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1. Library Classification Systems:

Classification is a tool for organization of phenomena of the universe or any of its portion. Modern library classification is classification of knowledge as contained in documents of all sorts. Therefore, it is more than knowledge classification and has many intellectual and mechanical functions to perform. Since their modern origin in late 1870s many library classification systems have been designed to organize and access knowledge in libraries. Over the years with experience their features have been standardised though their techniques may differ. Some of the important general classification systems are:

Dewey Decimal Classification(1876+)/ by Melvil Dewey

Universal Decimal Classification (1905+)/ FID, now UDCC

Expansive Classification (1892)/ by C.A. Cutter

Library of Congress Classification (1904-)

Subject Classification (1906-1939)/ by J.D. Brown

Bibliographic Classification (1940-1953)/ By H.E. Bliss

Colon Classification (1933-1987)/ by S.R. Ranganathan

Bibliothecal Bibliographical Klassifikation (BBK, 1960-1970)/ by VINITI, Russia

Rider's International Classifcation(1961)/ by Fremont A. Rider

Information Coding Classification (ICC, 1970) by I. Dahlberg

BC-2(1977-)/ by J. Mills

BSO (1978)/ by Eric Coates

Of these the DDC, UDC and LCC are considered big three systems while the CC and BC-2 are ideal and scientifically sound systems. BSO and ICC are not shelf classifications, whereas the fate of the Russian BBK is not known. Rest, namely EC, SC, BC and RIC are now only of historical interest.

Purpose of this module is to understand their components and their inter-relations and to describe the best practices among them. A library classification is a system having mutually related components. It has its anatomy (hardware) showing its visible and invisible component each having supporting its functions (physiology).

2. Qualities of a Library Classification:

It has been claimed that modern bibliographical work demands a standard classification which:

1. Brings together closely related classes.
2. Is sufficiently subdivided to index everything or its class under the sun .
3. Is capable of further extension and subdivision, as our knowledge grows.
4. Is not subject too frequent revision or any drastic reorganisation.
5. Is recognized widely so that the users may easily find their way about it.
6. Has extensive index of its classes in alphabetical order.
7. Has moderately mixed notation which shows hierarchy, is easy for inserting and finding the classified arrangement and is hospitable to new subjects and allows interdisciplinary combinations.
8. Is available as a web based online database.

Functions:

An ideal library classification system is supposed to have the following broader functions in the order of their importance:

1. Cognitive function(Mapping of knowledge)
2. Bibliographic function(Information retrieval)
3. Shelf arrangement(Location and browsing)

A classification system which performs an upper function best also performs lower functions equally good.The systematic arrangement of knowledge or of the documents in a collection translates into following functions:It gives us an overview of the subject field covered

1. It makes it possible for information on a subject to be retrieved without having

to search the whole file, i.e., provides random access to documents and information.

2. Allows meaningful browsing in stacks or surrogates in a database.

The features that a bibliographic classification requires in order to achieve these ends are a helpful order, a brief memorable notation, and a host of techniques and devices for number synthesis.

Functional Requirements of Bibliographic Classifications:

Practically a library classification performs two functions:

1. Linking an item on the shelves with its catalogue entry. An item's class number forms part of its call number, which enables items in a library catalogue to be retrieved from the shelves.
2. Direct retrieval by browsing. If we know where a subject is classified, we can locate it without having to search the whole collection; and can moreover expect to find related subjects nearby. However, because of the limitations of linear order, and division by discipline not all related subjects can be collocated. It is the function of a classification to group together the topics that the library users are most likely to see grouped together (both on library shelves and in digital collections). It is done by arranging documents in a filiation sequence.

What is necessary for a library classification system?

It should be:

- explicit, recorded, unambiguous with notes and instructions
- available to both classifiers and users
- designed to comprehensively mirror the cognitive structures of potential users

- designed to cover the literature, information or knowledge base which it is supposed to organize. In other words it should be based on literary warrant.

Print and machine-readable formats of classification systems:

Since the last decade of the previous century, most of the living classification systems have converted their print format into machine readable databases. The DDC, UDC and the LCC are available both in print and machine readable format. Now machine readable database is the main source while other versions, including print edition, are its byproducts. In the beginning, it was done only to help the editors in the editing and publishing the system. But now these have been made available to the users mostly on the web which have many additional features apart from being kept updated by the publishers. Classification systems in a machine readable database which these days are in *MARC-21 Concise Format for Classification Data* have the following functions (Slavic, 2008):

- searching and browsing of classification by notation; hierarchy allows to broaden or deepen the search at any point.
- searching notation through associated verbal expression
- sort and display of schedules in various layouts
- automatic tracing of hierarchical and associative linking
- tracing of system rules to the area of their application
- navigation between tables, facets and subject areas
- tracing historical data through a scheme's lifespan ('replaces/replaced by')
- various outputs and exports
- identification of classes independent of notation

However, an online classification system does not differ logically or intellectually

from its print version.

General and special classification:

A collection may be general or special. A general classification covers all subjects. A special classification concentrates on a narrower range of topics, or the goods manufactured or services provided by the organization for which it has been developed. It also refers to classification of documents by form such as government reports, fiction or maps etc. Some general classifications, notably UDC, LCC and BC2, have been developed in sufficient depth of details to enable them to be adapted to special collections.

3. Parts of a Library Classification:

A classification is simply a systematically arranged list of subjects in the universe of knowledge. To be of practical use a classification needs additional features, and these are what make it into a system. A classification scheme has three broader components (Rowley and Hartley):

1. The schedules, in which subjects are listed systematically in arrays and chains showing their relationships: the ordering of subjects in these schedules is not self-evident, and therefore requires:
2. A notation, a code using numbers and/or letters that have a readily understood order which guides the arrangement of the schedules; and
3. An alphabetical index to locate the terms within the schedules.

It is often stated that a classification requires a fourth component: governing body to keep it innovative, current and for its marketing.

Schedules A schedule is a systematic list of classes and their subdivisions arranged in

a helpful way. It is the core or the *terra firma* of the system. Classification schedules comprise the following elements:

- Main classes
- The division of classes
- Facets, generated by facet analysis
- Sub-facets (arrays), formed by the subdivision of the facets by a single characteristic at a time.

Example:

Aida Slavic (2008) explains an entry from the online UDC schedules having the following components:

Basic mathematical algorithms

For mathematical theory of algorithms in general use 510.5 Specify mathematical Process by colon combination with class 51 Examples of combinations)

004.421.2:517.443FastFouriertransform

004.421.2:517.535Algorithmsforrationalexpression

004.421.2:519.17Graphalgorithms

=> 519.16

=> 519.178

When stored in a database information implicit in the above entry has explicitly following 7 blocks of data elements:

1. Notation (classification number)

Tables from which notation is taken type of notation

(simple or composed) notation structural
elements/components relationships between
elements: span, phase relationships

2. Broader class

3. Caption

4. Notes

Scope note

Application (instruction) note notation Building notes and rules

Rules for parallel division (derived from; divide) Rules for combination and
expansion(add, specify by) Examples of combination

Notation history note (replaces, replaced by) general content

note Editorial note

5. References (See also)

6. Class ID (Unique identifier of a class)

7. Index(search)terms(keywords)

Division of classes

The division of classes must be by one characteristic at a time. There are two approaches to the division of classes, namely enumerative and faceted. Historically bibliographic classifications have followed enumerative systems in which classes and subclasses have been deduced top down moving from general to specific. This gradual division takes the shape of a funnel. Enumerative method has the following problems:

1. Successive divisions can only properly cover one type of relationship i.e.

hierarchical.

2. Successive subdivisions of classes may be carried unnecessarily ignoring the literary warrant. Some topics may get repeated under different arrays.

Enumerative systems are now out of fashion giving way to faceted approach.

Faceted approach Faceted classifications are constructed in an inductive, bottom-up manner in which the basic concepts are assigned to a few preordained categories or facets. In a faceted approach:

- Compound and complex classes are formed by synthesis only.
- Classification is easily hospitable to new subjects. This hospitality is multidimensional.
- Class numbers are customized to be co-extensive with the subject of the document.
- Structure of knowledge is clearer.

Relations in Library Classification:

Classification is all about relations. There are two types of relations both: displayed or inherent in classification schedules.

Semantic relations:

The first is semantic relations which are hierarchical, cognate, collocative and filial. Arrangement of main classes and their subdivisions into arrays and chains are semantic relations which are deemed helpful to the users. For arrangement of subclasses in an array Ranganathan prescribes eight principles of helpful sequence such as chronological arrangement, geographical arrangement, evolutionary

arrangement, conventional arrangement and so on.

Syntactic relations:

These are grammatical relations among the components/facets of a compound subject. In other words, these relations are governed by citation order. Ranganathan postulated grand but broader formula in the form of PMEST in which the facets are arranged in the order of their decreasing concreteness. To arrange facets within Rounds and Levels Ranganathan formulated an over-arching Wall-picture principle which is an analogical name for dependency principle. Another such picturesque principle he formulated is Cow-calf principle to arrange facets in logical order. But the BC-2/CRG formulated a detailed itemised citation formula which is comprehensive of all possible facets in abstract and is free of confusing concept of Rounds and Levels. It is: Thing-Kind-Part-Property-Material-Process-Operation-Patient-Product-Byproduct-Agent-Space-Time. It bypasses the mazy and confusing act of arrangement of entities in Rounds and Levels. It is much simpler.

Principle of Inversion:

The citation order prescribes arrangement of facets from specific to general or concrete to abstract. But the arrangement of documents on the shelves or entries in a catalogue is from general to specific i.e. in the reverse order of the citation of facets. This general to special order on shelves is achieved by manipulating the ordinal value of digits and indicator digits. In the UDC the auxiliary facets are arranged in tables 1a-1k which are in general to specific order but these are applied in the 1k-1a order. Hence the inversion

Main classes

In both the systems the first division is by broad classes called main classes. All

current classifications base their main classes on division by discipline. A discipline is a broader division of the universe of knowledge which gives context to the phenomena. Main classes form the first order array of the division of universe of knowledge. These, being conventional, are postulated bit arbitrarily by the designer of the system. There are ten main classes in the DDC,24 in in the LCC w and more than 700 in the CC-7

Generalia Class

As its name implies, this is the general works class provided to accommodate such books as generalencyclopedias, newspapers, and other polytopical books which cover knowledge in general, or such a portion of it that it is impossible to place under any one main class in the schedules. This hold-all class, is an essential feature of book classification. Its place precedes the disciplinary divided subjects.

In providing places for works which on account of their form do not belong specifically to any other main class, the Generalia class may be considered as a form class. In its practical form, however, when subjects considered pervasive of knowledge are included, it cannot be considered as a rigid form class. Thus a generalia class is more than a form class.

The outline of the Generalia class in the DeweyDecimal Classification is:

- 000 Knowledge & Systems
- 010 Bibliographies
- 020 Library& Information Science
- 030 Encyclopedia and books of facts
- 050 Magazines, Journals &Serials

060 Associations, Organizations & Museums

070 Newspaper, Journalism & Publishing

080 Quotations

090 Manuscripts and rare books

Form Divisions

A book on any particular subject may deal with that subject in various ways, from different viewpoints or in different forms. It may be an encyclopedia, a dictionary, a periodical, an advanced or elementary treatise, or it may be written as a history, a philosophy, in essay or other literary form. Books on almost every subject frequently fall into one of these categories. Many schemes recognize their generality of application by converting them into common subdivisions, i.e. a constant set of divisions which can be used to qualify any subject on the schedules. All bibliographical classifications make provisions for this "form" in books by the addition of the so-called (auxiliary) form division, or common divisions. In the DDC, such form divisions are given in Table-1, e.g.

-01	Theory & philosophy
-02	Handbooks etc.
-03	Alphabetical reference works
-05	Serial publications-06 Conference proceedings
-07	Study, teaching & research
-08	Anthologies

These can be added to any number in the schedules. Similar provisions also exist in other classifications.

Formvs. Subject

Many of the terms representing these forms correspond to terms used in the main schedules for specific subjects. There is, however, a distinct difference in their meaning and implication. In the main schedules the terms are used to represent recognized subjects from the field of knowledge, e.g. Encyclopedia Britannica gets the class number 032. Similar terms used in the form divisions represent either a special way in which a book is written and produced, or aspect from which the subject is viewed. Form divisions are exclusive to a libraryclassification; they form the generalia divisions of a specific class. In practice, they enable a further, more detailed and convenient grouping of books to be made on the shelves (Philips, p.38).

Devices for synthesis andPhase relations:

A schedule, alwaysequipped with many instructions, devices and techniques, is more than a systematic list ofsubjects. It is a mint to forge new class numbers for unforeseen subjects of future. In a system like the DDC or UDC, the minted or synthesized numbers may be much more than the explicitly listed numbers. The UDC uses + / : : [] for combination of subjects.

3+5	Social Sciences and Natural Sciences
5/6	Science and Technology
2:5	Religion and Science (Relation)

These are devised to classify interdisciplinary or composite subjects which are in *ad hoc* relations.

4. Notation

Classification notation is a series of symbols which stands for the names of a class or any divisions or subdivision of a class, and forms a convenient means of reference to the arrangement of a classification. Though the notation is an important addition to a classification schedule, yet it should in no way determine its logic, its scope, or its sequence of development. It furnishes a convenient reference to the arrangement of a classification; the symbol is not assigned until after the schedule has been worked out in the idea plane. Ranganathan harshly terms notation as servant of the Idea Plane to implement the decision taken by the later. Notation is the engine of library classification, far from being any menial servant. A notation is essential for a library classification; without notation it would be impossible to apply classification to documents. As classification is the “foundation of librarianship”, it can be said that “notation is the engine of practical classification”.

Summarizing its usefulness, a notation:

1. Is a guide to the sequence of subject. It places a term in the hierarchy of the schedules. A notation serves to denote the classes, their subdivisions, and the order in which these are arranged without in any way naming or defining them explicitly. It makes the mapping of knowledge quite visible
2. Makes possible the use of the index. The symbol attached to the index entry is the only means of quick reference to the place of the topic in the schedules.

3. Is used as a short sign to be written in various parts of the book—on the spine, back of title-page, label, charging cards, etc.—to facilitate the arrangement of books on the shelves, the recording of issues, and other statistical information.
4. It is the basis of chain indexing to derive standardized subject headings for the subject catalogue.

The notation is a piece of apparatus, without which a book classification cannot function.

The Qualities of a Good Notation

1. Should convey order clearly and automatically.
2. Be as brief simple as possible without compromising its efficacy.
3. Be hospitable to new subjects, i.e. allow insertions at any point without dislocating the existing subjects and allow classification to expand its boundaries without drastic reorganization. This is particularly true of the schedules of a book classification, which must be of a semi-permanent nature. Knowledge is growing turbulently since the mid 20th century. In the ICT era its speed has become tremendous. All this knowledge must be mapped, organized and even reorganized. It is here that the hospitality of the notation is of paramount importance.

Types of Notation:

There are two types of notation by pedigree: pure and mixed. Pure comprises of single species of digits usually numerals or alphabets. The DDC which uses Indo-Arabic numerals is the best example of a pure notation: RIC which uses only A/Z is also another example of a pure notation. Mixed notations can again be divided into two categories of moderately or highly mixed. The LCC and BC-2 which use only alphabets and numerals together are considered ideal model of notation. The CC and UDC use

highly mixed notations which comprise of alphabets, numerals and punctuation marks etc. Moderately mixed notations are elegant and work effectively. The Library of Congress uses an alphabetical notation A-Z for the main classes; the subdivisions are denoted by a second sequence A-Z, and within these divisions a numerical span from 1 to 9999 is used. Gaps are left in between for expansion:

U	Military Science
UB	Administration
200	Commanders. Generals
210	Command of Troops. Leadership
220-225	Staffs of Armies
230-235	Headquarters, Aides, etc.
240-245	Inspection. Inspectors
250	Intelligence
260	Attaches
270	Spies

Book Numbers

In library classification, the class number alone is not able to provide a unique place to a document. For example, there may be many books on the History of Mughal India bearing exactly the same class number. For a proper and effective organization and location, such books having the same class number should be further divided granularly. The device to do this is called book number or author number. In the LCC

and to some extent in the CC book number is a part of the call number. Book numbers usually follow two opposing techniques: Alphabetical by author/title or chronological by the year of publication. The Library of Congress uses simplified Cutter author numbers as an integral part of the notation to provide a complete call number.

5. Alphabetical Index

An index is an alphabetical list of the terms mentioned in the schedule and tables referring to their notations. It usually includes, so far as is possible, all the synonyms of these terms, together with some synthesized subjects even if they are not included in the schedules. The index is a labour-saving device assisting in the location of topics in lengthy and mazy schedules, but should be used only as an aid to, not a means of, classification. Its principal virtue is that it ensures that a subject will always be classified in the same place in the schedules. The index to the classification schedules has two purposes:

- To locate topics within the classification
- To bring together related aspects of a subject which appear in more than one place in the schedules.

There are two types of indexes:

1. Specific, which gives one entry only for each topic mentioned in the schedules.
2. Relative, which enumerates topics mentioned, all synonyms, and to a great extent shows the relation of each subject to other subjects. Perhaps the best example of a full relative index is that appended to the Encyclopedia Britannica, and to the DDC.

Faceted classifications need only to index the simple concepts appearing in the schedules. The index of the DDC also includes selection of synthesized subjects. In the LCC each class has its own separate index.

6. Revision Machinery

Bibliographic classifications are born out of date. Classifications are necessarily closed rather than open systems. The placing of a new topic is not automatic, as it is with the list of subject headings: only a controlling organization can determine the correct placing of a new topic within the schedules. This revision committee is essentially a part of governing body of the system. It has been experienced that systems such as the LCC and the DDC which have a backing of a big library and are regularly revised remain popular. It is taken as an assurance for the long life and stability of the system. The classification such as the CC and BC-2 though sound in theory are not accepted by the librarians due to lack of any institutional support. To survive a library classification needs to provide after sale service to its users.

7. Summing up: Features of a Library Classification

1. It should be comprehensive covering the whole field of knowledge as represented in books.
2. It should be formulated with due regard to the literary warrant, aiming to provide a place for every type of subject and document
3. It should be systematic, proceeding from the general to the specific.
4. The arrangement of the classes and subdivisions should be made with constant regard for the main purpose of library classification—the securing of helpful order convenient to the user.
5. The terms used must be clear and current accompanied, where necessary, by full

definitions, referring to the scope of the headings and equipped with notes for the guidance of the classifier.

6. It should be evenly apportioned and should allow alternative locations for certain subject or classes.
7. It should be equipped with:
Generalia and Form classes.
 - a) Form and geographical common divisions.
 - b) An effective notation. The notation should fit the scheme (not the scheme the notation) and may include mnemonic, and synthetic combinatory devices.
 - c) A detailed alphabetical index.
8. It should be structurally expansive both in breadth and depth..
9. It should be displayed in a form easy to handle and consult, to assist the user to grasp the hierarchy and layout of classes.
10. It should be revised regularly but not too frequently, by an editorial committee working under a governing body.
11. It should be maintained (and also made web accessible) as a machine readable database.

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