Knowledge Organization and Processing: Classification

DBLIS 101

Unit-1

Purpose, functions and limitations of Bibliographic classification

1. Classification and Purpose of Libraries:

Libraries are established to acquire, house, preserve and make available to users books and other documentary heritage of mankind. After selective acquisition the documents have to be organized for retrieval whenever required. Classification is a tool of organization. Books and other information sources are knowledge objects which can be classified and arranged like other physical objects. Since antiquity librarians have 'classified' books to form convenient groupings, and to facilitate their location at the time of need. An unarranged collection is a heap of books, not a library by definition. To find a book from such a library will be like locating a needle from a huge heap of hay. Hence a library is always organized. In earlier times books were grouped and arranged on the basis of their language, size, colour of binding, authorship or broad subject categories. Those methods were perfectly useful in those times as the main aim of libraries was to store and preserve documents rather them to serve them to the scholars. Access to knowledge was the preserve of the privileged few.

Classification of the documents in the library:

As said earlier, classification of documents and other reading materials is indispensable for any library. Various standard and local methods for arranging library materials, ranging from clay tablets, papyrus rolls, monographs and other print documents, AVs, CDs, Multimedia and now Web sources, have been employed from time to time by librarians to organize their collections. Their classification has varied from home-made or ad hoc systems to somewhat adapted from some universal knowledge classification systems. Since the late nineteenth century librarians have developed many standard classification systems pioneered by the Dewey decimal classification in 1876.

Modern Library Classification:

Dewey's invention was a social need and product of its time. In the then emerging industrial society and burgeoning democracy of the late nineteenth century there was an attitudinal shift in the values of education.Libraries were ecognized as instrument of self learning, and treated as People's universities. Importance of literacy was recognized for aware and responsible citizens in a democratic society. Access to education was democratized and opened to all. "Education for all" became the objectives of the welfare state. To meet the needs of the society not only many new libraries were established by law, the doors of libraries were opened to all and sundry – scholars, students, neo-literates, poor, children, housewives, old and handicaps, ethnical minorities and other marginalized sections of the society without any discrimination. Further to maximize their use books were placed in open stacks and users were allowed open and direct access to the books. That open access policy required a novel and systematic arrangement of books for the browsers. Then Melvil Dewey (1851-1931) designed his decimal classification which divided knowledge by academic disciplines of study in higher education. He used decimal notation to denote subjects. Latter provided almost infinite capacity for expansion and easy insertion of new subjects at proper places. Since then the books are being classified predominantly on the basis of their subject content, that is knowledge divided into disciplines and subjects. Thus library classification is knowledge classification as applied in libraries. In other words library classification is applied knowledge classification.

2. **Definition:**

Formally and traditionally, library classification has been defined as the arrangement of books and other reading material on the shelves or entries in a classified catalogue in a way that is helpful to the majority of users. It is a "rational sequence of maximum utility" (Maltby, 1975). Today's libraries are mostly arranged by disciplines divided into subject though different types of collections are arranged in different ways. For example, government documents, patents or standards are arranged by their own official codes. Current periodicals are arranged alphabetically by title. Maps, CDs, pamphlets, photographs indeed require different and separate arrangements. Making of library classification systems is also classification. Designer of a classification scheme is known as

classificationist. Operating a classification system to assign class numbers to documents in a library is also classification ; such a person is called a classifier. Ranganathan has given five meanings of the term classification (Prolegomena, pp. 55-60).

Importance of library classification:

Classification is vital to library services. In fact systematic classification is implied in definition of a service library. In supports all library services. Classification is to a library as skeleton is to human body on which all the body organs rest. Classification of a library collection is its content map. In a library, classification serves all the function, namely a tool of management, brings aesthetics and helps knowledge creation. It also helps in collection development. All the Five Laws of Library Science (1931, 1957) formulated by Ranganathan support library classification and have specific implications to design effective classification systems to serve the users. Without classification a library is an unorganized dump of books. Therefore, without it the full value of a library collection cannot be obtained.

3. Classification systems:

Earlier classifications to be applied in libraries were home made. It is no more possible now keeping in view the complex needs of the library users and expectation from the classification systems. Moreover, making a workable classification is a daunting task both in terms of intellectual labour and skills and high financial cost.

Types of Library Classification Systems:

A library classification may be general, that is, covering the entire gamut of human knowledge. Such systems are suited to cater to the needs of general libraries both big and small – from national library to village library. Academic libraries also use such systems. On the other hand there are institutions which require in-depth or minute classification to organize micro literature. These are special and research libraries of institutes like the rubber research institutes or petroleum research and development centers, or say the library of a defense research center or even the library of a mathematics department.

General classifications:

Since Melvil Dewey, many general classification systems have been developed either to improve upon the defects of the DDC or to provide an alternative to it. Nevertheless the DDC has proved to be the enduring mother of all modern classification systems. Some of the universally known general classification systems are:

4. Uses of classification in a library:

Classification is indispensable for libraries. However, its specific uses can be broadly listed as : It brings together books on the same subject. Thus a patron gets all the books at one place which is much more convenient to the users. It facilitates the browsing function of a library. Browsing   is to look at library collections without any specific purpose – a sort of window shopping. Browsing. It shows hierarchical and associative relations, which are essential for retrieval of specific and related subjects available in a library. General to specific order of arrangement with some notational maneuvering has been turned into pedagogical order in schemes like the CC. Ranganathan calls it APUPA pattern on the shelves. It is quite helpful for the self-learners. Thus systematic arrangement of books in open access libraries is helpful in self learning. It is a location tool; without classification the library catalogue will not be able to function properly. It is also used for preparing shelflists. It helps to replace the books at their correct places when the books are returned to the stacks after the home or inside use.

Classification is the basis of all information retrieval systems and methods both in manual and electronic systems.

Uses in Electronic Environment:

Traditional classifications can be easily used to arrange and retrieve records in electronic databases. Online Public Access Catalogues (OPACs) function far better when class numbers are provided as another access point. In fact, in the electronic information era it has found so many new uses that it is rightly said that we are witnessing the second golden age of classification. Conventional classification systems such as the DDC, UDC, LCC have been used to organize and search information on the world wide web (WWW) search engines. Search

engines like Yahoo, Google, AltaVista use broader classification methods for organizing their information. Eccellio(http://science.eccellio.com) is a search engine which uses faceted classification which returns precise information. It uses Google database but adds an extra level of classification to refine search. It is termed as Google++. In the web environment at least seven functions of classification have been identified by Professor Lois Mai Chan. These are location, browsing, hierarchical searching, retrieval, identification, sub-grouping (partitioning) and profiling. It has aptly been called mathematics of librarianship. (More of it has been discussed in Module ID: KO:LIS/KOP-C/17).

Classification is Indispensable:

There are many day to day routine uses of classification in a library so much so that it will be impossible for a library to function properly and achieve its objectives without a sound classification. There are many opponents of classification, too, who project it as a weak and defective instrument, and a costly process in more than one ways. Alternatives they suggest are much more costlier and cumbersome. These alternative experiments prove that there is no substitute to library classification.

5. **Limitations of classification:**

Classification was described as mathematics of librarianship, yet like the value of it is never exact. Classification, especially the library classification has many limitations and problems. Classifications are social, not natural. These do not satisfy the needs of all the library users. Only majority are served while some users with specialized needs may require different arrangement. It is a costly process and subjective, too. Despite lengthy class numbers,no classification can comprehensively represent the total subjects dealt in a book. Even a monograph may deal with more than one subject at a time. In classification only the dominant subject is represented. A textbook on algebra and geometry is either placed at algebra, or geometry, not both. Further, let us say a textbook in cataloguing may have a very valuable chapter on history of cataloguing or on the life of C A Cutter. These buried topics will not be represented by the class number, and may remain hidden from needy users. Classification by discipline also scatters subjects. For example, a books on "Family life" may be placed in different main classes such as Ethics, Sociology, Anthropology, Social Welfare, and Medicine. Hence the

scattering.Systematic arrangement in itself is very difficult to use even by the trained librarians or subject experts. Therefore a classification system invariably needs an alphabetical index to work as a key to the classified arrangement. In libraries it may be difficult to locate books without a subject catalogue. Hence a classified arrangement is not sufficient alone to serve the users. It is not incorrect to say that classification suppresses and scatters more than it reveals and collocates. Many information retrieval experiments have proved that no classification is able to retrieve more than 60% of the material available on a topic in a library. A classification may not satisfy all the users as they have individual needs. Classifications are not based on the survey of the needs of library users. An inherent defect in all library classification systems is that these are biased towards the culture and time of their origin. No classification is really universal, neutral or value free. The DDC is notorious for its WASPish bias. As a result it lacks in non-western non-American subjects. It is a known fact that the DDC has to be extended, modified and adapted in countries of Asia and Africa. Such extensions and adaptations have their own problems

its structure. Thus, classification systems have to be revised from time to time. Applying revised classification is costly and cumbersome. Librarians are always scared of reclassifying their collections. Designing a scientific and qualitative classification is one thing. Applying it correctly and as intended by the designers is another. Often the same system is applied differently by different classifiers or in different libraries. Two classifiers may genuinely differ widely on the correct classification of a given book, and both may be correct. Not only this a classifier may class a given book differently at different times. These differences may be due to different perceptions on the subject of the document or due to different interpretations of a class in the classification system. This is known as inter-indexer inconsistency. To reduce this general schemes like the DDC have issued separate policy manuals for correct interpretations of the schedules. Keeping all this in view a nineteenth century English philosopher W.S. Jevons (1835-1882) had criticized library classification as a logical absurdity.But there is no better substitute to it. We have to work with imperfect tools till we create better ones

Summary:

Classification can be made of all entities under the sun. Philosophers, scientists, librarians, shopkeepers, postmen, housewives all do classification for different purposes. The four broader uses of classification are organization, economy, aesthetics and productivity. Many philosophers right from Aristotle have done classification of the entire universe of knowledge. Scientists have produced taxonomies of plants, animals and chemical substances. In libraries we apply knowledge classification to organize our books, databases and other reading material both in print and electronic form to serve our users. In fact in computerized databases and network information searches classification has found new but powerful uses. Classification is so much the basis of all library services that it has been described as foundation study of librarianship. Yet classification has its own many problems, difficulties and limitations. At best it is an imperfect tool of organization and retrieval. Using classification in libraries may be costly, but it is much less so in using unorganised libraries. "… despite the difficulties, classification is a good servant" writes Maltby (1976)

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Unit-2

Classification system and its components.

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

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 recognized widely so that the users may easily find their way about it.

   5.Has extensive index of its classes in alphabetical order.

   6.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.

   7.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)

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 seegrouped together (both on library shelves and in digital collections). It is done by arranging documents in a filiatory sequence.

• 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 beingkept updated by the publishers.Classification systems in a machine readable database which these days are in MARC-21 Concise Format for Classification Datahave 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

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 bodyto 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.

• 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:

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.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.

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.

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

-09   History, biography, etc.

4. **Notation**

Classificationnotation 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

1. Is a guide to the sequence of subject. Itplaces 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.

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 onthe 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 furtherdivided 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.

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:

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

Automated classification system:

As contrasted from usual print systems automated library classification systems are in a machine readable data format. Their standard for formatting in MARC21 Concise Format for Classification Data (2003).

Book numbers:

A device to sub-arrange documents in a library having the same ultimate class number. Mostly two opposing systems are popular for book numbering, namely alphabetical by author, and chronological by the year of publication. For Alphabetical system mostly Cutter tables are used, whereas chronological method was invented by

W.S. Biscoe, but perfected by S.R. Ranganathan. Apart from these two there are other numerous well known but less used system designed for special materials such as literary works, periodicals, biographies, fiction etc. In the Library of Congress Classification book number is an integral part of the Call number. These are also known as author or cutter numbers

Call number:

A composite number comprising of class number, book number and collection number which provides a unique and complete shelf address of the document.

Notation:

An adjunct of library classification to denote classes and their subdivisions and their auxiliary aspects by a series of symbols: a system of brief symbols to translate subjects and their subdivisions into ordinal numbers for mechanization of the classified arrangement of subjects. Knowledge classification doesn't need notation. A variety of explanations, suggestions or instructions appended to an

entry in the classification schedules or auxiliary tables. Notes guide and aid the classifier in clear interpretation of the entry for uniformity and consistency in application of the system. Notes enhance inter-indexer consistency in using the system.

Schedules:

A printed or otherwise recorded (asan electronic databases)is a series of lists of subjects and their subdivisions arranged in a systematic, usually general to specific order with unique notation for each entry. Considered as core of a classification system

the other parts such as index are considered adjunct to classification. In the UDC, it is called main tables.

Semantic relations:

Subject and substantive relations in library classifications and other controlled vocabularies which are mostly controlled by hierarchical or collocative relations. These are relations among classes in arrays or in chains

Syntactic relations:

Citation orderof components in a compound subject which are mostly determined by the logical principle of dependency of facets. PMEST is the grand model for such relations.

Unit-3

Subjects and Disciplines: Modes of formation of Subjects.

1. Definition, Nature and Properties of Knowledge

Knowledge is defined as sum-total of ideas conserved by the society. It is manifested in sciences, arts, literature, fiction and facts, religion and myth, expressed feelings and experiences. In other words, the society is the conservator of knowledge. There can not be any knowledge without a knower. The knowledge is knower dependent. Man is the creator and consumer of knowledge. Knowledge is created to solve problems facing mankind and leads to new systems, products, services, values and ultimately the outlook.

Characteristics of knowledge:

All assorted chunks of knowledge can be unified into a single big whole. There is unity in knowledge says J. H. Shera(1903-1981). In other words, the entire body of knowledge is a system having its definite characteristics:

• Knowledge is not independent. It does not exist a priori. It is dependent upon the knower, the man. It is subjective, and resides in the mind.

• It is conserved by human society. Thus it is social in character.

• Knowledge is never complete. It is fragmentary. It is dynamic, multidimensional and changing. It changes with time and society. With time, its quantity increases and quality improves.

• Thus it is inexhaustible, i.e. never ending. In other words it is infinite

• Technology, social advancements and knowledge creation are mutually dependent.

• Knowledge originates from the environment, both physical and social. Man is the knower. The Nature, including society, is the ultimate source of knowledge. Our sense organs are raw tools to perceive knowledge.

Knowledge generation and use:

Information is generated when the knower interacts with the nature through the sense organs. Information thus intercepted/perceived is integrated with the

previously conserved knowledge for its use and validation. Thus knowledge is socio-biological in nature. Society is the producer and consumer of knowledge, while knowledge is the prime mover of society. Thus society and knowledge are locked in mutual influence on one another. It is not possible to isolate the one way influence. Knowledge grows as society grows; whereas society changes, develops and progresses as new knowledge is generated. It is the society which decides which kind of knowledge it is going to have; in which direction and in how much quantity; and determines the value scales for the different categories of knowledge.

Importance of knowledge studies for librarians:

Knowledge is both recorded and oral. (Tribal and illiterate societies still orally preserve their knowledge). Librarians deal only with recorded knowledge i.e. documents. Knowledge is stock in trade of th librarians and information professionals. Therefore, quite obviously the study of the knowledge, its characteristics and structure is important to we librarians. Study of the nature of knowledge is as important to the library and information professionals as is the study of anatomy important to surgeons, says Jesse Shera(1903-1981). Hence as librarians we need to know the sources, nature and structure of knowledge. Only then we will be able to collect, organize, disseminate and preserve it effectively.

1. **Growth of Knowledge:**

Every system and entity in this universe is growing and changing. Universe of knowledge is a system; and like every system it grows. Growth of knowledge is both additive, as in humanities, and cumulative, as in sciences. S.R. Ranganathan's Fifth Law of library science, viz. Library is a growing organism, is a simple bibliothecal manifestation of this inviolable law of growth of knowledge. Kevin McGarry aptly equates this growth to biological growth. Today this growth rate is unprecedented and alarming. We are obviously witnessing an information deluge – though it is not easy to quantify the volume of knowledge or its speed of growth. However, as measured through the quantity of literature, scientific literature grows annually at the rate of 5 to 15% and thus doubles between 5 to 15 years, writes a Director of Chemical Abstract Service. But in the days of digital information revolution, the growth is rather out of bound. Eric Schmidt Chairman, Google Inc., has estimated that between the beginning of time and 2003 the

humanity had generated five exabytes of data. This amount of data is now being produced daily and by 2015 it will rise to one zettabyte In some areas of soft sciences, such as humanities, knowledge growth is slow, so is the rate of obsolescence. We however see a palpable growth of knowledge in all areas of human thought, and endeavours and in all its manifestations. The growth may be of three types:

Natural Growth

Paul Weiss and S.R. Ranganathan liken knowledge growth to the growth and development of living organism so does Kevin McGarry. Thus knowledge grows without

any conscious efforts, as in a forest, provided the environment is not inimical. In every age and society there are curious and restless souls engaged of their own in knowledge creation. This continuous growth makes knowledge a system in a dynamic continuum. Every system needs information feed for its stability and development. This is true even of homeostasis stage. It means knowledge needs further knowledge for preservation and dissemination of the existing stock of knowledge – thus adding more to the existing stock. Hence, it grows of its own. Another factor for growth of knowledge is the innate curiosity, urge to be held in high esteem, and spirit of adventure and exploration in human beings. Next to food, shelter and security what man wants is to know the unknown.

Knowledge is fragmentary

Another natural reason for growth is inherent in the fragmentary nature of knowledge. By nature, knowledge is never complete or final. It is an inexhaustible resource. For example, any research inquiry is always open ended. This is too obvious from the fact that every worth while piece of research raises more questions than it answers. Ironically advancing knowledge holds a mirror to some areas of our ignorance. Hence, knowledge is always incomplete, whatsoever may be added to its huge and inestimable repertoire. It is always moving towards its ever advancing frontiers. Hence, it has infinitely innate capacity to grow forever and ever This growth is both quantitative and qualitative. Qualitative growth leads to refinement and precision or corrects our existing world view. It also fills known gaps in our knowledge. Quantitative growth opens new frontiers and advances its boundaries in all directions.

2. Modes of Knowledge Growth

Knowledge is essentially a cerebral construct though social in character; and only the socially available or the public knowledge is knowledge ipso facto. Factors and means to procreate knowledge are numerous and varied. Nature is the ultimate source, and human being is the only agent to unearth knowledge. Non-human creatures do not have this creative facility. Research is one process to increase the fund of knowledge. Intuition, imagination and apperception are transcendental ways to conceive knowledge, whereas experimental, survey, and speculative methods are available to all. Studies on the nature of knowledge have given rise to a body of knowledge called social epistemology science of knowledge.

In spite of the increased importance of epistemological studies in philosophy, psychology, metaphysics, sociology, economics, education, genetics, linguistics, research methodology, cybernetics, artificial intelligence, and of course the library and information science surprisingly there have been very few studies on the mode of topology of growth of subjects. "We do not take enough notice of what contemporary philosophers and scientists have to say about the nature of knowledge", aptly warned nature is of as much important to us as the study of anatomy to a surgeon. Its implications in information management are all pervasive and too numerous. In Library and Information Science (LIS) discipline, S.R. Ranganathan (1892-1972) is a pioneer in the studies on the modes of knowledge growth and subjects. In the year 1948 Ranganathan got introduced to a paper "Development and structure of the universe of subjects" in the postgraduate library science curriculum of the University of Delhi, though his announced book on the subject was never published. However, he had an abiding interest in the field and always obtained fresh results (Kemp 1976, 11, Ranganathan 1968). The work has been continued by his schoolmen at the Documentation Research and Training Centre at Bangalore (Neelameghan 1973a, Neelameghan 1973b, Gopinath and Seetharama 1979) and elsewhere (Puranik, 1952, Vickery, 1952, Jyothirmai, et al, 1996). Late Dean Jesse H. Shera (1903-1982) lauds this as Ranganathan's everlasting "intellectual contribution to the underlying philosophy of librarianship".

Inter-disciplinary Growth

The trend of specialization got so perverse that the scholars became isolated and distant from one another. Subjects became too jargon ridden to be easily communicated to other scholars. Scholars became ignorant of one another's work in the same broader field. McGarry argues "This tendency, though it makes for greater efficiency, can lead to communication problem, to individual researchers loosing sense of the 'whole'. In practical terms it can lead to costly duplication of efforts. It can even lead to duplication of efforts within the same profession...". "However there is a clear concern that the fragmentation of the disciplines is failing to serve society in the face of a complex of global problem and conflicting initiatives."

This trend has happily been counter-balanced by inter-disciplinary studies, set in especially after the last World War. Team and relay research, close cooperation among scholars, availability of subject consultants, have led the scholars to join hands for inter-disciplinary studies. Cross-breeding has yielded such subjects as chemical physics, biophysics or social Darwinism. Knowledge advances through the juxtaposition of subjects. It has been aptly said that subjects criss-cross in boundaries and neat demarcations are now gone. There is inter- and cross breeding to produce new species of subjects. Then there are subjects like "Physical Education" which feed on the other subjects in the environment. Inter-disciplinary subjects may be defined as a subject of interest to scholars from different disciplines or vice-versa. Ranganathan isolated the following modes of their formation.

Multidisciplinary Growth

During the last year of his life in association with colleagues at the Documentation Research and Training Centre at Indian Statistical Institute, Bengaluru (established in 1962), Ranganathan isolated three more modes of formation of subjects. These are all multidisciplinary in nature in accordance with the latest trends in research. Area or mission oriented or marginalised social groups, such as women, dalits tribals and areas like family studies, early childhood studies being the latest fashion in research are a major cause for the outbreak of such subjects which are mostly of applied nature. Team work and interaction of pure and applied research also give birth to such subjects. These modes are as described below:

1. Procreation

If knowledge grows organically then some of it might be procreated by copulation of two subjects. One such subject is "Linguistics" which is a knowledge field of recent and rapid growth says McGarry. He further writes "Claiming descent from a union of philosophy and philology, it became a widely taught subject in the early 1960s. Its claimed territory is the scientific study of human language and this claim was supported by the increasing need to investigate language and communication in relation to human needs and human behaviour... A group of brilliant theoreticians created a new and broader picture for

2. Self-Procreated:

Furthering the analogy of knowledge bio-organism some organism like the bi-sexuals are self-procreated. Applied mathematics, Applied physics, Applied Optics, Applied Chemistry, Human biology are a few of numerous such subjects being taught as independent disciplines. Though every knowledge is applied, yet every mature knowledge is theoretical. Indeed a theory is the most applied knowledge. These subjects are not applied in the sense of technology, as applied chemistry is not chemical technology. Nuclear physics and nuclear engineering are two different subjects.

3. Analogical mode

Some subjects find parallels in other disciplines. For example, Darwin's theory of the evolution of species and survival of the fittest found echoes in social institutions and processes. Society, its organs and institutions evolve, grow and even mutate into other forms. Such studies are aptly described by the term Social Darwinism. Social Darwinism has been used to illuminate and explicate many social phenomena and problems.

4. Instrument Based Subjects

Some subjects are based on a machine and have grown into full disciplines by gathering subjects around a machine or device. An example is Microscopy or Microbiology which has risen from the Microscope. But the most outstanding example is of the all pervasive discipline of Computer Science and engineering, and of late mobile based applications. It has encompassed and influenced every

strata of society. Such subjects are growing and even fragmenting, for example, Internet studies or social media are emerging as independent subjects.

5. **Annexation Mode**

Geography is a good example of all subject areas that grow by accretion or colonization...it has annexed many loosely defended positions in the social and human sciences, writes McGarry. This imperialist tendency of geography is visible in its branches such as commercial geography, medical geography, political geography and many more. Take another example of Physical education, including sports and aerobics, which draws its sustenance from physical, bio and social sciences. Knowledge and research methods from the hard sciences and mathematics have strongly influenced developments in exercise physiology, kinaesthetic and sport biomechanics. Physiology, sociology, history and philosophy formed the foundation for development of exercise physiology kinematics, sport psychology, motor learning. Sport sociology, sport history and sport philosophy have obviously drawn from social sciences and humanities. The rehabilitation sciences particularly physio-therapy have exercised an indelible influence on sport medicine and adapted physical activity. In sport management the influence of business management, law, communication and marketing is evident.

4. Relevance and Use

J C Binwal aptly writes "Modes of formation of subjects represent a typology of relations and act as guiding ideas in recognizing and formulating relations among concepts constituting a subject" Implications of such studies for hospitality in library classification have been explained and elaborated by S. Husain (1989). Clare Beghtol has reported some attempts to revise major library classification systems to accommodate multidisciplinary works more appropriately to reorient classification research towards pluralistic needs of multidisciplinary knowledge. Importance of such studies to the LIS community in general cannot be gainsaid for its own sake. Knowledge is librarian's stock in trade. A good shepherd knows his sheep and its breed.

5. Summary

Ranganathan and McGarry mostly discovered above modes by impliedly empirical studies based on the published literature. Ranganthan was more speculative and intuitive. It may be easily visualised from the emergence of recent academic subjects that these modes of growth are not exclusive or working singularly. There may be two modes at work simultaneously. Take the new subject of early childhood studies where fission and agglomeration are together at work. Specialization with cooperation across the disciplines seems the present trend as exhibited by the recently completed

Genome project. Recombination of specialties across disciplinary borders is viewed by Dogan Obviously such results are never final. Subjects will continue to be fragmented, aligned and re-aligned in different ways. The more we understand the nature of knowledge more may be the modes that can be visualized. This 'so various, so beautiful, and ever new' universe of knowledge will continue to throw forth new subjects formed by yet unforeseen modes. Internet with its vast content and memory is showing new forms of subjects – which are beyond the scope of this attempt. The report of the Gulbenkian Commission (Open the Social Sciences) clearly mentions "We are at a point when it [existing disciplinary structure] has been questioned and when competing studies are trying to come into existence." This is what was envisioned long back by the invincible T S Eliot (1888-1965) in his poem East Coker II (1944):

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Unit-4

Subjects: Basic, Compound and Complex: Phase relations.

1. **Kinds of subjects:**

In the library classifications the universe of knowledge is organized in many layers starting from disciplines going down to elemental and individual concepts like isolates. In between there are main classes, canonical classes, categories and facets. These all are composed of subjects. A subject provides context and focus to a topic or an isolate idea. In the CC, there are three kinds of subjects Basic, Compound and Complex on the analogy of chemical substances.

Basic subjects:

It is a subject without any isolate idea. A main class is a broad assumption into which all the modern library classifications are divided. It is assumed that a main class represents an accepted broad field of broader specialization which provides a context to a subject. It is a coherent field of specialization. These basic subjects are postulated a priori by the classification system. Their number is limited by many social and academic factors and may be constrained by the notation used. The basic subjects are mostly social in nature. Their number and boundaries vary from time to time. For example, in the sixth edition (1960) of the CC, their number was less than 100 whereas in the seventh edition (1987), it has risen to more than 700. The number of main classes in the DDC is only ten.

Kinds of Basic Subjects:

Ranganathan has further divided basic subjects into ten kinds as shown in the following figure.

Compound subjects:

These subjects are composed of a basic class and one or more isolates. The enumerative classification systems such as the DDC or the Library of Congress mostly enumerate compound subjects.Their number is infinite in the universe of knowledge. In a faceted classification these are constructed by the classifier. A compound subject comprises of a basic subject and facets arranged in some systematic order. For example:

Complex subjects

In the CC, the schedule of main classes is designed in such a way that no two main classes can be expressed in terms of the other main class. A subject may have foci from two or main classes—a sort of mixed main class. A complex class is defined as a class comprising of two (or more) phases taken from different main classes. However phase relation is never between a whole and its parts. Interaction of two distinct subjects is called phase relation. These phases are locked in some inter-relation. But it is not easy to anticipate all the possible relations between two subjects. Obviously such subjects are interdisciplinary in nature formed by loose assemblage. The device to construct a class number for a complex class is known as Phase Relation Device. It brings hospitality in array. It is a very efficient device to cope with the turbulent outturn of inter-disciplinary and in-depth subjects. Phenomena of phase relation has been implicit in all the modern library classification schemes. Provision has been made for it to a certain extent in all library classifications. Facets are layers of which a subject is made of. These are inborn constituents of a compound subject and are hard to set apart. They make a compound subject. Identification of different facets in a compound subject is a process of facet analysis. But phases of a subject are loosely assembled and are in incidental relations which can be easily set apart as they form.

2. Kinds of Relations

At the first instance, in the 6th edition (1963) of the CC,Ranganathan recognizes five kinds of relations or interactionsbetween the involved phases. In the 7th edition (1987) one more relation Tool Phase has been rather reintroduced to make them six.Namely these are:

General Relation

It is an unspecified relation comprehending all other relations notincluded in any of the following five relations. This sort ofrelation is vague and undefined. For example, Relation ofPolitical Science with History; Relation between Algebra and Geometry

Bias Relation

When the exposition of a phase is favourable to orinclined towards another phase, it is deemed to be a BiasRelation. The biased subject is specifically attuned to the needs of a specified group, especially a specialist, or examples selected are of use to that group. It is a form of presentation. For example, Mathematics for Biologists uses examples calculated to interest a biologist and leaves out much Mathematics of no use to that group. Psychologyfor Doctors, or Physics for Civil Engineers, are other examples ofBias Phase Relations. Bias should be towards a specialist group. Gardening for handicaps or Hockey for teenagers are not bias phase subjects.

Comparison Relation

When the involved phases are compared with oneanother, then it is called a Comparison Relation. Ranganathan states such a relation is comprehensive or non- descriptive. e.g., AACR 1compared with AACR 2; Comparative study of Indian and British constitutions.

Difference Relation

As the name implies, this type of relation involves theexposition of the difference between the involved phases. Forexample, Difference between the Indian Constitution and theBritish Constitution; Difference between Hindu and Jain religions. This type of relation is either redundant or can betreated as a simple corollary of comparisonrelation.

Tool Relation

A subject may be used as a tool to study the exposition of other subjects. Then such subjects are called tool phase. It is a method to investigate the original subject by using another subject. For example, mathematical economics. Philosophy of science or Sociology of science are two such subjects where philosophy and sociology have been used to study science. Mathematics is often used to study or describe other subjects e.g., Mathematical geography.

Influencing Relation

When the phases are so involved that one is influencingthe exposition of the other, it is termed as the InfluencingRelation. This phase relation is very

prominent and frequent in research. For example, the Influence of British Constitution on the Indian Constitution; Impact of IT on library services.

3. **Levels of Relations**

To make class numbers brief and precise Ranganathanhas differentiated each of the six relations into three levels,viz., whether they occur at the level of the main class, facetsor isolates.

Phase Relations

When foci involved in some relation belong totwo different main classes, it is termed as Phase Relation. Forexample :

Difference between Mysticism and Religion. (Difference Phase Relation)

Law for Social workers (Bias Phase Relation) Science and Religion (General Phase Relation)

Impact of Climate on Economic growth (Influencing Phase Relation)

Intra-Facet Relations

When the two parts belong to one and the same mainclass, same category, but to different arrays, it is termed as Intra-Facet Relation.For example, Difference between Jew and Muslim religions:

Here both Jew and Muslim religions belong to thePersonality facet of the main class Q Religion, but their arraysare different.

Similarly, let us take the example of the title "Influenceof Transport on Trade". Both Transport and Trade belong tothe Energy facet of X Economics, but belong to the differentarrays.

They are again of six kinds ranging from general toinfluencing relations. Some more examples are:

A Comparative study of Indian and British Laws. (Intra-Facet Comparison Relation)

Relation between Algebra and Geometry

Intra-Array Relations

Ranganathan has carried the division one step furtherby inventing what he calls Intra-Array Relations. In this casethe two foci not only belong to the same facet of a mainclass, but also to the same array of that particular facet. In otherwords it is the relation between two equally ranked isolateswhose immediate parents are the same.

For example: "Relation between the First and theSecond House of the Indian Parliament". Here both the Firstand Second House belong to the same facet Personality andthe same array 3 of [P2] in V History. Thus it is a case of Intra-Array General Relation.

Phase analysis

Having analysed the kind and level of the relation of twophases, it is not difficult to construct the class number for thecomplex subject. But prior to this, precedence of one phaseover the other must be determined. Since the CC is a verystandardized scheme, so the determination of the First and theSecond Phase (Called Primary and Secondary Phaserespectively) is vital. Ranganathan has formulated rigid but easyand unambiguous rules for this purpose:

Symmetrical relations

General, Comparison and Difference Relationsat any level are symmetrical relations. Any of the two could be the primary phase. For standardization, Ranganathan prescribes that the Primary Phase is one with lesser ordinal value,i.e., which occurs first in the schedules. Accordingly, the Phasewith higher ordinal value becomes the Secondary Phase. Forexample, in "Relation between Chemistry and Physics" CPhysics forms the Primary Phase, while E Chemistry forms theSecondary Phase. Let us take another example, "Differencebetween Drama and Fiction". Here Drama is the Primary Phaseand Fiction forms the Secondary Phase. BC-2 prescribes the reversal of the phases for entry in a classified catalogue.

4. **Constructing Complex Class Numbers:**

Having determined the First and the Second Phases,connect the two phases by a zero and the specified relationindicator digit, which is always a roman small. Put the firstphase, then a zero as a connecting symbol, and a roman smalldigit taken from Chapter 6 of the schedule (page 2.28) followedby the notation for the Second Phase. Phase relations digits are so designed to keep complex classes ahead of the regular facets.

Intra-Facet Relations

Relation between Hinduism and Jainism Q20j3

Intra-Facet Comparison Relation

Comparison of Racial Psychology with Social Psychology S7 0m8

A Comparative Study of Shakespeareand George Bernard Shaw O111,2J640m M56

Intra-Facet Difference Relation

Difference between Gold and Paper currencies X61;l0n4

Intra-Facet Influencing Relation

Influence of Consumption on Production X : 20r1

Intra-Array Relations

Intra-Array General Relation

Relation between University and Research Libraries 2340t6

Chemical Relation between Silver and Gold E115 0t8

Intra-Array Comparison Relation

Comparison of Male and Female Curricula in Education T510v5 :2

Comparison of Atomic Weights of Gold and Silver E1150v8: 14

Intra-Array Difference Relation

Difference between Refraction and Reflection of Light C5 : 220w3

Difference between Circulation systems of University andCollege Libraries 2330w 4 : 6

Intra-Array Influencing Relation

Influence of Temperature on Atmospheric Pressure U2820y4

Influence of the opposition party on the party in officewith regards to India'sHome Policy

Multi-Phased Subjects:

In all the above examples the number of phases have been limited to two only. There is no example in the CC where more than two phases exist. But in the rules for Phase Relations there is nothing which may prevent us to apply the rules to three or more Phases. Theoretically Ranganathan and others make unelaborated reference to two or more phases. In the Descriptive Account of the Colon Classification (Section K03) he mentions that the order of a complex class is determined by the number of classes brought into phase relation. It is order 1 if two classes are brought together. It is order 2 if three classes are brought together into phase relation. Palmer and Wells also state that "When a specific subject brings more than two such phases into a relationship, it is said to be multi- or poly-phased." For detailed discussion on the issue see author's article in the Herald of Library Science (1979).

 4. Phase Relations in other Systems

The Library of Congress Classification

Phase relations within LC Classification are also fairly well handled obviously only by enumeration. There are examples of the bias phase, the influence phase, and the tool phase listed in the schedules. All of these are usually covered in LC Classification by the often ambiguous heading 'General Special'. This refers to special aspects of a general subject. For example:

In the fourteenth edition of DDC (1942), provision was made for 00 viewpoint division (such as the speculative, economic, organization and personal viewpoint divisions) and 0001 relation (to be divided like the main classification). It was a clumsy method which made the number unwieldy. Soon it was withdrawn. Instead in the 17th edition (1965), it provided some guidance for placing such

subjects. "Class an analytical work dealing with Shakespeare's influence on Keats with Keats". There is no provision to connect the number for Keats and Shakespeare or his influence in the class number suggested in this manner.

Being an enumerative system throughout its history it has here and there identified such complex subjects and given readymade number for them. For example,

215   Science and Religion

261.1 Role of Christian Church in Society

261.5 Christianity and Scientific Disciplines

340.112   Law and Ethics

340.115   Law and Society

700.103   Effect of Social Conditions on Arts

700.105   Effect of Science and Technology on Arts

However, types of various relations have not been isolated except the bias phase relation added since the 18th edition (1971) through the standard subdivisions-024.

The Universal Decimal Classification

In this scheme the ':' (colon) is used to indicate phase relation. However, UDC does not distinguish between the different kinds and levels of phase relations. It may be added that the colon is also used to represent a facet relations.

Examples:

General relation between physics and chemistry   53:45

Mathematics for Engineers   52:62

 5. **Summary**

In the universe of knowledge, there are three kinds of subjects -- Basic, Compound and Complex. The complex subjects which are interdisciplinary in nature are formed by loose assemblage mode of formation. These are two or multiphased subjects. Complex subjects have interacting foci from two or more

basic or compound subjects. The phenomenon of phase relation has been implicit in all the modern library classification systems. Thereinprovision has been made for it to a certain extent for classifying such subjects. The Library of Congress Classification (1904) enumerates such subjects based on their availability in the LC. It thus provides class numbers for such subjects as socialism and women HX546. The UDC did recognize such relations yet never isolated the types of relations between two subjects. Its symbolcolon (:)for relation and coordination though very flexible is totally non-specific. The DDC introduced the concepts of multiphased subjects bit late in life. In its fourteenth edition (1942) it had notation 001 "In relation to" to be divided by 001/999, e.g. 651.0001658 office organization and business productivity. Also 942.00001823 English history in English fiction. But later this clumsy notation was withdrawn in favor of instructions to classify such subjects here and there. Since the 18th edition (1971) there is a very sound provision for bias phase relation in the standard subdivision -024. These schemes have not provided a satisfactory method of classifying complex subjects as the phases were not really understood at the time of their origin. Late attempts to make provisions are only haphazard even vague or clumsy. No wonder then multiphased themes are out of place in the general to specific order. S.R. Ranganathan gave the problem a serious study and coined the term 'Phase' for distinct components of what he calls a complex class. He empirically isolated six kinds of phase relations which can occur at three levels, namely Main classes, Facets and Arrays. He further coined the concept of phase relation and phase analysis which is considered another important contribution to classification next to facet analysis. BC-2 revised by J. Mills since 1977 is another scheme which has given a very systematic treatment by identifying seven kinds of phase relations denoted by 9C to 9K. It has gone a step further to make the treatment of such subjects systematic and modern.

Nevertheless, in most of the scheme the methods have been intuitive. In the schemes like LCC, DDC and UDC methods to classify interdisciplinary subjects are haphazard and are some imposition on the structure than to be any organic development. However, it is not easy to anticipate all the possible relations which a subject may take with other subjects. The only way is to isolate such relations empirically as they emerge in published literature—i.e. literary warrant. But the

method to accommodate such different kinds of relations between subjects should be inherent.

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Unit-5

Fundamental Categories: Facets and facet analysis.

1. **Categories: Meaning and Definition**

   Dictionary meaning of the term categoryis a kind of entity, or a group of entities having some similarity among them. Philosophically, a category is an attribute, property, quality, or characteristic that can be predicated of a thing. "(Wikipedia).The idea of categories in epistemology is as old as Aristotle (384-322 BC). The Categories (LatinCategoriae) is from Organon writtenby Greek philosopher Aristotle (384-322B.C.).It enumerates all the possible kinds of things that can be the subject or the predicate of a proposition. The Categories places every object of human apprehension under one of ten categories. Aristotle intended them to be anything that can be either the subject or the predicate of a proposition. Beginning with Aristotle Aristotle had claimed that the following ten predicates or categories could be asserted of anything in general: Substance (man, dog, stone, gold, timber, house, etc.) Quantity (large, two feet long, etc.) Quality(blue,loud,good) Some commentators have argued that his distinctions were really linguistic. Aristotle's categories seem relevant since they refer to the elements of statements. The primary category is substance, which means individual things that exist, or members of classes in terms of traditional logic. Secondary substances are the species and genera to which individuals belong. However, Aristotle himself thought that he was referring to the nature of reality. In philosophy of Immanuel Kant(1724-1804), a category is a pure concept of the understanding. A Kantian category is a characteristic of the appearance of any object in general, before it has been experienced. Kant wrote that "They are concepts of an object in general Kant's categories refer to whole statements and do not appear to have much relevance to library needs. In subject analysis we are not making

2. Categories in Bibliographic Classification

Use of Categories for grouping of terms has become essential to organize knowledge into a coherent structure.Facet analysis is a tool for organization of information.From the beginning of the 20thcentury categories were more generally used in development of the UDC. However, their use was unsystematic and piecemeal. The DDC in its early life worked with two common categories of place and time, though the concept of categories was alien to it until veryrecently. The UDC is credited by many to be the first faceted classification, howsoever primitive, yet its facets never correspond to categories in the real sense. Work of S.R. Ranganathan This work was left to S R Ranganthan (1892-1972) "Ranganathan was the first to make full use of a clearly defined set of categories that were also the most generalized ever proposed for bibliographic purposes", writes D. W. Langridge.Ranganathan slowly developed from 1928 to 1952 the concept of Five Fundamental Categories (FFC) of knowledge. Full development of categories has been seen since the 4thedition (1952) of the CC. His concept of fundamental categories is comparable to any great theory of the order of what Thomas S Kuhn (1922-1996) calls paradigms. The basis of the fundamental categories concept seems to be the recurring symmetry in the whole body of knowledge which in turn is transmitted to the coherent fragments called the main classes. It is a postulate that every idea, every subject is manifestation of one or more (at the most five) categories. It has been postulated by Ranganathan that in the universe of knowledge there are Five and only Five Fundamental Categories-- Personality, Matter, Energy, Space and Time. It means that in the CC the recurrence of the fundamental categories is exactly in the manner a chemist recognizes every kind of matter, in any form, is constituent of any or some of the 104 basic chemical elements. How he formulated the FFCs At the empirical level we encounter millions of concepts, facets, and subjects. We can easily divide them in a few groups having some common pattern. But these are not seminal categories. A workable method of further abstraction is to descend from the phenomenal level to their roots to reduce them to a few categories falling into a few patterns irrespective of their subjects. Descending to the seminal level is a work of intuition.Ranganthan writes:"One experience is to descend down and down, and down and

down, and allow the millions of isolate ideas to get absorbed and assembled, re- absorbed, and re-assembled, and so on, until we find a few manageable seminal patterns." To sum up, by studying deeply the kindof facets to be found in different subjects he would see intuitively that at the seminal level they are manifested in five large fundamental groups. Name them whatever you want. According toD.J.Foskett, categories are clear cut, homogenous, mutually exclusive and exhaustive of their universe.Categories are "ultimate generic or seminal ideas at the bottom of all the patterns"

Debt to Aristotle

Languid feels that "Ranganathan seems to derive from Aristotle's idea of substance, buthe does not mention any debt to Aristotle… It is easy enough to see how the five of one relate to the ten of the other." The difference is due to different aims.

Problem of Defining Categories:

Formulation of categories is the first step then it is to define them objectively.These fundamental categories are not asdifficult to be identified as it is to formally define them.Categories tend to evade all definitions.It is alleged with some reason by many that Ranganthan has not defined his categories objectively. We know what theymean: but cannot tell what they are. A paradox. It is due tolack of experience. For example, the category Personality occursin all the main classes, but to say with certainty that it is suchand such is very difficult, indeed. It is hard to define, admits Ranganthan. Onlylong work experience helpsto recognise the categories. Flair based on experience may alsohelp. Nevertheless, they are best defined by enumeration. Their formulation was intuitive. Therefore, if somethingpuzzles us, the only answer seems that either we should acquireRanganathan'sintuitive insight, or acquiesce the wayRanganathan did it. Since the term 'category' has become vague by common usage Ranganathan underlines the significance of his set of categories by calling them "Fundamental Categories". Ranganthan has very cleverly defended their enigmatic nature. To quote him:"I have denoted these postulated fundamental ideas by the term 'Fundamental Categories'. By going to a dictionary, finding out the meaning of each of the two component terms,

'Fundamental' and 'Category' and then combining the meanings, we cannot know what the "Fundamental Categories" are. The word-group forming the term 'Fundamental Categories' is an unbreakable one. It is defined by enumeration only" (Prolegomena Sec.RA81, p.398). But the compound term fundamental-categories still remains undefined. In other words it may also mean fundamental categories are PMEST and vice-versa.

3. Identification of Categories :

They have no philosophical significance. These terms are used scientifically, and their practical nature is explicit. In any particular context these categories can manifest themselves in a variety of specific ways in each main class. Of the fivefundamental categories, the last two, viz., Space and Time are recurring, so they are the common categories for all the main classes. They remainthe same whatsoever may be the subject, therefore, have beenenumerated once for all in the CC.

Relations among categories

The sequence PMEST is in the decreasing order ofconcreteness: [P] is the most concrete and least abstract; [T] isthe most abstract and least concrete. But paradoxically the [P],though most concrete, is relatively difficult to identify. Onthe other hand [T] though most abstract is the most easy tobe identified in a given subject. Therefore, in practicalclassification we start by picking the [T] and come down to [P] viaSEM in subject analysis. Time Obviously it is the chronological aspectin a subject. 21st century poetry, medieval science, economic progress in thelast decade, or the 2014 Parliament elections, ALA winter conference, all these subjectsinvolve the time facet. In the CC the provision is to representtime up to a particular year, for example, "Political Events in2010". But we cannot indicate a particular month or day.Seasonal and diurnal times such as winter, snow, day, and night can bedenoted. Thus the provisions to indicate time very precisely,are more than that of in the DDC, though in comparison toUDC they are quite less. In the prescribed sequence of categories timecomes last, being the most abstract of all the categories(certainly we cannot catch it nor touch it). In the facet formulait is represented as [T] and in the class number it is indicatedby an inverted

comma. Here are some examples to illustratethe kind and use of time category. Travelling in Snow Times History of India in 100 BC Indian Struggle for Freedom (1857 to 1947) Future of Tertiary Education in India Snow times,100B.C.,1857/1947 and Future all refer to the category Time. Space Any division of earth such as physiographical, directionalorientation, political and administrative units, or populationclusters are manifestations of the space category. World, Asia,India, Punjab, Amritsar, Middle East countries, South Asia,Nordic countries, French empire, UN Member countries, Arab League, G-8, SAARC,BRICS,Developing countries,Muslimcountries, English speaking world, Hills,Mountains, Valleys, Deserts, Forests, Water bodies, all are examplesof the Space category in the CC, It occurs mostly in socialsciences. In the facet formula it is indicated as [S]. In the classnumber it is indicated by a dot, "."In the PMEST sequence itcomes after energy. It means that it is less concrete than energy,but more concrete than time.

Energy

Next to Personality, it is the most important facet--asimportant that from its indicator digit Colon ":" the schemedraws its name, the Colon Classification. In the facet formulait is represented as [E]. In order of concreteness it lies halfwayof all the five categories. It means it is as concrete as it isabstract. As compared to Space and Time categories energyposes some difficulties in identification or detection. Thereseems no single term which may comprehensively define thecategory Energy as it exists under various main classes.However, broadly we can say that it is the manifestation ofactions, reactions, problems, solutions, processes andoperations. Linguistically speaking, verb takes the form ofenergy in the CC. In Library Science matter is akind of document, whetherbooks, periodicals, manuscripts, microforms or a CD. Inphysiology, it is the substance which goes into the body; innitrogen metabolism, nitrogen is the matter --something beingconsumed. In Textile it is the thread material. In Music it is thekind of musical instrument. In money (Economics) it is thepaper or the kind of metal--the medium of currency. In most of the subjects in the CC-6 this category remains absent. Personality Of all the five categories Personality is the most concreteandyet most difficult to recognize and describe. Like human personality it is anelusive something. Ranganathan describes it ineffable. It imparts a distinct personality to the

subject.It bestows an identity upon the subject. Without it a subjectmay be formless—without a face. It is wholeness of a topic. Let us consider the subjects:

4. Problem of Defining Categorie.

Residual Method

Since the personality facet in a subject is difficult to recognize, therefore, Ranganathan has prescribed theResidual Method for its identification. A simple logic workshere. It consists in eliminating one by one all the other easilyrecognizable categories, starting from the identification of Timefacet. Since the number of categories never exceeds five, so ifthe other four categories have been identified, then obviouslythe remainder one will be the Personality. Chemists usuallyemploy this method of elimination in laboratories forsalt analysis. The remaining category, which Ranganathan called personality, is the one that has been most difficult for many people to understand or accept. Ranganathan himself was at least partly responsible for making it look difficult by describing this category as ineffable and proposing a negative method for its identification. M.A. Gopinath, a close associate of Ranganathan, later claimed that the can be identified directly in a subject without resorting to the residual method. A Practical Exampl To illustrate, let us take a title "Cataloguing of Periodicalsin University Libraries". In this compound subject, whose main class is 2Library Science, we can see at the outset that the Time andSpace categories are absent. Energy is cataloguing (being some action) and theperiodical (being the kind of document) is the Matter facet. Nowwhat is left in the residue, i.e., University library, must be thePersonality. In the facet formula, it is represented as *P+ and inthe class numbers it is indicated by a comma ",". There arealso cases where personality facet does not require any indicatordigit in the mechanics of the facet formula.Their value has been further confirmed by the experience of the Classification Research Group. They began by accepting Ranganathan's ideas in general principle but refused slavishly to be bound by his system in detail. Ironically, they ended up using the same five categories for research in general classification, three of them under the more objective terms of Entity, Property and Activity in the PRECIS, a subject indexing system for the BNB

developed by Derek Austin (1921-2001). Formation of these categorieswas the distillation of British experience with special subjects during the 1950s. From the 1960s the Classification Research Group (CRG, London established in 1952) turned its attention to the problems of general classification, and the outstanding product of this attention has been the ingenious work of Jack Mills(1918-2010) as a member of the CRG in total revision of the internal structure and detail of the Bliss Bibliographic Classification. He was assisted by Vanda Broughton. A full account of the categories and their use is to be found in the Introduction to the BC-2 scheme, 1977-.It has elucidated   categoriesto thirteen   numbers:Thing-Kind-Part-Property-Material-Process-Operation-Patient-Product- Byproduct-Agent-Place-Time. These facets and their citation order represents a high degree of generality, but the names of the categories reflect their derivation from the study of empirical subjects: their validity in technology is more obvious. Despite this, they have been found to have wide application in the construction of BC2.Ranganathan would easily reduce all these facets to his five fundamental categories in rounds and levels

The DDC and the Categories

DDC being a hierarchical scheme does not recognize categories as such though Timeand Geographical areas have been used as common tables for synthesis of numbers for quite a long time. Now it has of late realized that there is no escape from categories. In choice or precedence of facets it now prescribes standard citation order of categories: Things and their Kinds, Parts, Materials, Properties, Processes, Operations, Agents, Place, and Time

Debate on the Number of Categories

anganthan writes,"One may ask 'Why should the Fundamental Ideas postulated be five? Why not 3? Why not 6?' It is possible. There is absolute freedom for everybody to try it out. A person may be fond of six. He must classify on that basis some thousands of assorted articles. If they produce satisfactory results in arranging the subjects of the articles along a line, that postulate may be accepted. This is not a matter to be argued out ex cathedra without such a thorough and prolonged try-out. Working on the basis of five fundamental ideas has produced satisfactory results during the last six decades. Even while keeping to the number five, the ideas postulated may be different. This is also possible. The hypothesis of

Five Fundamental Categories (FFC) is only a working assumption.His sole justification for the five is that they have worked in practice

Ploy of Rounds and Levels.

Any concept referring to a phenomenon can be allocated to one of the five categories. Categories being deep and nebulous manifest themselves in facet – these cannot be seen directly. That is why Ranganathan prescribes facet formula for each main class.Though thecategories are five but facets within them can be numerous. A lady who had obsession with her age to be of 22 years when asked about her age she replied 22 years and a few months. When further asked how many months then she said hundred twenty months. So iswith five categories and their facets. Though Ranganthan has given a mechanical formula for formation of mazy rounds and levels and their sequence using the principles of facet sequence, but has never made clear the substance of facets going with say second or third round, except that [S] and [T] categories are to be placed in the last round.What constitutes levels within a round has never been explained. In fact the concept of rounds and levels has made the facet formula mazy instead of keeping them in a linear mode of many facets succeeding logically one after the other. Recent splitting of the FC [M] into three categories of matter–property, matter–method and matter –material has taken away even the crispiness of the five categories. If these are fundamental how then these can be further broken --they no more remain fundamental.Something which is fundamental is immutable so cannot impersonate as something else as Space and time often masquerade as personality. Anyhow, it is admitted that so far only he has given the least number of categories in library classification.

These are postulates only:

These seminal ideas, nothing can be asserted about their being true or false. If they prove helpful, we have just to postulate them and work with them. The terms we use to denote them should be taken only as assumed terms and not as fully defined terms. We should start in this way. On the other hand, if we say, "We shall first settle fully what these five ideas are and then only start working", we may not all start working. Therefore, we start with something about which we vaguely agree. We go forward. As we go on classifying with their help, this or that may become clearer and even be modified if necessary. This is how postulational classification begins. Here Ranganthan is very rational and open. But despite more than six decades of their clear formulation and work by the CRG the Indian school has never moved further to assimilate the research in Europe and elsewhere in the US. There is a need to relookat the postulate of FFCs to reconcile with the latest developments.

Summary

A category literally means kind or type. In philosophy, the term goes back to Aristotle (384-322 B.C.) who divided the entire phenomena into 10 categories. Since then many philosophers like I. Kant have tried to sum up or abstract all phenomena into a few categories. In library science, we begin with J.O. Kaiser who in 1911 divided all the concepts into two categories of concrete and process. He was concerned with indexing than with systematic classification. Despite their inadvertent use in the DDC, the clear credit to fully develop and employ categories in subject analysis goes to S.R. Ranganathan (1892-1972). Though he brought a revolution in theory and practice with his faceted classification published in 1933 but assimilation of various facets took slowly from 1928-1952. In 1952, he formulated his postulates of Five and only Five Categories in the universe of knowledge depicted by the acronym PMEST. The concept clicked especially with its British disciples who founded the CRG, London in 1952 and designed many special subject classifications based on facet analysis. But they didn't subscribe to the postulate of five fundamental categories. They elaborated the five to almost ten and worked successfully. One of their outstanding memberJ.Mills (1918- 2010) who revised rather overhauled the Bibliographic Classification (BC, 1944-1953) by H.E. Bliss (1870-1955) elaborated them to

thirteen:Thing-Kind-Part-Property-   Material-Process-Operation-Patient-Product-Byproduct-Agent-Place-Time. The Mills' BC-2 which is being published in parts since 1977 is considered a very technically sound and up to date library classification based on facet analysis. There has always been a debate on the number of categories. Though Ranganathan wants to prove by all means that the postulate of five categories is working well. On the other hand (with a tongue and cheek) he declares to be open to any number. It seems that in the present age of micro subjects the mound of five categories is small to accommodate all the facets in subject analysis. The concept of Rounds and Levels is a backdoor admission of more categories than five. Splitting of the matter category into three kinds of Matter- Property, Matter-Method and Matter-Material is a severe blow to the number five. It is time the Indian school takes cognizance of the research in categories done in Europe and North America.

applications which can be used to group other entities or concepts.Categories are "ultimate generic or seminal ideas at the bottom of all the patterns"

Concrete: An object or phenomena which can be perceived by any of the sense organs,

e.g. Table, music, pungent odour, sour, soft. It corresponds to thing or entity in Kaiser's terms.

Facet: A subgroup of equally ranked entities obtained by the applications of single characteristics to agroup.A facet is mostly taken synonyms with category in the Western literature. However, on the Ranganathan's CC the facets occur with a category. In Literature there are four facets, namely, Language, Form Author and Work of the Personality Category.

Facet analysis: The process of breaking a subject into its constituent topics and assigning each concept to any of the pre-determined category. Another name for subject analysis.

Phenomena: Any existence, abstract or concrete, in the universe; a fact or event in nature or society. It is any observable occurrence.In scientific usage, a phenomenon is any event that is observable, however common it might be, even if it requires the use of instrumentation to observe, record, or compile data concerning it.

PMEST: A famous acronym for Ranganathan five fundamental categoriesshowing their order and intra relations in the specific to general order.

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