alvite Díez, Universidad de León, 2007, p. 399-409; Claudio Gnoli, “Facets, levels and semantic factoring”, *SRELS journal of information management*, 50: 2013, n. 6, p. 751-762; Rodrigo De Santis - Claudio Gnoli, “Expressing dependence relationships in the Integrative Levels Classification using OWL”, in *Knowledge organization for a sustainable world: proceedings of the Fourteenth international ISKO Conference, Rio de Janeiro, 27-29 September 2016*, eds. José Augusto Chaves Guimarães - Suellen Oliveira Milani - Vera Dodebei, Ergon, Würzburg 2016, p. 368-375; Claudio Gnoli, “Genealogical classification”, in *ISKO Encyclopedia of Knowledge Organization*, edited by Birger Hjørland and Claudio Gnoli, isko.org/cyclo/genealogical 2018.

(usually chosen among less important ones) can be expressed with the emptying digit z followed by a further letter: despite their longer notation, such classes are at the same rank as the adjacent ones¹¹:

| | |
|---------|-------------------|
| mqvhx | tetraodontiformes |
| mqvhxzf | flatfishes |
| mqvhxzs | scorpaeniformes |
| mqvhy | perciformes |

3: Matrix classes

A limited number of classes in ILC schedules are structured as matrices. They work just as any other class, with subdivisions of increasing specificity, but their second, third etc. letters have a fixed meaning that is repeated for every subclass, like in a table. For example, in the list of chemical elements, the third letter always means the chemical group, with -b for group 1, -c for group 2 etc.:

| | |
|-----|---------------------------------|
| e | atoms; chemical elements |
| eX | periods |
| eXX | groups; families |
| eXb | alkali metals; group 1 elements |
| eb | period 1 elements |
| ebb | hydrogen |
| ec | period 2 elements |
| ecb | lithium |

The Xs represent a rank that can be occupied by any lowercase letter. Such are the subclasses of numbers, of atom orbitals, of chemical elements, of phonemes, of administrative subdivisions. Users do not need to pay attention to their matrix structure, as the syntax is not different. Although matrices remind of facets, they are not facets proper¹².

¹¹ Emptying digits appear to have been introduced in bibliographic classifications by S. R. Ranganathan, *Prolegomena to library classification*, SRELS, Bangalore 1967.

¹² Matrix classes are also used in DDC literature classes or in Bianchini's recent classification of games. They are useful to classify phenomena that can be defined by the values of a limited set of characteristics of division. On the other hand, facets allow to express such values just as optional specifications.

4: Themes

Most documents don't deal with just a single phenomenon – say, just with lithium. Rather, they deal with several phenomena, for example lithium and mood. Any phenomenon that is discussed in a document in a way significant enough to deserve to be recorded we call a *theme*¹³. Significance is hard to define, especially in indexing such rich documents as novels or videos or in annotating full texts semi-automatically¹⁴: details that may seem non-relevant for most users may later prove relevant as cases of the “evidential paradigm”¹⁵. However, it is usually possible to identify the main intended message of a document, also called its *subject* or *aboutness*, as opposed to the other details it describes or represents just as cases or symbols that convey the message, also called its *ofness*. Aboutness themes must be expressed in classmarks, while ofness themes may optionally be appended by facet 030 (see below).

One can examine a document and intellectually identify its subject matter (this process is called *conceptual analysis*¹⁶). This will include one or, more likely, several *themes*, for example lithium and mood. Having an idea of the general structure of ILC, lithium will be looked for in the classes of lower-level material phenomena, and can indeed be found at `ecb`; while mood will be looked for among middle-way mental phenomena, and is found at `pg`. A word-based search box may obviously help, although one has to pay attention to homonyms at different levels – e.g. “snow cats” may mean either two natural phenomena or a manufactured vehicle, and the entries at the appropriate level need to be selected.

¹³ Claudio Gnoli, “Themes and citation order in free classification”, *IASLIC bulletin*, 55: 2010, n. 1, p. 13-19; id., “Classifying phenomena. Part 4: Themes and rhemes”, *Knowledge organization*, 45: 2018, n. 1, p. 43-53; Claudio Gnoli - Alberto Cheti, “Sorting documents by base theme with synthetic classification: the double query method”, in *Classification & visualization: interfaces to knowledge: proceedings of the international UDC Seminar, 24-25 October 2013, The Hague*, eds. Aida Slavic - Almila Akdag Salah - Sylvie Davies, Ergon, Würzburg 2013, p. 225-232.

¹⁴ Douglas Tudhope - Ceri Binding, “KOS-based enrichment of archaeological fieldwork reports”, ISKO UK Conference 2023, Glasgow, *CEUR workshop proceedings*, <https://ceur-ws.org/>, in prep.

¹⁵ Carlo Ginzburg, “Clues: roots of an evidential paradigm”, in *Clues, myths, and the historical methods*, 2nd ed., Johns Hopkins University Press, Baltimore - London 1989.

¹⁶ Alberto Cheti, *Manuale ipertestuale di analisi concettuale*, a cura di Serena Spinelli, Università di Bologna, <http://www2.sba.unibo.it/miac/> 1996.

The themes that have been identified can be expressed in classmarks by just listing them separated by a blank space:

```
ecb pg      lithium: moods
ecb suts    lithium: smartphones
```

The theme that is cited first will affect the position of the classmark in lists. Accordingly, it is best to cite first the theme that is given more importance in the document, called the *base theme*, as opposed to other *particular themes*. For example, the classmark above is appropriate for a document primarily discussing lithium, and also considering mood as a particular theme. On the other hand, a document taking mood as its base theme, such as an essay in psychology, and discussing lithium as a particular theme, has to be expressed by the inverted order:

```
pg ecb      moods: lithium
```

In this way, the classmark will be listed together with classmarks also having moods as their base theme, combined with various particular themes such as lithium or other phenomena.

For documents where more than two themes are identified, the base theme will be cited first, followed by several particular themes. These in turn can have an order of relevance, or they can all have the same relevance. In the latter case, it is advisable to cite them in a default inverted order of levels, that is, inverted alphabetical order of their notation¹⁷. For example, a document focusing on lithium and also discussing its effects on mood and their medical treatment can be indexed as:

```
ecb sh pg   lithium: healthcare: moods
```

where the particular themes “healthcare” and “moods” have been listed in an inverted alphabetical order, that is starting with the higher level.

Bibliographic classifications use to class documents under one traditional discipline, e.g. under chemistry or under medicine or under psychology. ILC classes it under the treated

¹⁷ Gnoli, “Ontological foundations in knowledge organization”, cit.

phenomena. In case the disciplinary approach is relevant to describe the document's perspective, it can be expressed as the last theme:

ecb sh pg ysth lithium: healthcare: moods: psychology

or more specifically as a perspective facet (see below).

5: Free facets

Until now, we have just listed the themes that are judged to be relevant in a knowledge source, without any additional information. One may want to be more specific, and express the kind of relationship holding between mood and lithium. Are we discussing the effect of lithium on mood, or the use of lithium in healing mood disorders, or the mood of a person who is worried about pollution by lithium...?

A first possibility is expressing that mood and lithium are discussed for their relationship, while not being specific about that relationship. This is what is often meant by such document titles as "Mood and lithium". In ILC classmarks, this can be expressed by connecting the two through the facet indicator 0¹⁸:

pg0ecb moods, as for lithium

In order to be more specific about relationships, the following fundamental categories of relationships, that is of *facets*, are available in ILC¹⁹:

¹⁸ Those familiar with the Universal Decimal Classification (UDC) will observe that 0 here is equivalent to : in UDC.

¹⁹ Claudio Gnoli, "The meaning of facets in nondisciplinary classifications", in *Knowledge organization for a global learning society: proceedings of the Ninth ISKO international conference, Vienna, July 2006*, eds. Gerhard Budin - Christian Swertz - Konstantin Mitgutsch, Ergon, Würzburg 2006, p. 11-18; Claudio Gnoli - Hong Mei, "Freely faceted classification for Web-based information retrieval", *New review of hypermedia & multimedia* 12: 2006, n. 1, p. 63-81; Claudio Gnoli, "Categories and facets in integrative levels", *Axiomathes*, 18: 2008, n. 2, p. 177-192; Claudio Gnoli, "Classifying phenomena, part 3: Facets", in *Dimensions of knowledge: facets for knowledge organization*, eds. Richard Smiraglia - Hur-Li Lee, Ergon, Würzburg 2017, p. 55-67.

- 0 as for *perspective*
- 1 at *position; time*
- 2 in *location; context*
- 3 affected by *agent*
- 4 versus *opposition*
- 5 through *transformation; change*
- 6 having *property*
- 7 with *part*
- 8 in *quantity*
- 9 of *quality; specification*

Any two classes can be connected by the digit for a fundamental category followed by 0, for example:

| | |
|---------|---|
| pg30ecb | moods, affected by lithium |
| pg40ecb | moods, opposed to lithium |
| pg70ecb | moods, with lithium [e.g. as a medicinal] |

The -0 is used to mean that the subsequent values of the facet (also called its *foci* in Ranganathan's terms) are taken from any class in the scheme without modification. In ontology terms, this means that the range of a free facet is the whole of phenomena, a to \bar{y}^{20} . Indeed, we can freely replace *ecb* "lithium" with any other class:

| | |
|----------|----------------------------|
| pg30j3X | moods, affected by weather |
| pg30mqvo | moods, affected by birds |
| pg30w | moods, affected by customs |

The value of a facet can sometimes be left unexpressed. This can be done by a capital X after the facet indicator:

| | |
|-------|------------------------------|
| pg30X | moods, affected by something |
|-------|------------------------------|

²⁰ Claudio Gnoli - Tom Pullmann - Philippe Cousson - Gabriele Merli - Rick Szostak, "Representing the structural elements of a freely faceted classification", in *Classification and ontology: proceedings of the International UDC Seminar, 19-20 September 2011, The Hague*, eds. Aida Slavic - Edgardo Civallero, Ergon, Würzburg 2011; Claudio Gnoli, "Faceted classifications as linked data: a logical analysis", *Knowledge Organization*, 48: 2021, n. 3, p. 213-218.

6: Parallel facets

While the most general categories are expressed by single digits, more specific meanings can be expressed by a combination of digits: for example, 23 means “from *provenance*”, as 2 means “in *location*” and 3 means “by *agent*”, so that their combination can be taken to mean original location, that is provenance.

So, each facet category can be further subdivided into nine sub-categories, and so on:

| | | |
|----|------|--|
| 21 | [an] | in <i>position</i> ; <i>rank</i> ; <i>spatial sequence</i> |
| 22 | [jU] | near <i>zone</i> ; <i>area</i> |
| 23 | [jU] | from <i>provenance</i> ; <i>origin</i> |
| 24 | [jU] | away from; outside <i>far place</i> ; <i>elsewhere</i> |
| 25 | [ny] | in; within <i>environment</i> ; <i>niche</i> ; <i>context</i> ; <i>set</i> ; <i>system</i> |
| 26 | [j7] | towards <i>cardinal point</i> ; <i>sector</i> |
| 27 | [uU] | in <i>region</i> ; <i>place</i> |
| 28 | [j8] | at <i>latitude degrees</i> ; <i>relative position</i> |
| 29 | [X] | in <i>special place</i> ; <i>region</i> ; <i>location</i> |

Multi-digit facets ending by -1 through -8, such as 21, 22 etc., or 31, 32 etc., are all parallel facets. This means that their values (foci) are taken not from any class, but only from the class that is given in square brackets in the schedules. This foci are also called *extra-defined foci (EDF)*. (As we have seen, facets ending by -0 are free facets; facets ending by -9 we will discuss later.)

Let us take an example. Class `mqv0` “birds” can have facet 27 “in *region*”. Schedules say that the foci for this facet have to be taken from class `uU` “contemporary political divisions”.

This class is subdivided like this:

| | |
|-------------------|----------------------------------|
| <code>uU</code> | contemporary political divisions |
| <code>uUb</code> | Britain |
| <code>uUbe</code> | England |
| <code>uUb1</code> | Wales |
| ... | |

Then, to express e.g. “birds, in Wales”, we take notation for Wales $\tau U b 1$ and trim its initial part uU already shown in square brackets in the schedules, thus getting:

$m q v o 2 7 b e$ birds, in England
 $m q v o 2 7 b 1$ birds, in Wales

Such a trimming mechanism contributes to make ILC classmarks shorter in common combinations of classes. The original meaning of foci can be reconstructed by looking at the schedules, including via automatic means²¹: as 27 is associated with implicit class $[uU]$ in the schedules, $-be$ actually means $uUbe$ “England”.

Parallel facets express relationships that always involve the same kind of phenomena. In case one rather wants to express a relationship with a different class, e.g. with a kind of region that is not listed under uU such as sdt “metropolises”, she can always use any other class and make this a free facet by appending a 0. In this case, of course, the notation for “metropolises” is not shortened:

$m q v o 2 7 0 s d t$ birds, in metropolises

Let’s take another example: rj “breeding” always uses as its material some animal: there is no breeding of rocks or of trumpets, only breeding of animals. Hence facet 77 “of livestock” of rop always is some animal $m q$, and in the schedules we find

$r j$ breeding; pastoralism
 $r j 7 7 [m q]$ of *livestock; tame species*
 $r j 7 7 n g$ breeding, of earthworms
 $r j 7 7 v t u l$ breeding, of camelids

the last example resulting from

$m q$ animals
 $m q v$ chordates
 $m q v t$ mammals

²¹ Gnoli et al., “Simpler search in a complex world”, cit.

| | |
|--------|--------------|
| mqvtu | artiodactyla |
| mqvtul | camelids |

The foci have sometimes to be taken from a facet rather than a subclass, but the mechanism is the same:

| | |
|---------|--|
| 26 [j7] | towards <i>cardinal point</i> ; sector |
| j7n | south |
| mqvo26n | birds, towards south |

7: Bound facets

The last facet type we have to consider are *bound facets*, that is facets whose foci are defined only in the facet itself (*context-defined foci, CDF*) rather than being taken from another class. For example, beak is always a part of an animal, hence a 7- facet of mq animals, rather than of any other class:

| | |
|-----------|----------------------------------|
| mq | animals |
| mq7 | <i>animal organ</i> |
| mq7d | animals, digestive organs |
| mq7db | animals, mouth |
| mq7dbb | animals, beak |
| mqvo7dbb | birds, beak |
| mqvtc7dbb | monotremes [e.g. platypus], beak |

Bound facets are expressed by one-digit facet indicators, as in the example just above, or by facet indicators ending by -9 (as you will remember from above, the other facet type indicators never end by -9),

Each class can thus have its own set of bound facets:

| | |
|-------|-----------------------|
| mq4 | <i>animal disease</i> |
| mq41 | inflammation |
| mq7 | <i>animal organ</i> |
| mq7d | digestive organ |
| mq79 | <i>animal tissue</i> |
| mq79c | connective tissue |

In compound classmarks, bound facets always refer to the class cited immediately before, unlike free and parallel facets (see “Subfacets” below).

8: Common vs. special facets

Until now we have discussed the place where foci of a facet are taken from, that is the facet range. We will now consider the rank at which a facet is defined, that is the facet *domain*. In our last example, the domain of facet m_q7 “animal organs” is class m_q “animals”. On the other hand, the part facet m_p7 of class m_p “plants” will have a different meaning, as it will cover plants organs such as stems, leaves and flowers, which are not parts of animals.

These are special facets, in the sense that they are special of a given class. On the other hand, there are facets that can be appended to any class as they are defined at a general level. These are called *common facets*, both in ILC and in other classifications such as UDC (in other classification schemes they called "common subdivisions" or "common auxiliaries"). The facets 21 to 28 that we have seen in section 6 are common facets. They can be appended to any class:

| | |
|---------------|--------------------|
| $m_{qvo}27b1$ | birds, in Wales |
| p_g27b1 | moods, in Wales |
| r_j27b1 | breeding, in Wales |

Facets of time (1-), place (2-) and measures (8-) are most often common, as they keep the same meaning for all classes. For example, $m_{qvo}88ot$ means “five birds” and $q88ot$ means “five languages”.

How can one know whether a particular facet is common or special? In the schedules, common facets are listed as notation starting with numerals. If no facet is listed for particular numerals, or a general meaning is listed with a generic [X] as foci, one has to

look at the subsequent ranks for definition. For example, under 7 – one finds:

7 [X] *part; organ; component*

only as a generic meaning. One then looks under first-rank classes, e.g. m “organisms”, and finds

m7 [X] *organ; viscus; organ system; body system*

This is a more specific meaning of part facets for the class of organisms; however, foci are still indicated as [X] so that one has to go further down to find e.g.

mq7 *animal organ*

mq7d *animals, digestive organs*

mq7db *animals, mouth*

mq7dbb *animals, beak*

where the specific foci of animal parts are listed.

The foci listed in one facet can be applied to all the subordinate ranks (*cascading facets*). As we have seen above, beak can be a facet of birds mqvo as well as one of platypuses mqvtc, though not one of plants mp.

In case a facet needs to be defined at a rank lower than that of an existing facet, this can be expressed by a capital letter marking the rank, starting with A for the most general rank – that of common facets. Take class of mqvtu “artiodactyla”:

mqvtu7B is a special part facet of m “organisms”,

mqvtu7C is a special part facet of mq “animals”,

mqvtu7D is a special part facet of mqv “chordates”,

mqvtu7E is a special part facet of mqvt “mammals”,

mqvtu7F is a special part facet of mqvtu “artiodactyla”.

A real case occurs with `mqvtu7doFe` “rumen”, belonging to `mqvtu7do` “stomach”. Indeed, rumen is a part of stomach only in artiodactyla hence it is defined within their subclass – there is no bird rumen or monkey rumen²².

9: Passive facets

Reversed relations, i.e. passive facets, can be obtained by affixing `-04` to the facet digit:

| | |
|----------------------|---------------------------------|
| <code>ny30rh</code> | ecosystems, affected by hunting |
| <code>rh304ny</code> | hunting, affecting ecosystems |

This is useful when a concept, like "hunting", is the focus in the classed document, and other concepts have to be mentioned only in relation to it. In other words, this is the faceted equivalent of a base theme preceding particular themes.

10: Citation order of facets

When more than one facet is expressed for the same phenomenon, they should be cited in the reversed order of numerals, according to the inversion principle of facet analysis: as `27`, `4` and `7` follow each other in this order, the standard way of combining them is:

| | |
|----------------------------|--------------------------------------|
| <code>mqvo7db4127b1</code> | birds, mouth, inflammation, in Wales |
|----------------------------|--------------------------------------|

rather than `mqv127b1417db` or any other sequence.

Only when a facet is especially focused in a document subject, e.g. what is discussed is especially birds in Wales, while mouth inflammation is only an additional detail, can it be moved before the others despite the standard citation order:

| | |
|----------------------------|--------------------------------------|
| <code>mqvo27b17db41</code> | birds, in Wales, mouth, inflammation |
|----------------------------|--------------------------------------|

²² A similar situation was described by Vanda Broughton as “the Genesis problem” when illustrating the faceted representation of sacred texts in UDC class 2; in ILC it would be `wts7sbDb` “Judaism, scriptures. Genesis”. Without this syntax, such non-existent combinations as Veda’s Genesis, monkey rumen, pine flowers or taiga penguins are possible, as they are in DDC and BC2: see Gnoli et al., “Taiga penguins”, cit.

The inverted order of ILC categories (base theme ... transformation ... agent), similarly to other faceted systems, corresponds to that of passive sentences in Western languages, like in “ecosystems are affected by hunting”. This has been found in facet analysis literature to be the optimal solution for indexing. The equivalent of an active sentence with a direct object (“hunting affects ecosystems”) can be obtained by a passive facet as shown in the previous section. This may be useful in teaching applications with young children who are used to the constructions of common language.

11: Subfacets

Let us take our above example `rj77vtu1` “breeding, of camelids” and suppose that we want to specify that what is bred are small camelids. Sex of organisms is expressed by a 9-facet:

```
mqvtu182f camelids, small
```

However, notation `rj77vtu182f` would mean that `-82f` “small” is a facet of `rj` “breeding”, which is not the intended meaning. In order to express that `-82f` is a facet of camelids, it needs to be put in brackets:

```
rj77vtu1(82f) breeding, of camelids (small)
```

Brackets are not needed when the subfacet is a bound facet, as this refers by default to the immediately preceding class:

```
rj77vtu19y breeding, of camelids, female
```

In case one instead needs to express a bound facet of the basic class, to avoid ambiguity this is expressed by the capital letter specifying the facet domain:

```
rj77vtu19B1 breeding, of camelids, producing leather
```

Notice that brackets start after the focus `-vtu1` to ensure an appropriate sorting of

notation: indeed, `rj77(vtul82f)`, though looking more intuitive in reading, would be listed away from its parent `rj77vtul`.

Although this is not expected to be a common situation, brackets can even be nested to express sub-subfacets, etc. When indexing specialized documents deeply, the nesting of subfacets can become complex. An article titled "Guidelines on the applications of the environment protection and biodiversity conservation act to interactions between offshore operations and larger cetaceans" was classed as "regulations, about conservation (of whales (big, disturbed by technical operations) in oceanic zones)"²³. To make notation less awful and easier to parse by both humans and computers, it can be "flattened" by writing some facets as separate terms introduced by free relationship, connected by phoric `z`:

```
tay88Z ve97Z26nyc mqvtu829u4vah (ILC2 notation)
```

```
regulations, about the following: conservation, of the following, in oceanic zones:  
whales, big, disturbed by technical operations
```

`z` "the following" is a deictic (see below) referring to the whole subsequent phase, thus avoiding brackets.

12: Conjunctions and spans

Two or more classes sharing the same syntactical role can be listed in the same order of schedules and glued by the symbols `WA`, `WB`, `WC`...:

```
iWAm rocks and organisms
```

²³ Claudio Gnoli - Gabriele Merli - Gianni Pavan - Elisabetta Bernuzzi - Marco Priano, "Freely faceted classification for a Web-based bibliographic archive: the BioAcoustic Reference Database", in *Wissensspeicher in digitalen Räumen: Nachhaltigkeit, Verfügbarkeit, semantische Interoperabilität: Proceedings der 11. Tagung der Deutschen Sektion der Internationalen Gesellschaft für Wissenorganisation, Konstanz, 20. bis 22. Februar 2008*, eds. Jörn Sieglerschmidt - H.-Peter Ohly, Ergon, Würzburg 2010, p. 124-134.

This can also happen within a facet:

y90i knowledge, on rocks

y90iWAm knowledge, on rocks and organisms

The upper case following \bar{w} means the number of letters shared with the previous class, starting to count from the beginning of the classmark:

abcdWAx = abcd together with x

abcdWBx = abcd together with ax

abcdWCx = abcd together with abx

abcdWDx = abcd together with abcx

In case the focus is a shortened one in a parallel facet, the count starts from the first letter of the original class, not of the shortened focus: thus, in

ef5 [ab]

ef5cdWCx

x stands for abx.

A consecutive series of classes can be expressed by connecting the notation of the first and the last of them by the symbol \bar{w} , whose shape is suggestive of a connection from the left term to the right term:

jWm = jWakWAlWAm rocks and genes and bacteria and organisms

wtsWu "Abrahamic religions"

= wts "Judaism" and wtt "Christianity" and wtu "Islam"

When used in subclasses, by default \bar{w} introduces a sister class, like in the case of conjunctions:

mnWp = mnWAoWAp fungi and red algae and plants

In the rare cases where non-sister classes are involved, they have to be listed all by conjunctions, rather than as a span.

13: Typical or favoured classes and special schemes

Some phenomena are of particular interest to human knowledge. Among all organisms, Man is obviously the most interesting and studied in human knowledge. As an anthropoid primate mammal, its complete notation would be $m_{qvt}guos$; but it is helpful that this long notation is shortened, and Man is listed first among organisms as the one most frequently discussed. To this purpose, in the schedules the symbol U "the typical" is used as a differentia, meaning that which we all have in mind²⁴:

h celestial objects

hU the Earth

$h1$ stars

$h1U$ the Sun

j lands

jU regions of the contemporary Earth

m organisms

mU humans

The general class U (not preceded by any digit) stands for the most typical subject, that is considered to individual persons as these are very often the focus of human discourse. Its formal equivalent is p_{x91} "persons, born in", so it can be divided by birth time, with foci taken from $w1$ (p_x "person" is considered in its mental and conscious aspects, at a higher

²⁴ Claudio Gnoli, "Classificazione a livelli per una bibliografia web di cultura locale", in *Classificare la documentazione locale: giornata di studio, San Giorgio di Nogaro, 17 dicembre 2005*, ISKO Italia, <http://www.iskoi.org/doc/locale3.htm>

level than mU "human organism"). Like in the Colon Classification, birth time is a short way to identify individual persons in ILC:

| | |
|-----------|---|
| $UX [w1]$ | persons by birth millennium |
| Uni | persons born in 6th century BCE; Gautama Buddha |
| $Uptus$ | persons born in 1564 |
| $Uptusc$ | persons born in February 1564; Galileo Galilei |
| $Uptuse$ | persons born in April 1564; William Shakespeare |

Classes w and U as introduced above are just a case of special classes and special subclasses, that are represented by capital letters in ILC. Most of them are *deictics*, that is concepts that change their meaning according to the context, such as "next", "tomorrow", "here", "you"... Indeed, the meaning of "tomorrow" depends on which day is it today, and the meaning of "you" depends on whom am I speaking to. w is a deictic in that it refers to another class close to the previous one in the schedules; U is a deictic in that it refers to the class that commonly comes to mind.

Special classes can follow a standard basic class, like in hU "the Earth" or pYc "you"; or they can be basic classes themselves, like in A , U , etc.

Deictic T is the local domain of discourse, or favoured host class in Ranganathan's term. It represents the focus phenomena of concern in the present context. This is useful when dealing with knowledge that mostly concerns a specific domain. For example, in a bibliography about whales, the class of whales $mqvtn$ and its subclasses will occur often. We can then define $T = mqvtn$ and get shorter notations such as Ti "dolphins", $st1340T$ "vessels interacting with whales", etc.

While Ti is just an abbreviation of an existing class $mqvtni$ "dolphins", one can sometimes need to introduce new detailed notation that is not listed in the schedules, used for a local meaning. To this purpose, S can be used: $abcSde$ will thus mean subclass $-de$ of a published class abc .

One can also develop a special classification scheme compatible with ILC by just establishing classes starting with S- followed by small caps a to y:

S animals
Sa animals that belong to the Emperor
Sb embalmed animals
Sc animals that are trained
Sd suckling pigs
etc.

As suggested by this paradoxical example taken from a famous essay by J.L. Borges, special schemes can follow any idiosyncratic logic and do not need to follow the general ILC principles of integrative levels, genealogy, specificity etc.²⁵

14: Referring to ranks and the absolute class

The remaining 18 letters A to R are used in ILC to refer to the increasingly deep ranks in a class chain or a classmark. For example, in class *mqvtni* “dolphins”, D refers to the rank *mqv* (“vertebrates”). This may be useful to express facets that have a deep rank as their domain, as we have seen in the example of rumen above. Another example is spermaceti, an organ that only occurs in sperm whales *mqvtnspm*, so that it is represented as *mqvtnspm7I*: indeed, the -I- after facet indicator -7- means that this is a part special facet defined at eighth rank *mqvtnspm*, that is a facet exclusive of sperm whales. The previous ranks in this chain would be:

H = *mqvtnsp* “Physeter”
G = *mqvtns* “psyseteridae”
F = *mqvtn* “whales”
E = *mqvt* “mammals”
D = *mqv* “chordates”
C = *mq* “animals”
B = *m* “organisms”
A = everything

²⁵ Claudio Gnoli, “Animals belonging to the emperor: enabling viewpoint warrant in classification”, in *Subject access: preparing for the future*, eds. Patrice Landry - Leda Bultrini - Edward T. O'Neill - Sandra K. Roe, De Gruyter, Berlin 2011, p. 91-100.

As it can be seen here, deictic Δ refers to the most general objects, that is the whole of classes a to y . Such class of all phenomena not better determined is thus a way to refer to undifferentiated reality, or “being; the world; the universe”. By its very nature, Δ is not analyzed into more specific classes in the schedules, only referred to generically in a deictic way (“that whole”). It only has a specification Δa that it is taken to mean “absolute; apeiron; logos; Tao; brahman; God; noumenon”, that is reality just as it is undifferentiated²⁶. Δa can indeed be used to express metaphysical or mystical meanings, such as “the absolute” or “God”, like in $p_{ex90\Delta a}$ “trust, in God”.

Deictics can also be used in combination: BWD “B to D”, YX “is it true?”. The precedence order of their meaning is reversed: Z prevails on Y , X , W , V , U , T , $B-S$, A .

15: Referring to present, unspecified or actual objects

We now have to complete the review of ILC special classes with classes v to z , although w we have already treated above speaking of conjunctions and spans.

v is the most typical of deictics, as it means “the present”. Taken alone as a main class it then means what is present here and now, e.g. p_{190v} “awareness, of the present”.

However, a more common use may be attaching $-v$ to an existing class to mean some present instance of the class: h_{1v} “these stars”, m_{qv} “these animals”, r_{jv} “this breeding”.

x stands for an unspecified class or subclass, as also suggested by its mathematical meaning (although in ILC as a special class it needs to be a capital letter). x alone just means “something”. It is often useful when the foci of a facet is left unspecified:

$m_{qvo7db4X27b1}$ birds, mouth, some disease, in Wales

²⁶ Gnoli et. al., “Taiga penguins”, cit.

If appended to an existing class, -X means an unspecified subclass: m_qX “some animals”. It can be found in the schedules to express a certain rank in a general way, e.g. in matrix classes:

eXb alkali metals
ecb lithium
edb sodium
eeb potassium

i1X geological eras
i1XX geological periods; stratigraphical systems
i1XXX geological epochs; stratigraphical series
i1XXXX geological ages; stratigraphical stages
i1s Mesozoic
i1sj Jurassic
etc.

Y means actual occurrences of classes, as opposed to classes as an abstraction. Thus m_qY “actual animals” refer to individual animals occurring in reality as opposed to the classes of animals in general. This can be used to differentiate non-existent faceted classes (“taiga penguins”) from really occurring cases (“actual penguins”)²⁷. While m_qv_to_me_m are badgers in general, m_qv_to_me_mY are individual badgers like Dachsi, the one bred by zoologist Irenäus Eibl-Eibesfeldt. p_Y are actual persons including p_Ya “I; we”, p_Yc “you” and p_Yd “he; she”. When following a facet indicator, -Y means that the relationship is an actually occurring one: m_qv_o7_db_b “birds, with beak”, m_qv_o7_Yd_bb “birds have beak”.

Z is a reference to a class mentioned later, within a compound classmark. As seen above, it can be used to represent complex networks of relationships. It is also possible to refer to specific classes by their beginning, e.g. to refer to the badgers above one can write m_Z “the

²⁷ Gnoli et al., “Taiga penguins”, cit.

mentioned organisms”. By default it refers to a subsequent term (cataphoric), while z refers back to previous terms (anaphoric).

16: Perspective facets and dimensions

The phenomena that are usually expressed in ILC classmarks are those that documents are about. This is also called the *aboutness* of documents. A video of a penguin is indexed as m q v o x “penguins”.

On the other hand, the same phenomenon can be represented in a document under different *perspectives*: for example, the video can deal with penguins in a scientific way, or in a popularizing way to instruct children, or in fiction... In each case, it will be indexed under “penguins”, but a dimensional facet should be added to express these differences:

| | |
|-------------------------------|---|
| m q v o x $006i$ | penguins, treated for children |
| m q v o x $07s1$ | penguins, as studied in biology |
| m q v o x $08f$ | penguins, fictional |
| m q v o x $08f006i$ | penguins, fictional, treated for children |

Dimensional facets always start with $0-$. In particular, they can express several dimensions according to the number of initial zeros:

| | |
|-----------|--|
| $0-$ | as for <i>perspective</i> |
| $00-$ | as attested in <i>document</i> |
| $000-$ | as kept in <i>collection</i> |
| $0000-$ | as relevant to <i>information need</i> |
| $00000-$ | as accessed by <i>people</i> |
| $000000-$ | as known by <i>cognitive ability</i> |

Let us consider them starting with the first and most common: perspective.

Perspective is the way one looks at phenomena and discuss them. In the most general case, a phenomenon can be considered in light of another phenomenon: `mqvox0st1` “penguins, as for vessels” (this may be termed a *phase relationship*). Most often, however, perspective facets concern a particular theory, discipline, viewpoint or method by which the phenomena are seen. Several authors have recommended that KOSs reflect different viewpoints in accurate ways (*viewpoint warrant*).²⁸ ILC schedules are intended to be as objective and neutral as contemporary knowledge allows; of course, one can always claim that this is only one among many possible views of the world, as happens with any classification. Making perspectives explicit contributes to a more neutral approach.

Facet `07-` [`ys`] expresses a disciplinary approach taken from class `ys` “disciplines”. This includes the empirical sciences `ysss`, among which is `ysst1` “biology”, so that `-07st1` in the example above means “as studied in biology”. In this way, although ILC gives priority to phenomena, when needed it can also express the disciplinary way in which they are studied. Notice that documents treating penguins under different disciplines will all file under “penguins”, though they can be distinguished by the value of the subsequent facet `-07-`.

Since disciplines are listed under `ys`, one can even set `ys` as the favoured class `T` and obtain a discipline-based scheme similar to those of traditional bibliographic classifications²⁹:

| | |
|------------------------|-----------------------------------|
| <code>Td</code> | <code>physics</code> |
| <code>Tj</code> | <code>geology</code> |
| <code>Tl</code> | <code>biology</code> |
| <code>Tl90mqvox</code> | <code>biology, of penguins</code> |

²⁸ Clare Beghtol, “A proposed ethical warrant for global knowledge representation and organization systems”, *Journal of documentation*, 58: 2002, n. 5, p. 507-532; Gnoli, “Animals belonging to the emperor”, cit.

²⁹ Claudio Gnoli - Andreas Ledl - Ziyong Park - Marcin Trzmielewski, “Phenomenon-based vs. disciplinary classification: possibilities for evaluating and for mapping”, in *Challenges and opportunities for knowledge organization in the digital age: proceedings of the Fifteenth International ISKO Conference, 9-11 July 2018, Porto*, eds. Fernanda Ribeiro - Maria Elisa Cerveira, Ergon, Würzburg 2018, p. 653-661.

| | |
|-----------|------------------------|
| Tq | linguistics |
| Tr | sociology |
| Tu | economics |
| Tu90mqv0x | economics, of penguins |

Another perspective facet that is often relevant is the theory according to which a phenomenon is discussed. This can be either a general philosophical theory (mqv0x06mm “penguins, according to dialectical materialism”) or a special theory concerning the particular class of phenomena (mqv0x09x “penguins, according to cladistic taxonomy”). The latter, having a facet indicator that ends with -9, is defined under each main class: theories about m- organisms, like cladistic taxonomy, do not apply to other classes.

Another important perspective facet is 03- “studied by *method*”. Indeed, theories and methods are considered by some authors to be the key specifications in the study of phenomena³⁰:

| | |
|-----------|--|
| mqv0x03b | penguins, studied by observation |
| mqv0x03d | penguins, studied by physical tracks |
| mqv0x03es | penguins, studied by satellite imagery |

Clearly, several perspective facets can be combined in a classmark:

| | |
|--------------|---|
| mqv0x07s103b | penguins, as studied in biology, studied by observation |
|--------------|---|

Of particular interest in indexing research reports, as well as fiction or images (see below), is facet -030- “exemplified by *study case; sample; specimen*”. Indeed, this can be used to express some cases or details represented in the document (its *ofness*) that are considered

³⁰ Rick Szostak, *Classifying science: phenomena, data, theory, method, practice*, Springer, Dordrecht 2004; *The Léon Manifesto*, cit.; Claudio Gnoli and Rick Szostak, “Classifying by phenomena, theories and methods: examples with focused social science theories”, in *Culture and identity in knowledge organization: proceedings of the Tenth international ISKO conference, 5th-8th August 2008*, Montréal, eds. Clément Arsenault - Joseph T. Tennis, Ergon, Würzburg 2008, p. 203-209.

to convey its overall message (its aboutness): `ny4X030mqvov` “ecosystems, disorders, exemplified by penguins”.

17: Document facets

As we have seen above, facets starting by `00-` can express features of the particular document where the phenomena are discussed (document’s *isness*). These can be specified in classmarks only when needed, e.g. when indexing collections that consist of different document kinds so that it may be useful to select only one of them. They include document size, format, target, language, authors, place and time of production. Expressing them allows to include a form of descriptive cataloguing in the classmark:

`mqvov007m006i001qoqr` penguins, as in videos, for children, produced in 2023

18: Collection and information need facets

Facets starting by `000-` can express the fact that a document is kept in the context of a collection focusing on some phenomena:

`mqvov000w` penguins, as in collections on customs

Facets starting by `0000-` can express that a document is relevant to a specific information need. This can be useful in request-oriented indexing, where classmarks are created to serve expected user needs. An example³¹ is a famous series of articles by Fisher on crop variation, that in time has become especially relevant for the statistical methods it has introduced; so it can be indexed as

`r1rA85b0000y5 (co)` grass crops, diminishing, as relevant for statistical analysis

³¹ Birger Hjørland, “Subject (of documents)”, in *ISKO encyclopedia of Knowledge organization*, eds. B. Hjørland - C. Gnoli, <https://www.isko.org/cyclo/subject#2.6>, also *Knowledge organization* 44, n. 1, p. 55-64.

19: Indexing fiction

Documents *about* literature, cinema, etc. must be classified in `x1` "literature", `xs` "cinema" etc. On the other hand, works *of* literature and cinema must not; indeed, they are not about these arts, but just are in the form of art³². So, what are they about?...

In most cases, literary works are about topics related with people and society, in a more or less fictional setting. Thus, they can be classified as `px08f` "persons, fictional", or `t08f` "communities, fictional", etc., depending on which level is the focus. (`-08f` will not apply to such works as documentary films.)

For example, Maigret novels mainly deal with the personalities (`ph`) of people involved in murders (`u4d`) in 20th century France; thus, they can be classified as `ph90u4d27d17px08f` "personalities, aware of politics (murders), in France, in 20th century, fictional". If the author is relevant, it can be expressed: `ph90u4d27d17px08f003pxorc` "... by author born on 13 February 1903 [Georges Simenon]". If one wants to account for the document being a video adaptation of Simenon's novels, `009m` "in moving images" can be appended. Wim Wender's film *The American friend* deals with friendship (`p6q`) by a fictional story set in Germany (`082c`) in form of moving images (`009m`); thus, it can be classified as `p6q08f082c009m`.

A deep analysis of a fictional work has been performed on the example of Antonio Tabucchi's novel *Pereira declares*³³. Set in Lisbon and Parede during Salazar's regime, it has various themes, including local politics, authoritarian regime, journalism, inner change, etc.

³² Barbara Kyle, "An examination of some of the problems involved in drafting general classifications and some proposals for their solution", *Review of documentation*, 26: 1959, n. 1, p. 17-21.

³³ Patrícia de Almeida - Claudio Gnoli, "Fiction in a phenomenon-based classification", *Cataloguing and classification quarterly*, 59: 2021, n. 5, p. 477-491; id., "Afirmando Pereira: a Integrative Levels Classification na representação do assunto ficcional", in *Organização do conhecimento no horizonte 2030: atas do V Congresso ISKO Espanha-Portugal*, eds. Carlos Guardado da Silva - Jorge Revez - Luis Corujo, Universidade de Lisboa - Colibri, 2021, p. 605-616.

Of these, the base theme has been found to be courage in facing censorship. This can be represented in ILC3 as t6i90cp90ydcg (40X) 27ezp17pxrwi00x1t002f "communities, bravery, dealing with change, dealing with magazines (censored by someone), in Portugal, in August 1938, as attested in novels, produced in Italy". In a disciplinary classification such as Dewey, this would simply go under 853 "Italian prose", with no hint about Portuguese history nor social or mental aspects.

On the other hand, if the form is more relevant than the contents, as in a collection of French poems on very disparate subjects, the classmark may only consist of formal facets: x0058v005Uf "something, in poetry, in French". The same can be true for abstract paintings or symphonies (although such cases as Smetana's *Moldau* also have a phenomenon dimension: j sr92fzf00xm "rivers, in Czech Republic, as attested in music").

20: Indexing images

Images often contain many different elements and details (their ofness: see above) that are used to convey a message (their aboutness)³⁴. For example, Giuseppe Pellizza's painting *Speranze deluse* (Disappointed hopes, 1894) shows a young female shepherd looking pained, while a marriage procession led by two pipe players moves on the background.

³⁴ Erwin Panofsky, *Meaning in the visual arts*, Doubleday, 1955; S. Shatford, "Analyzing the subject of a picture: a theoretical approach", *Cataloging & classification quarterly*, 6: 1986, n. 3, p. 39-62; id., "Some issues in the indexing of images", *Journal of the American Society for Information Science*, 45: 1994, n. 8, p. 583-588; Athena Salaba, "Indexing of non-textual materials", in *Look beyond: subject indexing of non-book resources*, Rome, 6 February 2023, presentation, <https://www.aib.it/wp-content/uploads/2023/04/Salaba-Non-Text-2023.pdf>



One understands that the reason for the girl's sadness is that her admirer eventually married a richer woman, who can afford a white dress and a duo of players. While the young woman's sadness (pei96ly), breeding sheep (xj77Us) and the marriage dress, procession and instruments (wmmm7c5c53no53nq) are ofness themes, the base theme is the implied social inequality (t4i) which led to the present situation. One thus gets

t4i030pei(96ly50rj(77Us)40wmmm(7c5c53no53nq))007i

that is "communities, inequality, as exemplified in sadness (of young women, doing pastoralism (of sheep), opposed to marriage (with clothes, procession, with oboes, with bagpipes)), as in pictures". Particular themes can still be relevant, e.g. to a search for bagpipes, as the document witnesses their presence in late 19th century-Northern Italy.

21: Indexing specimens

Expositions such as museums, botanical and zoological gardens display real entities ("realia"). In these cases, the document (isness) consists in the specimen itself – a mineral, an animal or whatever. However, the specimen is shown in order to convey knowledge

about the corresponding phenomena as a general class (aboutness). A penguin is shown to provide knowledge on penguins in general (mqvox). It can then be expressed as

mqvox007s penguins, as in specimens