

# Subject Headings in Library Catalogue for Retrieval of Bengali Documents: A Critical Review

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*As library catalogue is a surrogate to a library collection, it enables users to know the resources available in the library. A subject catalogue helps users to search documents by subject. Reports the results of content analysis of existing literature on subject cataloguing. Finds that most of the popular subject headings lists have been created with English language vocabulary. Besides some attempts have also been made to prepare subject headings lists with non-English language vocabulary. Due to unavailability of uniform and standard vocabulary control device in Bengali, assigning subject headings in library catalogue lacks uniformity and consistency. Development of necessary software has enabled preparation of catalogue of books in Indian languages. However, formulation of principles and rules for use of Bengali subject headings in OPAC has remained untouched area of research.*

**Keywords:** *Controlled Vocabulary, Information Retrieval, Library Catalogue, OPAC, Subject Catalogue, Subject Headings, Bengali Subject Headings*

## 1 Introduction

The issue of subject approach to library catalogue has been found as an interesting subject matter of research for over four decades involving numerous studies with the help of various methodologies. Several studies on cataloging and specifically on the subject access have been conducted till now. Due to their numerous aspects, such as standardization, vocabulary control, multilingualism, technological issues, etc., researchers concentrate on micro thought. The study of existing literature now reflects a dramatic change in the area showing the development of cataloging as a means to resource discovery. Some highlights to this direction can be brought out. A popular topic is the use of uncontrolled tags in catalogues,

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often user-generated. Tags effectiveness compared to controlled subject headings, such as the Library of Congress Subject Headings (LCSH), by now has been studied extensively. Another common research tack has been the study of the encroachment on "traditional" cataloging by non-MARC metadata, and the potentials for bibliographic metadata's interoperability with the wider web, the end-product of which is often referred to as the semantic web.

Problems in this regard in academic libraries are represented overwhelmingly in the literature. A number of important issues came up while reviewing the literature. The studies can be classified into broad genres such as Subject Headings Principles, Subject Catalogue, Controlled and Uncontrolled Headings, Subject Heading Languages, Syntagmatic or Syntactic Relationships, Subject Headings Structure, Subject Retrieval in OPAC, etc. However, it is worth noting here in this context that most of the studies have spanned over more than one genre.

## 2 Scope

The scope of the review is limited by the following parameters:

- **Language:** English and Bengali language literature;
- **Main Focus:** Specifically the practice and theory of subject headings, subject cataloguing, vocabulary controlled devices including knowledge organization systems and theory;
- **Sub-themes:** Subject Headings Principles, Subject Catalogue, Controlled and Uncontrolled Headings, Subject Heading Languages, Syntagmatic or Syntactic Relationships, Subject Headings Structure, Subject Retrieval in OPAC, etc.

**Types of Sources Consulted:** Journal articles, conference papers, monographs, dissertations and theses, manuscripts of presentations, reports, e-journals, e-books, databases, and policy documents. However, in some cases when news items, slides from presentations, book reviews are found relevant and pertinent, they have been included. Thus there are a few exceptions in this regard that can be found in the study;

## 3 Observations

The observations from the review of literature are as follows.

### 3.1 Subject Headings Principles

Subject headings as a controlled vocabulary assigned by librarians in catalogues are considered as a key instrument that can increase the precision of information search results. Theoretically, when users do not know the exact titles, authors or series, the best way to find the information they are looking for is to use "subject search". However, the findings in many studies showed that library users do not understand the structure of authorized subject headings and therefore have difficulty in identifying the correct subject terms to conduct a comprehensive subject search (Drabens-tott, Simcox, & Fenton, 1999; Olson & Boll, 2001). It often makes users feel frustrated and dissatisfied with either too many results or none when they use this type of search. Some users do not even know the existence of subject terms (Antell & Huang, 2008).

According to the ALA Glossary of Library and Information Science, Subject Heading is an access point to a bibliographic record, consisting of a word or phrase which designates the subject(s) of the work(s) contained in the bibliographic item (American Library Association, 1983). Subject headings list contains the list of controlled subject headings. Several authorities and institution tried their level best to compile subject headings list to overcome various problems depending on their individual needs. In order to design such a list several important suggestions have been put forwarded, notably, by Charles Ammi Cutter, Kaiser, Farradene, Coates, Ranganathan, Vickery, Olding, Metcalf, Lynch, Neelameghan, Gilchrist, Ganesh Bhattacharya, Phani Bhusan Roy, Eline Sevenoneous, Library of Congress Subject Headings (LCSH), Sears List of Subject Headings, Dewey, etc. (Mukhopadhyay, 1998).

The fundamental principles guiding the development of the Library of Congress Subject Headings are effective responses to user needs and to literary warrant, use of uniform and unique headings, provision of direct access to specific subjects, stability, and consistency (Chan, 1990). Satija (2008) ascertained that vocabulary control is important for providing subject access to information in libraries and databases. Names of subjects called, subject descriptors, must be standardized for use in subject catalogues, otherwise information retrieval system will be chaotic and inefficient. Roe (2001) added that a standard and popular subject cataloguing tool for more than eight decades, the Sears List of Subject Headings was first designed in 1923 by Minnie Earl Sears in deference to demands of small libraries for simpler and broader subject headings for use in their dictionary catalogues. Although Sears maintains conformity to



the usage of LCSH as much as is possible, the differences are that Sears (1) contains fewer technical terms, (2) allows for direct geographic subdivisions rather than indirect, and (3) does not contain inverted headings.

There is a significant system that one way to assign subject terms automatically is through the use of text categorization (TC) using supervised machine learning algorithms (Chung & Hastings, 2010). Study contains that humans don't use the full text when assigning subject headings, so computer algorithms perhaps should not, also. The conceptual frameworks based on human-informed processes can best direct text categorization by computers. Keyword was shown to be a more effective source than full text when mining the article for subject terms, and cited works, article title and journal title were as effective as mining the full text when performing TC on a document. A recent work has tried to uncover whether LCSH can be employed as an effective subject access tool in a networked environment (Yi & Chan, 2010). The study examined that the syntax and structure of the headings and determined that there is both a local relational structure as well as a global hierarchical structure. The LCSH retains too many features of natural language to be used universally successfully as an interoperable controlled vocabulary, and the LCSH needs to be more rigorously hierarchical. Ultimately, the syntactic structures are too diverse to parse algorithmically, making the LCSH of limited use in the networked environment as it is. A Greek team informed that they have made an effort to take advantage of the inherent semantic wealth existing within LCSH in order to provide more efficient subject-based information retrieval in digital libraries and the prototype describes a system capable of making the expressiveness of the underlying ontology readily available to end users while at the same time retaining simplicity and ease-of use (Papadakis, Kyprianos, Mavropodi, & Stefani-dakis, 2009).

### 3.2 Subject Catalogue

In the context of subject catalogue, Cutter (1876) in his book entitled "Rules for a Dictionary Catalog" stated two objectives, i.e. to enable a person to find a book of which the subject is known, and to show what the library has on a given subject.

According to Coates (1960), in subject catalogues it is encountered only in a piecemeal and implicit manner in connection with 'compound subject'. Gardin in the early 1960s, who, following ideas propounded by Saussure in the linguistics field, pointed out that subject indications needed

to take account of two different kinds of subject relations, paradigmatic and syntagmatic. Paradigmatic relations are a priori relations between concepts, in which the relation is implied in the meaning of the concept; these include the hierarchical and collateral relationships familiarly manifested in classification systems, and in a more fragmentary fashion in thesauri. They may alternatively be termed semantic relationship.

Some advocated that the OPAC be completely redesigned into a web search engine that looks and functions like Google (Russell & Huang, 2009, p. 77). But most of the reference librarians and cataloging librarians still highly value the controlled vocabularies and subject search. It was claimed that authorized subject headings remain viable for the specificity it brings to subject search (Mann, 2003; Beall, 2006). Many librarians believe that subject headings provide greater precision in subject search (Carstens & Buchanan, 2004). The appropriate use of subject searching is a powerful tool that enables users to extract relevant information from the OPAC (Antell & Huang, 2008, p. 73).

In 1995, the Association for Library Collections and Technical Services in its program addresses "Crisis in Subject Cataloging and Retrieval". It pointed out that there was an administrative push to cut back or eliminate subject cataloging because of the availability of keyword searching (Steinhagen, 1996). Based on the data collected from surveys, interviews, and transaction logs, etc. in the study of subject search over the years, many good suggestions and ideas, such as allowing users to supply descriptive tags to catalog records, utilizing a new type of external knowledge source folksonomy, incorporating less-controlled vocabulary through broader usage of cross-references, updating and adding new subject terms more quickly, providing just in time instruction and assistance, have been introduced (Antell & Huang, 2008; Rolla, 2009; Russell & Huang, 2009; Yi & Chan, 2010).

### 3.3 Controlled and Uncontrolled Headings

The discussion and debate over the usefulness of the controlled subject vocabularies started after some research revealed that many library users, especially the younger generation, prefer to use keyword search over subject search. The increasing reliance on keyword or natural language searching has also prompted information professionals to question if controlled vocabularies such as LCSH are still necessary in the online environment (Steele, 2010, p. 6). Uncontrolled headings are keywords attached to documents, web sites, bibliographic records, or other content,



that are not from a thesaurus or other list of controlled headings. The term "tag" is often used to denote keywords input by users of content, though expert metadata creators can also assign tags to a document. The aggregate of tags associated with a defined grouping of content is termed a folksonomy. Much research has been done of late to examine this phenomenon (Wyatt, 2009). Bates (2009) believes that authority control to the people should be conceded. Tags are not added to content just to describe the item, there are many creative and useful ways tags may be applied, and they all may be harnessed formally some way in the future to enhance access. Bianco (2009) conducted a survey through which it is found that social tagging is still not a technology widely used by medical librarians. In another study, in exploring new ways of teaching students how to use Medical Subject Headings (MeSH), librarians at Boston University's Alumni Medical Library (AML) integrated social tagging into their instruction (Maggio, Bresnahan, Flynn, Harzbecker, Blanchard, Ginn, 2009). A research study has shown that subject liaisons can add value to OPAC records and enhance discovery of electronic databases and media items by providing searchable keywords and resource descriptions (Griffis, 2009). Another study examines the overlap between author-assigned keywords and cataloger-assigned Library of Congress Subject Headings (LCSH) for a set of electronic theses and dissertations in Ohio State University's online catalog (Strader, 2009). A comparative study of controlled terms in Library of Congress Subject Headings and user-generated tags in LibraryThing for transgender books was conducted by Adler (2009). Results revealed that perhaps the greatest power of folksonomies, especially when set against controlled vocabularies like the LCSHs, lies in their capacity to empower user communities to name their own resources in their own terms. The two sets of vocabulary each has their strengths and their limitations, and thereby complement each other. A group of librarians from Auburn University also analyzed the tags assigned by users (Thomas, Caudle, & Schmitz, 2010). They found that tag variations are the most prominent hindrance to search and retrieval, variations referring specifically to tags which were the same except for tense, symbols, spelling, and capitalization also included noun-adjective combinations and word combinations meaning the same thing or concept. Ten books were chosen for the study to which a whopping 7,653 tags had been assigned and 59% of those tags were either variation, like those listed above, and/or contained no alphabetic characters. They determine from their research that folksonomies can augment controlled headings, but cannot re-

place them.

Another effort has been made linking folksonomy to Library of Congress Subject Headings for the Journal of Documentation (Yi & Chan, 2009). They examined a potential linking of social tags and LCSH with the goal of organizing networked resources through a combination of tags and LCSH (Yi & Chan, 2010). In this circumstance they found that up to 77% of tags assigned in delicious, a social book marking service, have matches or potential matches to an LCSH, which could lead to "the integration of multiple information repositories based on the two vocabularies." Two other, more technical, articles cover the same topic, including one by Yi (2010) and another by a team from Brigham Young University (Pera, Lund, & Ng, 2009). Employing various methods, many additional articles address variations on the issue of the ontology or folksonomy interplay (Golub, Moon, Tudhope, & Lykke, 2008). Sharif (2009) refers to folksonomies as Web 2.0 technology, and ontologies or lists of controlled terms, Web 3.0 technology and the backbone of the semantic web. Key point is that although ontologies are difficult to maintain, to be effective, they need to change possibly as fast as the parts of the world. Sharif also believes that users should be consulted when developing ontologies and collaborative environments as provided in social tagging may inspire new ways of efficient ontology engineering. Another team observed that the current state of the art on the semantic correlation between folksonomies and knowledge organization systems (KOS) centers upon the analysis and integration of user, creator, expert, and machine generated vocabularies (Kakali & Papatheodorou, 2010). They directed a tagging effort by a group of experts and had a group of catalogers inspect the tag choices. The librarians approved of the majority of the tags input by expert users, and a smaller quantity of the LibraryThing tags, but confirmed that in general the tags enrich the subject description of the documents. In the same context, while social tagging does consist of a great deal of subjective tagging, there is enough objective tagging available on bibliographic-related websites such as Amazon and LibraryThing that librarians can use to provide enriched bibliographic records and there are specific instances and categories where social tagging can enhance traditional subject cataloging and provide more comprehensive access for the users (Lawson, 2009). Rolla (2009) remarks that user tags can enhance subject access to library materials, but they cannot entirely replace controlled vocabularies such as the Library of Congress Subject Headings. Tolkoff (2010) also lists some potential pitfalls with regard to interoperability, including problems with translit-



eration and translation, as well as issues related to use of diverse subject heading systems internationally. A comment arose about the special challenges in cataloging workflow for small libraries that subject heading assignment cannot always be by the book in a small library (McElfresh, 2009). To be too strict about its use would be a disservice to patrons. Use of a broader term or related term instead of a very specific heading will collocate similar items much better.

### 3.4 Subject Heading Languages

A survey conducted by Heiner-Freiling (2000) under the auspices of the International Federation of Library Associations and Organizations (IFLA) reveals that the Library of Congress Subject Headings is heavily used in national libraries outside the United States, particularly in English-speaking countries. Many other countries report that they use a translation or adaptation of LCSH as their principal subject heading language. Tsai (2001) distinguishes two types of language, V-to-I type vs. V-to-V type, with a view to deriving two distinct patterns of associating non-specific interpretations with subject positions. In the former type, verbs move to a higher functional head, either overtly or covertly, and non-specific numeral indefinites may appear in Spec, TP at S-structure. In the latter type, verbs do not move to a higher functional head, and non-specific numeral indefinites cannot appear in Spec, TP at S-structure. This is the case with Chinese, where cardinal subjects are relatively rare. Developing the idea that syntax-semantics mapping is cyclic and closely aligned with syntactic predication, provides a principled account of an asymmetry between Chinese declarative and modal constructions with respect to their subject specificity.

Subject indexing remains the weakest point in information exchange. Besides terminological and language barriers, an essential need exists for better understanding of the different existing systems and their conceptual foundations. This concern was addressed in 1990, with the establishment of the IFLA Section on Classification and Indexing Working Group on Principles Underlying Subject Heading Languages (Lopes, 1995). Clavel-Merrin (1996) stated that the application of authority control to collections using the same subject heading languages is facilitated as libraries can exchange and copy records and thus improves monolingual indexing consistency across collections. Whereas traditionally, bilingual or multilingual access was assured through multiple subject headings coded in the authority records, today many research initiatives seek to provide access through Internet based linking processes. Concepts

such as language cross-linking, or interoperability in subject headings languages, which are common in today's research in multilingual access were limited ten years ago to language specialists.

A study group representing four European national libraries (the Swiss National Library, Die Deutsche Bibliothek, the Bibliotheque nationale de France and The British Library) conducted a study on the possibility of establishing multilingual thesaurus links between the headings in the LCSH authority file and the authority files of the German indexing system SWD/RSWK and the French indexing system RAMEAU. The study demonstrated a high level of correspondence in main headings, but also revealed a number of issues requiring further investigation. The study group's findings led to recommendations on the scope for the development of a prototype system for linking the three Subject Heading Languages (SHLs) in the databases of the four institutions (Macewan, 2000). The IFLA Section on Classification and Indexing Working Group on Principles Underlying Subject Headings Languages had identified a set of eleven principles for subject heading languages and excerpted the texts that match each principle from the instructions for each of eleven national subject indexing systems, including excerpts from the LC's Subject Cataloging Manual: Subject Headings. This study compares the IFLA principles with other texts that express the principles underlying LCSH, especially Library of Congress Subject Headings: Principles of Structure and Policies for Application, prepared by Lois Mai Chan for the Library of Congress in 1990, Chan's later book on LCSH, and earlier documents by Frykin and Cutter. The principles are further elaborated for clarity and discussed (Hoerman & Furniss, 2000).

The MACS (Multilingual access to subjects) project is one of the many projects that are currently exploring solutions to multilingual subject access to online catalogs. The trend to using mapping or linking strategies between different controlled vocabularies to create multilingual access challenges the traditional view of the multilingual thesaurus (Landry, 2006). Shared authority files and cooperation in the development of national lists, both author and subject, have enabled libraries to share resources and improve access to their collections. By creating links between existing subject heading languages (initially in French, German, and English), MACS (Multilingual Access to Subjects) allows users to carry out searches in major national library collections in Europe using subject headings in their own languages (Clavel-Merrin, 2004). Swedish libraries used to create their own approaches to subject access if at all. With the help of IFLA's principles, LCSH and Rameau, a Swed-



ish Subject Heading Language has been created. It was developed in close contact with the National Bibliographic Agency. It has been applied since 2002 and is used by most libraries attached to the Swedish union catalogue LIBRIS. In many ways Sweden has regarded itself as unique in terms of cataloguing and subject access. For instance, Sweden has a classification system of its own (Leth, 2004). The Biblioteca nazionale centrale di Firenze (National Library of Florence) has started a renewal of the Soggettario, the subject heading list used by the Bibliografia Nazionale Italiana and by most of the Italian libraries. A Feasibility Study on the Revision of the Soggettario, in which the most important languages and tools for indexing at present in use are reviewed and analysed, shows the features of this new tool. Its basic inspiring principles are the respect of the international standards on the vocabulary control and the analysis of syntactic roles in order to build subject strings. The system integrates various features: Rules, stating the principles and guidelines of the indexing language, a Thesaurus and an Application manual (Fontana, 2004).

During the second half of the twentieth century, Mexican libraries began to compile their subject lists based in translations from the LCSH. Their work was not only literal translations of terms or expressions, but also an interpretation of these words to fit the local language features. As a result of the authority work, the National Library of Mexico published in 1978 its Subject Headings List, which was adopted by the majority of Mexican libraries and used for their subject cataloguing. Although the authority record files continued being updated, there was not other printed edition. Additionally, the General Direction for Libraries of the National Autonomous of Mexico, that carry out centralized cataloging for more than one hundred of branch libraries, has done translations of LCSH terms and at the present has compiled a file that includes 98 000 Spanish-English terms (Martínez Arellano, 2004). A web survey on the use of Spanish language subject headings in local catalogs indicated that while few academic libraries assign such headings locally, many retain and display them in the catalog when provided through copy cataloging records (Laurence S Creider, 2003). Authority control of Spanish-language subject headings is described, with a special focus on Mexico. Efforts currently underway in Colombia, Chile, Spain and Mexico, although they share the same language, are somewhat lacking in standardization and cooperation among countries. In the absence of a national authority for bibliographic control in Mexico, a group of university libraries has initiated a cooperative project to build in the near future a national file of Spanish subject headings for

the Social Sciences. The project, based upon the experience and rich collections of El Colegio de Mexico, has attracted support from the U.S. (Solis, Jimenez, & Servin, 2000). According to Sharada (2010) previously, for books in Indian languages, the entries were made in Roman transliteration. The software revolution has enabled the preparation of catalogue of books in Indian languages in the script of the original language itself. The library management software should be UNICODE compliant for this. Though the cataloging is done in Indian languages, the information retrieval component, 'Subject heading', has to be rendered in English owing to lack of information retrieval tools such as classification schedule, subject heading (SH) list, etc. in Indian languages. In order to support information retrieval, WordNet was used for English books in the library OPAC as a lexical interface. Similarly, for Indian languages, the Indo WordNet came handy but was available only for Hindi and Marathi.

There are various problems peculiar to construction of Bengali subject headings like problem of semantic and syntax, synonym and homonym, etc. These create problem in the use of uniform and consistent subject headings in Bengali catalogues and indexes. Several initiatives have been taken to compile subject heading lists to overcome various problems, but, a comprehensive Subject Headings List based on sound principles and rules is yet to be published. Though there is a subject headings list in Bengali entitled "Bisay Shironam" by Krishnamay Bhattacharyay, but it is not updated. Another work in Bengali entitled "Bijnan: Bishay Shironam" by Pinaki Nath Mukhopadhyay was published in 2001. Mukhopadhyay has prepared a Subject Headings List on the subject science only. Side by side, Ratna Bandyapadhyay wrote a book entitled "Bishay Shironam Gathan Paddhati: darshan, sahitya, shilpakala" in 2004. Bandyapadhyay (2001) describes that in the present era, rate of publication of Bengali documents are growing and collection of those Bengali books, journals, etc. is increasing. But many of the libraries lack the subject catalogue. Where ever Bengali subject headings are assigned, are not complete or proper and these also lack standardized principles. Due to unavailability of standard Bengali subject headings, users' approaches are not satisfied. Bandyapadhyay studied different public libraries in West Bengal and Bangladesh and finally felt the necessity to prepare a Subject Heading List in Bengali language. In this context some of the publication in Bengali such as National Bibliography: Bengali; Kraylabhya Bangla Granther Bishayanug Talika (Bengali Trade Bibliography Arranged according to Subject); Books in Print and Calcutta Book Fair Directory; Bani Basu's Ban-



gla Shishu Sahityer Granthapanji (Bibliography of Bengali Children Literature); Probhat Kumar Mukhopadhyay's Bangla granthaborgikaran (scheme of Bengali book classification); Ramkrishna Saha's Bangla Pustak Bargikaran (Bengali Book Classification) should be mentioned.

In the context of subject heading list in Bengali language, Mukhopadhyay (1998) stated that due to flood of literature in Bengali of various kinds, it becomes very difficult to make one self aware and to acquire relevant 'information-subject-knowledge' on specific field. Various persons, authorities, scholars, writers, etc. are representing their experiences through their publications of various kinds in various forms. Even in an article authors are using a subject term in various forms along with synonyms terms to denote and connote the same subject. In wide range of publications it appears very difficult even impossible to find a specific 'Information-subject-knowledge' for various levels. It hinders proper, effective communication.

### 3.5 Syntagmatic or Syntactic Relationships

Syntagmatic or syntactic relationships are on the contrary a posteriori explicit in discourse and expressed by word juxtaposition in sentence, by inflections and by prepositions. In the light of the Gardin dichotomy it becomes apparent that recent progress in subject indication theory and in mechanised subject indication has been very largely on the syntactic relationship side alone. The semantic relation side of Ranganathan's classification, of the B.T.I. system, and later of PRECIS has recourse to existing convention, which depends in turn on a large element of intuitive craft. In the meantime, a number of librarians are convinced that subject headings do have their limitations and need to be improved so that they are more user-friendly and easier to use. It has been suggested that efforts "be made to render the semantics and syntax of LCSH more consistent and predictable," and that their structures "be made more rigorously hierarchical" (Yi & Chan, 2010, p. 686).

To organize information, librarians create structures and these structures grow from a logic that goes back at least as far as Aristotle. It is the basis of classification as we practice it, and thesauri and subject headings have developed from it. Feminist critiques of logic suggest that logic is gendered in nature. In thesauri and subject heading lists we privilege hierarchical relationships, reflected in the synthetic structure of broader and narrower terms, over all other relationships. Carol Gilligan's in *A Different Voice* (1982), *Women's Ways of Knowing* (Belenky, Clinchy, Goldberger, & Tarule, 1986). More recent related research sug-

gests a different type of structure for women's knowledge grounded in 'connected knowing'. Study explores current and potential element of connected knowing in subject access with a focus on the relationships, both paradigmatic and syntagmatic, between concepts (Olson, 2007). Another important issue like changes affecting LCSH over its 100-year history is highlighted by Svenonius (2000). Adopting a linguistic conceptualization, it frames these changes as relating to the semantics, syntax and pragmatics of the LCSH language. While its category semantics has remained stable over time, the LCSH relational semantics underwent a significant upheaval when a thesaurus structure was imposed upon its traditional See and See also structure. Over time the LCSH syntax has become increasingly complex as it has moved from being largely enumerative to in large part synthetic. Until fairly recently the LCSH pragmatics consisted of only one rule, viz, the injunction to assign specific headings. This rule, always controversial, has become even more debated and interpreted with the move to the online environment.

Sapon-White (2009) throws the light on the issue that how the cataloging staff at Oregon State University responded when the Library of Congress changed its policy such that series would no longer be traced. The set of records with untraced series statements gathered from the Library of Congress over the study period was truly negligible. Only approximately 900 and more than that came through with untraced series in total, thereby indicating that this change was indeed not a burden on the staff and did not warrant a significant change in workflow to accommodate. The Library of Congress Subject Headings (LCSH) schema is by far the most commonly used and widely accepted subject vocabulary for general application. It is the de facto universal controlled vocabulary and has been a model for developing new subject heading systems around the world. However, LCSHs complex syntax and rules for constructing headings restrict its application by requiring highly skilled personnel and limit the effectiveness of automated authority control (O'Neill & Chan, 2003).

### 3.6 Subject Headings Structure

Many kinds of structure can be discerned in the headings and rules governing the LCSH. By addressing these structures at different levels, librarians can develop different approaches to the machine-assisted validation of subject headings, from the checking of individual words to the validation of complex forms of heading/subdivision compatibility. Using computer programs to assist with maintenance



of subject headings is becoming increasingly necessary as technical services libraries strive to create consistent and useful patterns of subject collocation in library catalogs (Hearn, 2000). GUI interface exposes the hierarchy of the subject headings employed within an OPAC, as well as all relations between headings, as links that the user can follow, effectively traversing the ontology and formulating at the same time the actual query to the underlying OPAC (Papadakis, Stefanidakis & Tzali, 2008).

The rapid growth of shared information mostly controlled by social tags poses a new challenge for social tag-based information organization and retrieval. A plausible approach for this challenge is linking social tags to a controlled vocabulary (Yi, 2010). With the current information environment characterized by the proliferation of digital resources, including collaboratively created and shared resources; LCSH is facing the challenges of effective and efficient subject-based organization and retrieval of digital resources. There is a need to revisit LCSH's basic characteristics to explore the feasibility of utilizing it in a digital environment. A study was conducted to analyze LCSH in both syntactic and relational structures, to discover the structural characteristics of LCSH, and to identify problems and issues for the feasibility of LCSH as an effective subject access tool (Yi & Chan, 2010).

However, a study made by Wepsiec (1991) analyses the hierarchical structure of subject headings in the cluster of the Social Sciences in the twelfth edition of the Subject Headings of the Library of Congress and recommends some headings presently in the cluster for elimination, and suggests some not related at present. On the other hand Ramananda (1967) described the compilation of an alphabetic subject index to a classified library catalog using the chain procedure. This procedure mechanizes the selection of subject headings and, therefore, simplifies and makes more economical the compilation of subject indexes.

The Subject Analysis Committee Subcommittee on FAST of the Association for Library Collections & Technical Services (ALCTS) was established in the fall of 2004 to explore issues related to the implementation of the Faceted Application of Subject Terminology (FAST) subject heading schema. FAST is being developed at the Online Computer Library Center (OCLC) and is derived from the LCSH with a simplified syntax (Jin, 2008). LCSH schema is the most commonly used and widely accepted subject vocabulary for general application. It is the de facto universal controlled vocabulary and has been a model for developing subject heading systems by many countries. However, LCSH's complex syntax and rules for construct-

ing headings restricts its application by requiring highly skilled personnel and limit the effectiveness of automated authority control. Recent trends, driven to a large extent by the rapid growth of the web are forcing changes in bibliographic control systems to make them easier to use, understand, and apply, and subject headings are no exception. The schema maintains compatibility with LCSH - any valid Library of Congress subject heading can be converted to FAST headings (Dean, 2004). In regards of combination order, Mukhopadhyay (1998) ascertained that prescription of various authorities may be considered, such as Ranganathan's PMEST formula and Round-Level principle; Coates's Thing-Part-Material-Property-Action-Agent; Vickery's Thing (product)-Part-Constituent-Property-Measure-Patient/Process/Action/Operation-Agent-place/Condition -Time, etc.

### 3.7 Retrieval by Subject in OPAC

The analysis of user approaches in Online Public Access Catalogue (OPAC) has now been the most important topic of research, involving numerous studies and diverse methodologies. A comparative study of use of OPAC and card catalogue of ISRO Satellite Centre (ISAC) library investigated the reasons of steady decline in use of subject searching by end-users and the associated problems and issues. Results revealed that moving from traditional card catalogue to modern OPAC has not made subject searching more attractive and effective (Sridhar, 2004). A transactional log analysis study of subject searching has been made by Villén-Rueda, Senso & Moya-Anegón (2007) and the results indicated that searches by browsing are similar in frequency to the analytical queries, and that only 14 percent of queries actually specify the subject heading. Another result of the transaction logs analysis shows that subject searching was the most often used but least successful search. Study encountered that 54% of the searches failed due to a misunderstanding of how to operate the system, typographical errors, and the use of uncontrolled vocabulary (Hunter, 1991). A comparison between the "LibraryThing" tags for a group of books and the library-supplied subject headings for the same books shows that users and cataloguers approach these descriptors very differently. Because of these differences, user tags can enhance subject access to library materials, but they cannot entirely replace controlled vocabularies such as the Library of Congress subject headings (Rolla, 2009). Yu & young (2004) found that user success in subject searching remains problematic. A major increase in the frequency of searches that would have been



more successful in resources other than the library catalog is noted over the time period 2000-2002. In the same way Choi, Hsieh-Yee, & Kules (2007) investigated the effectiveness of two modes of subject representation, i.e., table of contents (TOC) and subject headings in subject searching in OPAC. The retrieval difference between TOC and the Library of Congress subject headings (LCSH) was statistically significant; the effect of subject domain was not statistically significant; users had better success matching their keywords to TOC than to LCSH; but their keywords often failed to retrieve items similar to the target items. These findings underscore the need to bridge user keywords to both TOC and LCSH. A research was undertaken to explore whether subject facets would increase patron use of subject headings in a faceted versus a non-faceted catalog interface. Initial usability testing showed that patrons would try facets, but had some problems effectively using them. It proved that facets were used less than subject heading links in records in either interface (Bauer & Peterson-Hart, 2012). Snipes (2007) argues that Sears fail to be useful cataloging resources for the web environment. However, Janes' (2005) American Libraries column points out that iSchool at Drexel (2007) has done just that by cataloging the Internet Public Library using Sears subject headings. According to Sears List of Subject Headings, 19th ed. (2007) the challenge of catalogers in the future is to approach every new technology and theory knowledgeably and fearlessly, judge them against what we know are the soundest principles, and embrace the good and reject the spurious, always keeping in mind the ultimate goal of meeting, even anticipating, the changing needs of the library users (Sears, Miller & Bristow, 2007).

#### 4 Summary of Findings

Summary of findings from the review of literature is furnished hereinunder:

- i. All acceptable subject headings lists have been created on the basis of English language vocabulary;
- ii. The study also reveals that there are some attempts to prepare subject headings lists in non-English languages;
- iii. There is no standard and uniform vocabulary control device in Bengali to make subject headings in library catalogue. Initiatives have been taken earlier, such as, "Bisoy Shironam" by Krishnomay Bhattacharyay and few others on specific subject, like on Science by Pinaki Nath Mukhopadhyay and on Social Science by Ratna Bandopadhyay, etc.;
- iv. The software revolution has enabled the preparation of catalog of books in Indian languages in the script of the original language itself;
- v. Research initiatives seek to provide access through Internet based linking processes. Concepts such as language cross-linking, or interoperability in subject headings languages, which are common in today's research in multilingual access were limited ten years ago to language specialists; and
- vi. Formulation of principles and rules for use of Bengali subject headings in OPAC remains untouched area of research.

#### 5 Conclusion

Formulation of principles and rules for preparation of an effective list of Bengali subject headings has now become the thrust area of research. This is supposed to make us able to use standard Bengali subject headings in library catalogue. The ultimate benefit of this research is expected to go to the users and the library staff as well. It is also expected that the researchers in the field of Library and Information Science will find new areas of research from the outcome of such research work.

#### References

- Adler, M. (2009). Transcending Library Catalogs: A Comparative Study of Controlled Terms in Library of Congress Subject Headings and User-Generated Tags in LibraryThing for Transgender Books. *Journal of Web Librarianship*, 3(4), 309-331. Retrieved from <http://www.tandfonline.com/doi/full/10.1080/19322900903341099#>. Uz-hrqiSzJI
- American Library Association. (1983). *The ALA Glossary of Library and Information Science*. Chicago: American Library Association, 220.
- Antell, K., & Huang, J. (2008). Subject searching success: Transaction logs, patron perception, and implications for library instruction. *Reference & User Services Quarterly*, 48(1), 68-76.
- Bandyopadhyay, R. (2001). Suchikarna. Kolkata: Bangiya Granthagar Parisad.
- Bates, M. E. (2009). Authority Control to the People! E-Content, [1] p. Retrieved from <http://www.econtentmag.com/Articles/Column/Info-Pro/Authority-Control-to-the-People!-53025.htm>



- Bauer, K., & Peterson-Hart, A. (2012). Does faceted display in a library catalog increase use of subject headings? *Library Hi Tech*, 30(2), 347–358.
- Beall, J. (2006). Ethnic groups and Library of Congress Subject Headings. *Colorado Libraries*, 32(4), 37-44.
- Bhattacharya, A. (2003). Report on printed Bengali language material in different institutional and private collections in West Bengal and Bangladesh.
- Bhattacharyay, K. (1370). *Bishay Shiranam*. Kolkata: Bangiya Sahitya Parishad.
- Bianco, C. E. (2009). Medical librarians uses and perceptions of social tagging. *Journal of the Medical Library Association JMLA*, 97(2), 136-139. Medical Library Association. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19404506>
- Carstens, T., & Buchanan, H. (2004). The future of the catalog: A user-friendly academic search engine. *Technical Services Quarterly*, 22(2), 37-47.
- Chan, L. M. (1990). *Library of Congress Subject Headings: Principles of Structure and Policies for Application*. Annotated version. Washington, D.C.: Cataloging Distribution Service, Library of Congress.
- Choi, Y., Hsieh-Yee, I., & Kules, B. (2007). Retrieval effectiveness of table of contents and subject headings. *Proceedings of the 7th ACM/IEEE-CS Joint Conference on Digital Libraries*, 103-104. ACM Press. Retrieved from <http://portal.acm.org/citation.cfm?id=1255175.1255195>
- Chung, E., & Hastings, S. K. (2010). A Framework of Automatic Subject Term Assignment for Text Categorization: An Indexing Conception-Based. *Journal of the American Society for Information Science*, 61(4), 688-699.
- Clavel-Merrin, G. (1996). Principles underlying subject heading languages: an international approach. *International cataloguing and bibliographic control*, 39(1-2), 1-5. Retrieved from <http://cat.inist.fr/?a-Modele=afficheN&cpsidt=3196787>
- Clavel-Merrin, G. (2004). MACS (Multilingual Access to Subjects): A Virtual Authority File across Languages. *Cataloging & Classification Quarterly*, 39(1/2). Retrieved from <http://www.haworthpress.com/store/E-Text/ViewLibraryEText.asp?s=J104>
- Coates, E. J. (1960). *Subject cataloguing: heading and structure*. London: The Library Association.
- Das, B. B. Ghosh, S. & Paul, P. K. (2002). *Cataloguing of Bengali Books and Periodicals: Rules with Examples*. Kolkata: Progressive.
- Dean, R. J. (2004). FAST: Development of Simplified Headings for Metadata. *Cataloging Classification Quarterly*, 39(1), 331-352. Routledge. Retrieved from <http://www.haworthpress.com/store/E-Text/ViewLibraryEText.asp?s=J104>
- Drabenstott, K. M., Simcox, S., & Fenton, E. G. (1999). End-user understanding of subject headings in library catalogs. *Library Resources & Technical Services*, 43(3), 140-160.
- Fontana, A. I. (2004). Subject Indexing between International Standards and Local Contexts: The Italian Case. *Proceedings of IFLA General Conference and Council*, (70). Retrieved from <http://www.ifla.org/IV/ifla70/papers/038e-Fontana.pdf>
- Golub, K., Moon, J., Tudhope, D., & Lykke, M. (2008). Enhancing Social Tagging with a Knowledge Organization System. *ALISS Quarterly*, 3(4), 13-16.
- Gorman, Michael & Winkler, Paul W. (Eds.). (1988). *Anglo-American Cataloguing Rules* (2nd rev. ed.). Calcutta: Oxford & IBM Publishing.
- Griffis, P. (2009). Enhancing OPAC Records for Discovery. *Information Technology Libraries*, 28(4), 191-193. Retrieved from [http://www.ala.org/ala/mgrps/divs/lita/ital/282009/2804dec/griffis2\\_pdf.cfm](http://www.ala.org/ala/mgrps/divs/lita/ital/282009/2804dec/griffis2_pdf.cfm)
- Hearn, S. (2000). Machine-assisted validation of LC subject headings: implications for authority file structure. *Cataloging & Classification Quarterly*, 29(1-2).
- Heiner-Freiling, M. (2000). Survey on subject heading languages used in national libraries and bibliographies. *Cataloging & Classification Quarterly*, 29(1-2).
- Hoerman, H. L., & Furniss, K. A. (2000). Turning practice into principles: a comparison of the IFLA principles underlying Subject Heading Languages (SHLs) and the principles underlying the Library of Congress Subject Headings System. *Cataloging & Classification Quarterly*, 29(1-2).
- Hunter, R. N. (1991). Successes and failures of patrons searching the online catalog at a large academic library: a transaction log analysis. *RQ*, 30(3), 395-402.



- Janes, J. (2005). Librarianship of Connections...American Libraries, Internet Librarian Column. Retrieved March 17th, 2008 from <http://www.ala.org/ala/online/inetlibrarian/2005columns/internetMay05.cfm>
- Jin, Q. (2008). Is FAST the Right Direction for a New System of Subject Cataloging and Metadata? *Cataloging Classification Quarterly*, 45(3), 91-110. Routledge. Retrieved from <http://ejournals.ebsco.com/direct.asp?ArticleID=4D488378AED1571E8FA6>
- Kaiser, J. (1911). *Systematic indexing*. London: Pitman & Co.
- Kakali, C. (2010). Could Social Tags Enrich the Library Subject Index? Proceedings of the LIDA 2010 Libraries in the Digital Age University of Zadar, May 24- 28, 2010. Rutgers University and University of Zadar. Retrieved from [http://scholar.google.es/scholar\\_url?hl=es&q=http://www.ionio.gr/~papatheodor/papers/Lida2010.pdf&oi=scholar&ct=alrt&cd=5&sa=X&scisig=AAGBfin3-hIA7RkhuoQ2W0NbF3SY3mS2\\_yQ](http://scholar.google.es/scholar_url?hl=es&q=http://www.ionio.gr/~papatheodor/papers/Lida2010.pdf&oi=scholar&ct=alrt&cd=5&sa=X&scisig=AAGBfin3-hIA7RkhuoQ2W0NbF3SY3mS2_yQ)
- Kakali, C., & Papatheodorou, C. (2010). Exploitation of folksonomies in subject analysis. *Library Information Science Research*, 32(3), 192-202. Elsevier Inc. Retrieved from <http://linkinghub.elsevier.com/retrieve/pii/S0740818810000368>
- Landry, P. (2000). The MACS Project : Multilingual Access to Subjects (LCSH, RAMEAU, SWD). Proceedings of IFLA General Conference and Council, (66). Retrieved from <http://www.ifla.org/IV/ifla66/papers/165-181e.pdf>
- Landry, P. (2006). Multilingual Subject Access : The Linking Approach of MACS. *Cataloging & Classification Quarterly*, 37(906113898).
- Laurence S Creider, A. (2003). What are academic libraries doing with Spanish language subject headings? *The Journal of Academic Librarianship*, 29(2). Retrieved from [http://www.sciencedirect.com/science?\\_ob=MIImg&\\_imagekey](http://www.sciencedirect.com/science?_ob=MIImg&_imagekey)
- Lawson, K. G. (2009). Mining Social Tagging Data for Enhanced Subject Access for Readers and Researchers. *The Journal of Academic Librarianship*, 35(6), 574-582. Elsevier Inc. Retrieved from <http://linkinghub.elsevier.com/retrieve/pii/S009913330900161X>
- Lesk, M. E. (1985). SIGIR 85. *ACM SIGIR Forum*, 18(2-4), 10-15.
- Leth, P. (2004). Subject Indexing in Sweden – the creating of a national system based on international standards in a country that often wanted to go its own way. Proceedings of IFLA General Conference and Council, (70). Retrieved from [http://www.ifla.org/IV/ifla70/papers/041e-Leth\\_Berg.pdf](http://www.ifla.org/IV/ifla70/papers/041e-Leth_Berg.pdf)
- Lopes, M. I. (1995). Principles Underlying Subject Heading Languages: An International Approach. 61st IFLA General Conference - Conference Proceedings - August 20-25. Retrieved from <http://archive.ifla.org/IV/ifla61/61-lopm.htm>
- Macewan, A. (2000). Crossing language barriers in Europe: linking LCSH to other subject heading languages. *Cataloging & Classification Quarterly*, 29(919383128).
- Maggio, L. A., Bresnahan, M., Flynn, D. B., Harzbecker, J., Blanchard, M., & Ginn, D. (2009). A case study: using social tagging to engage students in learning Medical Subject Headings. *Journal of the Medical Library Association JMLA*, 97(2), 77-83.
- Medical Library Association. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2670207&tool=pmcentrez&rendertype=abstract>
- Mann, T. (2003). Why LC subject headings are more important than ever. *American Libraries*, 34(9), 52-54.
- Martinez Arellano, F. F. (2004). Development of a Spanish subject headings list. Proceedings of IFLA General Conference and Council, (70). Retrieved from <http://www.ifla.org/IV/ifla70/papers/039e-Arellano.pdf>
- McElfresh, Laura Kane. (2009). Cataloging and Classification in a Small Library: The Good, the Bad, and the Challenging. *Technicalities*, 29(4): 4-8.
- Mukhopadhyay, P. N. (1998). Compilation of subject headings list in Bengali. *RBU Journal of Library and Information Science*, 26-28.
- Mukhopadhyay, P. N. (2001). *Bijnan: bishay shironam*. Kolkata: Bona.
- Mukhopadhyay, P. K. (1951). *Bangla granthaborgikaran: dashamik prothay bangla granther bargikaran paddhati*. Kolkata: Orient Book Company.
- O'Neill, E., & Chan, L. M. (2003). FAST (Faceted Application of Subject Terminology): a simplified LCSH-based vocabulary. World Library and Information Congress 69th IFLA General Conference and Council, (69). Retrieved from [http://archive.ifla.org/IV/ifla69/papers/010e-ONeill\\_Mai-Chan.pdf](http://archive.ifla.org/IV/ifla69/papers/010e-ONeill_Mai-Chan.pdf)



- Olson, H. A. (2007). How We Construct Subjects: A Feminist Analysis. *Library Trends*, 56(2), 509.
- Papadakis, I., Kyprianos, K., Mavropodi, R., & Stefanidakis, M. (2009). Subject-based Information Retrieval within Digital Libraries Employing LCSHs. *DLib Magazine*, 15(9/10), 1-15. Retrieved from <http://www.dlib.org/dlib/september09/papadakis/09papadakis.html>
- Papadakis, I., Stefanidakis, M., & Tzali, A. (2008). Visualizing OPAC subject headings. *Library Hi Tech*, 26(1), 19-23. Retrieved from <http://www.emeraldinsight.com/10.1108/07378830810857762>
- Pera, M. S., Lund, W., & Ng, Y.-K. (2009). A sophisticated library search strategy using folksonomies and similarity matching. (W. InterScience, Ed.) *Journal of the American Society for Information Science and Technology*, 9999(9999), 1392-1406. Wiley Subscription Services, Inc. Retrieved from <http://www3.interscience.wiley.com/cgi-bin/abstract/122277848/ABSTRACT>
- Ramananda, B. S. (1967). Subject headings by chain procedure and classification. In Documentation Research and Training Centre (Indian Statistical Institute). Annual Seminar 5, Developments in Classification Management of Reprography Service. Subject Headings and Feature Headings. 1967. Documentation Research and Training Centre (indi. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=ISTA0501685&site=ehost-live&scope=site>
- Roe, S. (2001). Subject Access Vocabularies in a Multi-Type Library Consortium. *Cataloging & classification quarterly*, 33 (2), 55-67.
- Rolla, P. J. (2009). User Tags versus Subject Headings: Can User-Supplied Data Improve Subject Access to Library Collections? *Library Resources Technical Services*, 53(3), 174-184. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=42999002&site=ehost-live>
- Russell, S. E., & Huang, J. (2009). Increasing information retrieval through subject access improvements. In C. M. Garcia & T. A. Flores (Eds.), *Academic Librarianship in the 21st Century*, 75-90. Hauppauge, NY: Nova Publishers.
- Sapon-White, R. (2009). Series authority control at Oregon State University after the Library of Congress's series policy change. *Library resources technical services*, 53(2), 79-85.
- Satija, M. P. (2008). Sears List of Subject Headings: An introduction to the Nineteenth Edition (2007). *Pakistan Journal of Library and Information Science*, 9, 31 - 48.
- Sears, M. E., Miller, J. & Bristow, B. A. (2007). *Sears list of subject headings*. New York: H.W. Wilson Co.
- Sears, M. E. (1991). *Sears list of subject headings (14th ed.)*. New York: H. W. Wilson.
- Sharada, B. A. (2010). Exploring Hindi WordNet as a lexical interface and subject headings tool in library OPAC. Retrieved from [http://www.cfilt.iitb.ac.in/gwc2010/pdfs/10\\_exploring\\_wordnet\\_in\\_library\\_OPAC\\_sharada.pdf](http://www.cfilt.iitb.ac.in/gwc2010/pdfs/10_exploring_wordnet_in_library_OPAC_sharada.pdf)
- Sharif, A. (2009). Combining ontology and folksonomy: An Integrated Approach to Knowledge Representation. Presented at IFLA 2009 Satellite Meeting in Florence, Italy. Retrieved from [www.ifla2009satelliteflorence.it/meeting3/program/assets/AtefehSharif.pdf](http://www.ifla2009satelliteflorence.it/meeting3/program/assets/AtefehSharif.pdf) (accessed March 30, 2011).
- Snipes, P. (2007) Folksonomy vs. Minnie Earl and Melville. *Library Media Connection*; 25(7), 54-56.
- Sridhar, M. S. (2004). Subject searching in the OPAC of a special library: problems and issues. *OCLC Systems & Services*.
- Steele, G. (2010). The wisdom of the cataloguers: Using collective intelligence to assign Library of Congress Subject Headings. *Catalogue & Index*, 161, 6-9.
- Steinhagen, E. N. (1996). Cataloging news. *Cataloging & Classification Quarterly*, 22(2), 89-97.
- Strader, C. (2009). Author-Assigned Keywords versus Library of Congress Subject Headings: Implications for the Cataloging of Electronic Theses and Dissertations. *Library Resources Technical Services*, 53(4), 243. Retrieved from <http://proquest.umi.com/pqdlink?did=1884842181&Fmt=7&clientId=31537&RQT=309&VName=PQD>
- Svenonius, E. (2000). LCSH: semantics, syntax and specificity. *Cataloging & Classification Quarterly*, 29(1-2).
- Thomas, M., Caudle, D. M., & Schmitz, C. (2010). Trash tags: problematic tags in LibraryThing. *New Library World*, 111(5/6), 223-235. Retrieved from <http://www.emeraldinsight.com/10.1108/03074801011044098>
- Tolkoff, I. (2010). The path toward global interoperability in cataloging. *Information Technology and Libraries*, 29(1), 30-39.



- Tsai, W. T. D. (2001). On subject specificity and theory of syntax-semantics interface. *Journal of East Asian Linguistics*, 10(2), 129-168. Springer. Retrieved from <http://www.springerlink.com/index/W4RH-77H70910K727.pdf>
- USSR Cataloguing Committee (1975). *List of Uniform Headings for Higher Legislative and Ministerial Bodies in European Countries*. London: IFLA Committee on Cataloguing.
- Verona, E. (1975). *Corporate Headings: Their Use in Library Catalogues and National Bibliographies: A Comparative and Critical Study*. London: IFLA Committee on Cataloguing.
- Villén-Rueda, L., Senso, J. A., & Moya-Anegón, F. D. (2007). The Use of OPAC in a Large Academic Library: A Transactional Log Analysis Study of Subject Searching. *Journal of Academic Librarianship*, 33(3), 327-337.
- Wepsiec, J. (1991). Hierarchical Structure of Subject Headings in the Social Sciences. *Cataloging & Classification Quarterly*.
- Working Group on the Organization of Headings for Volu-Minous Authors, IFLA Committee on Cataloguing. (1975). *The Arrangement of Entries for Complex Material under Headings for Personal Authors*. London: IFLA Committee on Cataloguing.
- Working Group on Uniform Headings for Liturgical Works, IFLA Committee on Cataloguing. (1975). *List of Uniform Titles for Liturgical Works of the Latin Rites of the Catholic Church*. London: IFLA Committee on Cataloguing.
- Wyatt, N. (2009). The Ideal Tool: Large-Scale Tagging Projects outside Libraries Put Users at the Center and Offer a Model for Readers' Advisory. *Library Journal*, 134(17): 39-43; quotes p. 39, 42-43. Retrieved from [www.libraryjournal.com/lj/communitypublicservices/855888-276/story.csp](http://www.libraryjournal.com/lj/communitypublicservices/855888-276/story.csp).
- Yi, K. (2010). A semantic similarity approach to predicting Library of Congress subject headings for social tags. *Journal of the American Society for Information Science and Technology*, 61(8), 1658-1672. Wiley Subscription Services, Inc., A Wiley Company. Retrieved from <http://dx.doi.org/10.1002/asi.21351>
- Yi, K., & Chan, L. M. (2009). Linking folksonomy to Library of Congress subject headings: an exploratory study. *Journal of Documentation*, 65(6), 872-900. Emerald Group Publishing Limited. Retrieved from <http://www.emeraldinsight.com/10.1108/00220410910998906>
- Yi, K., & Chan, L. M. (2010). Revisiting the syntactical and structural analysis of Library of Congress Subject Headings for the digital environment. *Journal of the American Society for Information Science and Technology*, 61(4), 677-687. Retrieved from <http://dx.doi.org/10.1002/asi.21295>
- Yu, H., & Young, M. (2004). The Impact of Web Search Engines on Subject Searching in OPAC. *Information Technology & Libraries*, 23(4), 168-180.