

# A Study on Varieties of Subject Access and Usabilities of the National Library of Korea Subject Headings\*

주제 접근의 다양성과 국립중앙도서관 주제명 표목의 활용가능성에 관한 연구

Yeon Kyoung Chung (정연경)\*\*

## ABSTRACT

The purposes of this study are to examine the various methods of subject access in the rapidly changing environment and to suggest the future of subject access in National Library of Korea (NLK). First of all, current status and problems of Library of Congress Subject Headings List as an representative subject headings in the world and the ways of improving effectiveness of subject retrieval were dealt with. As the ways of improving subject access, social bookmarking, folksonomy, tagging, facet applications, automatic assignment of keyword, thesauri, classification system, and auto-assigned search box were suggested. Finally, current status of NLK subject headings and the ways of improving for utilization of the subject headings as subject access were provided.

## 초 록

본 연구는 급격히 변화하는 도서관 환경 속에서 이루어지고 있는 주제 접근 방식의 다양성을 살펴보고 국립중앙도서관의 주제명표목에 관한 분석과 평가를 통해 주제 접근의 미래에 관해 제시하였다. 먼저 주제 접근의 현황과 문제점을 살펴보고 대표적인 주제명 표목인 미의회도서관 주제명표목의 장점과 단점을 바탕으로 주제명 표목의 검색 효율성을 증진하는 방법에 대해 다루었다. 소셜북마킹, 폭소노미, 태깅, 페킷 적용, 저자부여 키워드, 시소러스, 분류표, 자동완성기능 부여로 주제 접근성을 높일 수 있는 방법으로 제안하였고 국립중앙도서관의 주제명 표목의 현황과 향후 주제 접근 활용성을 높이기 위한 방안을 제시하였다.

Keywords: Subject Access, Subject Heading, Retrieval Effectiveness,  
Library of Congress Subject Headings (LSCH), National Library of Korea (NLK)  
주제 접근, 주제명 표목, 검색 효율성, 미의회도서관 주제명 표목, 국립중앙도서관

---

\* This study was carried by 2013 Research Fund from the National Library of Korea.

\*\* Professor. Dept. of Library and Information Science major, Ewha Womans University  
(ykchung@ewha.ac.kr)

논문접수일자 : 2014년 11월 16일 논문심사일자 : 2014년 11월 24일 게재확정일자 : 2014년 12월 9일  
한국비블리아학회지, 25(4): 171-185, 2014. [http://dx.doi.org/10.14699/kbiblia.2014.25.4.171]

## 1. Introduction

### 1.1 Background

The library environments in the 21st century continue to change rapidly. Today, an enormous store of information is easily available through a few keystrokes to anyone with a computer and access to the Internet. In this new information environment, people encounter enormous stores of information that challenge their ability to retrieve and manage it and users have new expectations and needs. So information access and organization are areas of ongoing critical responsibility for libraries. Libraries must offer an access to all information resources, information seekers and researchers who need to locate digital material not only through libraries' online catalogs but also in web repositories and web services.

The explosion of digital information distribution provides researchers easy access to information in all disciplines. While this new environment encourages researchers to contemplate creative and novel formulation from different disciplines, information abundance increases the complexity of traditional information gathering, raises user expectations for information discovery, and challenges the traditional, linear, subject-based access points that library catalogs provide.

Besides, information is proliferating and locating appropriate resources is increasingly difficult. Since traditional organization of knowledge is less relevant, we need to devise ways to optimize existing indexing tools, such as subject headings lists and classification

schemes in order to create enhanced and expanded accesses to resources wherever they may be held. The fundamental challenge is to create quality metadata through standard controlled vocabularies.

### 1.2 Purposes and Research Methods

The purposes of this study were to find various ways of subject access in the 21st century and to concentrate one of the ways - subject headings as one of the best strategies for subject searching. To accomplish those purposes, literature review on various methods of subject access and the comparison among them were carried.

And then one of the method, subject headings were selected and the National Library of Korea Subject Headings (NLKSH) were focused and analyzed. Finally, needs of subject headings of National Library of Korea (NLK) were suggested for subject access for the future.

## 2. Subject Access to Information

### 2.1 Trends of Subject Access

Early online public access catalogs required searchers to decide whether they would utilize natural language terms in title index searches or controlled vocabulary in subject index searches as the best means to discover resources that were relevant to their information need.

However, these days, everyone can be an information expert since there is no way to determine if the information is accurate, reliable, or authoritative. And people seem not to care when they get anything from Google or Wikipedia by keyword searching. Access to resources via keyword searching has led some managers and library administrators to question the need and value of adding controlled vocabularies. Assigning subject headings requires a time-consuming, challenging, and expensive work to do. Some librarians are even questioning whether it is cost effective to do subject cataloging at all, given that most patrons do not seem to use subject searching. So Taylor (1995) mentioned a major element of the coming crisis as an administrative push to cut back to eliminate subject cataloging due to the availability of keyword searching which many people think is sufficient.

Keyword access to titles, tables of contents, summaries, and descriptions have made searching and finding resources easier and many studies have been done to determine whether there is still value in assigning controlled vocabulary. Findings show that subject access to information should be used in conjunction with high-value topical free-text or natural language to provide access to content. Natural language factors such as synonyms, spelling variants, plurals, hyphenations, abbreviations, and numbers as well as the importance of context for meaning and how terminology is used by individual authors can negatively impact both precision and recall in the results of keyword searches. Controlled vocabulary attempts to minimize the adverse effects of these

conditions through controlling synonyms and homographs and through providing related terms (Chan and O'Neil 2010).

Therefore, controlled vocabulary assignment and use facilitate the efficiency and effectiveness of searching. By collocating resources on the same topic, controlled subject vocabularies assist the user in finding those resources of interest to them and excluding those resources that would be of limited value. While keyword access is generally successful for straightforward and simple searches, subject searching allows for more complex, thorough, and focused access to information.

The recommendations of ALCTS/SAC/Subcommittee (1999) identified and specified requirements to the subject control scheme used by accessing information resources in libraries and on the web as follows: be simple and easy to apply to comprehend, be intuitive so that sophisticated training in subject indexing and classification, while highly desirable, not be required in order to implement, to be logical so that it requires the least effort to understand and implement, to be scalable for implementation from the simplest to the most sophisticated.

## 2.2 Current Status and Problems of Subject Searching

Traditional approaches to subject indexing have their advantages and disadvantages. In subject cataloging, the complex syntax of many subject headings enables the provision of context and so renders an access point more expressive. In addition, terms in

controlled vocabularies are linked to a hidden ontology that is implied by broader-term, narrower-term, and related-term relationships, thus providing a hierarchical framework. Because of synonym control and established application policies, searchers can depend on the consistency and greater predictability in retrieval results.

Most of the disadvantages of current subject indexing practice lie in its high costs. It requires a great investment of professional time and resources. Building and maintaining a thesaurus, a subject headings list or a classification system is a time-consuming and intellectually demanding work. Such work is thus costly and unavoidably somewhat behind the times, often discouragingly so. Also, the complexity of the indexing and retrieval systems sometimes discourages searchers so that they are unable to benefit from all that it offers. In reality, subject searching is difficult for patrons, unlikely to be very successful, and becoming less frequent as patrons' behavior is shaped by keyword search engines such as Google. Moreover, subject cataloging is expensive. And another shortcoming is the absence of a direct way to gauge users' viewpoints.

Therefore, it is not unreasonable to question whether it is cost-effective to do subject cataloging at all. However, Gross and Taylor (2005) shows that keyword searching would become much less successful if subject terms were absent from the catalog.

Library of Congress Subject Headings (LCSH) is a controlled vocabulary representing the subject items contained in the Library of Congress (LOC) collections. LCSH has a dual purpose of providing

information seekers access to information on any subject and to provide material on a related topic. So the headings have become the most widely used subject indexing language in the world (Cataloging Policy and Support Office 2007).

However, LCSH is facing the challenges of effective and efficient subject-based organization and retrieval of digital resources. The use of LCSH for information retrieval has been widely criticized for its difficulty of use and its information retrieval effectiveness in online environments. Of the numerous criticisms, difficulties of use and user unfamiliarity are the greatest disadvantages of using LCSH for subject access. Users do not know what term to use in a search that relates to the underlying subject term used in the metadata subject field. If a user knows the exact term to use in search, LCSH can optimize precision and recall. This may only be accomplished if a user has access to subject terms.

So Fisher (2005) discussed common results of the major studies related to LCSH during the period of 1990-2001. She emphasized the needs of flexibility of the LCSH in order to get interoperability and expandability in online environment. And Anderson and Hoffmann (2006) suggested the needs and the possibilities of applying facet syntax in LCSH and focused on the problems of using 13 LCSH examples. Yi and Chan (2010) also identified the effectiveness and the problems of LCSH in digital information environment and they suggested improvements of developing LCSH as an effective subject access tool.

Average users only have a vague notion of what

they are looking for when initializing a search. Users commonly use keywords and phrases they believe are close to their information needs, trying different terms and hoping they match the indexed terms within the metadata. This scenario can only lead to success if the user happens to choose a term that matches the underlying subject headings within the system. The difficulty of the use and syntax of LCSH has been a problem with their use in collection since their creation and it continues in the searches of digital collections. That's why subject-based searching does not seem to be a popular way of querying digital collections (Papadakis et al. 2009).

### 3. Improving Subject Retrieval

With the popularity of keyword use in retrieval, it has been ventured whether there is even a need for controlled vocabularies in a digital environment. So we need to bridge the gap between users' information needs and the terminology employed to develop the underlying subject headings. There are several complementary ways to improve retrieval in subject searching.

#### 3.1 Social bookmarking, folksonomy and tagging

One alternative to subject cataloging is the phenomenon known as "folksonomy". In order to achieve the best result in information organization and index, a bridge between folksonomies and controlled vocab-

ularies is often suggested (Rosenfeld 2005; Chan 2009).

Tagging is a process with a focus on users' choices of terminologies and folksonomy is the resulting collective vocabulary with a focus on knowledge organization, which plays a major role in organizing, accessing, and retrieve resources in the Web 2.0 environment. Integrated library system vendors are embracing a "tagging" trend by offering new OPAC interfaces that support tagging, suggesting that controlled vocabularies and a user-defined classification might continue to coexist for the foreseeable future.

The purpose of collaborative tagging is to provide subject representation and access to facilitate information retrieval for the benefit of users. This is also the purpose of subject indexing, the traditional method of providing subject access to information by way of formal subject cataloging and indexing activities, typically with the use of a controlled vocabulary such as a thesaurus or a subject heading list in libraries.

In the context of social bookmarking, the provider and the consumer of subject information are usually the same people, whereas in the library-information environment, the provider and the user are typically different individuals. In social bookmarking, there has been almost unlimited freedom, but subject indexing is restricted to the use of established terms, applied following firm rules. Professional catalogers apply relatively few headings per item; social bookmarkers provide an abundance of tags. Social bookmarkers are often highly subjective in their tags and comments, catalogers, by a long custom, are objective. Professional cataloging is very expensive, social bookmarking is

done by volunteers. Social tags may be unpredictable; professional indexing is consistent and predictable.

Tags can be used as synonyms for subject controlled terms; they can enrich a vocabulary of controlled systems by making vocabulary up-to-date and more user-friendly. Even more, the idea of using user-added tag (tag clouds) and the terminology of large library (MARC) databases to generate word clusters associated with controlled vocabulary terms and classification seems to be very promising. So we need to allow to users to add reasonable public tags to meta data records created by professionals.

How best to bridge the social bookmarking and subject indexing in order to maximize the benefit of both is a challenge for all those in the field of providing the most efficient and effective subject access tools. There are different ways of achieving this goal. One is to match automatically user-assigned tags with controlled vocabulary terms. There are two ways to do this. The first is to develop a mechanism that maps existing user-assigned tags to controlled vocabulary terms. The second is to suggest controlled vocabulary terms to users during the tagging process. Ideally, a parallel operation would make it possible to include cross-references from controlled vocabularies in the search engine. Incorporating the advantages of controlled vocabulary should greatly facilitate the process of social bookmarking and at the same time enhance its value and usefulness.

### 3.2 Faceted application

Recently, faceted search and navigation have be-

come a popular method for allowing users' accesses to underlying subject index within collections. In a faceted system, terms are listed in separate groups, each group representing a facet that contains terms that share the same characteristics, such as concept, object, time, place, language, genre and so on (Chan and O'Neil 2010).

The facets allow users to navigate or browse items related to the search term used. An interface using faceted navigation shows the user a preview of where to go next and how to return to the original search results. Faceted navigation has recently become the principal method for interfaces for navigating digital library collections (Heast and Stoica 2009).

The faceted interfaces do a good job of allowing users to navigate different bibliographic categories. For example, in the Arizona memory site ([azmemory.azlibrary.gov/](http://azmemory.azlibrary.gov/)), a user can browse the different attributes of subject, format, creator and date of digital items within the collection.

Other examples are as follows: Harvard University Hollis libraries (<http://library.harvard.edu/>) interface using faceted navigation, using an interface from Aqua Browser. University of Chicago Digital Library (<http://lens.lib.uchicago.edu/>) interface using faceted navigation, using an interface from Aqua Browser. And North Carolina State University Library (<http://www.lib.ncsu.edu/>) interface using faceted navigation, using an interface from Endeca.

Faceted Application of Subject Terminology (FAST) is a controlled vocabulary based on the terminology of LCSH. FAST consists of headings which are categorized into seven subject facets and one

form/genre facet. When FAST headings are presented as tag clouds, users can quickly see what subjects have been applied to a work. In a cataloging environment, access to aggregations of headings can lead to more efficient workflows, especially for the cataloging of new editions of existing works. Library staff members might also be more likely to notice and correct erroneous headings since they stand out among the correctly assigned ones. In the end user environment, FAST can be used to improve browsing and navigation (Chan and O'Neil 2010).

### 3.3 Author-assigned keywords

Author-assigned keywords, data in the title, and abstract are all comprised of more natural language and may guide the cataloger's choice of subject headings. The controlled and uncontrolled vocabularies are complementary tools for helping users find the materials that they need. Using both author-assigned keywords and subject headings to the bibliographic record, it is clear that two vocabularies augment and complement each other. The weaknesses of keywords are the strengths of a controlled vocabulary and vice versa so that, each vocabulary has usefulness in connecting users with resources. When the characteristics of keywords and subject headings inevitably increase their uniqueness, the resulting record is made more useful, not less. Through their uniqueness, both vocabularies provide distinct terms for discovery in the catalog and keywords and subject headings complement each other in the library catalog.

### 3.4 Thesauri

A thesaurus is a useful tool in information retrieval and bridges the gap between the term indexed in metadata and the keywords used by a searcher. Taylor and Jourdre (2009) list four differences between subject headings and Thesauri. Thesauri are made up of single terms and bound terms representing single concepts (often called descriptors). Bound terms occur when some concepts can only be represented by two or more words. Thesauri are more strictly hierarchical. Because they are made up of a single term, each term usually has only one broader term. Thesauri are narrower in scope. They are usually made up of terms from one specific subject area. Thesauri are more likely to be multilingual than subject heading lists. Because single terms are used, equivalent terms in other languages are easier to find and maintain.

Access of this detail provides users with an accurate list of terms for subject access and promotes matching between query description and item description. Instead of hoping their search term will match an underlying subject term, users can choose the appropriate term that will improve precision and recall from a collection.

Recently, Visual Thesaurus (<http://www.visualthesaurus.com>) - an online thesaurus and dictionary of over 145,000 words that you explore using an interactive map came out as a tool for people who think visually and choose words they want.

Graph Words (<http://graphwords.com>) is an online thesaurus to help you explore English dictionary and find meanings of words and their associations in

easy way.

Visualization techniques can be used to leverage the semantic structure of thesauri to create exploratory search interfaces to support browsing and navigation. One way to enhance information retrieval using thesauri is to give users visual access to the controlled vocabulary being used in the collection.

### 3.5 Classification scheme

An integrated retrieval tool of verbal expressions based on a classification scheme seems to be another solution, as the classification scheme supports: browsing and retrieval capability of system, creation of hierarchical structure, easier identification of concepts, display of subject relationships between terms, and switching language in multilingual environment. Verbal controlled scheme supports above all synonymous and homograph control, and usage of current and expressive captions, since a notation of classification scheme can give a context to the verbal search term.

### 3.6 Auto-suggest search box

The interface uses an auto-suggest search box that prompts the user to input the first few letters of their search term. The search box then generates a list of subject headings and the user can select from the list the term that best matches their information need. This process can be repeated until the subject heading appears is appropriate for the user's information need.

Having access to the subject headings and using the correct subject heading improves precision and recall in the search results. Access to a display of the subject headings using this automated pattern-matching technique is the most effective way available for utilizing subject access. The system assists users in choosing the correct term to use the matches the underlying subject element within the metadata and also teaches users how subject headings relate to their keywords. The researchers claim "during the search process, users enhance their cognitive learning, since they are able to discover which subject headings correspond to their information needs (Papadakis et al. 2009).

## 4. Subject Access in National Library of Korea

### 4.1 National Bibliographic Control Division

Task Force Team for the Bibliographic Information Center in National Library of Korea was set up in February 12, 2010, and the team worked very hard for designing and reorganizing the future of information organization. Due to their efforts, in April 17, 2012, National Bibliographic Control Division was established.

Now, NLK is making efforts to implement such projects as The Library at Your Fingertips, through which people can have access to the library whenever and wherever they want.



Special concern on standardization in subject access field among libraries and information centers at national level in Korea was needed in the early 21st century. However, at that time, there was no subject headings in Korea and no guidelines for subject indexing. Only Korean Decimal Classification (KDC) has developed by a committee of Classification Division in Korean Library Association (KLA) since 1964.

#### 4.2 National Library of Korea Subject Headings

The beginning of the development of Korean subject headings in thesaurus type post-coordinated indexing terms has begun in 2002. Post-coordination requires the searcher of the system to coordinate the terms. So each concept is entered discretely, without any stringing together of sub concepts, place names, time periods, or form. Searchers must combine terms using Boolean techniques, so library users who are used to using a keyword searching is easy to use if they choose subject headings correctly.

After developing NLK subject headings, unfortunately, due to the poor management of the system developing company, addition, revision, quality control of NLKSH and the development of system have not managed at all since 2007. So NLKSH has existed but has not activated usage of it by library users although subject headings have assigned by catalogers in NLK. And there was a lack of guidelines for subject indexing and subject authority file.

#### 4.3 Enhancement of the National Library of Korea Subject Heading List

Finally, the time has arrived for analysis of current situation regarding NLKSH. A five months research project called “A study on enhancement of the Subject Heading List for the National Library of Korea” has been conducted since 2013 for a better subject access in NLK.

Among the 560,563 NLKSH, 45,830 subject headings that have been used at least one time in 650 field in bibliographic records, 1,124 subject headings that have been used over 100 times in 650 field and their 30,997 relationships, been never used 285 subject headings and their 1,144 relationships, and newly requested 3,607 subject headings were analyzed for the quality of NLKSH.

Several problems were found in the analysis of NLKSH as follows: improper preferred subject headings, duplicated subject headings, inconsistency of rule of describing subject headings, unclear relationships among subject headings, inconsistency of applying hierarchical relationships, unclear meaning of subject headings due to multi Broader Terms (BTs), setting up Narrower Terms (NTs) for subject headings of having same spellings with different meanings, ambiguous meaning of subject headings, poor currency of subject headings, unnecessary relationships of subject headings, inaccurate classification numbers for the subject headings, poor guidelines for new subject headings and inconsistent application of the manual of NLKSH (Chung and Choi 2014).

Survey questionnaires by 32 librarians in Biblio-

graphical Division were carried to find problems of using NLKSH in August 22nd, 2013. The questionnaires were as follows: general information (age, sex, major duties, and professional experiences), assigning of NLKSH, using of NLKSH system, usefulness of NLKSH manuals and the quality control of NLKSH.

The results were as follows: Most librarians were interested in assigning of subject headings. However, their time to spend for subject heading works were less than 30% of their workload. The most difficult thing was no subject heading in NLKSH when they wanted to assign. And the next one was no existence of guidelines for assigning proper subject headings. Whenever they found no proper subject headings, most librarians assign subject headings that have similar meanings (50%), or assign subject headings among broader terms (31.3%), or assign unauthorized subject keywords (6.3%) or do not assign any subject headings (6.3%). Most librarians want to improve the quality of subject headings (75%) and get guidelines or manuals for assigning proper subject headings (15.6%). Their satisfaction of NLKSH was pretty low (21.9%) and average (31.3%). Their inconvenience of the NLKSH system were overall process of using system (40.6%), retrieval methods and conditions for subject headings (25%), and the final results of searching subject headings (9.4%). Most librarians thought the manual of NLKSH was better than nothing (31.3%), hard to evaluate (25%), very helpful (25%), sometimes useful (15.56%) and almost useless (3.1%). Most librarians want to improve several parts in manual such as the principles of

assigning subject headings (62.5%), methods of deciding subject headings (21.9%), and detailed explanations with some examples of using each describing principles (6.3%). And they also want to improve NLKSH in the aspect of selection of subject headings in NLKSH (56.3%), standard of selecting preferred subject headings (18.8%), building relationships among subject headings (12.5%), and the way of writing qualifiers (3.1%). However, with regards to the quality of NLKSH, less than a half of librarians (43.75%) satisfied in average level and 10 librarians (31.25%) were not satisfied the NLKSH in general. As a way of quality control of assigning of NLKSH, to examine quality of NLKSH was the first ranked (56.3%) and the second one (34.4%) was the hiring professional librarians who were in charge of assigning and doing quality control NLKSH. The lack of new subject headings in NLKSH was ranked as the first problem (50%), and ranked as a second problem (34.4%). And the next problem of NLKSH was the nonexistence of proper NLKSH to express the subject of works. Regarding to the usefulness of KDC and DDC number in NLKSH, 15 librarians (46.9%) mentioned that it would be helpful and they mentioned that those would be helpful (68.8%) and would be very necessary (18.8%). Most of them also felt that KDC and DDC should be updated when the schedules were revised.

Advisory meeting with subject heading experts from KISTI research library and Library and Information Science schools, these finding were discussed and several solutions for the problems were suggested as follows:

First of all, preferred subject headings should be checked and corrected in bibliographic records and a function of extending UF subject headings in search engines are needed. Synonyms of a subject heading needs to be explicitly listed through the equivalence relationship using USE and UF.

Second, standards for building USE subject headings should be suggested according to the best practices in other countries' and there should be a committee for reviewing NLKSH in regular. A working group consisting of special senior catalogers in NLK and professors in information organization fields is necessary to approve new subject headings and to change or revise preferred terms. Maintenance of subject headings' cross-references, use of current terminology that had not yet been included in subject heading list, and use of non-topical keywords must be maintained to facilitate searching, since it provides links from current to established terminology.

Third, there is a need to review how to describe the subject heading such as a word spacing, capital letters, special letters and qualifiers. Homograph control should be practiced in subject headings through a specific syntactic form, the qualifier. All of these should be included in the manual of NLKSH clearly.

Fourth, simple but core relationships among subject headings should be controlled well after deleting never used relationships in NLKSH. Ninety seven possible relationship exist to input, but most relationships were RT, BT, NT, KEN, ENG, KDC, DDC, USE, and UF. Although building hierarchical and associative relationships is very time-consuming, these relationships are valuable, and we have to in-

crease their use and focus to improve information retrieval.

Fifth, criteria of BT, NT, and RT relationships need to be included in manual of establishing subject headings. An independent heading ideally represents a mutually exclusive a single concept, but headings with too many node (implying overly broad concept) or too few nodes (implying overly specific concept) are less useful for providing semantic information.

Sixth, non-used subject headings need to be analyzed and kept them for future use in NLKSH. Unmatched subject headings in subject searching and no proper subject headings in NLKSH increase unique access points and thereby foster discoverability.

Discovery can also be improved by providing users with a variety of approaches to an item through the catalog, particularly for those unfamiliar subject headings. The more unique terms in subject heading list are present (less matching), the more access points are provided to an item. Conversely, the more matching terms are present (less uniqueness), the more of a boost an item receives from relevance ranking.

The higher the uniqueness rate between headings and keywords, the more important cross-references become. The lack of maintenance of the cross-references interferes with the capacity of NLKSH to remain current.

Seventh, more user-friendly search interfaces are needed for NLKSH search. Whatever the user use in search box, the system should have an automating switching and provide the one the user wants.

Eighth, there is a need to introduce a structure

or function of subdivisions although it is hard to apply it now. It will increase uniqueness and specificity of results but it will also cause subject headings to be more difficult to match user query and to become more complex. Specificity may be achieved by assigning additional headings to bring out specific aspects of a topic or by applying representative facet indicators such as place and time.

Ninth, NLKSH should be linked to the KDC equivalent notations. Controlled vocabulary structure is tied to a classification scheme so that relationships between indexing terms can be expressed more definitely. Candidates of controlled terms are chosen with document in hand from bottom up in order to suggest terms as specific as needed. It is time to consider possible relationships between subject authority records and classification (Baek and Chung 2014).

Based upon the analysis and comparisons of best practices of other subject headings lists and other thesaurus, the ways to accomplish the high quality trends in NLKSH can be provided. Also, short term and long term plans for improving NLKSH are needed to provide a better subject access system and making a cooperative and sharing plans with related organizations.

## 5. Conclusion

The explosion of internet access, digital online resources, increased availability of information services and advanced search engines have produced a new type of library users who have a keen sense of expectation, demand remote access, expect more

precise information, and are very impatient. In addition, within Web 2.0, users are both content consumers and content providers. User's requirements have changed significantly, especially as a result of the impact of the Web. Consequently the services providing subject access need to adapt to these changes. Libraries must provide subject access to relevant, current, and valid information in user-friendly and highly valuable manner to meet search criteria of users of all types.

So many libraries intend to develop "new generation" or "next generation" catalogs that would support a simpler access to information like Google and other Web services do. "Next generation" catalogs will provide an easier and friendlier search option by exploring fully subject categorization and classification in faceted browsing and clustering. Faceted browsing based on subject controlled terms deliver more precise results while offering a range of refining options. So the "next generation" library catalog with more sophisticated faceted and clustering option should be implemented.

Unfortunately, budget pressures and increased workloads are causing cataloging departments to look for ways to capitalize on the resources they have. Many cataloging departments have experienced the effects of tightening budgets. Catalogers are forced to choose between quality, quantity, and timeliness.

To discover, identify and create new ways of subject access has been a very demanding task, both in the past, and in the present, and it will be in the future as well. The first step is to examine users' needs and create the subject access tools which are

able to meet their criteria. The second one is to fully explore potential flexibility in the current systems of subject access, potential abilities of information technologies in subject analysis area, potential funding strategies and partnerships.

The NLK strongly believes that information is one of the most significant resources for national development and it is very important to how to organize and access to them. So one of the important issues is to improve the quality and speed of subject cataloging. We do not want to compete with search engines, but the speed of providing information is important for the end-users. Another important issue is to help catalogers and library users in finding the best term in the complex network of relationships.

Currently, our greatest challenge is to explore potential enhancement of the terminology of NLKSH since it will serve as a base platform for creating other user-friendly organizing tools. There is a need to introduce features such as tagging and faceted browsing into the NLK OPAC. By doing this, NLKSH can be substantially enriched by consulting folksonomies with three goals in mind: to gain user's perspectives, to understand user's searching behavior, and to enhance subject access terms. These two methods represent considerably different approaches, but there is potential for a user benefit in capturing the best from both. Furthermore, for those responsible for creating and maintaining controlled vocabularies,

folksonomies provide a rich source for suggesting terms (both valid terms and lead-in terms) for inclusion in the NLKSH. But in order to make library users to tag whenever they use library catalog, there should be a well prepared library instruction on tagging process. Otherwise, they will seldom tag since it takes time to do it and most people are easy to ignore tags if they do not know the meaning of it as a subject access.

And also, we should explore the direct or indirect mapping among various subject heading lists, thesauri, and library classification schemes. Issues such as heading currency, literary warrant, aboutness, uniqueness, utility, and complementariness of subject headings all contribute to conclusions regarding the continuing assignment, construction or maintenance of subject headings. As one of the methods of improving subject searches, an attempt to map the NLKSH to the notations of the Korean Decimal Classification will be a meaningful initiative.

In the end, we should continue to create NLKSH as a standardized system of controlled vocabularies which could serve the needs of catalogers and library users. We should offer a NLK OPAC as an organizing tool not only to retrieve materials, but to tag materials as well, since library users would like to use a standardized indexing and retrieval tool, but simple in structure, in syntax, and with up-to-date terminologies.

## References

- ALCTS/SAC/Subcommittee. 1999. "Subject Data in the Metadata Record: Recommendations and Rationale" *A Report from the ALCTS/CCS/SAC/Subcommittee on Metadata and Subject Analysis*. July 1999. [cited 2014.10.10]. <[http://www.ala.org/alcts/resources/org/cat/subjectdata\\_record](http://www.ala.org/alcts/resources/org/cat/subjectdata_record)>.
- Anderson, James and Melissa Hoffmann. 2006. "A Fully Faceted Syntax for Library of Congress Subject Headings." *Cataloging & Classification Quarterly*, 43(1): 7-38.
- Arizona Memory Project. 2010. *Arizona Memory Project Home Page*. [cited 2014.10.10]. <<http://azmemory.lib.az.us/>>.
- Beall, Jeffrey. 2007. "Search Fatigue." *American Libraries*, 38(3): 46-50.
- Cataloging Policy and Support Office. 2007. *LCSH: Pre vs Post Coordination and Related Issues*. [cited 2014.10.10]. <[http://www.loc.gov/catdor/cps/p/pre\\_vs\\_post.pdf](http://www.loc.gov/catdor/cps/p/pre_vs_post.pdf)>.
- Chan, L. M. 2009. "Social Bookmarking and Subject Indexing." *Paper Presented at the Satellite Pre-conference, IFLA Classification and Indexing Section, Florence, Italy*. [cited 2014.10.10]. <<http://www.ifla2009satelliteflorence.it/meeting2/program/assets/Chan.pdf>>.
- Chan, Lois Mai and Edward T. O'Neil. 2010. *FAST: Faceted Application of Subject Terminology*. Westport, CT: Libraries Unlimited.
- Engelson, Leslie. 2013. "Correlations between Title Keywords and LCSH Terms and Their Implication for Fast-Track Cataloging." *Cataloging and Classification Quarterly*, 51: 697-727.
- Fischer, Karen. 2005. "Critical View of LCSH, 1990-2001: The Third Bibliographic Essay." *Cataloging & Classification Quarterly*, 41(1): 63-109.
- Gorman, Michael. 2004. "Authority Control in the Context of Bibliographic Control in the Electronic Environment." *Cataloging and Classification Quarterly*, 38(2004): 11-22.
- Gross, Tina and Arlene G. Taylor. 2005. "What Have We Got to Lose?: The Effect of Controlled Vocabulary on Keyword Searching Results." *College & Research Libraries*, 66(3): 212-230.
- Hearst, M. and E. Stoica. 2009. *NLP Support for Faceted Navigation in Scholarly Collections*. [cited 2014.10.10]. <<http://www.aclweb.org/anthology/W/W09-3608.pdf>>.
- Papadakis, L., K. Konstantinos, R. Marvopodi, and M. Stefanidakis. 2009. "Subject-based Information Retrieval within Digital Libraries Employing LCSHs." *D-Lib Magazine*, 15(9/10). [cited 2014.10.10]. <<http://www.dlib.org/dlib/september09/papadakis/09papadakis.html>>.
- Quintarelli, Emanuele. 2005. "Folksonomies: Power to the People." *Paper Presented at the ISKO UniMIB Meeting, Milan, Italy, June 24*. [cited 2014.10.10]. <<http://www.iskoi.org/doc/folksonomies.htm>>.
- Rosenfeld, L. 2005. *Folksonomies?: How about metadata ecologies?* [cited 2014.10.10].

<[http://www.louisronsenfeld.com/home/bloug\\_archive/000330.html](http://www.louisronsenfeld.com/home/bloug_archive/000330.html)>.

- Taylor, Arlene G. and Daniel N. Joudrey. 2009. *The Organization of Information (3rd ed)*. Westport, CT: Libraries Unlimited.
- Trant, J. 2009. "Studying Social Tagging and Folksonomy: A Review and Framework." *Journal of Digital Information*, 10(1): 1-44.
- Voss, Jakob. 2007. "Tagging, Folksonomy & Co - Renaissance of Manual Indexing?" *In Proceedings of the 10th International Symposium for Information Science. Cologne, Germany. May 30-June 1, 2007.* [cited 2014.10.10]. <<http://hdl.handle.net/10760/9657>>.
- Yi, Kwan and Lois Mai Chan. 2010. "Revising 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.
- 백지원, 정연경. 2014. 국립중앙도서관 주제명표목표 검색 시스템 개선 방안에 관한 연구. 『정보관리학회지』, 31(1): 31-51.
- 최윤경, 정연경. 2014. 국립중앙도서관 주제명표목표의 고품질화 방안에 관한 연구. 『한국문헌정보학회지』, 48(1): 75-95.

• 국문 참고자료의 영어 표기

(English translation / romanization of references originally written in Korean)

- Baek, Jiwon and Yeon-Kyoung Chung. 2014. "A Study on Improving Access & Retrieval System of the National Library of Korea Subject Headings." *Journal of the Korean Society for Information Management*, 31(1): 31-51.
- Choi, Yoon Kyung and Yeon-Kyoung Chung. 2014. "A Study on Improvements for High Quality in National Library of Korea Subject Headings List." *Journal of the Korean Society for Library and Information Science*, 48(1): 75-95.