

AUTHORSHIP IN JASIS: A QUANTITATIVE ANALYSIS

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The researchers systematically examined authorship patterns of feature articles and brief communications in the Journal of the American Society for Information Science (JASIS), a leading professional publication in its field, from 1970 to 1996. Characteristics of authors, as opposed to the content of the journal and the domain of information science, serve as the focus of the study. Data on gender, academic or other professional affiliation, geographic location, and frequency of authorship were drawn from the JASIS articles themselves and tabulated both by individual years and over the entire span of the study. The study sought quantitative evidence of changing authorship patterns and the findings are explained in relation to previous authorship studies.

INTRODUCTION

Traditionally, professional journals have served as the vehicle of exchange for scholarly information in academic communities. As in other disciplines, professionals in the field of information science write journal articles as a form of scholarly communication. One of the most important journals in the field of information science is the *Journal of the American Society for Information Science* (JASIS).

JASIS has been published since 1970, and is managed by the American Society for Information Science. JASIS consisted of six issues per year from 1970 to 1989, eight issues per year in 1990, ten issues per year from 1991 to 1995, and 12 issues per year from 1996 to 1997. JASIS recently announced that it would publish 14 issues per year starting in 1998. With the increase in the number of issues, there has been an increase in the number of articles published per year.

Throughout the history of this journal, one might expect to discover changing patterns in the area of

authorship. In order to determine whether this was the case, this collaborative project sought to determine whether any trends in authorship could be identified, particularly in terms of co-authorship, frequency of authorship, gender, geography, and institutional affiliation.

METHODOLOGY

In order to determine authorship trends in JASIS, bibliographic data from the 27-year period from 1970 to 1996 were gathered. Three specific types of JASIS articles were analyzed: feature articles, brief communications, and perspectives. Excluded were editorial notes, book reviews, letters to the editor, and miscellaneous special articles. For each journal article, volume, issue number, and year were recorded. Article titles were omitted because they were determined to be outside the scope of the study.

The decision to record the name of only the first author for each article followed the standard set by the Institute for Scientific Information (ISI). However, in an effort to address multiple authorship and compensate for the omission of co-author names, the number of additional authors was logged as well.

Each author's affiliation was identified and assigned to one of six categories. In an effort to solve potential problems presented by the varied and ever-changing terminology used within the library and information science (LIS) discipline, "SLIS Academic" was used to represent any academic institution with the words "library" and/or "information science" in its title. "Other Academic" was defined as any other university subject area, such as computer science, mathematics, and engineering. "Corporate" affiliation encompassed all private,

public, and for-profit organizations including institutes and laboratories. The category "Government" included any agency associated with the government, while "Library" was composed of all libraries regardless of their institutional affiliation. When the nature of an organization could not be readily determined, it was categorized as "Unknown."

In an effort to be comprehensive in the coverage of affiliations, the category "Other" was initially included as an affiliation type. During data collection, this was determined to be a problematic category due to its inconsistent and frequent use. "Other" was eliminated and subsequently replaced with "Unknown." "Unknown" was only used in the rare case when no affiliation was provided for an author, or if language barriers prevented classification. To eliminate further inconsistencies, laboratory and institute affiliations, which were originally included in "Other," were placed in the "Corporate" category.

Another variable, author gender, categorized authors as male, female, or undeterminable, and was based solely on interpretations of the authors' first names. Problems encountered in data collection regarding gender involved instances in which only the authors' initials were used in their JASIS articles. Thus, if a first name was non-gender specific, consisted only of initials, or was of foreign origin (with language barriers preventing gender identification), the category "Unknown" was used.

The formal name of the organization with which the author was affiliated was recorded for academic institutions. This involved recording the university name and its individual campus location. The geographic area from which the author submitted his or her work was specified as being either United States, outside of the United States, or unknown.

TABLE 1. Percent of the total number of articles in JASIS published by authors appearing N times.

Total number (N) of times an author appears	1	2	3	4	5	6 or more
Total number of articles by authors appearing N time(s)	789	133	35	20	14	23
As a % of all articles	77.8	13.1	3.4	1.9	1.4	2.2

ANALYSIS AND DISCUSSION

Frequency of Authorship

Examining the number of times an author contributed to JASIS led to some interesting findings. As indicated by Table 1, almost 78% of all articles were written by an author who was published only once in JASIS between the years of 1970 and 1996, while 91% of all articles were by authors whose writing appeared either once or twice. Similarly, Walker (1997) studied the *Journal of Documentary Reproduction* and found that the majority of its authors contributed one or two articles, while only a small number contributed three or more. Certainly the explanation for why an author would be published so few times varies; these reasons may be an area for further study.

Authors who contributed six or seven times to this journal made up only 2.2% of all JASIS-published authors. Among those authors who contributed more than six articles over the 27-year period, the highest ranked were Abraham Bookstein, with 14, and Gerald Salton, with 13 (see Appendix). Interestingly enough, many of the authors who were published in JASIS more than six times had their writings spread out over a considerable period of time. For example, Bookstein's first article appeared in 1972, yet he published again as recently as 1996. Likewise, Salton's writings began to appear in 1972, and continued to be published periodically until 1990.

Since these authors' relatively numerous contributions covered a wide time frame, one could possibly conclude that these writers were, and are, heavily involved in their fields, perhaps as leading and respected researchers. However, looking at such select author characteristics did not provide a full account of the authors' areas of interest or specialty, nor reasons why Bookstein and Salton, as well as Stephen Harter and Leo Egghe, continue to publish. Further research examining the content of these authors' articles could yield insight into the subjects of their work. Perhaps their past studies are just as prevalent in today's growing research.

In conclusion, over the 27-year period, 78% of the articles examined were written by an author appearing only one time, while over 90% of all articles were contributed by an author who appeared one or two times. The authors whose work appeared six or more times were only 2.2% of total contributing authors. These findings were similar to the conclusions of Budd and Seavey (1990) who examined authorship in 36 LIS journals from 1983 to 1987. They found that only a small number of institutions and the majority of authors

contributed only one article. These findings thus provide evidence for the rule of Lotka's Law, the classic bibliometric law that suggests that in any subject field, only a small percentage of the authors are highly productive. Of those authors who contributed the greatest number of articles to JASIS, most of their work appeared over a longer period of time, and not in a particular decade or narrow range of years.

Co-authorship

This segment of the authorship study analyzed the collaborative authorship trends found over the same 27-year period in JASIS. The number of co-authors contributing to each of the articles was recorded in an effort to identify and address these trends. For the 1,489 articles included, 574 (39%) were co-authored. The majority of articles, 915 (61%) had no co-authors. This was consistent with Cline (1982), who found that a vast majority of the articles published in College and Research Libraries from 1939 to 1979 had no co-authors. Similarly, Harsanyi (1993) examined multiple authorship in bibliometrics and concluded that the field is not highly collaborative.

In this study, an increase in authorship collaboration was evident over time. A tabulation of the number of multiple-author articles for the 1970s, 80s and 90s revealed an increase in each decade, with 172, 185 and 217 co-authored articles respectively. A potential explanation for this may be the increase in the number of articles published in JASIS, but the results also paralleled findings in earlier studies of co-authorship patterns by Cline (1982), Metz (1989,) and Terry (1996). This increase has also been represented in scientific publication trends, an area where Price (1968) and Beaver and Rosen (1977) reported a significant increase in multiple authorship. A trend toward shared authorship among three or more individuals increasing over time was also outlined by Metz (1989). A comparison of the number of JASIS articles with three or more co-authors in the 1970s (14) and the 1990s (28) revealed an increase of 100%.

In addition, an analysis of articles with multiple authors revealed that shared authorship was more likely between two authors than among three or more authors. An inverse relationship existed between the number of co-authors and the number of articles co-authored. As the number of co-authors increased, the number of representative articles decreased. Of the 574 co-authored articles studied, 392 (68%) were written by three authors, 7.3% by four authors, while only 0.17% of the co-authored articles were written by seven or more au-

thors. The decision to omit biographical data for each co-author, and record only the total number of contributing authors, eliminated the potential for analyzing the relationships between co-authorship and other variables such as gender.

Academic Affiliations

Previous research has shown that LIS faculty are more highly represented in LIS journals than library professionals and faculty from other disciplines. Olsgaard and Olsgaard (1980) reviewed authorship characteristics in five major LIS journals and found that LIS faculty were more highly represented than the rest of the library profession. Raptis (1992) explored authorship traits in five international library journals and found that 33.3% of the writers were LIS faculty, while 8% came from other academic disciplines. Harter and Hooten (1992) analyzed JASIS from 1972 to 1974, 1982 to 1984, and 1988 to 1990 and reported an increase in authors associated with LIS schools since 1974.

In order to more clearly identify trends in the number of articles issued from LIS departments with other areas of academia, the researchers consolidated the number of articles into three-year periods. With the aid of the data presented in Figure 1, a comparison of articles from LIS schools and other academic areas identified a clear trend.

During the 1970s, twice as many articles originated in other academic areas as originated from LIS (199 vs. 96). During the 1980s, the gap narrowed. From 1985 to 1990, the number of articles was virtually the same in each affiliation division. From 1991 to 1996, a reverse trend occurred. In these years, the articles from LIS-affiliated authors outnumbered those from other academic areas by 20%.

This study also produced results similar to those of Budd and Seavey (1990). Their study found that a small

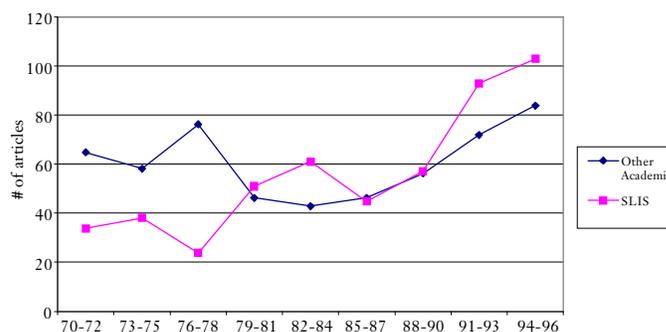


FIGURE 1. Number of JASIS articles by authors of academic affiliation per three-year period.

number of institutions were responsible for journal contributions to the literature, with most of the authors contributing only one article.

The total number of articles written by authors representing academic institutions is 1,052, while the total number of institutions is 259. The distribution of publication frequency by academic institution, both LIS and other, conformed broadly to expected rank-order patterns in which frequency of occurrence is a function of a constant applied to rank and size. In this case, rank (of institution productivity) showed an inverse relationship with size (number of articles published). The top 5% (13) of the institutions, for example, produced 384 articles, which was well over one-third of the total. The top 10% (26) produced 541 articles, or just slightly over half of the total. Additionally, authors from the most productive school—the University of California-Berkeley—produced 53 articles during the period studied, while 108 other institutions produced only one article apiece.

This distribution of authorship by affiliation did not conform to Lotka's Law for individual authorship; however it still showed a clear rank-order relationship. While these figures may be predictive of results found in other publications, it is important to keep in mind that they do not explain them. Causes of this relationship could involve many variables beyond the scope of this analysis, such as changes in editorial policy or personnel shifts at various institutions.

To investigate possible trends in dominance by an individual institution over the 27-year period being studied, publication frequency for the three most productive institutions, UC-Berkeley (53 articles), Drexel University (38), and the University of Maryland-College Park (38), was examined per decade. No overall trends were observed, although there were some minor fluctuations. For example, Berkeley and Maryland were more prolific in the 1970s, with 21 and 12 articles published respectively, while in the 90s their numbers changed to 23 and 19. Drexel was the most active in the 80s with 23 articles. These variances may be the result of the content of special issues in certain years, the increase in the number of articles published per year, as well as the factors affecting the rank-order relationship mentioned above.

In order to confirm the patterns identified in this study, studies of other important LIS journals should be done comparing the publishing patterns of LIS faculty with faculty in other disciplines. Also, the finding that a few institutions were responsible for many of the articles seemed to parallel distribution patterns that showed that

fewer authors tend to be responsible for more articles. Again, replicating this study with other journals may indicate that this pattern generally applies across disciplines.

Non-Academic Affiliations

The number of articles written by authors representing corporate institutions was at its peak in the early 1970s, when 36 articles a year were written by such authors, making up 23% of the total articles written between 1970 and 72. After 1972, the number of articles from corporations remained under 20%, and has been steadily decreasing since 1988, to its lowest point of less than five percent in 1996. This is consistent with the findings of Harter and Hooten (1992) who found that contributions by authors from government, public libraries, and corporations have consistently decreased.

The number of articles written by authors representing government agencies and libraries has always been minimal, averaging less than ten articles a year. In other words, only 5% of the articles in JASIS were written by authors representing government agencies, while 7% were written by authors representing libraries. Although the number of articles written by authors from government agencies, libraries, and corporations has declined, the total number of articles included in each issue of JASIS has increased by 36% over the last 27 years.

Gender

From 1970 through 1996, male authors accounted for 60% (887) of the authors appearing in JASIS, while female authors accounted for 22% (333) of the total. The gender of the remaining 18% (269) could not be readily determined. These findings paralleled the results of three studies; Olsgaard and Olsgaard (1980), Buttlar (1991), and Raptis (1992) looked at five or more

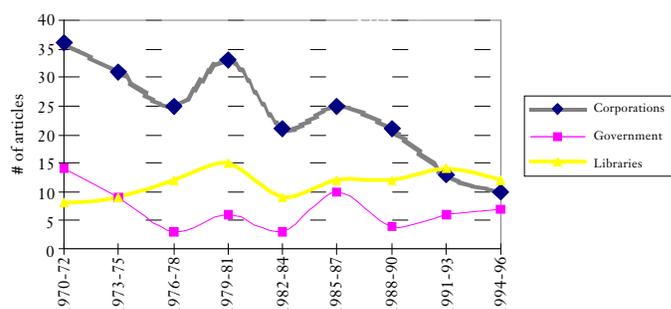


FIGURE 2. Number of JASIS articles by authors of non-academic affiliation per three-year period.

LIS journals and found that male authorship significantly outweighed female authorship.

Through the first five years of JASIS (1970-1974), male contributors outnumbered female contributors 68% to 16%. In the period from 1975 to 1979, female authorship made a significant jump to 22%, while male authorship fell to 62%. Female authorship stabilized, remaining at approximately 22% from 1975 to 1993. In the final three years addressed by this study, 1994 to 1996, female authorship again made a significant leap to 32% of all contributions. The trend towards increased female authorship in the late 1990s is consistent with the trends reported by Cline (1982), Metz (1989), and Terry (1996).

Further, the trend toward increased authorship in JASIS by females and LIS affiliates coincides with demographic shifts in LIS faculties. In the mid-70s male faculty outnumbered their female colleagues by a ratio of 59 to 41. By 1995 this disparity had all but evaporated. The male-female ratio in 1995/96 stood at 50.7% to 49.3% (ALISE, 1996). Increased authorship in JASIS by a more diverse LIS faculty is a possible explanation of the trend toward greater female share in JASIS authorship in the 90s.

The sizable proportion of authors of unknown gender (18%) presented a significant barrier in determining the true gender breakdown. The frequent use of first and middle initials, as well as the inability to decipher the gender of uncommon names may explain the large number of names categorized as unknown.

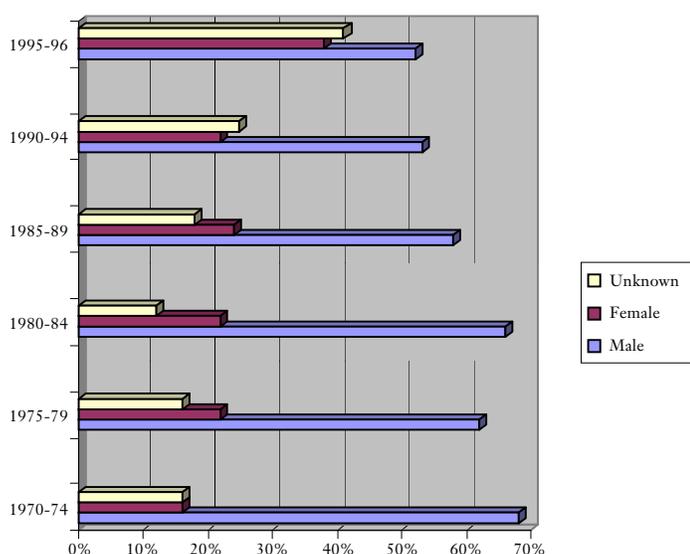


FIGURE 3. The composition by gender of JASIS authors, represented as a percentage for each five-year period.

Geography

For the period covered in the study, authors affiliated with institutions located in the United States numbered 1,156 (78%); authors affiliated with institutions located outside of the United States numbered 327 (22%). The geographic origin of only five articles could not be determined.

Geographic trends showed some similarities to fluctuations in gender. American contributors from institutions located within the United States (86%) outnumbered contributors affiliated with non-U.S. institutions (12%) in the first five years of JASIS. From 1975 to 1979, non-U.S. authorship experienced a significant jump to 23%. From 1975 until 1989, non-U.S. authorship remained from 20 to 23%. In 1989 however, non-U.S. authorship made a dramatic leap from 12% in 1988, to 36% in 1989. Non-U.S. authorship averaged 28% from 1990 to 1996.

The increasing international participation in JASIS agreed with the findings of Herubel (1991), who analyzed 23 years of authorship in library history. The overall percentage of non-U.S. authorship was significantly higher throughout our 27-year study than the small 9% determined by Buttlar (1991).

Overall Patterns in Gender and Geography

For this analysis of geography and gender, the focus was on examining authorship trends over five year periods. This method de-emphasized year-to-year fluctuations while emphasizing overall trends in authorship.

Male authorship was especially dominant in the first five years of JASIS. There were very small changes in

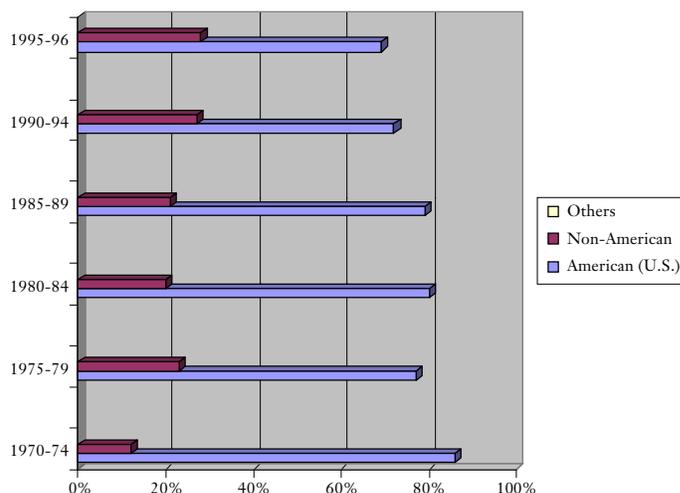


FIGURE 4. The composition by geographic location of JASIS authors, represented as a percentage for each five-year period.

the male-female ratio from 1975 to 1990. The 1990s saw a trend toward greater diversity in authorship. Participation by female authors and by contributors affiliated with non-U.S. institutions increased in the 1990s, coinciding with a significant increase in the number of articles published in each volume of JASIS. Further study needs to be completed to determine whether this diversity was an effect of increased expansion in the number of issues published each year.

CONCLUSION

Several trends can be seen from the analysis of these data, distribution and chronological patterns. Three patterns seem to conform to a principle implied in Lotka's Law, in that a small number of authors are disproportionately responsible for a large amount of literature.

Concerning frequency of authorship, a very small number of authors contributed six or more articles to JASIS, while the vast majority of authors contributed no more than two. Regarding multiple authorship, as the number of article co-authors increased, there was a significant decrease in the number of articles produced. In other words, among the total number of co-authored articles, few articles were written by large groups. In terms of the institutional affiliation of authors, a small number of institutions were responsible for a large amount of literature.

Another trend that emerged from the analysis in this study was that there was greater diversity in authorship over time. Over the 27-year span, there was a significant increase in the number of co-authored articles, the number of female authors, the number of authors from outside of the United States, and the number of authors from LIS schools. Of special importance to LIS, was determining that although contributions from disciplines

outside LIS originally outnumbered those within, LIS contributions now exceed those from other disciplines. There has also been a corresponding decrease in contributions from those not affiliated with academic departments. Perhaps the general trend toward diversity of gender and geography described in this analysis of JASIS reflects general trends in scholarly communication and society at large.

Consistent with the bibliometric ISI standard, this study was limited to examining the authorship characteristics of the first authors of collaborative articles. For several reasons, the gender of some of these authors was undeterminable, and may have altered some of the research results. Including all co-authors and determining author gender through additional research would contribute to a more comprehensive study, however this additional data would have been beyond the parameters established for this project. Another limitation may be that trends showing increases in certain variables were tempered by the increase in the number of articles published annually over time.

This study replicates the results of other studies of authorship characteristics (Olsgaard & Olsgaard, 1980; Raptis, 1992; Harter & Hooten, 1992) showing an increase in numbers of LIS authors in proportion to those from other disciplines. Further study of the changing composition of LIS faculties, revised curricula, and similar factors is needed to enhance our understanding of this trend and its broader implications.

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APPENDIX

Total number of appearances by authors from 1970-1996
(Authors appearing 4 or more times are listed individually)

Authors Appearing 1 time	789
Authors Appearing 2 times	133
Authors Appearing 3 times	35

Author	Number of articles	Author (cont)	Number of articles
Abraham Bookstein	14	Blaise Cronin	5
Gerald Salton	13	Charles H. Davis	5
Leo Egghe	10	Laurence B. Heilprin	5
Stephen Harter	10	William R. Hersh	5
Michael Buckland	9	Robert Losee	5
William S. Cooper	8	Victor Rosenberg	5
Michael Gordon	8	Mary Ellen Severt	5
Katherine W. McClain	8	Howard D. White	5
Charles Meadow	8	Martha E. Williams	5
Susan Artandi	7	S.K.M. Wong	5
Michael Cooper	7	Marion J. Ball	4
Raya Fidel	7	Marcia J. Bates	4
F.W. Lancaster	7	Virgil Diodato	4
William B. Rouse	7	Martin Dillon	4
Tefko Saracevic	7	Beth Krevitt Eres	4
M.C. Yovits	7	Valery I. Frants	4
Jack Belzer	6	Donald T. Hawkins	4
Christine Borgman	6	Eugene B. Jackson	4
Terrance Brooks	6	Paul B. Kantor	4
Frederick G. Kilgour	6	Donald H. Kraft	4
Manfred Kochen	6	Ray Larson	4
William M. Shaw Jr.	6	Clifford A. Lynch	4
Rowena Weiss Swanson	6	Miranda Lee Pao	4
Quentin L. Burrell	5	Steven E. Robertson	4
John Carroll	5	Ronald Rosseau	4
Timothy Craven	5	Elaine Svenonius	4
Bruce Croft	5	Don R. Swanson	4

REFERENCES

- Association for Library and Information Science Education. (1996). *Library and information science education statistical report, 1996*. State College, PA: ALISE.
- Beaver, D. de B., & Rosen, R. (1977). The professional origins of scientific co-authorship, Part III. *Scientometrics*, 1, 231-245.
- Budd, J., & Seavey, C. A. (1990). Characteristics of journal authorship by academic librarians. *College & Research Libraries*, 51, 463-470.
- Buttlar, L. (1991). Analyzing the library periodical literature: Content and authorship. *College & Research Libraries*, 52, 38-53.
- Cline, G. S. (1982). College and Research Libraries: Its first forty years. *Research Libraries*, 43, 208-232.
- Harsanyi, M. A. (1993). Multiple authors, multiple problems — Bibliometrics and the study of scholarly collaboration: A literature review. *Library and Information Science Research*, 15, 325-354.
- Harter, S. P., & Hooten, P. A. (1992). Information science and scientists: JASIS, 1972-1990. *Journal of the American Society for Information Science*, 43, 583-593.
- Herubel, J.-P. V. M. (1991). Authorship, gender, institutional affiliation in library history: The case of libraries and culture. *Behavioral and Social Sciences Librarian*, 11, 49-54.
- Metz, P. (1989). A statistical profile of College and Research Libraries. *College & Research Libraries*, 50, 42-47.
- Olsgaard, J., & Olsgaard J. (1980). Authorship in five library periodicals. *College & Research Libraries*, 41, 49-53.
- Price, D. de S. (1968). *Little science, big science*. New York: Columbia University Press.
- Raptis, P. (1992). Authorship characteristics in five international library science journals. *Libri*, 42, 35-52.
- Terry, J. L. (1996). Authorship in College and Research Libraries revisited: Gender, institutional affiliation, collaboration. *College & Research Libraries*, 57, 377-383.
- Walker, T. D. (1997). Journal of Documentary Reproduction, 1938-1942: Domain as reflected in characteristics of authorship and citation. *Journal of the American Society for Information Science*, 48, 361-368.