Transferring intended messages of subject headings exemplified in the list of Korean subject headings

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Abstract:

This paper focuses on meaning as the core concern and challenge of interoperability in a multilingual context. Korean subject headings, presently translated from English, crystallize issues attached to the semantics of translation in at least two languages (Korean, with written Chinese, and English). Presenting a model microcosm, which explains grammatical and semantic characteristics, and allows a search for equivalence of headings that have the closest approximation of semantic ranges, the study concludes the necessary conditions for linking multilingual subject headings and suggests an interoperable model for the transfer of meaning of headings across languages and cultures.

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by
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Introduction

In the global age of the Internet and with a variety of intellectual domain metadata schema alternative to MARC on the Web, a tremendous synergy for interoperability has burst onto the center stage of the professional consciousness in a way never seen before. The information workers who had never thought about crossing the boundaries of information traditions (libraries, archives, museums, search engines, and the publishing industry) are now increasingly musing on knowledge organization system (KOS) design and doing so across cultural and linguistic domains. Those of us in cataloging and classification, where knowledge organization has long been a core, if not *the* core, concern, are faced with a unique mix of challenges. Among the variety, heterogeneous languages and cultures are particularly key concerns to makers of content standards (AACR, subject heading lists, classification systems). In a NISO white paper, Clifford Lynch states that a rethinking of creation models requires the re-conceptualization of increased user support in making subject heading lists. [1] The idea of open ended vocabulary system is an essential part of the multilingual subject heading lists and thesauri that will comprise a virtual authority control. In what ways should we – all catalogers – re-conceptualize the making of an open ended vocabulary system for multilingual subject heading lists and thesauri, which will have increased user support and which will eventually comprise a virtual authority control?

My purpose here is to draw attention to the fact that the need and challenges to focusing on transferring meaning (i.e., intended messages) is the core concern in addressing interoperability, especially when crossing cultural and linguistic boundaries. The need and challenges present us a great potential and importance in KOS design and also for further research. Semantic interoperability (SI) has been identified as being of primary importance in digital libraries, [2] having its goal to facilitate complex and more advanced, context-sensitive query processing over heterogeneous information resources. The major concern of SI is in the

ways of processing shared information between different systems so that it is consistent with the intended meaning both in encoded queries and presented information, regardless of the source of information. One of the prerequisites for enhancing SI is the provision of KOS design that determines semantic proximity and supports semantic reconciliation regardless of language/script used in resources. This is a central challenge in building a coherent information environment out of the increasingly disparate metadata systems in development on the net.

Meaning in linguistic study and searching for models:

> Never to ask for the meaning of a word in isolation, but only in the context of a sentence; never to lose sight of the distinction between concept and object. [3]

In designing and developing KOS for subject access that transfers meaning across linguistic and cultural boundaries on the net, capturing the cognitive differences in writing systems (alphabetic and ideographic) is critical. [4] Crossing the boundaries of cultures and languages in a networked environment, dissonance in meaning at indexing and at searching multiplies and proliferates. The ways of seizing the intended meaning in a multi-linguistic and culturally networked world that will enable and enhance interoperable contexts must be sought.

In depth study and the significance of the language component of subject analysis from a linguistic point of view is a relatively recent awareness, [5] and is generally made without particular regard to meaning, further lessening the value of their contribution to subject analysis where results are not of much use without meaning. This general tendency to dismiss meaning as contained in subject headings is not surprising, because "meaning has come to be widely regarded as a legitimate object of systematic linguistic interest only within the past decade," as observed by Howard Maclay in 1971. [6] To the ordinary speaker of the language, meaning is a perfectly obvious feature of language. Yet the obviousness of meaning in words is matched by its eel-like slipperiness so that even as linguists try to catch it, it remains as the most intractable problem of linguistics. This paradoxical nature of meaning undoubtedly affects subject headings.

No account of subject headings which ignores this vital factor can possibly be adequate. The existence of meaning is acknowledged in everything from the very purpose of subject cataloging (i.e., to list under one uniform word or phrase all the works on a given subject) to Cutter's advocacy for public usage, the principle of specificity and uniformity, the use of parenthetical qualifiers and subdivisions to resolve ambiguity, and most distinctly in using the

syndetic structure for related terms. Yet one of the great weaknesses of the storage and retrieval process is the necessity for describing a subject in language that is extremely precarious without context and that is constantly in the state of change. Matching concepts represented in subject headings with ideas that are dealt within a document, assumes the indexer's knowledge of the intended message or meaning of subject headings and that of the document: its "aboutness" as found in the words of R.A. Fairthorne. [7] However, what exactly constitutes this "aboutness" or what unequivocally constitutes a subject heading is not clear. Different individuals at various times and in various places will read a different "aboutness" or a different meaning into the same subject heading, let alone the false assumption that there will be then a mirror synergy between the indexer and searcher even in one language environment. [8] In addition, since the terminology is always changing and ambiguity does occur in the same culture, even in classification, it is necessary to find some adequate means of dealing with constant change to provide clarity and prevent ambiguity.

A rigorous method of defining or evaluating the meaning of individual subject headings has not been examined to any significant degree from the linguistic point of view in our literature. Well-known textbooks provide few guidelines in this respect. [9] Frequently, cross-references and the shelf list are employed simultaneously as an authority which helps determine the meaning and usage of subject headings. There is, though, a phenomenologically different experience for the researcher/designer on one side and the user on the other, who has no practical access to cross-references or the shelflist. The user almost always knows less about the indexing issues in a topic area than the indexer does, as M. Bates states, and the same phenomenological gap holds true for the match between the system user and bodies of data that have been automatically indexed by some algorithm. [10]

The climate of the 20th and 21st century libraries has elevated the concept of subject analysis from that of a mere convenience to the level of unavoidable necessity, as evidenced in a variety of recent projects attempting provide solutions. [11] Ambiguities associated with words, the raw material of subject headings, have obviously been observed by linguists as well as librarians. Ambiguity increases as boundaries of languages are crossed, intensified by the translation processes, mainly because of different semantic structures. [12] The magnitude of this problem cannot be over-estimated in order to succeed in worldwide bibliographic control.

Translating subject headings from English into those of other languages has been indicated thus far as unsuccessful. And yet, there is a basis for communication that unites mankind more than divides it and also enables peoples to share the common core of human experience, even in cases of very disparate languages and cultures. In other words, where the user of a language, A, can understand the intent of subject headings, A, the basis for subject bibliographic control lies with the user comprehending the intent of subject headings, B, in his native, A. This basis provides a possibility of subject approach which will limit or narrow the meaning of subject headings in one language so that this can be transposed in headings of another language. It is important, then, to study an objective means that can account for the meaning of subject headings by delineating their semantic range.

Multilingual controlled vocabularies are treated as a special case of interoperability in ANSI/NISO Z39.19-2005, having a significant role played by issues of specificity and cultural context for the selection of terms and the creation of various types of relationships. [13] Three approaches (building a new thesaurus from the bottom up, combining existing thesauri, and translating a thesaurus into one or more other languages) are identified in the *Guidelines for Multilingual Thesauri*. [14] Of nine methods for achieving interoperability, presented by Marcia Zeng and Lois Chan, the following two methods seem to apply for multi-lingual and multi-script interoperability: (1) translation/adaptation, and (2) switching. [15] With a backdrop of research undertaken to uncover an objective means by which semantic areas of subject headings can be studied so that the meaning of subject vocabulary can be delimited and accounted for to gain a predictable response across language and cultural boundaries, [16] this paper will discuss and present necessary and sufficient conditions for the transfer of intended messages of subject headings in one language, English, to the same messages in another language, Korean.

Comparative semantic analysis: Linguistic explanations

The creation of *hangul* 한글 (Script of the [Korean] Han people), written Korean, devised by King Sey-Cong ca. 1446, was a linguistic triumph with a fully phonetic alphabet consisting of 24 letters – 14 consonants and 10 vowels. The consonants and vowels are employed in a fashion similar to a syllabary, as shown in the following sentence: 오늘 하루도 좋은 하루 되세요 [wishing you another good day]. As given here, Korean writing system combines the letters together into syllabic blocks, placing one or more spaces between words and with the traditional direction of writing

vertically in columns from top to bottom and from right to left. The sentence above is composed of alphabetic letters from left to right in the following sequence, ㅇㅗㄴㅡㄹㅎㅏㄹㅜㄷㅗㅈㅗㅎㅇㅡㄴㅎㅏㄹㅜㄷㅗㅣㅅㅔㅇㅛ.

Originally written using "*hanja*"한자漢字, or Chinese characters (ideograms), the Korean language is now mainly written in *hangul*한글, the Korean alphabet, optionally mixing in *hanja*한자 to write the nouns and verbs or Sino-Korean words in sentences. In Korean, a mixed writing system combining Chinese characters (*hanja*한자) and Korean alphabets (*hangul*한글) has been a norm, expecting high school children to learn at least 1,800 *hanja* 한자by the end of high school, and is found in most scholarly writings – academic papers and official documents. The most ideographic system is Chinese *hanzi*, using meaningful shapes, called logograms or ideograms. A logogram is a single written character which represents a complete grammatical word and which corresponds to meaningful words or phrases, imparting a meaningful concept rather than a sound and thus, providing no pronunciation clues to the reader. [17] Setting up a *conceptual* framework via the same *writing system*, *hanja*漢字, Chinese漢字 is one of the most important and powerful communication vehicle amongst those with very different cultural, national, ethnic and linguistic backgrounds. Both Korean and Japanese have radically different grammars, necessitating many adaptations to make Chinese characters work in those languages. [18] The abundant synonymous gerund expressions and homographs in Korean reflect the fact that about 50 - 70% of Korean vocabulary come from Chinese and the companion use of *written* Chinese characters which are ideographic in nature and rarely redundant.

Chinese characters, *hanja*한자, are frequently used as clarifiers and as a means of disambiguation in Korean scholarly writings in order to overcome ambiguity of meaning. Subject headings in Korean are no exception, as in *ko-lay*고래(鯨) for *Whales*, *cwi*쥐(鼠) *Rats*, and *kay*개(犬) Dogs. The pertinent point to observe here is the fact that all the Chinese characters in parenthesis, i.e., *hanja*漢字, match their counter Korean words in the intended message or meaning *only*, but not in sound nor in the number of syllables. Using *hanja*漢字,

Chinese characters, as in the case of *mal*말, disambiguates its meaning. The word *mal*말means "language" when it is accompanied by *mal*말(語), where as it means "horses" when accompanied by *mal*말(馬). When the shifts and ambiguities in intended messages occur due to the unique Korean linguistic characteristics (Korean personal surnames [19], two different sets of numbers (Sino-Korean and native Korean), the honorific dimension of terminology at extra layers for the same entity, and scholarly writing practices in noun expressions, including word boundaries, [20] to name a few), often *hanja*漢字, Chinese characters, are necessary for alignment in meaning. The degree of control of these grammatical structures, which are different and unique, is an index to how much difficulty would be encountered in a translation of meaning and its linking of subject headings across languages.

Approaches to semantic analysis:

Two approaches – denotational analysis and distributional analysis – explain the contextual restrictions needed for the appropriate interpretations of an intended message in a heading. In what ways the transfer of intended messages in English subject headings to those in Korean has occurred are examined denotationally in terms of a match, partial match or no match. [21] A perfect match of meaning between subject heading sets which have the same *sense* and refer to the same *referents*, is determined lexically [22], morphologically and syntactically, as in the subject headings in the previous paragraphs. Verbal redundancy is necessary to reduce ambiguity of headings; as H.A. Gleason states, "Redundancy is not an imperfection in language, but an essential feature, without which language would be inoperative." [23] Verbal redundancy by *hanja* 한자, which help fix ideas, sufficiently reduces ambiguity of headings by minimizing the distance between name and sense, as in the heading, hemp, *sam* 大麻. In addition, written Chinese aids in the selection of one denotational meaning out of the multiple lexical entries. There remains the question of whether full semantic interpretation of headings in Korean can be sufficiently limited by the denotations supplied by written Chinese, a type of a verbal qualifier or gloss, a functional context providing semantic weight for subject headings.

Semantic components:

In determining the closest verbal equivalent between two languages, translation of subject headings cannot be merely the matching of symbols (i.e. word-for-word comparisons), but must also include the interpretation of *senses* and the identification of *referents*. All approaches to the semantic analysis of natural languages are based on the insight that the meanings of lexical items are not unanalyzable or indefinable wholes. This insight has been made explicit in the essential systematic analysis of semantics, which is perhaps better known under the title "Componential Analysis." As one of the widely known and fruitful applications in semantics, "componential analysis is founded on the notion of semantic contrast: expressions are assumed to contrast simultaneously on different dimensions of meaning … within different semantic systems." [24] Because contrastive elements or factors are semantic features (or components) for which componential analysis is necessary to posit in order to account for all significant meaning relations, it is also particularly relevant for the study of translation and linking of subject headings. The semantic components not only consider the form of a word, what Lyons calls *grammatical words*, or tags which are realized only by phonological words, [25] but they also consider the referents and their senses. With the reference of a word, linguists and philosophers mean the **ostensive** definition by pointing to or otherwise indicating the referents (when used as a referring expression to refer to a particular object) of the word. The sense(s) of a word means the place in a system of relationships which is contrasted with other words in the vocabulary; it is also known as readings.

Because componential semantic analysis must start with small, clear, sub-systems, developing thereby the necessary basic concepts, one of the subject headings, *Man*, is selected and this selection gathers eleven English words. The matrix below provides an example of fairly restricted domain of meaning.

Semantic Specifications as Displayed in a Matrix

|		HUMAN	MATURITY	MALE	COMMENTS
1. Man	(a)	+			+HUM……… 👤 👤 👤 👤
	(b)	+	4	+	+HUM+MAT+MALE … 👤
in-lyu 인류	(a)	+			+HUM……… 👤 👤 👤 👤
2. Woman		+	4	−	+HUM+MAT-MALE .. 👤
ye-ca 여자		+	4	−	+HUM+MAT-MALE .. 👤
3. Young men		+	3	+	
cheng-so-nyen		+	3	+	
청소년					
4. Young women		+	3	−	
ye-ca-cheng-nyen		+	3	−	Contradiction (oxymoron)

여자청년	
...	
11. Animals	–
*tong-mul*동물	–

The above table is based on the componential analysis, expressed in binary system below:

Binary	+HUM human	+MALE	*male*
Systems	-HUM brute (animal)	-MALE	*female*

Multiple	{	1 MATURITY
Systems		2 MATURITY
		3 MATURITY
		4 MATURITY

Expressed in Binary Systems, 1 and 2 MATURITY can be expressed as –MATURITY while 3 and 4 can be expressed as + MATURITY.

A convenient way to represent components on paper is a tree structure (below) which assigns some distinctive sequence of capital letters to each system, and a different prefix to each term within the system. The relation of componential synonymy, like that of cognitive synonymy (equivalence of truth value), is independent of variations by register, emotive association, etc. For example, *adults* is clearly a formal term and ***grown-ups*** a colloquial one; this does not prevent us from regarding them as synonymous. Synonymy is mutual logical inclusion, comprising the same semantic representation. Hierarchy is logical inclusion. Antonymy is logical exclusion.

Componential Tree Structure

(Ten encircled words are used as subject headings.)
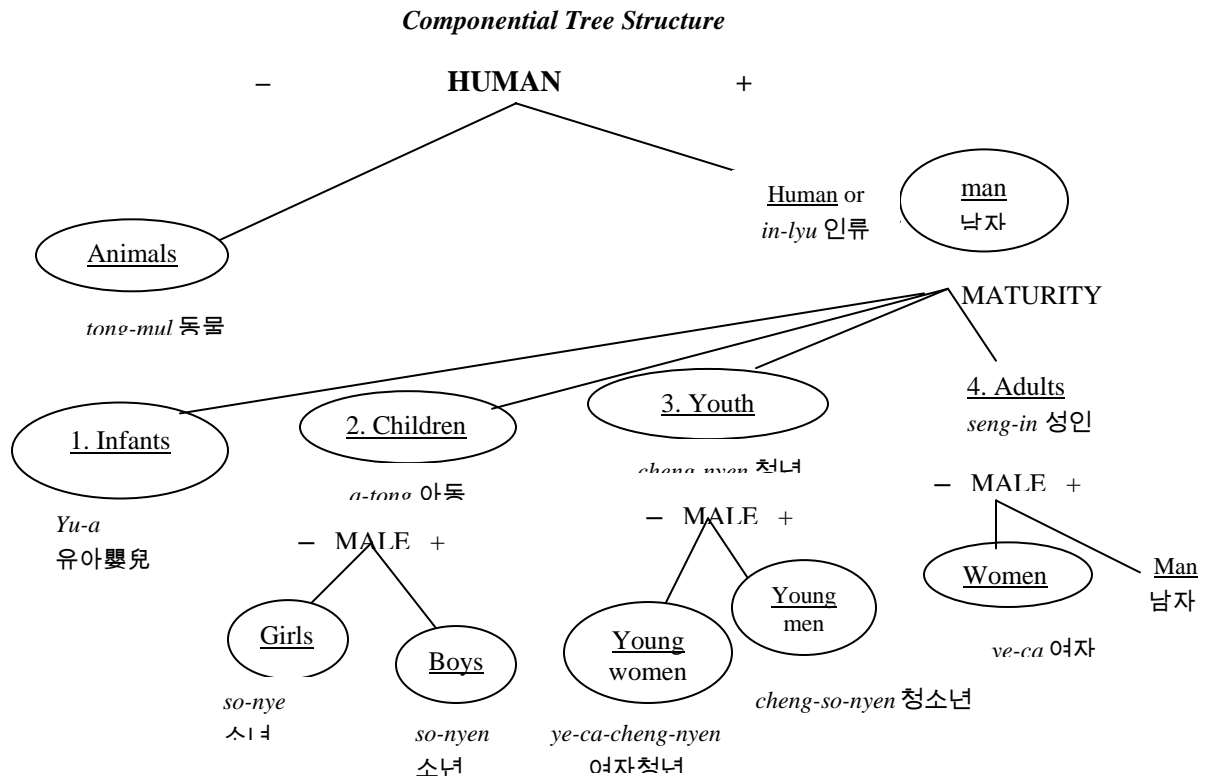
The componential tree structure above provides a simple characterization of certain semantic relationships:

(1) Logical inclusion

    x logically includes y if all the components of x are also components of y; "Adult" (+ HUM +MAT 4) logically includes *man* (+HUM +MALE ±MAT 4)

(2) Logical exclusion

    x logically excludes y, and vice versa, if x contains a component systematically contracting with a component y; in *man* (+HUM +MALE +MAT 4) and *girls* (+HUM –MALE +MAT 2)

(3) Componential synonymy

Two expressions are componentially synonymous if they have the same semantic representation; e.g., adults *in-lyu* 인류 grown-ups *sa-lam* 사람: (+HUM +MAT 4); infants 유아嬰兒 babies 아기 (+HUM +MAT 1). The sequence of letters representing the system may be chosen for mnemonic value. The prefixes + and – generally are used when the system has two terms; otherwise 1, 2, 3, etc. are used.

The first discovery after comparing the tree structure above with the matrix is the fact that every tree can be a matrix but not vice-versa. Therefore, a matrix is the general form of presentation and serves as the basis for defining and comparing subject headings. The definition of a subject heading is a combination of components which are represented simply by the conjoining or listing of their symbols. It should also be observed that in defining subject headings, a multiple system is expressed in the combinations of the binary system, and that the order in which the symbols are placed in this notational system is not significant: –MALE +HUM +MAT 4 or +HUM +MAT 4 –MALE would be alternative symbolizations for *woman*. Further semantic relationship, such as inclusion, is indicated by the componential tree structure, which exhibits hierarchical principles, while mutual logical inclusion is signified in synonymous relationships.

For instance, in addition to certain semantic relationships in the tree structure above, the expression, *male woman* is marked for a semantic oddity (oxymoron), on the grounds that the semantic specification of **male** (+MALE) logically excludes that of *woman* (+HUM –MALE +MAT 4). The expression of *ye-ca-cheng-nyen* 여자청년 [woman youth or women young men] in the target language Korean is a good instance of a semantic oddity or contradiction that has a deviant and anomalous meaning, demonstrating that its specification violates some rule which applies to all meaningful specifications. *Female woman* represents a different kind of irregularity (pleonasm): the meaning of *woman* (+HUM –MALE +MAT 4) logically includes that of *female* (–MALE). This task of semantic description, in the view presented here, consists in devising a notation which will accurately and unambiguously reflect the semantic properties of any expression in the language. It is, then, a sufficient condition of semantic equivalence (synonymy) that two expressions are assigned the same notational specification. Therefore,

translation/linking is an attempt to find common features of expression in source as well as target languages and the same notational specification. The basic criterion of translation of subject headings is not only to find source and target expressions that have common features or the same components, but also to locate the same notational specifications regarding the form, sense or reference. This author's research, then, points out the following conclusion: subject headings *can* be translated and linked from one language (English as a source language) into the closest equivalent verbal expression in the target language. Partial translation of *Man* resulted as a consequence of translating the form of word without considering all the senses involved. This lack of a certain sense in a subject heading caused a situation that ignores a certain referent and arrives at a partial translation. For translation, then, consideration of all the senses (readings) of a word is critically important in order to arrive at a whole translation without loss of meaning, which is particularly true according to the work of Von Humboldt, de Saussure, and Sapir on the basis that vocabularies of different languages are non-isomorphic: in words there are semantic distinctions made in one language which are not made in another; moreover, particular fields may be categorized in a totally different way by different languages.

Componential analysis of subject headings defines the meaning of a lexical element explicitly in terms of semantic components. These theoretical elements describe the semantic relations between the lexical elements of a given language and express relevant generalizations about the semantic structure of the vocabulary described. Componential analysis reveals the basic semantic structure underlying the apparently vague and imprecise phenomenon of meaning of subject headings in English and Korean: translation is not merely a task of matching symbols or word-for-word comparisons but also a concern with the equivalence of symbols, their arrangements, senses and referents. That is to say, the meaning of the entire utterance of subject headings, including the total exhibition of relationships, should be considered in a translation process.

Classificatory semantic context:

The second approach, distributional analysis, opens up the question of context for subject headings. As linguists define the distribution of a word as the list of contexts into which the word can be substituted and interchanged, the distributional similarity of a pair of two headings, in different languages, is the extent to which they can be substituted into the same contexts. [26]

Subject headings in Korean and in English that are outside of the perfect match category may not even have been paired if they were not given within a DDC number providing a common semantic delimitation. Morphological and syntactical differences as well as mismatch of semantic fields in these two languages may have placed all the partial matches in the category of non-matches. However, the context of DDC provides a semantic domain and a context of individual subject headings whereby grammatical peculiarities of each language are minimized to the extent that the same referents can be found regardless of the grammar of the language. For instance, *DDC 551.5 Meteorology and climatology* provides a semantic context in comparing subject headings in English and those in Korean to determine the same intended meaning as in *Atmosphere*, and *tay-ki* 대기(大氣). The context of *DDC 378 Higher education* places semantic partial matches for *Colleges and universities – Entrance requirements* and *ip-hak-si-hem/tay-hak* 입학시험/대학, and for *Teaching, Freedom of* and *hak-mun-uy ca-yu* 학문의 자유. More importantly, semantic mismatches created by different cultural backgrounds and linguistic differences are also greatly minimized so that differences and similarities can be noted while relating a similar meaning contained in two sets of subject headings. In one DDC context, grammatical peculiarities and semantic mismatches can be overcome.

Assuming that one lexical meaning of "chair," (a seat with back and legs and/or other support) is accepted as the only meaning of the subject heading *Chairs* [27], there are various associations as in house-hold furnishings, home workshops or furniture as art objects, because of the various DDC classification numbers as follows:

Chairs 645   Household furnishings
       684   Furnishings and home workshops
       749   Furniture and accessories

The semantic field of any lexical item is always much greater than the meaning which occurs within a specific context. In fact, it is precisely the function of the context to specify the particular *terminal meaning* intended by the subject heading. DDC classification provides semantic context just as linguistic context provides the basis for determining the specific terminal meaning, e.g. *a pelican's bill* and *a grocery bill*.

Semantic context provided by the DDC numbers proved to be particularly meaningful in measuring and in paralleling those headings with areas of semantic mismatch when mismatch of semantic fields occurs because of different classificatory references made by different cultures.

In the analysis of relationship between LC subject headings and LC classification, P. Immroth has observed: "There appears to be more contextual meaning in the classificatory reference than in the scope note." [28] In addition, even no-matches can be placed in semantic spaces. A no match can be equaled to a counter-heading in another language by representation of a semantic space in the range of DDC numbers, as observed below:

Semantic Representation of No Matches in DDC

English Headings	DDC References	Korean Headings
Apes	599 Mamalia	∅
Bats	599 (Mammals)	*pak-cwi* 박쥐
……		
Bison	599	∅
……		
Chipmunks	599	∅
……		
Coyotes	599	∅
……		
Moles (Animals)	599	*tu-te-cwi* 두더쥐
Monkeys	599	*wen-sung-i* 원숭이
……		
∅	599	*san-tho-kki* 산토끼

There are always more ideas and experiences than words can adequately express, and representation of absent ideas in semantic spaces is a necessary feature in the interchange of information across language and culture boundaries. It is evident that classification numbers placed next to subject headings function as disambiguating contexts, situational context in particular, and provide terminal meaning.

The contextual meaning provided by DDC numbers carries the heaviest semantic weight, even much heavier than the meaning offered by written Chinese, the least ambiguous language, when employed as a short hand form of the scope note. This logical semantic restriction frees subject headings from linguistic and cultural differences – in fact, even when it means an idea is absent. [29] Again, meaning must be given priority, for it is the content of the message of subject headings which is of prime importance across language boundaries.

Conclusion:

In conclusion what is a necessary and sufficient condition for transfer of intended messages of headings in one language, English, to the same messages in another language,

Korean, is two pronged: the use of a classification scheme, such as DDC, as a meta-language context for intended messages of subject headings, their terminal meaning in particular; and a repertoire of semantic components of subject headings preserving and indicating their arrangement, senses, and referents. The two pronged condition will facilitate the interoperability of semantics of subject headings, not only between KOS in multiple languages but also between the users of KOS and the indexers.

The results of this paper demonstrate that the contextual meaning provided by DDC numbers carries the heaviest semantic weight with subject headings, even much heavier than the meaning offered by written Chinese. As in the examples given, *hanja* 한자 (written Chinese characters), used as a means of redundancy to remove ambiguity in Korean subject headings has proved to be a device of insufficient semantic restrictions for subject headings. Contextual semantic restriction provided by classification, rather, emerged strongly as a necessary and sufficient condition for the transfer of intended messages of headings efficiently between two languages.

A repertoire of the semantic components of subject headings (their arrangement, senses and referents) is the second prong to the condition in transfer of intended messages. Componential analysis of subject headings defines the meaning of a lexical element explicitly in terms of semantic components, which are theoretical elements describing the semantic relations between the lexical elements of a given language and express relevant generalizations about the semantic structure of the vocabulary described. In addition, this componential analysis revealed the basic semantic structure underlying the apparently vague and imprecise phenomenon between meaning of subject headings in English and in Korean.

Thus, this two prong approach frees subject headings from cultural and linguistic differences, but in a sense also maintains them – that nuance which colors a particular language – because a classification scheme (the DDC) provides an objective approach while the componential analysis repertoire confronts the uniquely subjective side of language. Using the two-prong approach, the multilingual and multi-script KOS of tomorrow may include a clever internal structure of a distinct means of access and indexing that would achieve SI at a deeper level among library systems. Not only will the two functions of indexing and access be not one and the same, but they also will not be in one and the same language and script. It will not be necessary to require the user to input the "right" indexing term and the "right" language/script

indexing term, which the system in turn uses to search directly on record indexing. The design of the access component of a system can be different from the design of the indexing component, provided these two are appropriately linked. Making the link between the two – searching and indexing – and between two or more languages/scripts successfully is KOS consistent and complete, rigorous and logical in their internal structure for indexing and classification.

This is an opportune time to explore the two-pronged model, as we explore to build a conceptual model of Group 3 entities within the FRBR framework, i.e., FRSAR (Functional Requirements for Subject Authority Data), [30] let alone to embark on a virtual international authority file. With major changes in electronic communications, there is a new emphasis on interoperability at a deeper level among library systems and on a grander scale within the environment of electronic scholarship. With the advent of Internet and electronic scholarship comes the expectation for interactive real time access to resources – regardless of location and language. The potential of full interoperability has been examined along with its likely impact. Now, as the role of the library changes, its ability to access and be accessed becomes paramount and this involves interoperability in subject access. To achieve this, we may need to focus again on that basic thing which separates us (humanity), but which also seeks to link us together: language.

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