Knowledge Organization and Ranganathan

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Introduction:

Knowledge Organization (KO) is a sub-discipline at the core of Information Studies. The term *knowledge organization* is of comparatively recent origin; however. Bliss titled one of his books as *Organization of Knowledge in Libraries.* Knowledge organization as a discipline has its origins in philosophy; most early classificationists were philosophers. The history of modern library classification, however, begins in the last quarter of the 19th Century with the works of Melville Dewey and Charles Cutter. In the initial decades, however, *Classification* and *Cataloguing* were treated as two related but distinct sub-disciplines. Even *Subject Cataloguing* / *subject indexing* was being treated independently of developments in *Classification*.

This dichotomy was more because *Classification* was seen primarily as a means of assigning notation to documents to facilitate their arrangement on library shelves and *subject cataloguing* as concerned with assigning subject headings to documents for use in card catalogues. However, all these activities are primarily concerned with representation of subjects of discourses to support information retrieval.

More recently Svenonius adopted an even broader approach to *information organization* (as she prefers to refer to the sub-discipline) and looks at a unified theory of KO inclusive of bibliographic systems of all kinds – schemes of classification, codes of cataloguing, controlled vocabularies, etc (12). Souza [et al] have gone a step further and have developed a typology of KO systems (11).

[1]*Modified version of a paper entitled Ranganathan's Contributions to Knowledge Organization and Presentation by K.S. Raghavan and A. Neelameghan (In Knowledge Organization: From Libraries to the Web / Edited by K. S. Raghavan and A. Neelameghan. New Delhi: Ess Ess for SRELS, 2013. – p. 181-190)*

Today knowledge organization systems are used in information systems for a variety of purposes that include:Arranging information objects (artifacts such as documents and / or their metadata records) in a logical sequence to support browsing;Representing the 'aboutness' of information objects or users' queries to support search and retrieval of information;Displaying relationships between information objects / concepts to support navigation to enhance of information retrieval.

S. R. Ranganathan along with Bliss stands as one of the great theoreticians of knowledge organization; his contributions have influenced much of subsequent work and thinking in knowledge organization. It is not without significance that the CRG issued a manifesto even in the 1950s that all future methods of information retrieval should be based on facet analysis, a technique widely attributed to Ranganathan. In fact, a review of progress in classification by Dahlberg begins with the section heading “No developments since Ranganathan” (Advances in Librarianship, 1978). Even though there have been significant developments in the last few decades and more particularly since the advent of Web, Ranganathan's ideas are seen as relevant even in the digital world. According to David Weinberger, “The architecture of Ranganathan's system is perfectly designed for computer manipulation: Create a set of fields, or facets, and keep track of the values plugged into those fields. Then let people browse the fields in any order they want, creating their own trees. This is how browsing is organized at Apple Computer's iTunes page, Monster.com, and sites run by Eddie Bauer, NASA and many others. It's as if Ranganathan designed colon classification in 1933 specifically for the kind of instant reshuffling that computers made feasible decades later”.

Theoretical Base:

Knowladge organisation systems and even the facet analytical approach did exist before Ranganathan.the UDC had synthetic features, e.g. in the form of General Auxiliaries. Kaiser’s Systematic Indexing published in 1911 was essentially facet-analytic in nature. However, what characterized Ranganathan's approach was his search for a theoretical base. Ranganathan's Five Laws of Library Science are the most explicit statements of the goals and objectives of all kinds of information systems including libraries.

-Books are for use
-Every reader his or her book
-Every book its reader Save the time of the reader

Library is a Growing Organism

All his practices, tools and techniques were designed to fulfill, and evaluated against, these Five Laws. The Five Laws continue to serve as the broad parameters against which all tools and techniques aimed at improving and enhancing access to and discovery of information could be assessed and evaluated. It is from these Five Laws that Ranganathan derived Canons and Principles to guide the development of tools and techniques such as the Canons and Principles of Classification and Cataloguing

Ranganathan's approach to knowledge organization:

There was not much by way of theory of classification when Ranganathan came on the scene, although it is important to note the contributions of Bliss and Sayers. Ranganathan was in-charge of organizing the collection of Madras University Library and his Colon Classification (CC) and the Classified Catalogue Code (CCC) should be seen within this broad mandate of organizing a collection consisting primarily of books in a library. However, what came out eventually in the form of a General Theory of Classification contained in his Prolegomena to Library Classification and later writings by himself and his associates had significant applications outside the conventional library. His Theory of Library Catalogue (first published in 1938) is another important contribution to knowledge organization. The Canons and Principles that Ranganathan enunciated in this book formed the basis for his Heading and Canons, which is probably the first comprehensive comparative study of codes of cataloguing (7).

Planes of Work and Fundamental Categories:

Ranganathan explicitly defined and identified the three planes of work in designing knowledge organization systems, viz., the Idea Plane (the plane of logic), the Verbal Plane (the plane of terminology) and the Notational Plane (the plane of symbols):

Idea Plane:

The task of identifying concepts that collectively constitute a domain (universe of interest), categorization of these concepts, identifying and

defining the relationships (hierarchical and non-hierarchical lateral relationships) between the concepts, arranging the concepts in a logical helpful sequence;

Verbal Plane:
The task of labeling the concepts using terms in a natural language; and

Notational Plane:
The work of assigning notation to denote the concepts.The work in the Verbal and Notational planes is primarily 'Representation' of concepts identified in the Idea Plane. The facet-analytic approach constitutes the core of Ranganathan's contribution; It is essentially a methodology for identifying and categorizing concepts. Ranganathan's own schema of categories that formed the basis for his Colon Classification are based on this approach, which is now widely accepted as the basis for design of knowledge organization systems. That categories are the basic building blocks of a knowledge organization system is now widely conceded. The impact of Ranganathan's technique can be assessed from the fact that even in the present decade (i.e. since 2010) nearly 500 papers have appeared on the facet-analytic approach. CRG carried forward Ranganathan's work. While the members of this group did differ from one another about the nature and number of categories, the single most obvious difference between this group and Ranganathan (and his associates) relates to the notion of Fundamental Categories. It is in this context that we need to examine another important component of Ranganathan's theory of classification, viz., the postulational approach. In adopting the postulational approach, the principal questions that Ranganathan considered relate obviously to adequacy and helpfulness of the postulate in a given context.

Obviously Ranganathan found that the five Fundamental Categories were both adequate and helpful in categorizing concepts going with various 'Basic Subjects'. He argued that even 'Basic Subjects' are to be postulated depending on such factors as literary warrant, etc. Postulating Basic Subjects was a necessity for Ranganathan as he was, like Dewey, building a library classification. Coming back to the notion of Fundamental Categories, some alternatives have been suggested; the most widely suggested schema of

universal categories is the one proposed by B. C. Vickery. G. Bhattacharyya's schema of Elementary Categories (Discipline, Entity, Property, and Action) is also suggested as a universal schema applicable across disciplines. Thus, there are two broad schools of thought in applying facet-analytic approach to knowledge organization: One school of thought that advocates a schema of universal categories (Ranganathan, Vickery, Austin, Bhattacharyya, etc) and the other that suggests that the number and nature of categories are dependent on the discipline. The second approach dominated the initial years of developmental work by members of CRG and, in more recent times, it dominates the application of facet analysis for design of E-commerce websites. The first approach has been widely used in the design of knowledge organization systems such as Macrothesauri, classauri and the like. While the question of adequacy of the five Fundamental Categories remains, the question applies equally to other schemas. It is doubtful if there is an appropriate alternative to Ranganathan's method of postulates. One major criticism of Ranganathan's Fundamental Categories relates to “lack of clear definition” of the categories.

Norman Roberts in a paper has severely criticized Ranganathan's treatment of 'Personality' category (10). It is true that Ranganathan suggested the use of the 'Principle of Residues' in his writings to identify the facets belonging to 'Personality' in a subject. However, subsequently the five Fundamental Categories have been adequately defined and their connotation clearly indicated (1, 6). Whether one agrees with Ranganathan's five Fundamental Categories, there is no question that his facet-analytic approach and his schema of categories have been the basis for all schemas that have emerged since then. Ranganathan's Basic Subject, PMEST model clearly reflects systems thinking and it is not difficult to see the commonality between his schema and those that emerged later. The Thesaurofacet of Jean Aitchison, the Classaurus of G. Bhattacharyya apart, even conventional subject terminology schemas such as LCSH have realized the importance of the facet-analytic approach. The FAST (Faceted Application of Subject Terminology) derived from the Library of Congress Subject Headings (LCSH) which is a family of eight modular, complementary vocabularies designed to support faceted retrieval is a case in point.

Sequence of Ideas:

The issue of sequence of facets and sequence of concepts (isolates) within a facet was also given considerable attention by Ranganathan. His 'Wall-Picture Principle' referred to by Hutchins as the 'Principle of Dependence' is one of the most important principles in knowledge organization. It simply states that a concept follows the concept to which it is subordinate either in a classificatory or grammatical sense. His principles of facet sequence (Whole-organ Principle, Actand-Action-Actor-Tool Principle Commodity-Raw Material Principle, etc) and the Principle of Context-Dependence in PRECIS could be derived from this basic principle. Ranganathan also stressed the need for search for a natural syntax of facets – the syntax of facets most helpful to most people – i.e. the 'absolute syntax' of facets (8).

Ranganathan's Contributions to Cataloguing and Subject Indexing:

Reference has already been made to Heading and Canons, a comparative study of five catalogue codes. Apart from preparing the first complete code in the English language for a classified catalogue, his other most important contribution is Chain Indexing. Interestingly, Chain Indexing had its major large-scale application outside the Madras University Library, in the British National Bibliography which used the system to generate the alphabetical index to the classified part of the bibliography for 20 years since its inception in 1950 till 1970. Mills in his introduction to U.D.C. recommended Chain indexing as ideal for indexing any classification scheme. John Phillip Immroth tested Chain Indexing's applicability to LC classification. Its greatest advantage when applied to a classification scheme is its ability to group related subjects that are scattered by the scheme's notation; a feature referred to as 'symbiosis' by Ranganathan and 'collocation of distributed relatives' by Jack Mills.

This is achieved by the simple process of inverting the classificatory hierarchy while generating the index entries, a feature Dewey had introduced in his Relativ Index. Ranganathan's Chain Index is the basis for all string indexes (to borrow a term used by Timothy Craven) – PRECIS, POPSI, etc. in the sense that it was Chain Index which first introduced the idea of ordering terms in an index entry in a logical sequence (reverse order of the classificatory hierarchy). This coupled with Ranganathan's paper in the Journal of Documentation in 1964

*In Derek Austin's PRECIS, designed to build alphabetical indexes and not a library classification, the notion of *Basic subjects* does not exist.

could be seen as triggering the search for new systems of indexing that eventually resulted in PRECIS and POPSI. This paper of Ranganathan is significant as it signaled a shift in emphasis from Notational Plane to the Verbal Plane for effective information retrieval. (6).

S. R. Ranganathan and Presentation of Ideas in a Text:

According to Ranganathan, classification and categorization are neural necessities (8). The ability to sort and present items / ideas by every possible characteristic (facet), widely employed in today's e-commerce websites, was not available at the time of Ranganathan and one could only think of physical organization of items in a linear fashion. Ranganathan's 'APUPA' pattern and 'helpful sequence' – should be seen against this background. End users' search patterns and sorting (of information objects) requirements are many and varied, and no method of physical organization of information objects can meet all the approaches. The utility and value of facet-analytic techniques in organizing and presenting information objects in Cyberspace in a desired order dictated by the purpose on hand has been brought out in an article by David Weinberger (13). Ranganathan also came up with the idea of 'seminal mnemonics' - concepts that are equivalent at the seminal level. The similarity in the presentation of ideas in text in some of the works of some of the greatest thinkers of the 20th Century and that dictated by the application of seminal mnemonics has been shown in a paper by Prataplingam (5).

In a paper Neelameghan and Raghavan have examined the impact of culture on knowledge organization and, with examples from the domain of Carnatic music, have shown how different kinds of presentation of information could be made to meet different requirements (2). What is important is that such organization and presentation of information / information objects in different ways to meet different requirements is possible only via the application of facet analytic techniques.

Conclusion:

It is appropriate to conclude this paper by quoting Steve Papas, co-founder of Endeca, which uses Ranganathan's system in its software: “Facets are all about manipulating multidimensional space. You can't do that in the physical world. But Ranganathan was ahead of his time. The constraints of the physical world didn't inhibit his imagination.”

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