



Disponible en ligne sur
SciVerse ScienceDirect
 www.sciencedirect.com

Elsevier Masson France
EM|consulte
 www.em-consulte.com/en



Original article

How do scientists select articles in the PubMed database? An empirical study of criteria and strategies

Une étude empirique des critères et stratégies employés par des scientifiques pour sélectionner des articles dans la base de données PubMed

M. Macedo-Rouet^{a,*}, J.-F. Rouet^b, C. Ros^b, N. Vibert^b

^a Agence des usages des TICE, centre national de documentation pédagogique, EA-TECHNE, université de Poitiers, Téléport 1–4, BP 80158, 86961 Futuroscope cedex, France
^b CNRS UMR 6234, maison des sciences de l'homme et de la société, centre de recherches sur la cognition et l'apprentissage, université de Poitiers, 99, avenue du Recteur-Pineau, 86000 Poitiers, France

ARTICLE INFO

Article history:

Received 24 August 2009
 Received in revised form 12 January 2012
 Accepted 15 January 2012

Keywords:

Information seeking
 Neurosciences
 Search strategies
 Search tactics
 Online bibliographic database
 PubMed
 Empirical study

Mots clés :

Recherche d'information
 Neurosciences
 Stratégies de recherche
 Tactiques de recherche
 Base de données bibliographique en ligne
 PubMed
 Étude empirique

ABSTRACT

Introduction. – The present study investigated the strategies used by experienced researchers to find articles in an online bibliographic database.

Objective. – The goal was to shed light on researchers' actual search behaviour by empirically observing users during the search process.

Method. – We asked 16 neuroscience researchers and 16 researchers in other disciplines of life sciences to perform five search tasks on neuroscience topics using the PubMed database. Think-aloud protocols were recorded while the participants performed the search tasks.

Results. – All researchers managed to find adequate references for the tasks in the limited amount of time allocated. Most participants used similar, very basic moves and tactics to perform the tasks. However, they behaved in many different ways when they had to decide whether to read the retrieved results or to modify their query (according to the number of references they obtained), or when selecting the one or two references they finally gave as answers among all possible answers.

Discussion. – Variability in participants' behaviour may result from inter-individual differences in either the participants' mental models of PubMed or cognitive abilities and styles, but the question requires further investigation. The data further suggest that developers of online search engines and databases should concentrate their efforts on improving simple-search interfaces and helping users to correct search errors in real time.

© 2012 Elsevier Masson SAS. All rights reserved.

R É S U M É

Cette étude portait sur les stratégies utilisées par des scientifiques pour trouver des articles dans une base de données bibliographique en ligne. Seize chercheurs en neurosciences et 16 spécialistes d'autres disciplines biologiques ont réalisé cinq tâches de recherche de références sur des thèmes de neurosciences avec PubMed. Des protocoles verbaux ont été enregistrés pendant la réalisation des tâches. Tous les chercheurs sont parvenus à trouver dans le temps imparti des références correspondant à ce qui était demandé. La plupart ont utilisé des tactiques similaires, très simples, pour accomplir ces tâches. Les participants se comportaient toutefois de manière variable lorsqu'ils devaient décider, en fonction du nombre de références ramenées par PubMed, s'ils devaient en parcourir la liste ou modifier leur requête. De même, le mode de sélection de la ou des références choisies finalement comme réponse différait d'un individu à l'autre. Cette variabilité pourrait être liée à des représentations mentales de PubMed différentes, ou aux différences de capacités et styles cognitifs entre individus. Par ailleurs, les résultats suggèrent que les concepteurs de bases de données en ligne devraient concentrer leurs efforts sur l'optimisation des interfaces de recherche simple et sur une aide en temps réel à la correction des erreurs.

© 2012 Elsevier Masson SAS. Tous droits réservés.

* Corresponding author.

E-mail address: monica.macedo@cndp.fr (M. Macedo-Rouet).

1. Introduction

The development of online bibliographical databases is causing major changes in researchers' access to scientific information. More and more researchers are using databases such as PubMed to find bibliographical references, abstracts and/or full texts of articles. Tenopir (2003) found that researchers perceive the use of such tools as convenient and time saving. Rowlands and Fieldhouse (2007) pointed out that mediated library services are declining in favour of end-user self-service, and that researchers are reading more primary journal materials from a wider range of sources. The use of electronic journals and articles among researchers is increasing as search engines, databases and archives become more and more integrated within single, easily available online resources (Bar-Ilan and Fink, 2005; Tenopir et al., 2003). Despite the increasing popularity of these online resources, little is known about the behaviour and strategies used by high-level researchers while searching for references and articles. In the present paper, we summarize the state of the art on experts' bibliographical search and we present an empirical investigation of scientists' criteria and online strategies when using PubMed.

1.1. Researchers' bibliographical search strategies

Several studies examined researchers' strategies to find articles without including direct observations of researchers' behaviour. Worel (2004) analysed citations that researchers brought to the reference desk at two scientific libraries. She found that researchers relied on few indexes besides PubMed and obtained citations from different sources such as publication bibliographies, email correspondence and Websites. Boyce et al. (2004) conducted a long-term survey of researchers on their use of journal articles and found that online searching in electronic journals increased heavily from the early 1990s to 2002. Davis (2002) analyzed annual electronic journal usage data for the NorthEast Research Library consortium and found that researchers referred to several different resources to find articles such as the library catalogue, bibliographical databases and e-mail. These studies have focused on "indirect" evidence of researchers' behaviour and did not describe the exact tactics and moves used by researchers while searching in an online database. According to Marchionini (1995) (p. 74), tactics are "discrete intellectual choices or prompts manifested as behavioural actions during an information-seeking session" (e.g., restricting search to a specific document type), while moves are "fine-grained actions that are manifested as discrete behavioural actions" (e.g., clicking on a menu item). Both of these actions are part of a larger process of information seeking, in which "strategies" and "patterns" represent higher level actions that co-occur with these more fine-grained actions.

While the above-mentioned studies analysed server logs and survey data, very few studies examined the behaviour of researchers searching bibliographical databases. Hersh and Hickam (1998) and McKibbin et al. (1990) investigated health specialists' behaviour when searching the Medline database. They concluded that researchers were satisfied with this search tool, despite the low precision of their searches. Marchionini et al. (1993) studied how computer scientists, business specialists, and professional lawyers searched online reference databases relevant for their fields, but quantitative analysis of the data was limited. In order to explain why researchers select specific tools and how they assess the relevance of retrieved articles, a more detailed, analytic approach focusing on their actual search behaviour must be used.

Drabenstott (2003) conducted an exploratory study of non-domain experts' use of an information gateway and found that non-domain experts did not enlist experts' strategies such as using known documents to find new references and consulting

colleagues to ask for references. In her study, non-domain experts were undergraduate students, while the experts referred to in her literature review were faculty members. Other empirical studies have shown that faculty members shared common search strategies regardless of their domain of expertise. Rieh (2002) observed the behaviour of faculty members and graduate students while searching the Web and found that they used multiple criteria to assess the relevance of Web sites. Information quality and author characteristics represented more than half of the users' justifications about the relevance of Web sites. She also found that the relative importance of each criterion depended on the type of judgment (predictive or evaluative) that was made by researchers. More importantly, the use of multiple criteria was consistent across subjects although they had different domains of expertise.

Similar results were obtained in two follow-up studies involving faculty and graduate students in agricultural economics (Wang and Soergel, 1998; Wang and White, 1999). By comparing researchers' information-seeking and citation behaviour, the authors found that topic, quality, novelty and authority were the main criteria for selecting an article for reading, while topic and journals' orientation (target public) were the most frequent reasons for citing an article. Overall, more criteria were used in citation decisions than in selection decisions. Other studies have shown that relevance criteria applied to online materials are similar to those used in a traditional bibliographical search (e.g., topicality), although some criteria are specific to the Web (e.g., page design) (Smith, 1997; Wathen and Burkell, 2002). These empirical studies provided a detailed description of the criteria researchers use to determine relevance. However, they did not compare experts and non-experts using the same search tasks. Thus, it is not possible to ascertain from these studies whether the criteria that researchers use are linked to their expertise in a particular domain. Furthermore, expertise can be characterized not only by the possession of a large body of knowledge in a domain (Reimann and Chi, 1989; Wiley, 1998), but also by "discipline expertise" or the knowledge of methods and sources of information in the discipline (Perfetti et al., 1999; Rouet et al., 1997).

1.2. The role of prior knowledge when using the PubMed database

Researchers' use of online bibliographical databases is also influenced by their knowledge of available search tools. For scientists and health specialists, PubMed has become the most popular online bibliographical resource (De Groot and Dorsch, 2003). PubMed is perceived as both easy to use and very efficient. However, because most scientists have learned to use this database on their own, their use of PubMed is very basic and similar to the way lay people use Web-based general search engines (Aula and Nordhausen, 2006; Markey, 2007). Markey states that for most information needs, using a search engine is "convenient, immediate and instantaneous" (p. 1079). Vibert et al. (2007) used individual questionnaires and interviews to investigate French neuroscientists' use of online bibliographical resources. They concluded that PubMed was massively used as in other disciplines of life sciences, but also that the neuroscientists' bibliographical searches often returned a great number of irrelevant references, suggesting that their searches had low "precision". Despite the low precision, the participants reported that they were satisfied with the tool.

The purpose of the present study was to gain insight into the strategies that experienced researchers use to find articles in an online database. The specific goals were to determine whether researchers manage to find relevant references for different search tasks in a limited amount of time, to describe the criteria they use to assess relevance, and to learn how they solve critical incidents while searching. We asked neuroscience researchers and researchers in other disciplines of life sciences to perform

Download English Version:

<https://daneshyari.com/en/article/895494>

Download Persian Version:

<https://daneshyari.com/article/895494>

[Daneshyari.com](https://daneshyari.com)