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Coverage and quality: A comparison of Web of Science and Scopus databases for reporting faculty nursing publication metrics

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ABSTRACT

Background: Web of Science and Scopus are the leading databases of scholarly impact. Recent studies outside the field of nursing report differences in journal coverage and quality.
Purpose: A comparative analysis of nursing publications reported impact.
Method: Journal coverage by each database for the field of nursing was compared. Additionally, publications by 2014 nursing faculty were collected in both databases and compared for overall coverage and reported quality, as modeled by Scimajo Journal Rank, peer review status, and MEDLINE inclusion. Individual author impact, modeled by the h-index, was calculated by each database for comparison.
Discussion: Scopus offered significantly higher journal coverage. For 2014 faculty publications, 100% of journals were found in Scopus, Web of Science offered 82%. No significant difference was found in the quality of reported journals. Author h-index was found to be higher in Scopus.
Conclusion: When reporting faculty publications and scholarly impact, academic nursing programs may be better represented by Scopus, without compromising journal quality. Programs with strong interdisciplinary work should examine all areas of strength to ensure appropriate coverage.

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Introduction

Conversations about how research and faculty impact could, or should, be measured have gone on for decades. Twenty-first century technologies have resulted in a dramatic increase in the data points and definitions of what can be measured as impact. Building from the groundwork of the Science Citation Index (now part of Web of Science) founded in 1964, emerging tools over the last 10 years have highlighted the need for programmatic comparisons and evaluations of how impact and scholarly influence are reported. One recent comparison of such tools cautions that Web of Science and Scopus impact metrics should be humorously taken with a cautionary cup of salt, whereas metrics from Google Scholar and ResearchGate should be taken with the bountiful classroom of salt (Cochran, 2017).

Rationale for such cautions stem from the definitions and transparency of metrics provided by each

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source. Both Web of Science and Scopus use established and discoverable selection processes for publication inclusion and impact algorithms—but rely on subsets of scholarship meeting these criteria. ResearchGate and Google Scholar, on the other hand, seem to account for a much wider range of scholarly outputs and influence but leave their exact coverage and validation practices unreported. Similarly, these latter tools are driven by researcher created profiles rather than curated literature databases like Web of Science and Scopus. As such, impact profiles created under Google Scholar or ResearchGate cannot be independently created, vetted, or reproduced by third-parties. Web of Science and Scopus have thus become widely recognized as the primary academic databases used for faculty research metrics and impact measures.

Since 2011, the health sciences library at our institution has been regularly asked to provide third-party publication metrics for annual program reporting and to inform reviews of faculty impact for our School of Nursing. Because Web of Science and Scopus databases each require costly subscriptions and university-wide agreements, the library was interested in documenting differences in how our faculty publications were reported and measured in these two databases. We hope the findings reported here will aid other academic nursing programs in advocating for the best resources to promote and highlight their faculty's scholarly endeavors.

Background

The use of citation analysis, or bibliometrics, as a measure of scientific impact began in earnest in the mid-20th century, most notably with the introduction of Journal Impact Factors. Journals were able to use this metric to model prestige and impact (Garfield, 1955). In 1964, the database Science Citation Index was launched to formalize the citation tracking and ranking of journals in a reproducible and time-comparative way. Over half a century later, the h-index was proposed as a method for modeling individual researcher impact, based on the number of citations an article received (Hirsch, 2005). The h-index has since become a widespread metric for modeling scholarly impact over the course of a career. Together, these models of impact have become commonplace in the biomedical and clinical sciences and are often requested as part of an academic researcher's evaluation packages for hiring, tenure, promotion, funding, and so on. The field of nursing has not been exempt such applications and discussions (Fitzpatrick & Madigan, 2013; Goode et al., 2013; Molzahn & Clark, 2015; Smith & Hazelton, 2011; Thompson & Clark, 2015; Thompson & Watson, 2010). Although there are many caveats and potential drawbacks to attempting to quantify the impact of a researcher or article, these models remain a useful benchmark for comparing and evaluating researchers.

Until recently, Web of Science, having grown from the original Science Citation Index, offered the only source for authoritative citation counts and citation-based metrics. Only since 2004 did its competitors, Scopus and Google Scholar, become available. Many studies have shown that Web of Science and Scopus are more directly comparable than Google Scholar (Bar-Ilan, 2008; De Groote & Raszewski, 2012; Falagas, Pitsouni, Malietzis, & Pappas, 2008b; Jacso, 2005). However, Web of Science and Scopus are both subscription databases produced by large media and publishing companies (Thomson-Reuters and Elsevier, respectively), whereas Google Scholar remains, to date, free of charge. Thus, although many studies have advocated for using multiple sources when modeling researcher impact, the availability of multiple options becomes a financial consideration for the entire university or hospital center.

Within the field of nursing, there have only been a few studies that look to explore how bibliometrics apply specifically to academic and clinical nursing researchers (De Groote & Raszewski, 2012; Hack, Crooks, Plohman, & Kepron, 2010). Hack et al., (2010) relied exclusively on the Scopus database for their metrics. The justification for its exclusive use was the overall broader coverage offered by Scopus for the field of nursing. De Groote and Raszewski (2012), on the other hand, looked at how nursing faculty were measured across several sources. In this comparison, DeGroote and Raszewski highlighted the specific variation in the coverage of journals classified in the field of nursing. For Web of Science, they reported 95 journals in the nursing category for 2010 compared with 472 listed in Scopus for 2010. This was already an increase from the 74 nursing journals covered by Web of Science reported in 2009 (Polit & Northam, 2011). However, in tandem with the significantly broader coverage, DeGroote and Raszewski also remarked on a lower overall quality of journals included by Scopus. Similar observations of lower overall journal rankings in light of wider coverage have also been made in the field of pharmacology (Vieira & Gomes, 2009). Studies outside the field of nursing have reported no significant difference at the individual reporting level (i.e., h-index), but many noted a disciplinary bias in journal coverage (Bar-Ilan, 2008; Falagas, Kouranos, Arencibia-Jorge, & Karageorgopoulos, 2008a; Gorraiz & Schloegl, 2008; Mongeon & Paul-Hus, 2016). This brings into question, is the increased coverage of journals beneficial for the measurement of nursing faculty impact if it is potentially paired with a lower reported quality? In pursuit of this question, this study originated from conversations with nursing faculty administrators at a large and private research institution.

The aim of this study is to compare the Web of Science and Scopus databases using descriptive statistics to identify differences in publication coverage and the quality measures for our School of Nursing faculty publications. Specifically, we sought to determine if the previously reported increase in journal coverage offered by Scopus resulted in a decrease in

the reported quality of scholarship produced by nursing faculty as reported by our institution's standard reporting database, Web of Science. Descriptive statistics were used to compare the following:

- Overall coverage of each database for journals in the field of nursing
- Specific coverage of 2014 nursing faculty publications
- Reported quality of the journals in which 2014 nursing faculty publications appear
- Reported h-index for 2014 nursing faculty in each database

Methods

Determining Journal Coverage and Scope

Journal title lists for Web of Science and Scopus are publicly available (Scopus, n.d.; Thomson Reuters, n.d.). The most up-to-date title lists (April 2015 and February 2015 for Web of Science and Scopus, respectively) were harvested at the time of data collection. For Web of Science, journals were included if they appeared in either the Science Citation Index Expanded or the Social Science Citation Index collection. A journal was designated as nursing if it was categorized as such by either Web of Science or Scopus.

Faculty Inclusion

Full name listings for regular full-time faculty members were provided by administrators in the School of Nursing for the 2014 to 2015 academic year. All 61 individuals were included in the study, representing all aspects of our institution's academic nursing environment (Table 1).

Publication Identification

As information professional's are proficient with designing author-based search strategies in both databases, the study authors independently collected faculty career publication records and citation count data from Web of Science and Scopus. For example, the following representative search strategy will return a comprehensive yet fairly focused results list for most authors:

AUTHOR IDENTIFIERS: (1234–5678–9012–345X) OR (AUTHOR: (Lastname, F. or Lastname, FM) AND ADDRESS: (Affiliation A or Affiliation B)).

When publicly available, curriculum vitaes (CVs) and/or other online profiles were consulted to determine name variations and previous institution affiliations. When available, author identifiers such as ORCID or Researcher ID were included in the search strategy. Full reference information and citation counts for identified publications were saved to EndNote libraries. EndNote X7.2 (Thomson Reuters, New York, NY) for Windows was used to store and sort an initial publications list and subgroupings by faculty author. Study authors compared libraries for final consensus in publication identification and author attribution. The h-index for each faculty author was then calculated by the study authors using the finalized publication lists and captured citation counts.

Web of Science
The basic search function was used for data collection within Web of Science. Author identifiers, author name, and address fields were used to narrow search results. Results were limited to the document types article, proceedings paper, and review.

Scopus
The Author Search function was used to collect data within Scopus. Authors were identified by last and first names. Institutional affiliations were added as needed. To mirror Web of Science designations, results were limited to documents labeled as article, conference paper, or review. This reflects alternative labeling for publications defined as article, proceedings paper, or review within Web of Science.

2014 Calendar Year Comparison
The 2014 calendar year period (January 1–December 31, 2014) was selected for this study because of exportation limitations from the Scopus database. Although faculty and administrators typically prefer academic or calendar year reporting, only the year component of the publication data is retained when exporting from Scopus into EndNote libraries.

Journal Quality Indicators

Journals that published faculty articles in the 2014 calendar year were compared for the two databases. Journal impact rankings were determined using 2013

Table 1 – Breakdown of School of Nursing Faculty Members for 2014 Calendar Year by Rank and Track

Faculty Track	Assistant Professor	Associate Professor	Professor	Total Individuals
Clinical	13	11	6	30
Research	3	3	1	7
Tenure	10	4	10	24
Total individuals	26	18	17	61

SCImago Journal & Country Rankings (SJR). Three journals without available SJR were excluded from ranking analysis. Ulrich's periodical directory was used to determine peer-review status. Journal inclusion in MEDLINE was determined as listed in the National Library of Medicine online catalog (http://www.ncbi.nlm.nih.gov/nlmcatalog/).

Statistical Significance

Significant differences were determined using an unpaired two-tailed *t* test.

Analysis Inclusion/Exclusion Criteria

Data were collected during April 2015. Discrepancies in publication identifications were discussed by study authors for final agreement. When last name and initial(s) combined with affiliation were insufficient to determine proper author attribution, the publication full text was obtained for author full name determinations. When publicly available, CV and online profiles were used for inclusion only, that is, publications were not excluded if a profile or CV could not be found or was out of date. Identified publications were limited to document type designations of article, proceedings or conference paper, and review. Database discrepancies in article type were addressed using the Web of Science designation.

Results

Overall Journal Coverage

At the time of data collection, the most up-to-date title lists reported 116 nursing journals available in Web of Science and 693 available in Scopus. The comparison of nursing journal coverage was made more complex given that each database assigns its own subject area designations for included journals. A journal assigned a nursing designation in one database may not receive the same designation in the other. For example, *The Journal of Pediatric Health Care* is assigned both pediatrics and nursing subject areas in Web of Science but receives designations for medicine, pediatrics, and perinatology and child health in Scopus, with no mention of nursing. Thus, although each database can provide a list of journals in a given subject area, they may not be directly comparable without additional context. For this study, each list of nursing journals was compared to the full coverage list for the opposite database. In this manner, it was determined that 99% of Web of Science nursing journals were available in Scopus. However, when the Scopus list was compared with total Web of Science coverage, only 33% of Scopus nursing designated journals were available in Web of Science.

Table 2 – Database Reporting of 2014 Faculty Publications

Database	Articles	Journals
Web of Science	82	51
Scopus	94	62
Total unique publications	99 articles	62 journals

Journal Coverage for 2014 Faculty Publications

Faculty authored publications were found to be more widely reported under Scopus journal indexing for the 2014 calendar year (Table 2).

However, not all the specific publications appearing in the covered journals were found. Web of Science reported five articles that could not be found in Scopus, despite the inclusion of the journal title on the Scopus coverage lists. Similarly, one article identified in Scopus could not be found in Web of Science, although the journal was included on the index list, and other articles from the issue were readily identifiable. Reasons for the discrepancies between reported journal indexing and specific article availability remain unclear. Thus, the findings here, which report at the journal level, may in fact be idealized with regard to a specific article count of indexed publications.

For the 2014 faculty cohort journals, Scopus coverage offered an approximately 22% increase in coverage over Web of Science. It is important to note, however, that not all publications appear in nursing designated journals. Approximately 34% of nursing faculty publications appeared in journals on the nursing lists offered by either database (depending on individual database designations). This reflects the strongly interdisciplinary work done by nursing faculty. Other frequent subject areas include public health, obstetrics, midwifery, oncology, and pediatrics.

Quality of Covered Journals

Three independent quality indicators were used to compare faculty publication journals included in Web of Science and Scopus: peer-review status, current inclusion in MEDLINE, and the SJR (Table 3).

Table 3 – Comparison of Journal Quality Indicators for 2014 Faculty Publication Journals

Database	Peer-Reviewed	Indexed in MEDLINE	Average SJR and Standard Deviation
Web of Science ($n = 51$)	50	48	1.53 ± 1.69
Scopus ($n = 62$)	59	56	1.36 ± 1.60
Total unique publications ($n = 62$)	59	56	1

Note. SJR, SCImago Journal & Country Rankings.

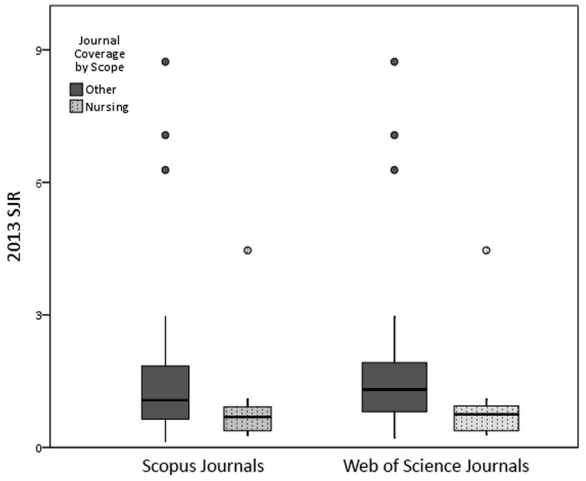

Figure 1 – Comparison of 2014 faculty publication journal SCImago Journal & Country Rankings by subject designation.

No significant difference was found between Web of Science and Scopus indexed journals with respect to the peer-review status of faculty publications. Similarly, no significant difference was found between the two databases when looking at MEDLINE inclusion.

The SJR was used to model the prestige of faculty publication journals included in each database. This metric was chosen primarily for its widespread availability. The more well-known, and proprietary, Journal Impact Factor metric was only available for 70% of study journals and did not typically cover the journals uniquely indexed by Scopus. Although the two metrics are not directly comparable as they count and weight citations differently in their calculations, the SJR has been largely accepted as a valid alternative to the impact factor (Falagas et al., 2008a). For the 2014 nursing faculty publications, the SJR calculation was compared across each database (Table 3). This comparison showed no significant difference in journal quality between the databases. However, on average, Web of Science offered a higher SJR for journals outside the field of nursing (Figure 1).

Again, only a third of the cohort's publications appeared in a nursing designated journal. Thus, although these results show no significant difference, further comparisons may need to be done to ensure adequate coverage and quality of interdisciplinary faculty work.

Researcher Impact

The final point of comparison was to look at individual faculty h-index as reported by each database. The h-index is an integer ranking commonly used to model the scholarly influence of an author. The h-index is based on a combination of an individual's career-wide publications and the citations received by those publications. Thus, the journal coverage and subsequent citation counts reported by each database have a strong influence on the modeled impact. In general, reporting the h-index for departmental or school faculty is a very time-consuming process. Lifetime publications are not always quickly identifiable in a database, particularly for individuals with common names and/or initials. Search strategies often need to include current and previous affiliations, which require consultation of a faculty member's CV before results can be narrowed to a reasonable list. Similarly, authors may use more than one professional name or publish under name variations. Examples of these may be authors who are routinely known by a legal middle name or have had a surname change during the course of their career. In light of this complex process, records of time spent in each database were kept during faculty publication identification for additional comparison.

After career publications were collected from each database, the h-index of each of the faculty member

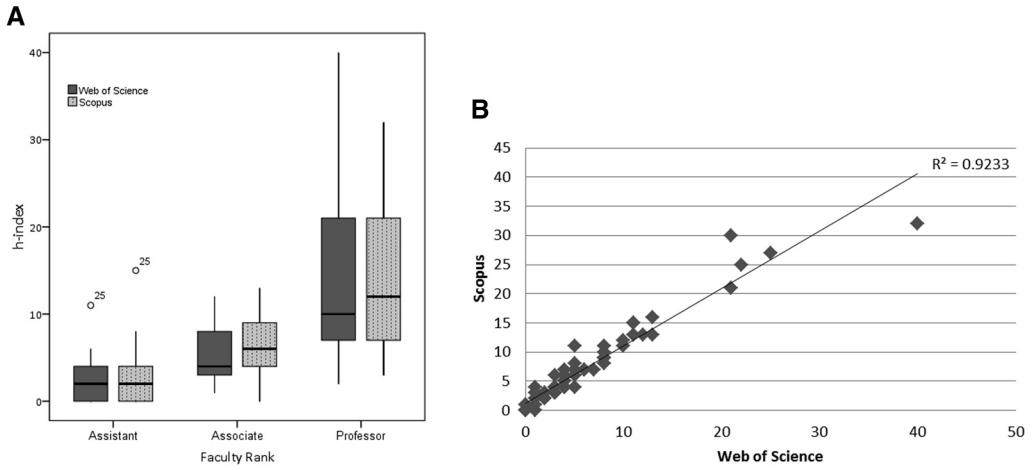

Figure 2 – (A) Comparison of researcher h-index by faculty rank (H-index chart). (B) Correlation of reported h-index.

was calculated using the respective citation counts. Scopus citation reporting yielded a higher calculated h-index for 59% ($n = 36$) of individuals (Figure 2A). An additional 36% ($n = 22$) showed no difference between the two reporting databases, leaving only 5% ($n = 3$) that received higher reported impact using Web of Science. However, the h-index calculations between the two databases were highly correlated (Figure 2B; $R^2 = 0.9233$). The overall rankings of individual faculty were not largely impacted; rather, the cohort as a whole was shown to have a higher h-index using Scopus data over Web of Science.

Taking a more detailed look at the 5% of faculty who had better impact reporting using Web of Science revealed a significant proportion of pre-1996 articles among identified career publications. This 1996 threshold is important because Scopus' current citation tracking practices do not include references made before 1996. Thus, researchers whose career impact may rely heavily on scholarship produced earlier than the mid-1990s would not have this influence represented for 2014 Scopus reporting practices (Dyas, 2014).

Discussion

The goal of this study was to allow academic nursing programs and their supporting information professionals to make informed decisions about how each of the two major bibliographic databases could be used to report measures of impact. To examine the reported impact provided by each database, four areas of comparison were explored: First, to compare the overall journal coverage offered by each database in the subject area of nursing. Second, to look specifically at the coverage of publications made by nursing faculty during the 2014 calendar year. Third, to explore the quality measures of journal impact provided by each database. And finally, to compare how individual researcher impact is reflected in each database as reported by the H-index model.

Our analysis confirmed previous findings that the Scopus database offers significantly wider coverage of designated nursing journals than Web of Science. However, it was also found that in 2014 the nursing cohort published in these field specific journals only 34% of the time. Other high-frequency subject areas for faculty publications were public health, oncology, and pediatrics. Of the faculty publications across all domains, 97% of articles by faculty could be found in Scopus, whereas only 84% were discoverable by Web of Science. Each database yielded unique article results, which echo previously published recommendations for consulting more than one literature database when seeking a comprehensive report of faculty publications.

When looking at the overall journal quality of 2014 faculty publications, regardless of subject designations, Scopus and Web of Science offered comparable quality rankings. However, our findings confirm the disciplinary bias reported in the literature with regard to journal quantity. Combined with the interdisciplinary publishing approach of nursing faculty shown in this study, this observation of bias underscores the need for further study. A similar degree of interdisciplinary practice would be expected among other academic nursing programs, although the additional fields may vary based on areas of faculty strength and expertise. Further studies are thus called for to measure the extant of coverage offered by these databases in the relevant interdisciplinary fields.

For individual researcher metrics, Scopus provided a higher reported h-index for faculty authors than Web of Science. However, the ranking order of researchers remained relatively the same in both databases. The increased journal coverage is the primary reason for the higher reporting. For those faculty authors who reported lower in Scopus, each had significant publications produced before 1996. At the date of data collection, Scopus was just beginning to offer citation coverage before 1996 and thus did not include such works in most of their h-index calculations. However, the database has since begun to expand its citation index to include citation counts dating back to the 1970s. The Scopus Cited Reference Expansion Program is expected to continue through 2016 (van Doorn, 2015).

Conclusions

This investigation shows that for the generalized field of nursing, and for our specific nursing faculty publications, Scopus outperformed or showed no significant difference from Web of Science. Other academic nursing programs should consider Scopus when reporting faculty publications in terms of journal quality and researcher impact. However, Web of Science reporting was preferable to Scopus data with regard to pre-1996 scholarly output. This observation is expected to disappear once Scopus completes its announced citation expansion project. Further research would be required to see if these results could be generalized outside the field of nursing or to other crossdisciplinary applications.

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