

In search of dimensions of subject from the standpoint of Ranganathan

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This paper highlights a new interpretation of dynamic state of subject from the viewpoint of Ranganathan's theory. Ranganathan introduced the following three concepts in order to describe the state of subject, viz., continuous infinite universe, spiral model of subject development and idea plane. These three concepts together depict four dimensions of a subject starting from its birth. The name given to these three concepts together is Ranganathan's three-tier description of subject.

Keywords: Subject classification, Canons of classification, Idea plane, Dimension of subject, Array of subject, Chain of subject, Characteristics of subject, S.R. Ranganathan, Spiral model, Continuous infinite universe

Introduction

The concept of subject has multiple orientations. The meaning of the word subject depends on different contexts. There are many synonyms and near synonyms generally used for the word subject. Some of such words occurring in different literature are aboutness, content, theme, topic etc. Generally a subject refers to some documents and their contents. The theme harboured in the content generally means the concerned subject. This is the general implication of subject in the context of library and information science, which chiefly deals with subject headings or some pre-determined subject terms. In this context, Ranganathan¹ declared subject as an 'assumed term'. The core area of library and information science is processing and organization of knowledge, whose principal facets are indexing and abstracting, classification of documents, subject analysis of documents, subject classification, information retrieval etc. The concept of subject is intrinsically linked with the concept of document in such a way that it is hardly possible to consider these two separately. Subjects may hardly be thought of without the support of documents. The process of library classification essentially deals with classification of documents. The concept of document-independent subject thus exists only in cognitive space. When somebody is generating some knowledge, generally s/he is not thinking about the name of the segment of

knowledge s/he has generated. At a later date this segment of knowledge is given some name and a subject comes into being. A subject cannot exist without a name.

If subject headings or descriptors of the same document are assigned by different analysts then subject headings or descriptors will vary in large number of cases. Different kinds of retrieval systems select different sets of documents with the subject headings or descriptors assigned by different analysts. Now an obvious question arises, what should be the crux of subject analysis of documents? Determination of subject of a document is thus highly subjective process. There are theories of subject analysis, but their applicabilities widely differ in different situations. The concept of subject has been described in so many different ways by different scientists even within the domain of library and information science. Cutter² and Drake³ described the growth and evolution of subject as a consequence of spontaneous social process. Wilson⁴ examined by thought experiment the appropriateness of different methods of probing the subject of a document. He concluded that each of these methods is insufficient to determine the subject of a document and remarked: "The notion of the subject of writing is indeterminate". He also pointed out that authors of documents often use terms in indefinite ways that often creates confusion. Even if the librarian could

personally develop a very precise understanding of a concept, he would be unable to use it in his classification, because none of the documents use the term in the same way. Based on this argumentation Wilson concluded: "If people write on what are for them ill-defined phenomena, a correct description of their subjects must reflect the ill-definedness".

Maron⁵ discussed the concept of aboutness to interpret the concept of subject. Hutchins⁶ remarked that "judgments of subject content (by authors, readers and indexers) are influenced by so many factors that any particular statement of a document's content should never be regarded as anything other than just one of many possible such statements. In other contexts and from other perspectives the same document may have other, quite different subjects." Miksa⁷ outlined an integrated view of subject headings generally used in dictionary catalogue since Cutter's time to his contemporary period. It is obvious from Miksa's impression on historical account of evolutionary stages of subject-heading concept that in library and information science, researchers mostly concentrate on subject terms or subject descriptors for the purpose of subject indexing and cataloguing. Therefore the phrases like descriptor, subject-term or index-term etc. are frequent casual misnomers in library and information science for the word subject. An axiomatic development of intrinsic concept of subject has been so long observed within the purview of epistemology and cognitive psychology. Cutter discussed with subject descriptors or subject index terms only, but no axiomatic concept of subject was hitherto presented in the context of library science. Soergel⁸ also emphasized on information organization through appropriate choice of subject heading or descriptor terms. His emphasis was chiefly on subject headings. Molina⁹ discussed content analysis, which is restricted within the limits of written textual documents. He concerned 'text', as an inseparable part of semiotic research, and 'content', as the informative power of text. The outlook projected by Hjørland¹⁰ highlighted that subject analysis is always done from a given viewpoint and objective. It aims some activities of users, which are defined by the explicit or implicit purpose of the information service that undertake the subject analysis. Hjørland¹¹ inferred that a subject may be regarded as the epistemological potential of a document containing the said subject matter.

Subject: Ranganathan's view

Ranganathan defined subject from the standpoint of Colon Classification system devised by him, which was based on analytico-synthetic mechanism. The definition of subject given by Ranganathan was based on concepts of facet and foci that may be recognized as components of subject. Ranganathan's attempt was perhaps the forerunner in developing document-independent description of subject, though it is difficult to achieve in a document-based world. Whenever a new idea is sprouting in our mind it is based on the documents we have read since childhood days. Sometimes ideas develop from an event, e.g. falling of an apple, from a message, and so on. Basing all these, knowledge may develop, and when the knowledge gets a name, a subject is developed.

Ranganathan's description was modified by Gopinath¹² later. Ranganathan developed the concept of subject from the perspective of library classification. At first, he ascertained the theory and process of library classification as a branch of knowledge that may be regarded as an individual subject. Then he established the concept of subject as the central theme of the subject named as library classification. He distinguished between the concepts of subject and knowledge in a very compatible way. According to him¹³, "For, the sixth meaning of philosophy recorded in the New English Dictionary is 'The study of the general principles of some particular branch of knowledge, experience or activity'. Library classification is surely an activity which has become essential to all librarians..... Library classification is also an experience whose profoundness increases with the depth to which it is taken to keep step with the new formations in the field of knowledge, especially in its deeper layers. Library classification has itself become a region of knowledge which has well-defined boundaries.It has acquired all the features of a discipline which is entitled to be recognized as a branch of knowledge". Thus the process of library classification has been established here as a well-defined branch of knowledge. Ranganathan¹³ further remarked, "There are various branches of knowledge which has knowledge itself as the object of study. Psychology is one of them. It seeks to explore what happens to the mind and in the mind in building up knowledge. Logic is another which deals with the way in which the intellect develops the impressions and experiences stored in memory and creates new impressions and experiences

which add to knowledge. Epistemology deals with one aspect of the nature of the knowledge restored and stored in one's memory: its sources and validity. Ontology examines another aspect of the nature of knowledge – its reduction to the minimum number of ultimates and the reality or otherwise of the correlates of knowledge outside the knower's mind. A fifth branch concerns itself with a description and assorting of the different kinds of knowledge-formations, their interrelations and the distinctive methods of investigation used in them. This I have called the Field of Knowledge. A sixth branch is concerned with the organization of the specific subjects – macroscopic as well as microscopic – which are recognizable in the field of knowledge, the mode of their arrangement in a helpful order and the development of an apparatus to mechanize the recalling, preservation and restoration of the preferred order. This is called Library Classification”.

Ranganathan thus identified six branches of knowledge which deal with knowledge itself as core object of study, viz. psychology, logic, epistemology, ontology, field of knowledge and library classification. Of these, the library classification deals with organization of specific subjects in microscopic and macroscopic forms. The idea of subject may thus be conceptualized in this context as the core theme of another subject viz. library classification. Library classification may therefore be viewed in this perspective as the subject of subjects.

Ranganathan's three-tier description of subject

Ranganathan interpreted concepts of subject from different angles. The growth and evolution of subject was described by him as an unending process named as spiral model of development of subjects. Also, he described the universe of subjects as continuous infinite universe, which may be exemplified as universe of points either on a straight line, or on a plane or in a cube. The notable feature is that the points on a line are linear, but the growth of subject from its origin is never linear. For instance, the subject physics was originally only physics. Afterwards, it branched into mechanics, sound, heat, light etc. From a point, it grew into different dimensions. It is thus logical to conceive universe of subjects as points within a plane or cube. As a point is a dimensionless entity, therefore it is plausible to conceive the state of a subject as dimensionless at the time of birth that is represented by the central point in Figure 1. This central point may be reckoned as the starting point in the course of growth

and development of the subject, which progressively moves ahead so that its locus sketches the path of an unending spiral. The locus of the starting point draws the spiral, which indicates the said subject's gradual attainment of dimension with the advancement of time. The spiral model thus asserts the continuous temporal growth of subject, which may be looked upon as evolution of subject with time. Since no entity undergone evolution with time can remain dimensionless, therefore a subject also starts to gradually acquire dimension since its birth. The idea about dimension of subject is essential in executing the practical classification work. Ranganathan defined three planes of work for execution of the task of classification, i.e. idea plane, verbal plane and notational plane. There are several canons corresponding to each plane of work. A scrutiny of the canons of idea plane reveals three axes of a subject at conceptual level that may be thought as three dimensions of a subject. These three features, viz. spiral model, continuous infinite universe and idea plane together describe the state of subject since birth as shown in Table 1. These three features occur at three

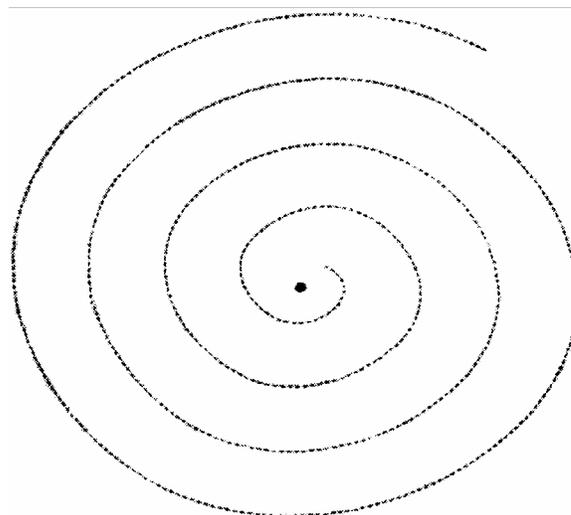


Fig. 1—Starting point or moment of birth of a subject, which may be conceived as momentarily dimensionless

Table 1—Ranganathan's three-tier description of subject

Tiers	Features	Describes	Structure
Tier 1	Continuous infinite universe	Birth of subject	Dimensionless at the time of birth
Tier 2	Spiral model	Growth and development of subject	Gradually attains dimension with the advancement of time
Tier 3	Idea plane	Dimension of subject in course of development	Three dimensional

levels of thinking process. Let us say these three levels together as three-tier description of subject.

Tier 1: Continuous infinite universe

Ranganathan¹⁴ described subject as continuous infinite universe. The universe of points in a straight line or in a plane or in a cube may be exemplified as continuous infinite universe. Gamow¹⁵ analytically proved that the infinity of all points within a cube is the same as the infinity of points within a square or plane or on a line. A cube is a three dimensional object, a plane is a two dimensional object and a line is a one dimensional object. Therefore the extent of space occupied by a line is less than the same occupied by a square plane having each side equal to the length of the said line, as a square is formed by four straight lines. Similarly, the extent of space occupied by the square plane is less than the same occupied by a cube having each plane equal to the area of the same plane, as a cube is formed by six planes. It is thus physically impossible for any finite dimensional discrete object to reside in equal number in each of a line, a plane and a cube in order to completely fill up the space therein, which is clear from Figure 2. But a dimensionless object like a point occupies no space. A point may be defined as an intersection of two straight lines, which has neither a length, nor a breadth, nor a height and therefore the same is considered as dimensionless. Actually a dimensionless entity exists only in concept space. Due to non-occupation of physical space it may be accommodated even in infinitely or extremely large number within any finite space. Now any fraction or multiple of infinity or extremely large number also remains as infinity. Neither any addition to infinity nor any subtraction from infinity can alter even the least possible quantitative measure of the same in either way. Hence, from this logic Gamow's assumption can be proved. But it holds good for dimensionless entities only.

Let us consider the case for finite-dimensional entity. Suppose, a finite-dimensional (say, three-dimensional) object *b* having length, breadth and height one unit each be placed on the line in Figure 1. Then 'a' number of the object 'b' will be required in order to completely fill up the space on the line. Similarly a^2 and a^3 numbers of the objects *b* will be required in order to completely fill up the space on the plane and within the cube respectively as shown in Figure 1.

Since, $a^3 > a^2 > a$, therefore any object having finite dimension can not be infinite in number within the domain of a finite space. Ranganathan's resemblance of subject with continuous infinite universe instantly reflects it as a dimensionless entity. The details about different definitions of subject according to Ranganathan have been presented here. It has been observed that Ranganathan's definition corroborates the dimensionless concept of subject only if the spiral model of subject growth and evolution is conceived.

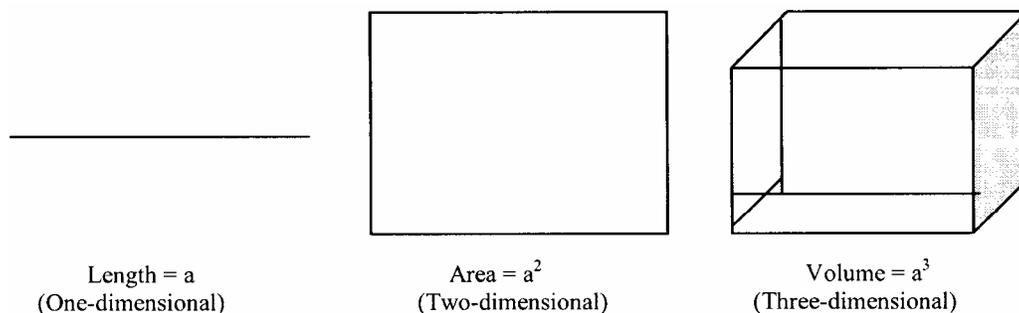
Tier 2: Spiral model

This model describes the growth and development of subject as an unending progression of spiral with time. This model asserts a subject as dimensionless at the instant of its birth while gradual attainment of dimension is occurred with temporal progression. This model thus manifests another dimension, i.e. the time dimension, which is involved with the concept of subject.

Tier 3: Idea plane

Ranganathan defined three planes of work involved in the process of classification, i.e. idea plane, verbal plane and notational plane. According to him, a scheme of classes involves the following five inherent concepts:

1. Characteristics
2. Succession of characteristics



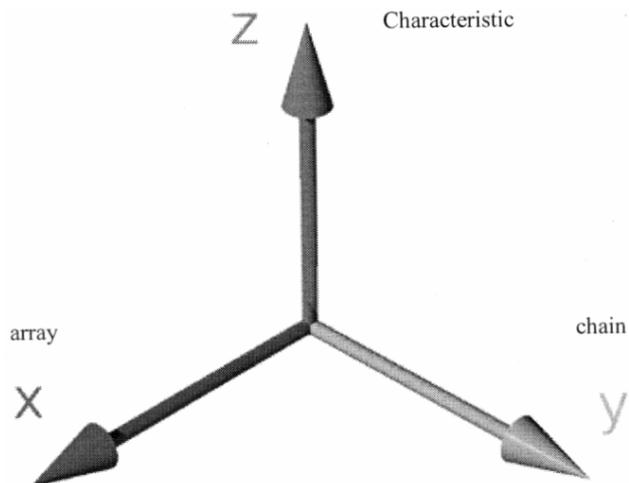


Fig. 3—Three areas of subject as described in idea plane by Ranganathan

3. Array of classes
4. Chain of classes and
5. Filiatory sequence

Accordingly, works on idea plane involved five sets of canons. Of these concepts, the first one, i.e. characteristics describes different parameters for differentiating a subject into different facets. A facet includes several concepts, which are represented by appropriate keywords. Once a subject has been differentiated into several facets, concepts are generally arranged in two ways. At first, the concepts may be co-ordinate classes to each other that form a horizontal line structure. Secondly, the concepts may be subordinated and super-ordinated to each other, which form a vertical line structure. The vertical arrangement of related concepts is known as chain, while the horizontal arrangement is known as array. The array and chain together form a two dimensional plane that depicts the spread of the subject. The array and chain may thus be thought as two axes of the subject, i.e. X and Y axes (Figure 3). Also array and chain cannot be clearly defined until and unless a particular characteristics shapes out a well-conceived facet of the subject. Therefore, the characteristics may be thought as the third axis, or Z axis (Figure 3). Thus, the three parameters, viz. characteristics, array and chain together form the three dimensional concept space of the subject as shown in Figure 3.

Conclusion

Ranganathan's three-tier description thus picturesquely manifests the conceptual completeness of a subject. The concept of continuous infinite universe shows dimensionless state of a subject at the instant of its birth. The spiral model shows growth and development of a subject with the advancement of time. The temporal dimension associated with it thus becomes clear from this model. The concept of idea plane shows three dimensions of a subject through the concepts of characteristics, array and chain. The three concepts together outline all dimensions of the subject starting from its inception. A subject is thus a time dependent entity undergone through continuous change of state with time.

References

- 1 Ranganathan S R, *Documentation and its facets*, (Asian Publishing House; London) 1963.
- 2 Cutter C A, *Rules for a dictionary catalog*, (Government Printing Office; Washington, DC) 1904.
- 3 Drake C L, What is a subject? *Australian Library Journal*, 9 (1) (1960) 34-41.
- 4 Wilson P, *Two kinds of power: an essay on bibliographical control*, (University of California Press; Berkeley) 1968.
- 5 Maron M E, On indexing, retrieval and the meaning of about, *Journal of the American Society for Information Science*, 28 (2) (1977) 38-43.
- 6 Hutchins W J, *Languages of indexing and classification: a linguistic study of structures and functions*, (Peter Peregrinus; London) 1975.
- 7 Miksa F, *The subject in the dictionary catalog from Cutter to the present*, (American Library Association; Chicago) 1983.
- 8 Soergel D, *Organizing information: principles of data base and retrieval systems*, (Academic Press; Orlando) 1985.
- 9 Molina M P, Interdisciplinary approaches to the concept and practice of written text documentary content analysis, *Journal of Documentation*, 50 (2) (1994) 111-133.
- 10 Hjørland B, Towards a theory of aboutness, subject, topicality, theme, domain, field, content and relevance, *Journal of the American Society for Information Science and Technology*, 52 (9) (2001) 774-778.
- 11 Hjørland B, The concept of "subject" in Information Science, *Journal of Documentation*, 48 (2) (1992) 172-200.
- 12 Gopinath M A, *Colon Classification*, (I: Classification in the 1970's. A second look. Revised edition. Ed. by Arthur Maltby. Clive Bingly; London) 1976.
- 13 Ranganathan S R, *Philosophy of library classification*, (Ess Ess Pub; New Delhi) 1973.
- 14 Ranganathan S R, *Prolegomena to library classification*, (Asia Publishing House; London) 1967.
- 15 Gamow G, *One two three infinity: facts and speculations of science*, (Dover Pub; New York) 1988.