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Knowledge Classification turns into Book Classification: Some Milestones in the Journey

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ABSTRACT

The concept book classification is based on the concept classification as found in philosophy or logic. The traditional classification concept was customized by the intellect of many stalwart of library science. Many eminent persons were involved in this process .Aristotle's traditional concepts; classical Indian philosophical thoughts of classification were customized for practical book classification. W C B Sayers, Melvil Dewey and S R Ranganathan are relevant in this regard. Sayers devised the grammar of library classification. Dewey opened the gateway of practical classification by devising the decimal system. S R Ranganathan has put the subject on a new dimension by introducing many concepts in theoretical and practical areas. The study aims to recollect the contributions library science stalwarts in library classification.

KEYWORDS: Book classification, Dynamic Theory, Relative Index, Absolute syntax, Bells curve, Three quadrants.

INTRODUCTION

The word Classification (English) is derived from the Latin *Classis* which denoted the economic status of the citizens of ancient Rome. The concept then shifted to the procedure of forming groups of entities with some characteristics. In knowledge world classification is being used from the very beginning. in earlier ages the philosophers classified the knowledge according to means of *knowing* like faculties of sense, reason, memory and intention **(Shabahat Husain,1993).** The philosophers grouped the ideas as per their mutual relationships and no sequence or order was not necessary for the purpose.

The Library science customized the idea of knowledge classification to organize the *knowledge containers* (i.e. the documents of the library in different forms).Thus the knowledge classification shaped into a new one known as Library classification or book classification.

1. **Why knowledge classification shaped into library classification**?

Classification is always guided by a certain purpose. Ancient philosophers classified the knowledge to facilitate their studies .But this abstract thinking does no help to organize the documents in a library where the librarians are concerned. In library system assortment of knowledge is essential. So the traditional concept of classification needed to be customized for the libraries. But it is to be noted that for classification of documents for retrieval purpose in library environment the knowledge classification can not be ignored as the knowledge is the content of the documents. So library classification is based by the knowledge classification with some necessary auxiliaries **(Sayers, 1912)**

2 Universe of knowledge and its classification by ancient philosophers-

Ancient philosophers classified the knowledge in some broad groups where the group members necessarily have some mutual relationships among themselves. Some of the prominent contributions are-

2.1 Vedic **classification-Knowledge is divided into four groups**-

2.1.1-**Dharma** (Religious aspects)-Subjects involved in an individual's conduct in the maintenance of the society are categorized under this heading .For example Law, Theology ,Ethics and Sociology

2.1.2.**Artha**(Social aspects)-Subjects related to social well-being are grouped under this category.

For example History, Political science, Economics, etc.

2.1.3 **Kama**(Creativity aspect)-Here the subjects related to human creativity are grouped together. For example Fine arts and Humanities.

2.1.4 **Moksha** (spirituality aspect)-The subjects related to the spirituality are grouped here .For example Philosophy and Spiritual experiences **(Shabahat Husain,1993)**

2.2 **Aristotle's contribution**-Greek philosopher Aristotle(384-322BC) classified the knowledge in to three broad groups as

2.2.**1Theoretical philosophy** including Logic, Metaphysics ,Mathematics ,Physics

.2.2.2 **Practical philosophy** including Ethics ,Political science ,Economics

2.2.3 **Productive arts** including Applied science ,Useful arts

2.3 **Francis Bacon's contribution**-Francis Bacon(1561-1626) also divided the universe of subjects into three categories but unlike other two knowledge classification schemes as mentioned above Bacon mentioned three classes in a order as

2.3.1 **Class 1**History (emerges from memory)-subjects are History and Geography

2.3.2 **Class 2 Poesy** (related to imagination)-subjects are Literature and Fine arts

2.3.3 **Class 3** Philosophy (developed by reason)-subjects are Philosophy ,Physics, etc **(Jamdade,Jamdade,Panage & Mugade,2012)**

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3. Library classification system

Library classificationists took the categories of the philosophers and added some new things to set the concept in library classification i.e. to arrange the documents in libraries .For library classification, categorization of the subjects is not enough but assortment or arrange of the subjects in a certain principle is necessary. Classificationists prefer the order from *pure* to *application* as Bhattacharya and Ranganathan (1978) termed as *Pure-Application sequence*

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3.1 W C Berwick Sayers : the grammarian of library classification

W C Berwick Sayers wrote a paper "the Principles of Classification" in 1908.In 1912 another paper was written by him "The Grammar of Classification" By the phrase "grammar" he wanted to concentrate in the thought and expression of the subject Classification in library science.(Sayers,1912).He first showed the path of customizing knowledge classification in library science. He framed two postulates-

a) Classification is an attempt to arrange all being in series to produce a microcosm of all knowledge past, present, and future-irrespective of form or expression
b) Bibliographical classification is the classification of knowledge with definite practical adjustments conditioned by the physical form of books(Sayers,1912)

So he clearly mentioned the necessity of adjustments in knowledge classification for library classification. Highlighting features of the grammar of classification are-

- Classification is aided by memory and reason.
- Class is a term of varying power and may be proceed from large extension (i.e genus) to smaller extension (i.e. species) successively with the application of *characteristics.*
- Fundamental definition of classification: the arranging together of things in the order of their degrees of likeness and the separation of things according to their degrees of unlikeness.
- The characteristics may be of two types- natural or artificial.
- The characteristic chosen for division must be adhered to throughout to avoid cross classification
- The entity names (subject names) must be mutually exclusive.
- Library classification is a mapping of knowledge into broad groups i.e. classes. These classes may be further divided into divisions and sections successively until the single thing or identity is reached. This mapping is known as *schedule* and successive order is known as *hierarchy.*
- Classification notations should be simple, brief and flexible.
- A classification schedule should be flexible in interpolate new subjects.
- Bibliographical classification is based on Knowledge classification. Bibliographical or book classification is an artificial one and it needs some additional elements namely *Generalia class, Form class, Form division, Notation and Index* for arrangement of books in a library.

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3.2. Melvil Dewey

Melvil Dewey the pioneer of decimal classification system who started development of classification scheme when he was 21 years old student working in the library of Amherest college. Dewey established the first library school in the year 1888 at the Columbia college in the New York city. It was the first library school in the world .Dewey had extensively worked for the school for its development. The first edition of the classification scheme was published in the year 1876 with the title "**A classification and subject index for cataloguing and arranging the books and pamphlets of a library"** consisting only48 pages and nine classes but to the later extent he divided universe of the subject into ten main classes .The outline in designing the classification scheme was borrowed from William Torrey Harris and Natale Battezzati. At present version of 23rd edition is now available published in four volumes?

3.2.1 Adopting Decimal system-Dewey was the first person who introduced decimal system . The advantage of decimal system over integer system is that infinite numbers can be accommodate either in between , or at the

beginning or at the end of the array which help the classificationist to expand the classification scheme with the development of knowledge discipline.

3.2.2 Arrangement of main classes-Dewey divided universe of knowledge into ten main classes which are again subdivided into division and sections. Dewey was influenced to adopt reverse order of Bacon system of classification in arranging the main classes in his own scheme of classification.

3.2.3 Relative Index: Melvin Dewey used the idea of Relative index for designing the indexing part of classification scheme. In relative index different phenomena are arranged alphabetically by their discipline and are shown in an hierarchical way along with the class number. It help the classifier in judging a particular phenomenon by its variant discipline while assigning the class number of the document.

3.3 S R, Ranganathan : Chief architect of theory of library classification

Ranganathan has planted the seeds of the theory of library classification in his book "Prolegomena of Library classification" (1st ed.) published in the year 1937 but this theory is known as descriptive theory in library classification and it is the first stage of development of the theory .It is one of the hidden faults of the development that has been discovered by Ranganathan because practices gave rise in the development of descriptive theory. The descriptive theory is a grammar of library classification which was developed in the period 1896-1937 by Sayers. S.R Ranganathan in the later stage had developed the dynamic theory of library classification .According to **Parkhi (1972)** dynamic theory of library classification is a theory of library classification capable of curving out methodology for the design of a scheme of library classification to follow .The universe of idea used in the theory of library classification are divided into various categories which are discussed below

- Faceted category
- Notational category
- Relationship category
- Documentary category
- Conventional category
- Formation category

The above category has been subdivided into various foci which has brought into the study of thoughts

3.3.1 Faceted category: Manifestation of different facet by their way of relationship.

- ✓ **Primary facet**
- ✓ **Secondary facet**
- ✓ **Principle of inversion**
- ✓ **Absolute syntax**
- ✓ **Principle of facet sequence**
- ✓ **Postulates of Facet Sequence**
- ✓ **Connecting Symbols**
- ✓ **Devices**

3.3.1.1 Primary facet: The colon classification is a general scheme which "aims to classify by discipline all subjects and all form of documents"(**Satija&Singh2010)** Ranganathan colon classification scheme can be described as faceted classification scheme where a combinations of five different elements are joined with each other to form the class number of any subject of the document belonging to various disciplines. Ranganathan has termed as postulates

of five fundamental categories .The dictionary meaning of the term category denotes classes of similar entities sharing common attributes. In the sense of Indian philosophy category refers to "***padartha***" meaning "what is referred to by words". It is used in metaphysical sense to denote the general kind of things that are the highest of genera

According to ***Vaisesika*** philosophy there are six categories exist in nature:

- Substance ***(dharva)***
- quality ***(guna)***
- action ***(karma)***
- universal ***(samanaya)***
- individuality ***(viseasa)***
- inherence ***(samavaya)***

The terms which that are included in parenthesis are Sanskrit terms has been translated into English.

Ranganathan has postulated five fundamental categories ie time ,space , energy , matter , personality. These five fundamental categories has been mapped with ***Vaisesika*** philosophy

VAISESIKA PHILOSOPHY	**FIVE FUNDAMENTAL CATEGORIES**
samanaya	Personality
viseasa	Personality
dravya	Matter
guna	Matter property
samavaya	Matter method
karma	Energy
dik	Space
kal	Time

Dik and kal are the nine categories of dravya which are divided into various elements i.e earth (***prthivi)*** ,water ***(Ap)*** , fire ***(tejas)*** , air ***(vaya)*** , ether ***(dkdsa)***, space ***(dik)*** , time *(kal),* spirit (atman), mind ***(manas)*** **(Mohanty ,2000)**

3.3.1.2 Secondary facet: Ranganathan categorized universe of documents into different kinds of facet that are manifested in different subject disciplines that works under the umbrella of five fundamental categories. As stated by **(Sen & Ghosh,2019)** facet can be divided into two board groups **: Transparent facets** are the secondary facets that can be directly be analyze and are not based on any analytical thinking or ideas .viz : substance facet ,absent facet , diffuse or multifocal facets. **semi transparent facets** are those that are based on analytical thinking with some preconceived idea reflecting ones own mind viz: latent facet, telescoping facet , dependable facet , differential facet

3.3.1.3 Principle of inversion: Ranganathan was the first classificationist to develop the theory of citation order which is based on decreasing concreteness where the sequence of facet would be arranged from the most concrete to the least concrete measure while assigning the class number of the documents but this principle will be reverse in filling the document moving from least concrete to most concrete measure known as principle of inversion. In the

family of faceted scheme this principle plays an important role where as in enumerative scheme digits are filled according to the sequence from moving from general to most specific measurement. . **(Ranganathan ,1967)**

3.3.1.4 Absolute syntax : In general sense the term syntax has a wide denotation and is used under two different heads ie linguistic syntax and facet syntax. Linguistic syntax is a syntax of words and phrase to make a meaningful combination that is used in natural language. The linguistic syntax may vary in different languages and can be expressed under different combinations.viz **use of vaccination to stop spread of disease against covid19 pandemic**. This meaningful combination can be altered or change under "n" number of combination where "n" is the kernel terms ie name of subject in different linguistic expression. In absolute syntax the sequence of facet has a fixed citation order and cannot be alter or changed or moved that is to say that it has a syntactical rule of classificatory language which only have formation rules but no transformation rules. **(Ranganathan ,1967)**

Example: **use of vaccination to stop spread disease against covid19 pandemic** if express in focal number we get : **L45:423:663 (CC 6th ed.)**

3.3.1.5 Principle of facet sequence: The principle of facet sequence was enunciated first by Ranganathan in 1967 in Prolegomena of Library classification for arranging the facet in a helpful sequence . Ranganathan formulated four principles of facet sequence viz Wall picture principle ,Whole organ principle , Cow- calf principle, commodity or Result –Actand –Action-Actor –Tool principle. The wall picture principle is described as master principle for determining the sequence of facet sequence **(Ranganathan ,1967)**

3.3.1.6 Postulates of Facet Sequence: Ranganathan enunciated the postulates of facet sequence in 1967 that is after determining the facets of a compound subjects they are to be arranged in the most helpful order .Five postulates has been stated ie Postulates of first facet, Postulates of concreteness , Postulates of facet sequence within a round Postulates of facet sequence within a last round , Postulates of levels and levels cluster. **(Ranganathan ,1967)**

3.3.1.7 Connecting Symbols : Five connecting symbols are the *panch parna* or five senses of soul .If these are lost then our life is lost. So if connecting symbols are not used then facet will become meaningless **(Kumar ,1986)**

3.3.1.8 Devices : Ranganathan has formulated different kinds of devices because devices are necessary to sharpen the class number in analytic synthetic classification scheme. For example **Teaching of Library and information science in India** and **teaching of Library and information of India** , for the later the class number will be T :3.44 and for the previous its class number will be T:3(2.44). Here 2.44 enclosed in circular bracket denotes the subject device and thus distinguishes and sharpen the two class number. several other devices has also being used such as chronological device, alphabetical device, classic device , gap device etc **(Ranganathan ,1967)**

3.3.2 Notational category : Use of different kinds of indicator digits in order to built the class number.

- ✓ **Elements of notational category**
- ✓ **Filing Sequence**

3.3.2.1 Elements of notational category : According Ranganathan a notation should have the following qualities:

- Breviety
- Speed of writing
- Prouncibility
- Block formation
- Facet formation

- Co extensiveness **(Ranganathan ,1967)**

3.3.2.2 Filing sequence: Colon classification (CC) is the only scheme which has shown the way in which documents would be arranged in the shelf by following the rules of filing sequence. As mentioned in CC 6th ed.(page 1.6) and in CC 7th ed. (page 32) the rules of filing sequence has been stated where different kinds of substantive digits used in construction of class number are to be taken when arranged in ascending sequence. **(Ranganathan ,1960)**

3.3.3 Relationship category: Manifestation of subject by their way of relationship

- ✓ **APUPA Relationship**
- ✓ **Phrase relation**

3.3.3.1 APUPA Relation : This acronym was framed by Ranganathan in which subjects are arranged in the most helpful sequence to the readers.. In fragmentation of alphabet we get U= umbral (most concrete position) , P= Penumbral (less concrete) , A=Alien (least concrete position) . In mathematical sense we may express it as : **A>P>U<P<A**. According to **Ranganathan(1973)** user searches documents in the most relevant position which constitute the umbral region . The neighborhoods of the umbral region are surrounded by partially irrelevant record known as penumbral and totally irrelevant record known as alien. Ranganathan has commented that the aesthetics of APUPA relation lies in the user search strategy which is just like the bell distribution model as progended by Gaussain

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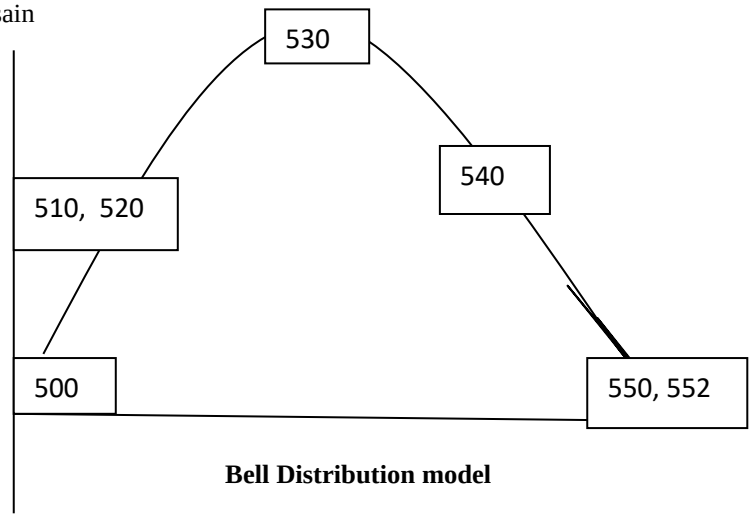


Bell Distribution model

500= science

510 = Mathematics

520= Astronomy

530 = Physics

540= chemistry

550= earth science

552- Petrology

If the interest of user is at 530 physics he or she would start at the lower most level that is level zero , known as ascent not related to user enquiry and then gradually move upward reaching to a mid level position which are partially related to host document and then reach to the peak or zenith of the host document which is fully relevant to user enquiry

3.3.3..2 **Phrase Relation:** Each component in an assembly is called a phrase . In a complex subject or in a complex isolate idea phrase are represented in two ways phrase 1 and phrase 2. Ranganthan has formulated different kinds of relation such as General, Bias , Comparison , Difference ,influence which is part of mode of formation of subject **(Ranganathan ,1967)**

3.3.4 Documentary Category : Manifestation from knowledge classification to book classification system

- ✓ **Canon of Book number**
- ✓ **Canon of Distinctiveness**

3.3.4.1 Book Number : Colon classification is only the complete scheme which stated canon to be followed for Book number system because it servers as most elementary function for any designation of document and without it a document seems to be senseless. Ranganathan has used different types of facet used in construction of book number ie language , form , year , volume , etc. **(Ranganathan ,1967)**

3.3.4.2 Canon of Distinctiveness: In a scheme for classification the class number , the book number and the collection number forming the call number should be written quite distinct from one another. The method of separation are performed in two ways

- If it is written in a horizontal straight line the three components ie class number , book number and collection number are to be written with sufficient and uniform space
- If written in vertical line the three components are written one below the other in three different lines **(Ranganathan ,1967)**

3.3.5 Conventional Category: **:** General theory parenting to classification system.

- ✓ Meta Physical Analogy
- ✓ Canon for Classification
- ✓ Principle of Helpful Sequence
- ✓ Three Planes of Work
- ✓ General terminology and concepts
- ✓ Laws , cannons and principles

3.3.5.1 Meta Physical Analogy : Meta physical analogy highlights some feature of a book or document . In Indian philosophy every living being is postulated to have three elements Soul , Subtle body, Gross body . If an hypothesis is made we get it as a Soul can be embodied in any number of subtle bodies in succession at same time. A combination of soul and subtle body can be embodied in any number of gross bodies.

- Universe of subject (soul)
- Individual subject (Individual soul)
- Language : (subtle body)
- Material or the work (Gross body)

So we may get : Soul +subtle body +gross body = Book or document **(Ranganathan ,1967)**

3.3.5.2 Canon for Classification : Ranganathan has formulated 43 canons which are grouped them under three different plane Idea Plane (15 canons) , Verbal Plane (4 Canons) and Notational Plane (23 canons). It acts a guiding principle in formation for the classification scheme whether enumerated or faceted. It is not possible for any

classification scheme to maintain all the canon rigidly as a result violation of canon has been observed . For e.g In cc6 canon of synonym has been violated by using 2 for mother country and 44 for India .DDC has also violated several canons e.g. Canon of homonym has been violated in literature class by using a single class number for representation of various phenomena of a single author. .**(Ranganathan ,1967)**

3.3.5.3 Principle of Helpful Sequence **"**The sequence of classes in an array of ranked isolates, should be helpful to the purpose of those to whom it is intended" **(Ranganathan,1967)** The principle of helpful sequence acts as a specific guidelines in order to design the scheme of library classification. It is to be said what is helpful to one person may not be helpful to another person which may vary from person to person or from different classification scheme. Ranganathan has formulated 23 principles of helpful sequence. e.g In cc Religion class ("Q") principle of later in time has been followed where the array of isolates has been arranged according to parallel progressive sequence that is the religion which comes later has been followed last, Where as DDC has violated because it has been biased toward Christianity. Several other principles has also been mentioned such as Principle of Later in evolution, Increasing quantity, Decreasing quantity, canonical sequence, Alphabetical sequence etc . viz . In agriculture class in CC ("J") Principle of literary warrant has been followed for arranging the array of isolate ideas. **(Ranganathan ,1967)**

3.3.5.4 Three Planes of Work :. Ranganathan had designed the three planes of work in designing the dynamic theory of library classification known by the name Idea Plane , Verbal Plane and notational Plane . Idea may be defined as the product of thinking , reflecting , imagining etc got by the intellect by integrating with the aid of logic . It is a means of individual consciousness that comes in human mind where a mapping of related facts, images , sensations are drawn in the mind of human being with the aid of Knowledge so we may say knowledge = Universe of ideas . Language is the medium of communication for expression of ideas, as ideas and language works together so the former precede the later. In the verbal plane the expression of related ideas are focused with the related terminology with the help of natural languages. In notational plane different kinds of ordinal digits, symbols are used for expression of related concepts**.** e.g In cc main class Library science is expressed by "2", Biology = "G. (**Ranganathan ,1967)**

3.3.5.5 General terminology and concepts: Terminology is the base for the development of any discipline .Any branch of science which is not stationary but progressive must time to time develop or renew its terminology. New terms along with the definition are to be added for the development of subject. Ranganathan has rediscovered many words and put them into current use. The nomenclature drawn from science bears resemblance to the corresponding phenomena . Viz dimension , order, rounds and parameter from mathematics. Phases , complex , compound , bond strength from chemistry. Rounds and levels in the facet formula bears somewhat resemblance to the phenomena of isotopes and isobars in chemistry. The fact that these words are not borrowed from other discipline or from common mother tongue and it should not be misleading as the words have given entirely altered meaning and precision. These terminologies are being used in entire theory of library classification and thus lead to the development of subject discipline. **(Satija ,1978)**

3.3.5.6 Laws , cannons and principle: Law, canon and principles are of synomonous terms . Law refers to those correct statement that are accepted as genuine and cannot be altered or change by any means and are applicable to any field of knowledge discipline or in a particular field of knowledge discipline . It is of two types General law and fundamental laws. viz : Five laws of library science , Newton's laws of motion are example of fundamental law. Ranganathan has used the term canon in the context of first order division of major discipline such as

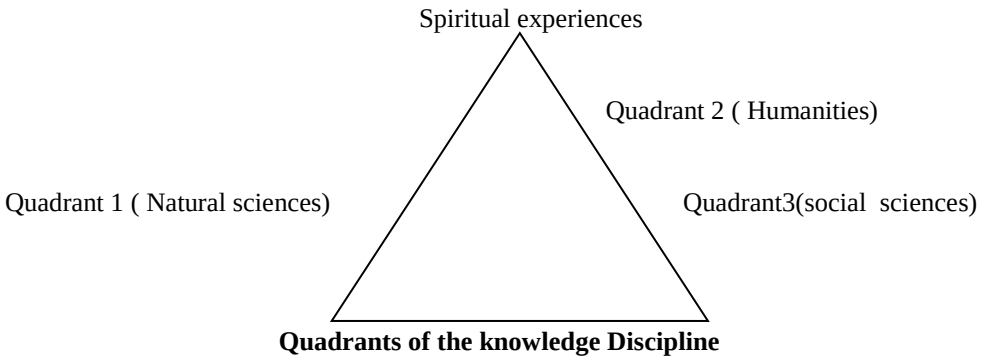
classification , cataloguing , book selection etc .Principle is the second or later order of major discipline such as principle of facet sequence , helpful sequence etc

3.3.6 Formation Category : It is sub divided into two categories

- ✓ Modes of formation of subject
- ✓ Distribution of Main class in colon classification

3.3.6.1 Modes of formation of subject : Ranganathan has viewed several modes of formation of subject. The modes of formation of subject acts as a guidelines while categorizing a document are different phenomena. At the initial stage there were only few modes of formation of subject such as Denudation , Lamination , Loose assemblage etc but with the development of subject disciple several others modes of formation of subject has emerged such as Lamination of kind 1,2 loose assemblage of kind 1 and 2, and 3, fusion , distillation , denudation , subject bundle. Several of terminology has been revised by A.Neelameghan to denote Partial comprehension as Agglomerate Basic subject and Subject Bundle as clustering. **(Neelameghan,1973)**

3.3.6.2 Distribution of Main class in colon classification : Ranganathan's view in modes of expression of knowledge discipline that are divided into three quadrants ie Quadrant 1 which include Natural sciences , Quadrant 2 Humanities and quadrant 3 Social sciences. The three quadrant are as follows. Classes B to M which falls under quadrant 1 , Classes N to S constitute humanities and Classes T to Z under social sciences. Each individuals classes are again divided into various subsections which in classificatory terms may be called as facet, focus or foci that works under the domain of each individual facet formula. The three quadrants take the shape of pyramidal structure. As stated by Ranganathan **(1987)** The subject distribution starts from the most abstract discipline of mathematics and then follow in progression to a concrete concept which is L medicine (Human organism) and reaching towards the zenith of concreteness par excellence ie spiritual experiences and mysticism which falls between quadrant 1 and 2 . On the right hand side of the pyramid a decreasing naturalness and an increasing artificiality can be observed which culminates in the main class Z. The quadrants of the knowledge discipline can be expressed by its diagrammatic representation which is as follows



Quadrants of the knowledge Discipline

DISCUSSION

There are so many contributors of the journey that took shape of book classification from knowledge classification. Dewey was the first person who devised classification scheme in 1876 for arranging documents in the library.

Sayers at the beginning of the 20th century framed some essential rules as "grammar" for library classification by keeping the philosophical essence of classification. His Grammar of classification really worked as unique guidelines for library professionals. The library classification probably reached its apex in the hand of Ranganathan who devised various theories that certainly brought new dimension in field of library classification as well as systematic practices rules In the age of 21st century with the rapid development of technological infrastructure classification has become knowledge organization and it is now an inevitable tool for organizing web document also , thus the idea of classification started in philosophy but now serving most efficiently in many disciples like botany , zoology etc The library science took the concept and customize it as per the requirements' document and knowledge organization

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