14th BISOP

Belgrade International Symposium on Pain

17-18 May 2019, Kolarac Foundation, Belgrade

EFIC EUROPEAN PAIN FEDERATION

Serbian Pain Society

14. beogradski internacionalni simpozijum o bolu

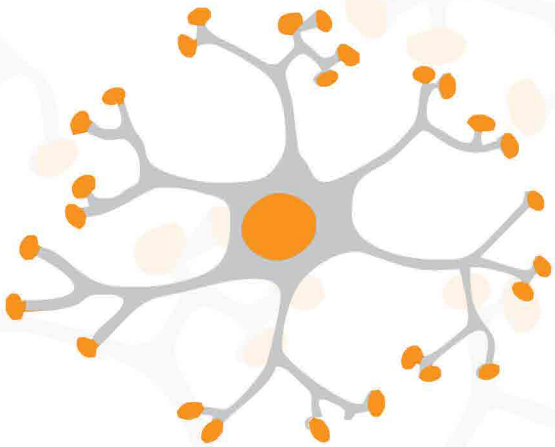
PROCEEDINGS

Beograd 17-18. maj 2019.
Kolarčeva zadužbina
Studenski trg 5, Beograd

14th Belgrade International Symposium on Pain

ZBORNIK PREDAVANJA

Belgrade 17. to 18. May 2019.
Kolarac Foundation
Studenski trg 5, Belgrade



Simpozijum je akreditovan od strane Zdravstvenog saveta Srbije sa 10 bodova za polaznike 13 bodova za poster prezentacije i 15 bodova za predavače, pod akreditacionim brojem A-1-706/19, odlukom 153-02-449/2019-01 od 04.03.2019. godine

14th Belgrade International Symposium on Pain

PROCEEDINGS
May 17-18, 2019
Belgrade, Serbia

14. beogradski internacionalni simpozijum o bolu

ZBORNIK PREDAVANJA
Maj 17-18, 2019
Beograd, Srbija

Editors/Urednici
Assoc.Prof./Doc.Dušica Stamenković, MD,PhD
Prof. Nebojša Lađević, MD,PhD

Publisher/Izdavač
Serbian Pain Society, Belgrade, Serbia

For the publisher/za izdavača
Nebojša Lađević, MD, PhD

Editors/Urednici
Dusica Stamenkovic, MD,PhD Nebojša Lađević, MD, PhD,

Technical Editor/Tehnički urednik
Milan Bogdanovic

Circulation/Tiraž 800

Printed by/Stampa Studio "Znak", Beograd

Circulation/Tiraž 800

2019

3 Literature search

Milica Ševkušić
Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade, Serbia

Abstract: The paper seeks to highlight the complexity of literature searching in online bibliographic databases and the importance of developing advanced search skills towards greater search efficiency. The lack of knowledge of the content, structure and operation of databases, poor search skills, and superficiality in assessing search results are discussed as the major obstacles to efficient literature searching. It is suggested that despite technical improvements towards adjusting search engines to natural language processing, the knowledge of traditional search strategies remains highly relevant.

Keywords: search strategies, bibliographic databases, search operators, search skills

Introduction

Online literature search is often assumed to be intuitive and easy – typing any search criteria in the search box usually returns some hits. This assumption may lead to an inaccurate impression regarding the state-of-the-art, major focuses and key publications in an area of study and bias in their assessment and interpretation. While bibliographic databases are now available online to a wide audience and efforts are constantly being made to facilitate information retrieval, they largely conform to structures and standards defined in the period when librarians were mediators between users and databases.

With no ambition of being exhaustive, the paper seeks to highlight the complexity of literature search and to draw attention to some procedures and tools that may increase its efficiency. It focuses on three issues that are, based on a librarian's experience, crucial for efficient literature searching:

– the knowledge of the content, structure and operation of databases;
– the knowledge of search techniques;
– assessing the relevance and quality of the retrieved results.

Bibliographic databases and their features

Publication databases, which store bibliographic metadata in structured fields, may be roughly divided into full-text databases (journal archives and repositories) and bibliographic databases. The latter contain only bibliographic metadata and a link to full text, if available. Both types may be multidisciplinary or subject-based. In practice, users are not always aware of the scope, coverage, and limitations of particular databases, which gives rise to unfounded expectations, resulting in irrelevant and/or incomplete search results.

Furthermore, it is important to understand that searching a single database will not cover a research problem comprehensively. Medical scholars, students, and practitioners show a strong preference for PubMed, the search engine that primarily relies on MEDLINE, even when the satisfaction with the search experience is poor[1]. The reasons for its popularity lie in MEDLINE's wide coverage of medical publications, the availability of full text through the repository PubMed Central, and the fact that it is freely available. However, MEDLINE's selection criteria are not limited to the quality of publications. They also include a technical requirement – delivering metadata in the xml format,[1] which many small non-profit journals still find difficult to meet. Searching alternative databases (e.g. Embase), multidisciplinary citation databases (Web of Science, Scopus, Dimension), repository aggregators (e.g. BASE), and using search engines such as Google Scholar helps increase the search coverage[2].

In bibliographic databases, the metadata extracted from publications are usually enriched with terms from controlled dictionaries. Subject-based databases use subject-specific controlled dictionaries organized in a hierarchical structure (e.g. MeSH – Medical Subject Headings in MEDLINE). In PubMed, a search for a subject heading will normally retrieve documents that contain the corresponding sub-terms. On the other hand, in multidisciplinary databases, this approach does not yield satisfactory results. Nevertheless, queries based on terms from controlled dictionaries may miss recently indexed publications because it takes some time (after indexing) to assign the terms.

In all bibliographic databases, recently published articles may be missing due to an indexing delay. This is yet another reason for using multiple sources of information.

Improving search techniques

Using simple search and browsing through a long list of hits without refinement is one of the most common practices that diminish search efficiency. This practice is equally present among domain experts and general users[1,3,4]. Bibliographic databases are intended for expert or advanced search using complex queries, where multiple search terms are limited to specific fields of metadata and combined with the help of Boolean

1 FAQ: Journal Selection for MEDLINE® Indexing at NLM. NIH US National Library of Medicine. Available from: https://www.nlm.nih.gov/lstrc/j_sel_faq.html

operators, truncation, terms enclosed in double quotation marks, and proximity operators. Search results can be refined by applying filters[5], whereas individual searches may be combined using search history. The latter feature is highly valued among healthcare information specialists[6].

It takes some skill to translate a well-formulated natural-language research question into the syntax understandable to the database search engine[7]. The process of identifying the key concepts, the keywords (and synonyms) that embody them, and relations among them, often involves test searches, skimming through retrieved documents, and checking suggestions offered by the database under 'related articles' to gain an insight into the terminology and phrases in circulation. An efficient strategy of identifying relevant search terms is checking the metadata of (and controlled terms assigned to) already known and indisputably relevant articles. In PubMed, the process is facilitated by adding automatically field names, relevant MeSH terms, synonyms and Boolean operators to user queries[8].

While Boolean operators are supported in all bibliographic databases, some features supported in one database may not work in another. PubMed supports only right-hand truncation, while in Scopus and the Web of Science both left- and right-hand truncation may be used. Unlike Scopus and the Web of Science, PubMed does not support proximity operators and additional wildcards. It is also noteworthy that bibliographic databases add Boolean operators to simple keyword queries – e.g. when dealing with juxtaposed terms, PubMed, Scopus and the Web of Science imply AND.[2]

Search efficiency may be improved by using the advantages of user accounts (saved searches and lists, search alerts). Saving searches makes it possible to reuse and remix saved search strategies. This is particularly important in the context of systematic reviews[6].

Assessing search results

Studies on information-seeking behaviour show that users start assessing the results only after they obtain a 'reasonable' number of hits. However, the exact numbers behind the idea of 'reasonable' vary[1,6]. Studies show that most users focus on the first page of results, due to which they are likely to miss relevant publications on other pages (3). The publication date, reputation of the journal, availability of full text, and the language of the reference are perceived as important[1,4].

The assessment of search results depends on the purpose of search. In a systematic literature review or a meta-analysis, search results are analyzed against strict criteria based on relevant protocols[3] to determine whether they should be included or not and

2 Scopus Search Guide [Internet]. Available from: https://dev.elsevier.com/tips/ScopusSearchTips.htm; Building the Search. NIH US National Library of Medicine. Available from: https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/020_010.html; Ruccolo M. LibGuides: Web of Science Core Collection: Search Tips. Available from: http://clarivate.libguides.com/woscc/searchtips

3 E.g. Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine – Standards for Systematic Reviews, Cochrane Risk of Bias Tool, JADAD Scale, GRADE, AMSTAR Checklist.

this is done by multiple reviewers independently, to eliminate bias. If a search is performed to gain a rough insight into a topic or find the solution to a specific practical issue, assessment criteria may be more flexible.

When examining the search results, users usually screen article titles for the key terms. The efficiency of this strategy is confirmed in a number of studies. Not only that experienced practitioners find titles sufficiently informative for the identification of clinically relevant articles[9], but there are also indications that screening articles based on their titles may be more efficient in the context of systematic reviews than screening titles and articles together[10]. It is also suggested that screening titles for the PICo elements (Participants, Interventions and Comparators) may increase assessment efficiency and save time[11].

Further assessment of search results is performed by reading the abstracts of the retrieved documents. This step is particularly relevant in systematic reviews[12]. It may be expected that, thanks to the Open Access movement and the growing number of tools discovering free full text (Unpaywall, 1findr, Open Access Button, Kopernio)[13], an increasing number of users will replace reading abstracts with skimming through full text, where it is just a click away.

When assessing the retrieved publications, it is important to know whether some of them are the subject of an ongoing discussion or a dispute. The rise of post-publication peer-review initiatives has made this information more transparent and accessible. A notable example is the PubPeer add-on for web browsers, which displays information about comments on PubPeer in the search results in bibliographic databases and search engines[14].

Conclusion

Studies on information-seeking behaviour suggest that users prefer intuitive interfaces, simple search and natural-language queries. This largely explains the popularity of Google Scholar. The new citation database, Dimensions, launched early in 2018, uses advanced concept extraction, natural language processing, and complex machine learning[15]. A number of tools supporting natural language search (e.g. eTBLAST), semantic search (e.g. SemanticMEDLINE, litVar[16]), relevance ranking (e.g. MedlineRanker, Twease, Quertle) and clustering into topics (e.g. GoPubMed, ClusterMed) have been developed, mostly by academic researchers, with the idea of facilitating search in PubMed[17]. Recent improvements to PubMed were focused on developing a new relevance algorithm based on machine learning, a new data structure and an improved user interface[18–20].

There are also applications that enable working with PubMed publications on a local computer. Abstract Sifter, a public domain Microsoft Excel-based application,[4]

4 Available from: http://doi.org/10.5281/zenodo.1040961

enables users to perform PubMed searches through the application, to import metadata, including abstracts, from MEDLINE, and to search, analyze and annotate the imported records on local computers[21]. Downloading PubMed XML files, loading them into a relational database, and generating a full text index suitable for natural-language search and text mining is supported by tools such as LingMed and LingPipe, or PubMedPortable, but they require advanced computer skills[22].

However, the traditional information skills based on designing complex queries remain relevant and necessary, especially in systematic literature reviews. Advanced search skills improve the quality of search regardless of the search platform. The widespread belief that they are of little use in generic search engines is called into question by the list of the search operators supported by Google[23]. As the same time, both information specialists and users (scholar, students, and practitioners) should remain receptive to new tools aimed at facilitating and optimizing information seeking.

References

1. Macedo-Rouet M, Rouet J-F, Ros C, Vibert N. How do scientists select articles in the PubMed database? An empirical study of criteria and strategies. Rev Eur Psychol Appliquée / European Rev Appl Psychol. 2012;62(2):63–72. http://dx.doi.org/10.1016/j.erap.2012.01.003
2. Khare R, Leaman R, Lu Z. Accessing Biomedical Literature in the Current Information Landscape. Methods Mol Biol Clifton NJ. 2014; 1159:11–31. https://doi.org/10.1007/978-1-4939-0709-0_2
3. Gschwandtne M, Kritz M, Boyer C. Requirements of the Health Professional Search [FP7 Project KHRESMOI, Grant Agreement No. 257528]. 2011 [cited 2019 Apr 6]. Report No.: C. D8.1.2. Available from: http://www.khresmoi.eu/assets/Deliverables/WP8/KhresmoiD812.pdf
4. Islamaj Dogan R, Murray GC, Névéol A, Lu Z. Understanding PubMed® user search behavior through log analysis. Database J Biol Databases Curation. 2009;2009. https://doi.org/10.1093/database/bap018
5. Fatehi F, Gray LC, Wootton R. How to improve your PubMed/MEDLINE searches: 2. display settings, complex search queries and topic searching. J Telemed Telecare. 2014;20(1):44–55. https://doi.org/10.1177/1357633X13517067
6. Russell-Rose T, Chamberlain J. Expert Search Strategies: The Information Retrieval Practices of Healthcare Information Professionals. JMIR Med Inform. 2017;5(4). https://doi.org/10.2196/medinform.7680
7. Leenaars M, Hooijmans CR, van Veggel N, ter Riet G, Leeflang M, Hooft L, et al. A step-by-step guide to systematically identify all relevant animal studies. Lab Anim. 2012;46(1):24–31. https://doi.org/10.1258/la.2011.011087
8. McKeever L, Nguyen V, Peterson SJ, Gomez-Perez S, Braunschweig C. Demystifying the Search Button. JPEN J Parenter Enteral Nutr. 2015;39(6):622–35. https://doi.org/10.1177/0148607115593791

9. Demner-Fushman D, Hauser S, Thoma G. The Role of Title, Metadata and Abstract in Identifying Clinically Relevant Journal Articles. AMIA Annu Symp Proc. 2005;2005:191–5. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1560462/
10. Mateen FJ, Oh J, Tergas AI, Bhayani NH, Kamdar BB. Titles versus titles and abstracts for initial screening of articles for systematic reviews. Clin Epidemiol. 2013;5:89–95. https://doi.org/10.2147/CLEP.S43118
11. Rathbone J, Albarqouni L, Bakhit M, Beller E, Byambasuren O, Hoffmann T, et al. Expediting citation screening using PICo-based title-only screening for identifying studies in scoping searches and rapid reviews. Syst Rev. 2017;6:233. https://doi.org/10.1186/s13643-017-0629-x
12. Eden J, Levit L, Berg A, Morton S, editors. Finding What Works in Health Care: Standards for Systematic Reviews. National Academies Press; 2011 [cited 2019 Apr 6]. Available from: https://www.nihlibrary.nih.gov/sites/default/files/Finding_What_Works_in_Health_Care_Standards_for_Systematic_Reviews_IOM_2011.pdf
13. Smith C. Alternative routes to scholarly articles and research outputs. OpenAccess.se. 2018 [cited 2019 Apr 8]. Available from: https://openaccess.blogg.kb.se/2018/07/01/alternative-routes-to-scholarly-articles-and-research-outputs/
14. PubPeer Browser extensions. PubPeer Blog. 2014 [cited 2019 Apr 6]. Available from: https://blog.pubpeer.com/publications/3FF32556E01D66DA1C4EB9E5C6E202
15. Williams C. Next-generation research and discovery tool links 128 million documents – Dimensions. Dimensions. 2018 [cited 2019 Apr 6]. Available from: https://www.dimensions.ai/2018/01/dimensions-a-next-generation-research-and-discovery-platform-linking-128-million-documents/
16. Allot A, Peng Y, Wei C-H, Lee K, Phan L, Lu Z. LitVar: a semantic search engine for linking genomic variant data in PubMed and PMC. Nucleic Acids Res. 2018;46(W1):W530–6. https://doi.org/10.1093/nar/gky355
17. Lu Z. PubMed and beyond: a survey of web tools for searching biomedical literature. Database J Biol Databases Curation. 2011;2011. https://doi.org/10.1093/database/baq036
18. Fiorini N, Lipman DJ, Lu Z. Cutting Edge: Towards PubMed 2.0. eLife. 2017;6. https://doi.org/10.7554/eLife.28801
19. Fiorini N, Canese K, Starchenko G, Kireev E, Kim W, Miller V, et al. Best Match: New relevance search for PubMed. PLoS Biol. 2018;16(8). https://doi.org/10.1371/journal.pbio.2005343
20. Fiorini N, Canese K, Bryzgunov R, Radetska I, Gindulyte A, Latterner M, et al. PubMed Labs: an experimental system for improving biomedical literature search. Database J Biol Databases Curation. 2018;2018. https://doi.org/10.1093/database/bay094

21. Baker N, Knudsen T, Williams A. Abstract Sifter: a comprehensive front-end system to PubMed. F1000Research. 2017;6. https://doi.org/10.12688/f1000research.12865.1
22. Döring K, Grüning BA, Telukunta KK, Thomas P, Günther S. PubMedPortable: A Framework for Supporting the Development of Text Mining Applications. PLoS ONE. 2016;11(10). https://doi.org/10.1371/journal.pone.0163794
23. Hardwick J. Google Search Operators: The Complete List (42 Advanced Operators). SEO Blog by Ahrefs. 2018 [cited 2019 Apr 6]. https://ahrefs.com/blog/google-advanced-search-operators/

CIP – Каталогизација у публикацији
Народна библиотека Србије, Београд

616.8-009.7-08(082)(0.034.2)
616-089.5(082)(0.034.2)
615.211/.216(082)(0.034.2)

BELGRADE International Symposium on Pain (14th; 2019; Beograd)
Proceedings [Elektronski izvor]/14th Belgrade International Symposium on Pain, May 17-18, 2019 Belgrade, Serbia = Zbornik predavanja/14. Beogradski internacionalni simpozijum o bolu, Maj 17-18, 2019 Beograd, Srbija; [editors, urednici Dušica Stamenković, Nebojša Lađević]. – Belgrade: Serbian Pain Society, 2019 (Beograd: Studio Znak). – 1 elektronski optički disk (CD-ROM); 12 cm

Sistemski zahtevi: Nisu navedeni. – Nasl. sa naslovne strane dokumenta. – Radovi na srp. i engl. jeziku. – Tiraž 800. – Bibliografija uz svaki rad

ISBN 978-86-80920-02-3

a) Бол – Лечење – Зборници b) Анестезиологија – Зборници

COBISS.SR-ID 278775052