**COMPARISON OF ASSOCIATION BETWEEN LC SUBJECT HEADINGS AND CLASS NOTATIONS IN SINGLE- AND MULTIPLE-HEADING BIBLIOGRAPHIC RECORDS**

BY

A. (Sam) Khosh-khui*

Ph.D., Indiana University

**COMPARISON OF ASSOCIATION BETWEEN LC SUBJECT HEADINGS AND CLASS**

**NOTATIONS IN SINGLE- AND MULTIPLE-HEADING RECORDS**

**ABSTRACT**

Subject headings and their corresponding class notations of
101,347 of the Library of Congress MARC records were analysed to
determine variations in the association between Library of
Congress Subject Headings (LCSHs) and Library of Congress
Classification Notations (LCCNs) with respect to the variations
in the number of subject headings per record.  As the number of
LCSHs per record increased, the association between LCSHs and
LCCNs decreased.  The probability of having identical LCCNs for
identical LCSHs in single-heading records was found to be
significantly higher than in multiple heading records.  This
implies that in recommending a class notation to a patron,
distinction should be made between single- and multiple heading
bibliographic records.

**INTRODUCTION**


Subject analysis of library materials involves the use of
both classification and subject headings.  These two approaches
complement each other and are used for subject retrieval.
Classification is unidimensional while subject heading approach
is multidimensional.  That is, while multiple subject headings
can be assigned to a document to cover topics expressed in that
work, there is usually only one class notation corresponding to
those subject headings assigned to that document.  Each approach
of subject analysis permits the retrieval of information from a
different angle.  Considering the differences between these two
methods of subject retrieval, this study attempts to determine
the relationship between the number of subject headings per
bibliographic record and the probability of having identical
class notations for identical subject headings in the card
catalog.


Various aspects of the relationship of subject headings and
classification have been studied by a number of authors.  Dewey
studied the degree to which a subject catalog could
satisfactorily be substituted for three classification systems
and concluded that while some degree of substitution was
possible, both subject heading and classification approaches were
needed to give the best service to users.[1] Irnmroth found a
significant relationship between terminology of the LCSHs and

Library of Congress Classification (LCC) system.2 Patterson

was concerned with determining the degree of relationship between

the KSHs, LCC schedules, and index to the LCC schedules.3

He concluded that these three vocabularies are identical.

Manheimer found that the LCSHs and LCC system in Class R are

related in an entirely unpredictable way.4

Fenske concluded that incataloging practice, approaching

from subject heading to classification is better than from

classification to subject heading.5  The results of Butler's

study suggested that practical increase in subject access to

bibliographic collections can be obtained through the use of

computer based cross-references between subject headings and

class terms.6  The author studied various factors affecting

relationships between subject headings and class

notations.7-9

**METHODOLOGY**

A comparison of identical subject headings in a list of

bibliographic records sorted alphabetically by subject, i.e. a

subject card catalog or an online subject catalog, would indicate

that the classification notations corresponding to identical

subject headings are not necessarily identical.  Generally, the

probability of having identical class notations for identical

subject headings in 'single-heading' bibliographic records is higher than in 'multiple-heading' records.  In other words, fewer subject heading in bibliographic records will result in a greater agreement between class notations corresponding to various occurrences of a subject heading in a subject catalog. More subject headings in bibliographic records will cause a greater difference or disagreement between class notations corresponding to occurrences of a subject heading in a subject catalog. This implies that the degree of association between subject headings and their corresponding class notations decreases as the number of subject headings per bibliographic record increases. More subject headings assigned to a bibliographic record result in a significant decrease in the degree of association between subject headings and their corresponding class notations.

The derived hypothesis from the above statement suggests that there is significantly more agreement between the Library of Congress class nocations corresponding to the Library of Congress Subject Headings in 'single-' than 'multiple-heading' bibliographic records. As the number of Library of Congress Subject Headings per bibliographic record increases, the degree of association between LCSHs and their corresponding LCCNs decreases.

Therefore, the question of this study is to find out effects of variation in number of subject headings per bibliographic

record on associations between the Library of Congress Subject
Headings and the Library of Congress Classification Notations,
that is, to determine if there is any statistically significant
difference between LCSH/LCCN pairs among subject headings from
bibliographic records with a different number of subject headings
per bibliographic record.

To test the above hypothesis, subject headings and their
corresponding class notations of 101,347 bibliographic records
were selected from two LC MARC tapes through a systematic test.
The subject headings (N= 131,263) were sorted alphabetically and
subarranged by LC Classification notations.  A computer program
was developed to count all subject headings having an occurrence
of more than one and then count the frequency of the most
frequent identical class notation corresponding to these subject
headings.  Based on the number of subject headings per
bibliographic record, all records were grouped into four
categories.  The probability of having identical class notations
for identical subject headings in each category was calculated.
In addition, correlation measures were computed for each group of
bibliographic records and, using chi square test, the differences
between each group were tested.

## ANALYSIS OF DATA

The probability of having identical LCCHs for identical
LCSHS decreased as the number of subject headings per
bibliographic records increased, except for the fourth group.
While the probability of having identical class notations for
identical subject headings in single-heading bibliographic
records was 82Z, it reduced to 61% for the double-heading group,
54% for the triple-heading group, and 64% for the group of
bibliographic records with four or more subject headings.  The
difference between observed and expected values in each group
were statistically significant at the 0.001 level.  The following
table summarizes the results of data  analysis.

Table 1
Probability, Correlation, and Chi Square Test of Differences
Between LC Subject Headings and LCC Notations i n Four Groups
of Bibliographic Records

| No. of LCSH/ Record | LCSH f | LCCN f | p | r | s | Adjusted LCSH f | Observed LCCN f | Expected LCCN f |
|---|---|---|---|---|---|---|---|---|
| 1 | 6412 | 5010 | 0.82 | .74 | .001 | 7272 | 5932 | 4727 |
| 2 | 11400 | 6939 | 0.61 | .82 | .001 | 7272 | 4426 | 4727 |
| 3 | 7476 | 4036 | 0.54 | .91 | .001 | 7272 | 3926 | 4727 |
| 4 | 4070 | 2578 | 0.64 | .82 | .001 | 7272 | 4622 | 4727 |
| ALL | 61766 | 27188 | 0.44 | .0085 | .113 | | | |

$x^2$= 463,946            df = 3            p < ,001

df= Degrees of freedom.
f = Frequency counts.
p = Probability of having identical LCCNs for identical LCSHs.
r = Correlation between frequency counts of LCSHs and LCCNS.
s = Significance of correlation value r.

**DISCUSSION**

The probability of having identical LC class notations for identical subject headings decreased as the number of subject headings per record increased.  The fact that there was not a 100% probability for the single-heading group showed that LCC notations were not consistantly assigned to bibliographic records witH the same LC Subject Headings.  Alternatively, there could be more than one LC subject heading corresponding to each LCCN representing a given topic.

The reason that the fourth group had a higher probability than the previous group could be due to the fact that the frequency of subject headings in the last group was generally less than previous groups, therefore, the analysis of data was done with a relatively smaller number of subject headings.  The low occurrence of identical subject headings in this group may have caused an unexpected increase in the probability.

Unlike probability measures, the pattern of variation in correlation measures between frequencies of class notations and subject headings was not fixed and predictable.  Regression analysis between two sets of frequencies showed that when there is more rhan one subject headings per bibliographic record, the pattern of variation in LCCN frequencies with respect to variations in LCSH frequencies, would not be predictable.

## CONCLUSION

An alphabetical suBject list simulating a subject catalog
was used to test effects of the variation in the number of
subject headings per bibliographic record on the association
between LCSHs and LCCNs.  Although there was a statistically
significant difference between the degree of association between
LCSHs and their corresponsing LCCNs, the variations in the number
of the Library of Congress Subject Headings per bibliographic
record was not a predictor of the variation of Library of
Congress Classification Notations.  Results indicated
inconsistency in assigning the same class notations to the same
subject headings.  LC Classification index vocuabulary and LC
Subject Headings should be improved to increase association
between the two methods of subject retrieval.  When public
service librarians recommend class notations from subject
catalogs to patrons for possible browsing on a subject, their
recommendation would be more precise if the suggested class
notation is selected from single- rather than multiple-heading
bibliographic records.

**REFERENCES**

1. Harry Dewey, "The Relationship Between the Headings in the Subject Catalog and the Classification Numbers of the Books," in <u>Reclassification: Rationale and Problems</u>; Proceedings of a Conference on Reclassification, held at the Center of Adult Education, University of Maryland, College Park, April 4 to 6 1968.  Edited by Jean M. Perreault. (College Park, Md.: School of Library and Information Services, University of Maryland, 19681, p. 57.


2. John Immroth, <u>An Analysis of Vocabulary Control in Library of Congress Classification, Indexes and Subject Headings</u> (Littleton, Colorado: Libraries Unlimited, 19711, pp. 144-45.


3. Charles Donald Patterson, "A Graphemic, Morphological, Syntactical, Lexical, and Contextual Analysis of the Library of Congress Music Subject Headings and Their Relationship to the Library of Congress Classification Schedules, Class M, as Determined by a Comparative Sampling of Two Vocabularies," (Ph,D. dissertation, University of Pittsburgh, 1971), p. 181.


4. Martha L. Manheimer, "The Relationship of the Classified Library of Congress Subjecr Headings to the Library of Congress Classification Scheme," in <u>Classified Library of Congress Subject Headings</u>, 2 vol., ed. by James G. Williams, Martha L.

Manheimer, and Jay E. Daily (New York: Marcel Dekker, 19721, 1: 13.

5. Ruth E. Fenske, "Mechanization of Library of Congress Procedures in the Medium-Sized Medical Library: XIV. Correlations between National Library of Medicine Classification Numbers and MeSH Headings," <u>Bulletin of the Medical Library Association</u> 60 (April 1972): 319.

6. Brett Butler, "Bibliographic Subject Access: A Measure of the Relation between the Use of Library of Congress Subject Headings Terms," in <u>Proceedings of the American Society for Information Science Annual Meeting</u> (Washington, D.C.: American Society for Information Science, 1976), 13: 96.

7. A. Khosh-khui, "Statistical Analysis of the Association between Library of Congress Subject Headings and Their Corresponding Class Notations in Main Classes of LCC and DDC," (Ph.D. Dissertation, Indiana University, 1985)

8. A. Khosh-khui, <u>Statistical Analysis of the Association between Subject Headings and Their Corresponding Class Notations in Science and Technolopy Monographs</u> (Syracuse, N.Y.: ERIC Document, ED 220 092, 1981), p. 1.

9. A. Khosh-khui, "Effects of Subject Specificity: Pt. II, Relationship of LC Subject Headings Specificity and Class Notation Length," Technical Services Quarterly 4, no. 3 (Spring 1987).