Mapping of social sciences in the Colon Classification

M.P. Satija

Guru Nanak Dev University, Amritsar – 143005, Email: satija_mp@yahoo.com

Defines knowledge as sum total of ideas, emotions, beliefs, and experiences conserved by the society. Enumerates its properties as being social, ever growing, multidimensional and fragmentary. Explains in brief social epistemology. Lists the growth of knowledge by specialization, interdisciplinary and multidisciplinary modes. Views classifications as impermanent maps of knowledge which change with society and time. Explains the four principles of the mapping of knowledge as given by D W Langridge, namely, ideological, social purpose, taxonomic, and disciplinary. Defines the field and scope of social sciences and briefly introduces the Colon Classification, its method, structure and kind of subjects therein. Further outlines and critically evaluates the order of basic subjects as divided in to major disciplines of sciences, humanities, and social sciences. Lastly it dwells minutely on the order of social sciences main classes, namely, education, geography, history, political science, economics, sociology and law. Ranganathan claimed this order to be of increasing artificiality of their laws. Refutes Ranganathan's concept of artificiality of social laws. This paper by analysis argues the order of CC-6(1960) main classes to be of serial dependency as given by August Comte and already practiced by the Library of Congress Classification.

Introduction

Knowledge has been defined as the sum total of recorded ideas, facts, fiction, myths, experiences and expressed emotions conserved by the society. In simple words, what is known to the society and is held in its collective memory is knowledge. Knowledge is essentially public. Tacit knowledge is formed with public knowledge and experience. Private knowledge is not knowledge *per se*. In other words, the society is the preserver and conservator of knowledge. The knowledge is knower, i.e. the man, dependent. Man is the creator and consumer of knowledge. There cannot be any knowledge without a knower. Knowledge is created to solve problems facing mankind and leads to new systems, products, services, values and ultimately the outlook and perceptions.

Characteristics of knowledge

All assorted chunks of knowledge can be unified into a single big fragmentary whole. There is unity in knowledge, says J.H. Shera[1]. In other words, the entire body of knowledge is a living system having its definite characteristics:

- Knowledge is not independent, it is dependent upon the knower, the man. It is subjective, and resides in the mind.
- It is generated used and preserved by human society. Thus it is social in character.
- Knowledge is never complete. It is fragmentary, dynamic, multidimensional and changing. It changes with time and society, and changes as it grows. What we know is a tip of the iceberg. Finality of knowledge can never be reached.
- Thus it is inexhaustible, i.e. never ending. In other words it is infinite.
- Technology, social advancements, knowledge creation and use 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 organic tools to perceive information and data[2]. Brain transforms them into knowledge.
- Knowledge is socio-biological. Information is generated when the knower interacts with the nature through the sense organs. Information thus gained is integrated with the previously conserved knowledge for its use and validation[3]. Thus knowledge is socio-biological in nature. Society is the producer and consumer of knowledge, while knowledge in turn 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. Therefore, thrust areas in research to develop new knowledge will depend on the values and priorities of a society. The prevailing philosophy, material culture, economic and technological needs, cosmic vision, sense of history and values held by the society influence the status and structure of the stock of knowledge in its possession. This is known as social epistemology.

Importance of knowledge studies for librarians

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

Modes of growth of knowledge

Knowledge is growing constantly. New subjects are emerging. S.R. Rnaganathan identified many modes of growth of subjects of various kinds[4]. These are:

A By Specialization
      A1   By denudation (Vertical split)
      A2   By dissection (Horizontal division)
      A3   By lamination (Imposition of concepts)

B Interdisciplinary mode
      B1   By loose assemblage (Combination)
      B2   By fusion (Permanent combination)

C Multidisciplinary mode
      C1   By distillation (Sublimated essence of many subjects: Management sciences)
      C2   By agglomeration (Collection of neighbourly subjects: Social Sciences)
      C3   By subject bundles (Missions oriented aggregation: Antarctica Expedition)

The modes of formation of a subject cast a considerable influence on its structure. Explanation of these modes of formation of subjects is beyond the scope of this paper[5].

Classification

A classification is a structure; a map. Knowledge classification is a cognitive map of knowledge[6]. But no classification is absolute or value free. It reflects boundaries and structure of knowledge as perceived by its designer. The designer in turn is invariably influenced by the intellectual or social milieu of time and place. Knowledge is social, fragmentary and dynamic, so it is aptly said that there is no finality of knowledge. If there is no finality, then a map can neither be stable nor universally acceptable. Consequently there cannot be any consensus on its structure and inter-relations of subjects. Inevitably the knowledge is depicted and mapped differently in different classifications – and there is nothing right or wrong about it[7]. Nevertheless, organization of knowledge that a classification does, acts as a force towards integration and synthesis of knowledge. Classification is utilitarian in purpose.

Mapping of the universe of knowledge

As said earlier knowledge is ever growing, changing and ever new. New subjects constantly emerge, old subjects change their status, structure and boundaries. There is no universal pattern of all knowledge that could be all things to all users. Hierarchy is only one pattern. Therefore, individual subjects change their structure; and relationships between subjects are seen in different ways. In fact knowledge has no inherent structure. It is imposed by the society on it. Every age and society has a distinct view of knowledge. For example, in the middle ages theology was considered the queen of sciences and other subjects were valued according to their capacity to serve her. Natural sciences considered as an idle man's task were not valued much then. Even during the times of Melvil Dewey in late 19th century philosophy and theology occupied a very respectable position. It is evident from the fact that 1/5th of space in the Dewey's universe of knowledge was occupied jointly by these two classes[8]. Today the scales are tilted towards the study of natural sciences and their economic and technical implications. Sciences rule the roost and have been given the status of a national religion in some secular countries. Empirical and experimental modes

of investigation are considered reliable methods to discover new knowledge and solve problems. These days authority, faith and intuition as sources of knowledge are looked upon with suspicion. Thus, the status a subject commands in a society is never stable. Some subjects once important and at the centre stage of knowledge are now relegated to a peripheral position. Once it was industrial production which was important. Today the cyber space, environmental studies, human/animal rights, management, biotechnology and research on non-conventional sources of energy are pervasive.

Classifications are impermanent

As said earlier, with the emergence of new knowledge the status and position of existing subjects undergo a change. Subject equations are always in a flux. For example, many subjects such as public health, international law, geopolitics, demography which had status of compound or complex subjects in the 6th edition of the Colon Classification gained the status of basic subjects in its 7th edition (1987)[9]. Many similar examples can be tendered from regular revisions of the DDC. Thus knowledge structure is always changing. Classification essentially represents knowledge, and is its map. It is a tool to analyze, organize and notionally represent knowledge. Therefore, as the knowledge advances by multidimensional expansions and filling gaps, we need new classifications, or adjust and modify the earlier ones. We have not only to revise classifications, but have to invent new classificatory techniques to organize new species of knowledge. S.R. Ranganathan commended the DDC as the best classification for the 19th century literature. At the same time he thought it quite unsuitable to classify 20th century knowledge especially of the post world wars period. Thus 20th century needed new classification system and techniques and the 21st century may well need new techniques particularly for organizing the Internet. To visualise structure of knowledge we need to limit ourselves to one epoch within one culture to find some firm basis for a unified knowledge.

Principles for mapping the universe of knowledge

D.W. Langridge, a well known English librarian, identifies four principles for mapping of the universe of knowledge[10]. These, however, are not mutually exclusive.

Ideological principle

These are based on some schools of thought, or some ideologically held principles. Earlier examples are

Christian schemes of the middle ages. Latest example is the Russian classification system BBK which had made Marxism-Leninism as the center of the universe of knowledge. To some extent every scheme is based on some ideology. As said earlier, no classification scheme can be value free or independent of the time and culture of its origin. Every scheme is biased towards the values and culture of the society of its origin. That is why the Dewey Decimal Classification has to be modified and adapted to classify African and Asian subjects.

Principle of social purpose

In the Vedas (1500 BC) the division of knowledge into categories of *Dharm* (normative principles), *Arth* (social sciences), *Kam* (pure sciences and arts) and *Moksh* (spiritual knowledge) is an example of this principle. This is a broad classification which arranges knowledge in an order of decreasing current social utility and in the increasing potential for future use. This is a theoretical classification which has never been the basis of a library classification or any detailed knowledge classification. Ranganathan was bit influenced by it but he never used it as the basis of his Colon Classification.

Scientific order

It is an order based on some natural and logical order of subjects. Its principles were first crystallized by E.C. Richardson in his famous book, *Classification: Theoretical and Practical.* C A Cutter used the evolutionary order of main classes in his Expansive Classification (1893). Cutter was of the opinion that nature has an order which should be reflected in knowledge organization. His system is based upon the assumption, "Order of sciences is the order of things, and order of things is the order of their complexity"[11]. This obviously betrays the influence of the theory of origin of species as given by the naturalist Charles Darwin (1809-1882). Entities in nature have evolved from atomic to molecular and to molar forms. These principles were used to some extent by J D Brown (1862-1914) in his Subject Classification (1906) and H E Bliss (1870-1955) in his Bibliographic Classification (1935). The arrangement of classes in the Library of Congress Classification (1904+) is also based on this principle. The arrangement of classes in botany and zoology in the DDC and CC is predominantly taxonomic. But its full implications were explored by the Classification Research Group (CRG) London (established in 1955) when the Group attempted to solve the problems of

general classification schemes and tried to design a new system of library classification. The vague evolutionary order was more deeply explored and precisely defined in the theory of Integrative Levels by J E L Ferradane (1906-1989) and later propagated by D J Foskett (1918-2005). The objective of this theory was to "identify all the entities or objects of knowledge in existence, and to order them by means of a theory and thus provide a structure of knowledge". Obviously this theory applies mostly to natural objects which have physically evolved. It is also applicable to social entitles which obviously are always in a state of slow social evolution.

Principle arrangement by disciplines

A discipline is a major and cohesive chunk of knowledge formed by a single mode, or has similar objects of study. A major contribution of Melvil Dewey (1851-1931) was to divide knowledge by discipline. The DDC (Glossary) defines a discipline as "An organized field of study or branch of learning dealing with specific kinds of subjects and/or subjects considered from specific points of view". Disciplines differentiate knowledge into number of logically distinct domains characterized by the possession of cohesive types of concepts, structure and method of creation and verification of new knowledge. The division by discipline offers comparatively better solution to the problems of information retrieval to meet the needs of present day library users. First exposition of this method is from the *Advancement of Learning* (1605) by a famous English philosopher, man of letters, and scientist Francis Bacon (1561-1626). He deeply examined the then prevailing state of knowledge and means of its progress. He suggested that there are three kinds (major disciplines) of knowledge based upon three faculties of mind, namely Memory, Imagination and Reason. This produces correspondingly three major disciplines: History, Arts, and Sciences. However, it is debatable whether these disciplines are autonomous, mutually exclusive and fuse to make an integrated whole of knowledge. Neuro sciences have discovered many more functions of human brain. Anyhow, the present age is the age of division by discipline in unison with the trends pursued by scholars and reflected by the university academic organization[12].

Social Sciences

Social science is a discipline of academic study and research which started in the late eighteenth century with the exhortations like "Best study of mankind is man" Later day protagonists have adopted it as "Proper study of mankind is human groups and institutions". Indeed knowledge of human nature is the essence of learning and living. Influenced by the modern methods of research (applied successfully in natural sciences) and driven by industrialization, urbanization, menaces of growing population and depletion of natural resources, the social sciences have grown thick and fast. Formally these are defined as study of humans and their relations with one another, and in particular the study of various groups linking other groups, individuals persons and entities in the environment. A social group is any aggregate of human beings who are brought into relationships with one another. Social scientists agree that their studies extend the whole range of human relationships between groups of people and inter human-environmental relationships. Scope and complexity of social sciences are on the increase[13].

Colon Classification

Colon Classification (1st ed. 1933) by S R Ranganathan (1892-1972) is a thoroughly faceted and theory based classification. It is now in its 7th edition published in 1987, though the sixth edition (1960) continues to be popular. Ranganathan was very particular about the order of main classes and of facets in a class number. For him the order is the essence of classification. He formulated some postulates and principles for ordering classes in arrays and chains, and facets in the facet formula. Contrary to expectation the order of main classis in the CC is not Vedic, though a weak influence of this system can be seen.

Division of knowledge in the CC

Existence of time honoured main and canonical classes makes his scheme look steeped in disciplinary tradition. Ranganathan identified three types of subjects in the universe of knowledge: Basic, Compound and Complex, analogous to chemical substances. Basic subjects are unitary subjects, such as Physics, Economics, Music, Law and Library Science. Compound subjects are basic subjects with subdivisions or additional facets, e.g., Velocity of light, Transport economics, Guitar music, or Law of marriage, and Libraries in India. Compound subjects are virtually infinite in number. Complex subjects are mostly interdisciplinary in nature, e.g, mathematics for engineers, psychology for nurses, or

Comparative law. Ranganathan postulated that every subject, be it of any type or level, has a basic subject which forms the first facet in constructing a class number. Ranganathan further divided basic subjects into: Main basic subjects: Non-Main Basic subjects

And further divided them into ten species. On the basis of their modes of formation the following ten types of basic subjects have been identified.

1.   Main Basic Subjects
    1.1   Traditional (Law, Physics)
    1.2   Newly emerging (Library & Inf. Sc.)
    1.3   Fused (Geopolitics)
    1.4   Distilled (Research methodology)
    1.5   Subject bundles (Apollo mission)
    1.6   Agglomerates (Social sciences)
2.   Non-main basic subjects
    2.1   Canonical classes (Algebra, Geometry)
    2.2   System constituents (Marxian economy)
    2.3   Environment constituents War economy)
    2.4   Special constituents (Gerontology; Cooperative economics)

His broader main class order is:

Sciences A/M   ?   Mysticism & Spiritual Experience, Humanities N/S and Social Sciences T/Z

a/z 1/9
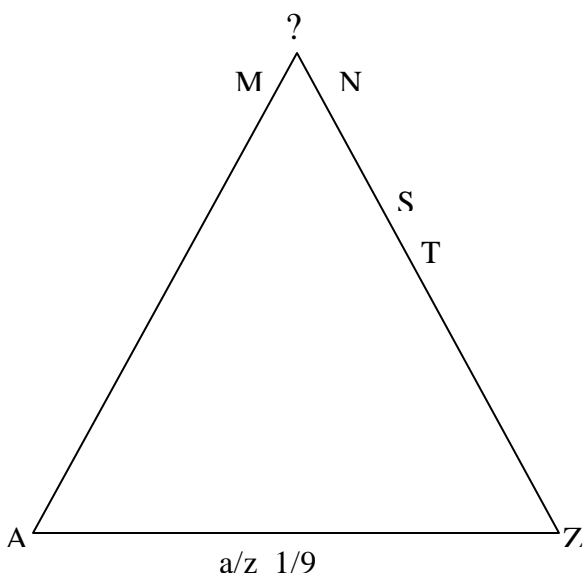
These can be represented by a triangle as given above.

Ranganathan was of the considered view that study of natural sciences had evolved first which was followed by humanities. Though the society is old but the social sciences are the last to come into being on the academic horizon. Keeping in view the social and academic trends Ranganathan devoted half of the total main classes to science and technology. The other side of the triangle has been divided between humanities and social sciences. Sciences A to M are in the order of their increasing concreteness. B mathematics is most abstract of the sciences; C physics is more concrete than B mathematics and less concrete than D Engineering and so on. M useful arts having classes such as Textile Engineering, Carpentry, Smithy, Games and sports is the most concrete of the sciences. Within sciences Ranganathan follows the serial system i.e. theory and practices of a subject alternate one another – as first given by August Comte (1798-1857). For example, B mathematics has many applications in C Physics which in turn forms the theory of D Engineering. F (Chemical) Technology follows E Chemistry; and J Agriculture follows I Botany. In this way theory and its applications have been brought together, which have been separated in the DDC. The Humanities N/S have been arranged in the order of their increasing richness of contents. That N Arts, even O Literature have no subject, only form. Social sciences T/Z have been arranged in the order of their increasing artificiality: For Ranganathan Z Law is the most artificial of all the social sciences. Main class •delta Mysticism and Spiritual Experience positioned between M and N, and placed at the vertex of the triangle has been given top position in the mapping of knowledge. It is at the cross roads of sciences and humanities. Ranganathan was of the opinion that mystic and spiritual knowledge is the source of all kinds of knowledge: its sum and summary. Spirituality in India is regarded as highest knowledge of God and self—*sarva vidya pratishtha*. Hence, its highest position. •is the confluence of two different streams of knowledge, the sciences and humanities, the two different cultures of C.P. Snow (1905-1980). Ranganathan holds spiritual experience as the fountain head of all knowledge, thus refuting Snow's two cultures theory. Inter-disciplinary knowledge, inter breeding of subjects have already given death blow to Snow's convictions.

The classification philosopher H E Bliss (1870-1955) endeavored to discover a permanent order of main classes based upon scientific and educational consensus.

In fact no consensus can ever be permanent. Ranganathan based his order instead on concrete and objectively stated principles. These principles are helpful in placing ever emerging new main classes at their logical places in the array of main classes. Number of basic subjects has increased to about eight hundred in CC-7 (1987) without any problem of placing them at their rightful place in the lengthy array of basic subjects[14].

Main classes and their order

Knowledge is librarian's merchandise. Understanding its nature and modes of growth is vital to a classificationist. Ranganathan's research in social epistemology has been lauded as everlasting "intellectual contribution to the underlying philosophy of librarianship" by late Dean Jesse H Shera. Ranganathan laid great emphasis on the order of knowledge and consequently on the arrangement of basic subjects in his CC. For him the essence of library classification lay in a filiatory sequence of subjects and documents. A classification must depict the structure of knowledge. As said earlier first division of knowledge in the CC is into traditional disciplines, which he arranges in the order of their evolution as academic studies, namely, Science and Technology, Humanities and Social Sciences

Now the disciplines are divided into sub disciplines, namely,

B*Z	Physical Sciences
G*Z	Bio Sciences
K*Z	Animal Sciences
L*Z	Medical Sciences
MZ*Z	Humanities and Social Sciences
S*Z	Behavioural Sciences
T*Z	Social Sciences

Within each discipline the CC has an order of main classes meticulously based on objectively stated principles[15]. An overview of main classes in the CC is as follows:

A/B Science/Mathematics	? Spiritual experience & Mysticism
	N Fine arts
C/D Physics/Engineering	O/P Literature/Language
E/F Chemistry/Chemical technology	Q/R Religion/Philosophy
G/H Biology/Geology	S/T Psychology/Education
I/J/K Botany/Agriculture/Zoology	U/V Geography/History
L Medicine	W/X Political Science / Economics
M/N Useful Arts/Fine Arts	Y/Z Sociology/Law

These main classes are in fact preceded by Generalalia and Form classes denoted by a/z, and newly emerging classes 1/9, e.g.

a	Bibliography	1	Universe of knowledge
k	General encyclopedias	2	Library science
m	General Periodicals	3	Book science
p	Conference Proceedings	4	Mass communication
w	Biographies	5	Management science
z	Generalia classes		

Sciences (including technologies), in classes A to M, have been arranged in order of their increasing concreteness: B, Mathematics, is the most abstract of the sciences, while M, Useful arts (which includes crafts and applied technologies) is the most concrete in the group. Within A/M, theory and practice alternate: theory always precedes its practice or applications. For example, B, Mathematics, precedes C, Physics, which in turn precedes D, Engineering. E, Chemistry precedes F, Chemical technology. Similarly I, Botany is followed by J, Agriculture. This internal arrangement is based on the principle of dependency, first promulgated by Auguste Comte (1798-1857). Unlike Dewey, Ranganathan preferred to collocate the theory with the practice of a subject. Indeed the Library of Congress Classification (1899/1940+) followed this principle earlier to him. In the humanities, which are spread over main classes N to S. This arrangement is in order of increasing richness of subject contents. The order of social sciences, in main classes T to Z, is of increasing artificiality of their laws: Z Laws being legislative and subject to frequent modifications are considered most artificial of the social laws.

In an article published prior to the release of CC, R. S. Parkhi commended its arrangement of main classes as logical and evolutionary[16]. Elucidating his viewpoint, he described the Generalia class as the complete microscopic view of knowledge that precedes the entire universe of knowledge. Physical sciences C-F study the matter and forces, which constitute this primal universe. B Mathematics pervades every science. G, Biology is vital science. Classes H-K are in evolutionary order of life on our planet. Classes L-P are application subjects for the well being and prosperity of humankind. Classes from Q, Religion to T, Education are for the moral and social development of individuals beyond animal existence, which in fact depend upon the correct applications of classes L-P, which in turn depend on classes A-K, the physical and the animal world.

Social sciences in the Colon Classification

As with knowledge in general, position and boundaries of social sciences vary from classification system to classification system. As said earlier the social sciences have been placed as the last discipline of knowledge in the CC denoted by the main classes T to Z. This evaluation is based on CC-6 (1960) which is the popular edition of the CC.

On the face of it here seems no obvious order of the main classes. The S Psychology the bordering class has been included in the humanities which by majority accounts is a behavioral science close to the hard sciences. Ranganathan claims that the social sciences have been arranged in the order of the increasing artificiality of their laws. It means that the laws of T Educations are more natural as compared to the laws of geography and history. That sounds true as theories of learning are based on psychology and medical sciences. But that does not mean the laws of geography and history are artificial or manmade. It also implies that laws of Z Laws are the most artificial ones. If so, Ranganthan has failed to make the fine distinction between the legislative laws enacted by parliaments and the normative principles of the discipline. Laws enacted by a legislative body may be artificial, *ad hoc*, and suited to the ruling group, and subject to frequent amendments, but its normative principles such as law of natural justice, law of tradition, law of precedence are as good as the laws of, say economics, namely, laws of consumption, utility, marketing. Economic man is a predictable entity. In brief law has its own norms and philosophy. There seems no convincing rationale in the arrangement of social sciences. In fact it is not appropriate to call the laws of social sciences as artificial. For example, economics laws are not artificial but based an long observation of human nature and behaviour.

T Education is the process of socialization, hence precedes all other social sciences. Of the duo U-V Geography/History, geography is multidisciplinary and has vital impact on history and culture. In the CC most confusing and hazy boundary is between V history and W Political Science. It seems Ranganathan has confined W Political Science to political theories and kinds of state, whereas practical politics governmental functioning, elections, political parties, functions of a given state or its organs, and foreign policies of all sorts are placed in V history. It is so much so that public administration also goes in V History, which perhaps no scholar will accept. Economy functions in an organized society and state, depends upon latter's kind. Indeed politics and economy are inseparable. Continuing the rationale Y sociology is the study of society. Society gets its moorings from the government by which it is governed, whatever be its kind and sophistication, whereas economy gives a society some definite shape and name. Any organized society forms its cultural and

legislative laws to keep it integrated and moving. Hence the justification of keeping Z law at the end. Laws overarch every action and thought of the society and its members and institutions. From the above it is clear that the underlying rationale is the Principle of dependency as enshrined in the wall-picture principle.

Contents of the CC look dated and senile. Statistics has been reduced merely to numerals keeping every sort of it with the subject itself. For example demography is placed in Y Sociology, while mortality statistics must go to L Medicine. Insurance, a welfare measure, has been placed in Economics, which also includes commerce and management including a depth schedule for industrial relations. Military science and police administration are not fully developed, so is the case with public administration, which makes an insignificant part of V History. Anthropology is a part of sociology and is not fully developed. Military science is a part of M Useful arts, but has no schedule of personality or energy isolates. No distinction seems to have been made between military science, its administration on the one hand and its history on the other. In Y Sociology there is no specific number for various social theories, though by the use of chronological device number for such systems can be constructed. Above all, terminology is dated, which can cause a great problem in chain indexing and information retrieval.

Conclusion

Broadly speaking, the organization of social sciences in the Colon Classification is weak and inadequate. Logic of ordering of the social sciences may not be strong, yet the Colon Classification has a powerful armory of adjunct basic subjects (i.e. canonical classes, systems, specials or environmental basic subjects), devices for hospitality for intercalation of new subjects, and phase relations to help in the precise and in depth information retrieval.

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