Journal clustering through interlocking editorship information

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ABSTRACT

This paper is an exploration of mapping journals in library and information science (LIS) through interlocking editorship information. Forty-eight LIS journals are clustered into four clusters. Possible reasons for some boundary-spanning journals and ten journals uninvolved in interlocking editorship are given. Results suggest that interlocking editorship information is useful for clustering journals in LIS, and additional suggestions regarding LIS journal re-categorization are proposed.

Keywords

Journal Clustering, Interlocking Editorship, Similarity, Categorization

INTRODUCTION

Two components in the market of scientific knowledge are scientific journals and their editors. The former serves as the main platform of research presentation and communication, and the latter acts as the gatekeeper of a discipline.

For decades, much attention has been paid to various aspects of scientific journals. One important issue is journal clustering and categorization, since its outcome can have considerable applications on the practical side. Journal clustering results can "reveal the pattern, the mosaic of scholarly activity", and is useful for "analyzing and validating thesauri, classification schemes, and indexing schemes" (Small & Koenig, 1977).

Editorial board members serve as gatekeeper of a particular discipline, since their main job is to determine which articles are qualified for publication (Budd, 2000).

Editors are distinguished scholars in a discipline. Nearly every publisher, whose aim is to maximize the reputation and quality of the journal it publishes, tends to invite scholars with high reputations in the same area as the journal's subject to serve on its editorial board, which results in the phenomenon that one particular scholar might serve on more than one editorial boards, referred as interlocking editorship (Baccini & Barabesi, 2010) in this paper. Two Journals are interlocked via editorial board members they share, and the shared editorial board members are called co-editors of these two journals in this paper. Note that co-editor here is not the "co-editor" in a journal editorial board, which is an alternative title of editor-in-chief used by several journals.

On the basis of the above understanding, editorial board member information, in fact, provides us another clue of journal clustering, based on the assumption that journals tends to have scholars those research foci are similar to their journal subject as their editorial board members. Thus, it can be expected that if two journals have a same scholar serve on their editorial boards, these two journals would share some similarity in their focusing fields or subjects. Most studies on journal clustering use journal citation information, while some use reader survey, author survey, consensus of expert researchers, etc. But little journal clustering research has been done through editorship information

This paper aims to cluster journals categorized in library and information science (LIS) subject by 2008 Journal Citation Reports (JCR) Social Science Edition by *Thomson Reuters* via interlocking editorship information. More specifically, main issues we focus are: (1) which LIS journals are interlocked; (2) who are co-editors of LIS journals; (3) which LIS journal pairs are most similar; (4) whether interlocking editorship information is useful for journal clustering; (5) if yes, will editorship information provide a different perspective for journal clustering; and (6) is it possible to infer something else from the clustering result?

The rest of this paper is organized as follows. Section 2 is an overview of related work in editorship and journal

clustering research. Section 3 introduces the data and methods used in this paper. Section 4 analyzes the result. Section 5 discusses the result and Section 6 draws the conclusion.

RELATED WORK

For decades, journal clustering has attracted the attention of scholars in bibliometrics community. Carpente and Narin (1973) grouped 288 journals of physics, chemistry and molecular via journal citation data using cluster analysis. Small and Koening (1977) innovatively used method of bibliographic coupling via a two-step linkage clustering method. They grouped 890 journals into 168 clusters and compared the result with manual classification of the same journal set. Hirst adopted Discipline Impact Factor to select core journals in a discipline (Hirst, 1978). Baturin and Molotkov (1986) also used bibliographic coupling data of journals and grouped 990 journals into 216 clusters by using KASTER software. Other journal clustering or classification studies used reader survey (Swisher & Smith, 1982), author survey (Meadow & Zaborowski, 1979) and consensus of expert researchers (Doreian, 1985).

Most previous studies about editorial board members (Matarese, 2008; Sievert & Haughawout, 1989; Wang, 2007), focus on their roles as gatekeepers. Until recently, social network analysis method is used to analyze the interlocking editorship among economic journals, statistical journals and digital library journals. Baccini & Barabesi (2008) studied statistical journals and found that the network generated by interlocking editorship is quite compact. Economics journals are also examined via interlocking editorship information by social network analysis method in (Baccini & Barabesi, 2010). By analyzing the editorial board, digital library is found to be a well-connected community converging from diverse disciplines with computer science as the common thread (Sharma & Urs, 2008). All these studies of interlocking editorship concentrate on using centrality measures to discover the social structure of journals in a certain field, but none of them deals with journal clustering and categorization. Therefore, it would be interesting and necessary to use interlocking editorship information as another way of clustering journals.

METHODOLOGY

Data

This research clusters journals included in LIS category in 2008 JCR, innovatively using interlocking editorship information.

In 2008 JCR Social Science Edition, 61 journals are included in LIS category. Fifty-eight journals and their current editorial board members are analyzed in this paper. Three journals[1] in language other than English are excluded for the convenience of data collecting and analysis.

The editorial board member information used in this paper was either directly collected from the website, or, for some cases when the website was inaccessible, from the hard copy of the journal. All the editorial board members included in this article are those indicated officially as of December, 2009.

Editors are assigned with different titles, such as editor-in-chief, co-editor, associate editor, assistant editor, editorial board member, advisory board, review editor, managing editor, etc. According to Baccini and Barabesi (2010), no literature discusses the actual role of different editors of scientific journals. After consulting some professionals involved in journal publishing, some types of editors, such as managing editor, assistant editor, special issue editor, etc., are excluded from our list. Only those with titles such as editor-in-chief, associate editor, co-editor, editorial board member, advisory committee, academic advisory board and book review editor are included in our data and are called editorial board members, since they are commonly regarded to be more likely to act as guardians: making decision of accepting or rejecting a paper.

Methods

Information of 1,561 editorial board members from 58 journals is gathered, and a matrix containing interlocking editorship information is obtained. To cluster journals, the similarity of journal pair is the basic concern of this paper. At the first stage of this paper, simple overlapping of editorial board members (*i.e.* co-editor number) is used as an indicator of preliminary similarity between journal pairs. Then Jaccard's similarity coefficient is adopted to provide a different view of similarity. Finally, factor analysis, hierarchical clustering, and multidimensional scaling (MDS) are used to explore the similarity pattern of these journals. Due to space limitation, only MDS result is shown in this paper.

RESULT ANALYSIS

Overview of LIS journal editorship

Frequency of editorial board seats of LIS journals
In 58 LIS journals, 1,785 editorial board seats are available and occupied by 1,561 scholars. On average, each LIS journal has 30.78 editorial board members, and each scholar serves on 1.14 journal editorial boards.

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[1] Those three journals are *Profesional de la Informacion* (in Spanish), *Library and Information Science* (in Japanese), and *Zeitschrift Fur Bibliothekswesen und Bibliographie* (in German).
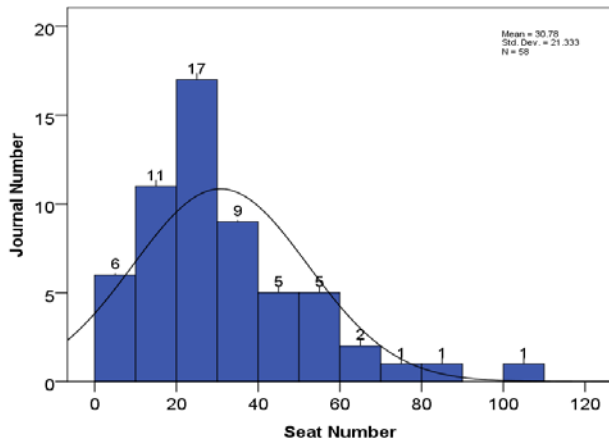
Figure 1. Distribution of editorial seats of LIS journal.

While looking into every specific journal, the editorial seat (*i.e.* editorial board member) number varies to a large extent, with a standard deviation of 21.33. Figure 1 shows the detailed distribution of editorial seats. More than 31% of these 58 journals have 20-30 scholars serve on their editorial boards. Only one journal, *Information & Management*, has more than 100 editorial board members, and one journal, *Journal of the Association for Information Systems,* has more than 80 editorial board members.

Frequency of editorial board members
As indicated in Figure 2, among those 1,561 scholars that serve on 58 journals, 89.12% serve on only one editorial board, and about 10% of those scholars (*i.e.* 171 scholars) serve on two or more editorial boards simultaneously. As perceived, the maximum number of editorial seat per scholar is six.
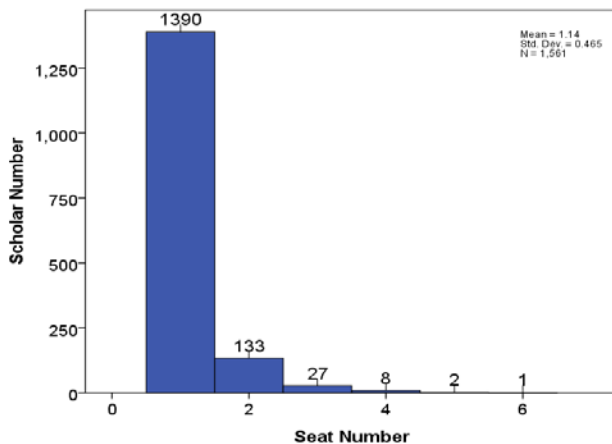

Figure 2. Distribution of scholars on journal editorial boards.

Editor	Seats	Editor	Seats
Thelwall, M	6	Ocholla, D. N	3
Cronin, B	5	Nah, F.F	3
Bar-Ilan, J	5	Gorman, G.E	3
Oppenheim, C	4	Ruthven, I	3
Borgman, C.L	4	Lee, J.N	3
Wolfram, D	4	Jansen, J	3
Davenport, E	4	Lyytinen, K	3
McCain, K. W	4	Tam, K. Y	3
Chau, P. Y. K	4	Egghe, L	3
Ingwersen, P	4	Leydesdorff, L	3
Rousseau, R	4	Keil, M	3
Spink, A	3	Caidi, N	3
van Raan, A	3	Belkin, N.J	3
Kankanhalli, A	3	Borlund, P	3
Tan, B. C. Y	3	Savolainen, R	3
Hjørland, B	3	Kostoff, R. N	3
Avgerou, C	3	Hirschheim, R	3
Loebbecke, C	3	Sawyer, S	3
Bawden, D	3	Rivard, S	3

Table 1. Scholars on three or more editorial boards.

Table 1 shows scholars that serve on three or more editorial boards in LIS. Dr. Mike Thelwall in University of Wolverhampton is the only one who serves simultaneously on six editorial boards. Dr. Blaise Cronin in Indiana University Bloomington and Dr. Judit Bar-Ilan in Bar-Ilan University in Israel are two scholars who serve on five editorial boards at the same time.

Similarity of journals interlocked by co-editors
Above analysis shows that about 10% of those scholars (*i.e.* 171 scholars) serve on two or more editorial boards of LIS journals at the same time. Journals are thus involved in a network generated by these scholars. For convenience, 58 journal names are abbreviated. Please refer to appendix A for details.

Frequency of co-editorship in LIS field
Calculating the frequency of co-editorship is the first step to explore the similarity pattern of journals. Fifty-eight journals are paired up to result in 1,653 journal pairs, among which, only 141 journal pairs share editorial board members. In other words, there are 10 journals in LIS

Co-editor	JPair	%	Co-editor	JPair	%
10+	1	0.06	4	9	0.54
10	1	0.06	3	10	0.60
9	1	0.06	2	24	1.45
8	0	0.00	1	84	5.08
7	1	0.06	0	1512	91.47
6	5	0.30	Total	1653	100.00
5	5	0.30			

Table 2. Co-editor number of journal pairs.

category that do not share any editorial board member with others. Note that "JPair" in table 2, table 3 and table 4 denotes "journal pair".

The density of the network based on interlocking editorship (i.e. the ratio of the actual number of edges to the maximum possible number of edges in the network) is 0.0853, which means only 8.53% edges in this network is presented (Wasserman & Faust, 1994). Compared with statistical journal interlocking editorship network in (Baccini, Barabesi, & Marcheselli, 2008) and economics journal interlocking editorship network in (Baccini & Barabesi, 2010), LIS network is denser.

Simple overlap of editorial board members
As indicated above, 48 journals are involved in this interlocking editorship. Since our assumption is that journals tend to invite scholars whose research foci are similar to journal subjects, two journals with a same scholar on their editorial boards would indicate some similarity on their subjects. Therefore, it is possible to discover journal pair similarity through editorial board members they share.

Table 3 shows the top 10 journal pairs ranked by co-editor numbers. *Journal of Informetrics* & *Scientometrics* are those two journals share most editorial board members, *i.e.* 16 co-editors. *Information Systems Research* & *Journal of the Association for Information Systems* have ten co-editors. In the top four journal pairs, three of them consist of journals related to Management Information Systems (MIS) field.

Rank	JPair	Co-editors
1	JInfor & Sciento	16
2	ISR & JAIS	10
3	JAIS & MIS	9
4	IM & JGIM	7
5	ARIST & InfRes	6
	ARIST & JASIST	
	InfRes & JASIST	
	JASIST & JInfor	
	ResEva & Sciento	
10	IM & JAIS	5
	IPM & JDOC	
	ISJ & JIT	
	ISR & JMIS	
	JASIST & Sciento	

Table 3. Top 10 journal pairs with largest number of co-editors.

Jaccard's similarity of journal pairs
The co-editor number shows the simple overlap of editorial board members of LIS journals, which, to some extent, shows the preliminary similarity of journal pairs. In order to obtain a further understanding of their similarities, Jaccard's similarity coefficient is used.

Jaccard's similarity coefficient is a proper statistic used for comparing the similarity and diversity of sample sets. It is defined as the size of the intersection divided by the size of the union of the sample sets. Considering that our aim is to investigate the similarity between journals through co-editorship, Jaccard's similarity coefficient is adopted here to discover the similarity of journal pairs, since it takes into account the size of a set. Jaccard's similarity coefficient is computed using formula (1).

$$Sim_{(JA, JB)} = |J_A \cap J_B| / (|J_A| + |J_B| - |J_A \cap J_B|) \qquad (1)$$

Table 4 shows the top 10 journal pairs ranked in Jaccard's similarity coefficient, as well as their co-editor number and its rank. Note that "*Jac.*" in the heading of table 4 means the Jaccard's similarity value, and "R$_{Jac}$" means its ranking order. A comparison with table 3 shows that fewer journal pairs of MIS are ranked top 10 in table 4. In addition, *Journal of Informetrics & Scientometrics* journal pair still ranks first by Jaccard's coefficient, which indicates that they are more similar with each other than any other journal pair. In fact, both of them are important journals concentrating on bibliometrics, informetrics and

Journal pair	*Jac.*	R$_{Jac}$	Co-editor	R$_{co-editor}$
JInfor & Sciento	0.188	1	16	1
ARIST & JASIST	0.143	2	6	5
ARIST & InfRes	0.113	3	6	5
JASIST & JInfor	0.102	4	6	5
LISR & JInfor	0.098	5	4	15
InfRes & JASIST	0.087	6	6	5
IPM & JDOC	0.085	7	5	10
ISR & JAIS	0.071	8	10	2
JAIS & MIS	0.067	9	9	3
ResEva & Sciento	0.066	10	6	5

Table 4. Jaccard's coefficient of top 10 journal pairs.

scientometrics. Some journal pairs ranked highly in co-editor number has a lower rank in Jaccard's coefficient, for instance, *Information Systems Research & Journal of the Association for Information Systems. Annual Review of Information Science and Technology* is a journal similar to several journals according to Jaccard's similarity coefficient, which probably results from its feature of wide subject coverage as an important review journal of LIS

Journal clustering with MDS

MDS is used in this paper to obtain another view of journal similarity. From a non-technical point of view, the purpose of MDS is to provide a visual representation of the pattern of similarity among a set of objects in the form of distance. For example, given a matrix of perceived similarities between various journal pairs, MDS plots the journals on a map such that those journals that are perceived to be very similar to each other are placed near each other on the map, and vice versa (Kruskal & Wish, 1978).

A key issue of similarity plot
The matrix used for MDS is editor co-occurrence data, *i.e.* the overlap of editorial board members of journal pairs. One key issue when using MDS program is the diagonal value of the co-occurrence matrix.

In bibliometrics, especially co-citation analysis, there are considerable debates on the appropriate choice of diagonal value of co-citation. White and Griffith (1981) took the three highest intersections and dividing by two as the diagonal value in author co-citation analysis. Diagonal value is also treated as missing value as introduced in (McCain, 1990), which is also the most popular way of diagonal value treatment in bibliometrics. Ahlgren et al. (2003) stated that the actual times an author co-cited with herself or himself should be used as the diagonal value. White (2003) proposed that the maximum number of an

author's co-citation with other authors should be used as diagonal value. We adopt White's idea and use maximum number plus one as the diagonal value for the following reason. The co-occurrence matrix, mostly author co-citation matrix, is constructed to measure the similarity of each author pair. In a raw co-citation matrix, each number shows the simple similarity between each author pair. For example, the maximum number of author A co-cited with other authors would reflect the highest similarity between author A and any other author, which shows the relatively meaningful similarity in raw co-citation matrix. Diagonal value of co-citation matrix shows the similarity between an author and oneself. It is undoubted that the similarity of an author to oneself is higher than the similarity between this author and the author co-cited for most times, which is also the case for editor co-occurrence data discussed here. Therefore, the maximum number of each row (*i.e.* the maximum number of editorial board members that this journal shares with any other journal) plus 1 is added as the diagonal value in our matrix in order to emphasize the similarity between a journal and itself.

Proximity map of 48 journals
As indicated in figure 3, 48 journals involved in interlocking editorship are grouped into four clusters, which are circled according to the result of hierarchical clustering and factor analysis results obtained in SPSS. The hierarchical cluster and factor analysis result is not shown here due to the space limitation. Figure 4 presents the journal similarity in the form of network generated by Pajek program. Figure 4 is used here as a complementary view for figure 3. MDS result shows the similarity pattern among a set of journals in the form of distance, while Pajek program can present the actual similarity of each journal pair via line value. Please note that only lines with values greater than 0.3 are displayed in figure 4.
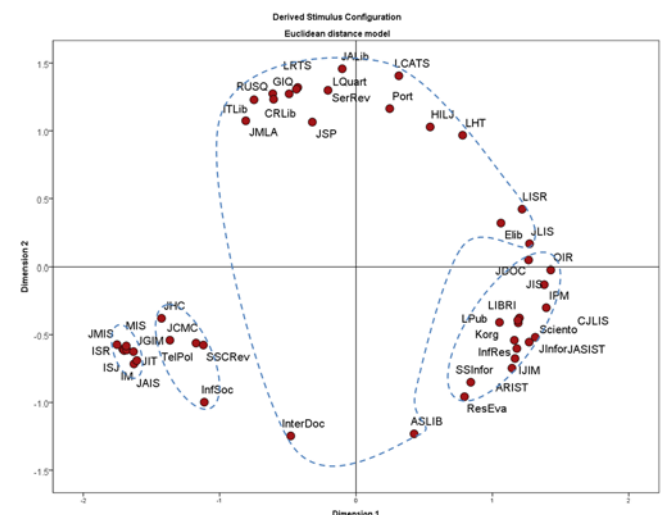

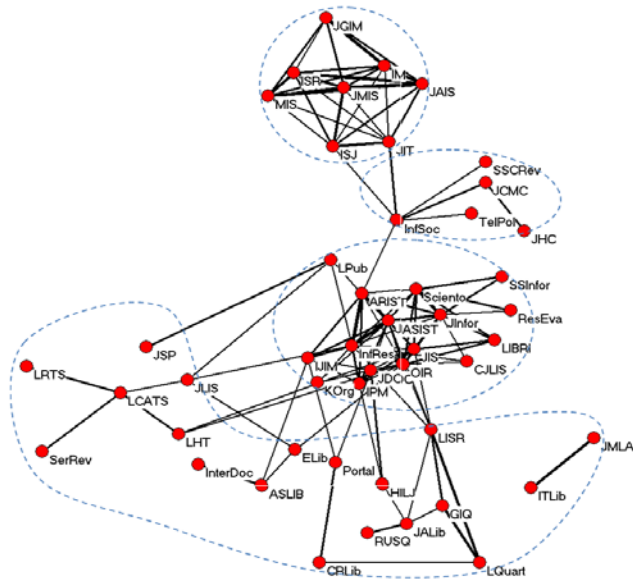**Figure 3. LIS Journal proximity map.**

Figure 4. Visual Network view of proximity map.

Cluster 1- MIS journal Cluster

Cluster 1 consists of eight journals related to Management Information Systems (MIS). It is not surprising that *Information & Management*, *Journal of the Association for Information Systems, Information Systems Research, Journal of Management Information Systems, Information systems Journal, MIS Quarterly* and *Journal of Global Information Management* are grouped together, since they all focus on MIS field as indicated directly by journal names. *Journal of Information Technology* is clustered closely with these seven MIS journals. Although not directly stated by its name as other journals in this cluster, it mainly concentrates on "management of information technology, including system development and implementation, communications, technology developments etc."[1] Eight journals in this cluster are very close to each other, and some nodes denoting journals even overlap in figure 3. Furthermore, six journals in this cluster rank top 10 by Impact Factor in 2008 JCR, and the average Impact Factor is 2.47.

Cluster 2 – Communication Journal cluster

Five journals are grouped as cluster 2 in this paper, including *Journal of Health Communication, Journal of Computer-Mediated Communication, Telecommunication Policy, Social Science Computer Review*, and *The Information Society*. Three of them are also categorized in communication subject in 2008 JCR. *The Information Society* is located as, according to both Figure 3 and Figure 4, the bridge of MIS journal cluster and

communication journal cluster. *The Information Society,* whose name indicates little relevance to MIS and communication, in fact pays particular attention to MIS and communication. A statistical on research interests of its editorial board members obtained from their Curriculum Vitae shows that, nearly 50% of this journal's editorial board members list communication or telecommunication as one of their research interests, and 60% for MIS. This would be an explanation for this journal's bridge position between two clusters. *Social Science Computer Review* covers "social science instructional and research applications of computing, as well as societal impacts of information technology"[2]. Therefore, it is not quite relevant to communication according to its own scope statement. A scrutiny at editorial board member of this journal reveals that this journal only shares one editorial board member with one journal, *The Information Society.* So this journal is clustered together with *The Information Society.* In fact, this journal is a singleton among those 48 journals. The average impact factor of cluster 2 is 1.39.

Cluster 3 – Research-Oriented LIS journal cluster

Cluster 3 comprises 16 research-oriented LIS journals. *Journal of Informetrics* and *Scientometrics*, two core journals of bibliometrics, informetrics and scientometrics, is the journal pair with highest similarity. They share 16 editorial board members. *Journal of the American Society for Information Science and Technology* and *Annual Review of Information Science and Technology* are also close to each other, and located at the core part of this cluster. *Social Science Information* and *Research Evaluation* are not quite close to other journals. It is noticed that LIS journals with comparatively higher Impact Factors in 2008 JCR are located in this cluster, such as *Information Processing & Management, Journal of the American Society for Information Science and Technology, Annual Review of Information Science and Technology, Journal of Information Science, Scientometrics,* etc. The average Impact Factor of this cluster is 1.26.

Cluster 4 – Practice-oriented LIS journal cluster

Cluster 4 consists of 19 practice-oriented LIS journals. *Portal-Library and the Academy* is "written by librarians for librarians"[3]. *Journal of the Medical Library Association, Health Information and Libraries Journal, Government Information Quarterly* and *College & Research Libraries* focus primarily on practical activities

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[1]Retrieved December 20, 2009 from http://www.palgrave-journals.com/jit/about.html

[2]Retrieved December 20, 2009 from http://www.sagepub.com/journalsProdDesc.nav?prodId=Journal200948

[3]Retrieved December 20, 2009 from http://muse.jhu.edu/journals/pla/

in special library and subject library. *Library Collections Acquisitions & Technical Services, Interlending and Document Supply, Journal of Librarianship and Information Science* and *Reference & User Services Quarterly* concentrate mostly on specific library service as directly indicated by their names. *The Library Quarterly* "has maintained its commitment to scholarly research in all areas of librarianship[1]", which is more practical than other library science research. Therefore, it is located in practice-oriented LIS journal cluster. Additionally, *Library & Information Science Research* is also clustered in this paper as a practical LIS journal. In fact, this journal focuses on applicable, practical applications and significance of research finding in LIS[2]. Therefore, this journal seems to be the bridge between research-oriented journal cluster and practice-oriented journal cluster. *Journal of Librarianship and Information Science* also acts as a boundary spanner journal between research-oriented and practice-oriented journal cluster. Both Figure 3 and Figure 4 show their boundary spanning position clearly. Journals in this cluster, compared with those in cluster 3, have relatively lower Impact Factors: 17 out of 19 journals in this cluster rank below than 30th among 61 LIS journals in 2008JCR, and the average impact factor of this cluster is 0.73.

Journals not interlocked via editorship
Except for 48 journals discussed above, it is also interesting and necessary to investigate into journals that do not share editorial board members in LIS, as shown in Table 5. There are some possible reasons for their special positions in LIS.

Journal	Editors	Journal	Editors
LLJ	1	Restaurator	15
Online	1	Program	16
Econtent	2	Scientist	24
LTrends	3	IJGIS	34
LibJ	5	JAMIA	47

Table 5. Journals not involved in interlocking editorship.

Library Trends, EContent, Law Library Journal, and *Library Journal* are in this case.

Second, some journals are too specific and specialty-oriented ones, such as *International of Geographic Information Science*, *Journal of the American Medical Informatics Association* and *Restaurator*. For the former two journals, most of their editorial board members are from Geography and Medical Informatics respectively. While the latter one, *Restaurator*, is the "only international periodical specializing exclusively in the conservation of library and archive materials"[3]. Among all the other journals discussed above, no one focuses on this field.

Third, *The Scientist* pays particular attention to life science according to its mission statement on its current website[4], which is quite different from LIS.

Finally, some journals tend to have editorial board members other from research affiliations. *Program* publishes articles on information technology application in libraries, archives, museums, galleries, etc.[5]. Thus, it is expected that it has professionals who are specifically involved in applications to serve on its editorial board, such as librarians, electronic source managers, library technicians, etc.

DISCUSSION
This research is conducted on the assumption that journals tend to invite scholars whose research areas are similar to their focusing fields. The result shows that interlocking editorship is proper to map journals in LIS.

On average, the LIS journal has more editorial board members than economic journal, revealed by a comparison of editorial board member information of LIS journals with that of economic journals. But each editorial board member of LIS journals occupie a smaller number of editorial seats than that of economic journals. About 90% of LIS editorial board members serve only on one editorial board simultaneously.

A closer look at the editorial board information validates the existence of interlocking editorship. The density of interlocking editorship network of LIS journals is less dispersed than that of Economic journals and Statistics journals. Of all the 58 journals discussed in this research,

[1]Retrieved December 20, 2009 from http://www.journals.uchicago.edu/page/lq/brief.html
[2]Retrieved December 20, 2009 from http://www.elsevier.com/wps/find/journaldescription.cws_home/620211/description#description

[3]Retrieved December 20, 2009 from http://www.deepdyve.com/browse/journals/restaurator-international-journal-for-the-preservation-of-library-and-archival-material
[4]Retrieved December 20, 2009 from http://www.the-scientist.com/about/index/
[5]Retrieved December 20, 2009 from http://info.emeraldinsight.com/products/journals/journals.htm?id=prog

48 journals are interlocked via editorial board members, resulting in 141 interlocking journal pairs.

The similarity of LIS journals is explored gradually through co-editorship information. At first, the simple overlap of editorial board members is discussed, showing that *Journal of Informetrics* and *Scientometrics* journal pair shares the largest number of editorial board member and journals related MIS research tend to share more editorial board members than others.

Jaccard's similarity coefficient is then computed. Jaccard's similarity rank shows *Journal of Informetrics* and *Scientometrics* are the most similar journals. *Annual Review of Information Science and Technology* shares editorial board members with most journals, which might be explained by its feature as a field-wide review journal in LIS.

In order to have a comprehensive view of journal proximity in LIS, MDS is used to plot the proximity map of 48 journals. The diagonal value of co-editor matrix is assigned with the maximum number of editorial board member each journal shares with other journals plus one. Squared Euclidean Distance is chosen as the distance measure to plot the proximity map. Forty-eight journals are grouped into four clusters, i.e. MIS journal cluster, communication journal cluster, research-oriented LIS journal cluster, and practice-oriented LIS journal cluster. Specific analysis on each cluster reveals that (1) most journals are grouped into the proper clusters with interlocking editorship information. Journal names and foci are used to validate the result; (2) *The Information Society* (between MIS journals and communication journals) and *Library & Information Science Research* (between research-oriented journals and practice-oriented journals) are boundary-spanning journals; (3) the dissimilarity between MIS journals and other journals in our database is distinguishable, since both MDS plot and Pajek visualization shows that the MIS journals are far away from the other three clusters; (4) communication related journals are closer to MIS journals than to other LIS journals; (5) the average impact factors of journals in four clusters are in descending order, from cluster 1 to cluster 4.

Ten LIS journals are not involved in interlocking editorship for several reasons, including the limited number of editorial board member, the specialty issue, the holding of editorial board members from non-research oriented affiliation, etc.

Therefore, it is obvious that interlocking editorship information is suitable for exploring the journal proximity pattern in LIS.

CONCLUSION

This research is valuable in using interlocking editorship information to explore the proximity pattern of LIS journals, validating that interlocking editorship information is useful to cluster journals in LIS.

In addition, this gradually furthered analysis also obtains several insights. First, journals in MIS cluster have greater Impact Factor values than the other three clusters, and research-oriented LIS journals achieves a higher average Impact Factor than practice-oriented LIS journals. Second, the 58 journals categorized in JCR in LIS subject might need re-categorization. It would be more reasonable that eight journals in MIS cluster will be categorized into another subject other than LIS, since both the simple similarity measure and MDS result show that those MIS journals are not similar in subjects with other journals in that category. Moreover, *The Scientist* might also be considered to be added into another category other than LIS in JCR, since it mainly publishes articles on issues of life science.

In conclusion, this research offers another way of journal clustering in a particular field by using interlocking editorship information, other than widely used journal citation information. Furthermore, according to the result, journals in LIS subject category in JCR are not firmly connected with LIS research, and proper re-categorization of LIS journals in JCR is suggested.

ACKNOWLEDGMENTS

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Appendix A

Full	Abb.	Full	Abb.
Annual Review of Information Science and Technology	ARIST	Journal of the American Medical Informatics Association	JAMIA
Aslib Proceedings	ASLIB	Journal of the American Society for Information Science and Technology	JASIST
Canadian Journal of Information and Library Science	CJLIS	Journal of the Association for Information Systems	JAIS
College & Research Libraries	CRLib	Journal of the Medical Library Association	JMLA
ECONTENT	Econtent	Knowledge Organization	Korg
Electronic Library	ELib	Law Library Journal	LLJ
Government Information Quarterly	GIQ	Learned Publishing	LPub
Health Information and Libraries Journal	HILJ	Library & Information Science Research	LISR
Information & Management	IM	Library Collections Acquisitions & Technical Services	LCATS
Information Processing & Management	IPM	Library Hi Tech	LHT
Information Research	InfRes	Library Journal	LibJ
Information Society	InfSoc	Library Quarterly	LQuart
Information Systems Journal	ISJ	Library Resources & Technical Services	LRTS
Information Systems Research	ISR	Library Trends	LTrends
Information Technology and Libraries	ITLib	LIBRI	LIBRI
Interlending & Document Supply	InterDoc	MIS Quarterly	MIS
International Journal of Geographical Information Science	IJGIS	Online Information Review	OIR
International Journal of Information Management	IJIM	Online	Online
Journal of Academic Librarianship	JALib	Portal-Libraries and the Academy	Portal
Journal of Computer-Mediated Communication	JCMC	Program	Program
Journal of Documentation	JDOC	Reference & User Services Quarterly	RUSQ
Journal of Global Information Management	JGIM	Research Evaluation	ResEva
Journal of Health Communication	JHC	Restaurator	Restaurator
Journal of Information Science	JIS	Scientist	Scientist
Journal of Information Technology	JIT	Scientometrics	Sciento
Journal of Informetrics	JInfor	Serials Review	SerRev
Journal of Librarianship and Information Science	JLIS	Social Science Computer Review	SSCRev
Journal of Management Information Systems	JMIS	Social Science Information	SSInfor
Journal of Scholarly Publishing	JSP	Telecommunications Policy	TelPol