Class and Classification

A class is a set of entities sharing one or more characteristics, grouped under a common denomination (the name of the class) and distinguished from other entities that do not share all the same characteristics.

A class is also one of the general or specific subdivisions provided for in a classification scheme.

A classification is a tool to arrange a set of entities grouped in classes.

Scientific Classification

Scientific classification schemes deal with the organization of natural world phenomena (realia) to support their systematic study.

For example:
- Botanical classification
- Zoological classification
- Periodic table of elements
- Classification of rocks and minerals

Bibliographic Classifications

Bibliographic Classification schemes are usually inspired by philosophical knowledge organization systems, but are deeply different in their approach to their objects.

Bibliographic Classifications do not deal with universe and knowledge in an abstract way, but by means of the documents in which the universe and our knowledge are described.

BCs deal with the useful organization of all the resources that embody the same identical subject (ideas and knowledge units).
Library classification

- “What, then, is "library classification"? It is the translation of the name of the subject of a book into a preferred artificial language of ordinal numbers, and the individualization of the several books dealing with the same specific subject by means of a further set of ordinal numbers which represent some features of the book other than their though content”

(Ranganathan, ELC, 2)

Subject

- A subject is “any concept or combination of concepts representing a theme in a document” (UNI/ISO 5963)
- Ranganathan distinguishes between simple or composed subjects
  - For example
  - Simple: “Emotions” or “Adolescents”
  - Composed: “Emotions in Adolescents”

Literary warrant

- Bibliographic Classification schemes follow practical principles, tied to conceptual and physical organization of bibliographic resources.
- In fact, bibliographic classifications apply the literary warrant principle:
  - In a classification scheme a subject is proposed and accepted by means of a minimum quantity of documents published or reasonably anticipated to be published about it.

Class and Hierarchy

- Usually, a class can be subdivided in smaller classes (subclasses) by means of further division characteristics (or Facets).
- This process results in the construction of a hierarchical structure, as each division level is subdivided in further sublevels.
Classification schemes by aspect

- The commonest general classification schemes (DDC, UDC, LC etc.) have an approach by aspect, as a simple concept can be placed in different positions of the scheme in relation to the focused aspect.

- Examples:
  - Potatoes: in agriculture, in botanic, in cooking, in history, etc.
  - Horses: in zoology, in breading, in driving force, in sports, in hobbies, etc.

Idea, Verbal, Notational planes

Ranganathan wrote that: “In the classification, it is very useful to distinguish three planes of work in classification:

- Idea plane
- Verbal plane
- Notational plane

«Such a separation facilitates the understanding and exploitation of each plane»

Notation

- “Notations are systems of written symbols that can be combined according to some set of syntactical rules to represent various meanings in a specialized domain.”
- N. can be alphabetical (when including only letters), numerical (when including only numerals) or alphanumerical (when including both letters and numerals).
- DDC is an example of classification with numerical notation, whereas CC is an example of a classification with alphanumerical notation.

** http://www.isko.org/cyclo/notation

Hospitality in Notation

- Hospitality is the capability of expansion of classes according to progress and change in knowledge either at the extremes of (extrapolation) or within (interpolation) an array, i.e. a ordered structure such as a list, a text, a classification scheme, etc.)
- Hospitality is important because knowledge universe is dynamic and ever growing.

- Examples:
  - Staminal cells, Bosons and fermions, Semantic Web

Hospitality. Counterexample

Notation of the array:

1. Belluno
2. Padova
3. Rovigo
4. Treviso
5. Venezia
6. Verona
7. Vicenza

Is in hospitable.

In fact, when a new province should be instituted (for example, Adria or Legnago), an integer number at the extreme or within the list would not be available. Numbers 8 and 9 are available but they do not respect the arranging criterion adopted in the array (alphabetical list).
Enumerative and analytical classification

- Representation of every simple and composed subject of a knowledge domain is possible by means of two different kinds of classification schemes:
  - Enumerative schemes
  - Analytico-synthetic schemes.

Hierarchical and coordinate relationships

Enumerative Classifications

Dewey Decimal Classification divides the whole knowledge in 10 main classes*

- 100 divisions
- 1000 sections

As a result, DDC is structured in well-developed hierarchies (tree structure)

* See Educational Materials, «EM02 DDC Summaries»
Enumerative Classifications: Limits

Enumerative Classifications must anticipate every simple subject and every possible combination of simple subjects (composed subjects) that could be found in any document.

Listing simple and composed subjects results in the construction of chain of classes.

In an enumerative scheme, chains of classes can be many, and very long.

Example of composed subjects

- The simple subject ‘Agriculture’ can be combined many times with other simple subjects (such as a place, a time, a process, an agent of the process, and so on ...)

For example:
- Agriculture
  - Agriculture in Poland, Italy, ...
  - Agriculture in the '50, '60 ... of the XX Cent.
  - Diseases, injuries ... in Agriculture
  - Diseases caused by animals in Agriculture

Chain of classes

- Any class of any sequence can generate many chains of classes, depending on possible composed subjects to be represented

Agriculture (order 1)
- By geographical area (Asia, Europe ...)
- By problem (diffusion, development, diseases ...)
- By utility (food, oil, fabric ...)

(order 2)

Chain of classes. Example

Agriculture
- Agriculture in Europe
  - Diffusion of agriculture in Europe
  - Development of agriculture in Europe
- Agriculture in Asia
  - Diffusion of agriculture in Asia
  - Development of agriculture in Asia
- Agriculture in America
  - ...
- Agriculture in Africa
  - ...

Enumerative Classifications: Limits (2)

As far as enumerative classifications should list – in an ordered way – all the subjects and their possible combinations in composed subjects, they:
- do not always can or succeed in being complete (in listing any possible combination)
- cannot anticipate a priori any possible concept in a composed subject;
- are in need of a continuous updating;
- tend to be very large in size.

For example, 22nd edition of DDC is in 4 vols of about 4500 p.
Example with the DDC

- The composed subject to be represented is:
  
  Museum Cooperation in Poland

- It is a subject composed by three ideas: Museums, Cooperation, and Poland

- First of all, DDC requires the classifier to determine the subject, the disciplinary focus, and, if applicable, the approach or form.

First Summary of DDC (EM no. 02, p. 7)

- 000 Comp. science, information & general works
- 100 Philosophy & psychology
- 200 Religion
- 300 Social sciences
- 400 Language
- 500 Science
- 600 Technology
- 700 Arts & recreation
- 800 Literature
- 900 History & geography

EM02, p. 8 – 060 Associations, organizations & museums

EM02, p. 9 – 069 Museum science
Example with the DDC (2)

- Following the disciplinary hierarchy provided for by the DDC, it results:
  - 000 Comp. science, information & general woks
  - 060 Associations, organizations, museums
  - 069 Museum science
  - 069.6 Administration (includes Staff, Public relations, etc.)
  - 069.68 Museums. Public relations with other organizations

- It must be noted that
  - For the moment, the concept "Poland" is missing
  - Concept «Public relations» is less exact than «Co-operation»
  - «Other organizations» is less exact than «Museums»

Example with the DDC (3)

- Class number 069.68 is not completely satisfactory, as it expresses a subject not coextensive to the subject of the document
- Anyway, the class number 069.68 permits to collocate usefully document sharing an identical or alike and near subject.
- This result is typical for enumerative classifications, in which classes and class numbers collocate not only alike documents, but also alike and near subjects.
- N.B. As we will see tomorrow, DDC is no more a purely enumerative classification, so that it would allow to define more exactly the subject of the example.

Analytico-synthetic Classifications

- Analytico-synthetic Classifications create schedules to define:
  - main basic classes, corresponding to disciplines and group of disciplines;
  - single concepts/subjects connected to each discipline, grouping them by facets (entities, activities, materials etc.)

Analytico-synthetic Classifications (2)

Analytico-synthetic Classifications do not list all the chains of classes to express any possible combination of simple subjects in composed subjects, but:

- List in special tables ideas/terms/notations (such as place, time, language, form etc.) frequently recurring in many composed subjects
- Define the rules to synthetize (join, with uniformity) composed subjects starting from simple subjects already listed in the Schedules

So, CC schedules are all included in just 123 pages!

Educational material 03
Reading
Faceted Classification and Colon Classification
Analytico-synthetic Classifications. Limits

- Analytico-synthetic Classifications do not supply a ready-made class number for each subject (particularly for composed subject);
- So, they require an additional work by the classifier, as he/she must find the class numbers for the component ideas and combine them in a new class number for the composed subject;
- Like enumerative classifications, analytico-synthetic classification need continuous updating, for the changing of the universe of knowledge (but with smaller impact).

Main Classes of CC (Ed. Material 04)

- z Generalia
- 1 Universe of Knowledge
- 2 Library Science
- 3 Book science
- 4 Journalism
- A Natural science
- AE Mathematical sciences
- B Mathematics
- BZ Physical sciences
- C Physics
- D Engineering
- E Chemistry
- F Technology
- G Biology
- H Geography
- HX Mining
- I Botany
- J Agriculture
- K Zoology
- KX Animal Husbandry
- L Medicine
- LZ Pharmacology
- LZ Pharmacopoeia
- M Useful arts
- M Spiritual experience and mysticism
- N Fine arts
- O Literature
- P Linguistics
- Q Religion
- R Philosophy
- S Psychology
- T Education
- U Geography
- V History
- W Political science
- X Economics
- Y Sociology
- YZ Social Work
- Z Law

Colon Classification. Example

- For example, the composed subject to be expressed is:

**Emotions in girls**

- From the analysis of the subject:
  - 'Girls' is the main idea;
  - 'Emotions' is the aspect under which girls are taken under consideration (it is an activity);
  - The discipline, or main facet, is S Psychology.
Example with the Colon Classification

- Like any other Basic Class, Schedule S Psychology prescribes the citation order for the concepts (isolates) and the punctuation, that is: S [P] : [E] [2P]
- In the schedules, concepts must be individuated by the terms and their notation is to be taken in account:
  - Basic Facet: S Psychology
  - From list [P]: 25 Girl
  - From list [E]: 52 Emotions
- So, the following notation can be created:
  \[ S + 25 + : + 52 = S_{25:52} \]