

# Domain-Specific Search Strategies for the Effective Retrieval of Healthcare and Shopping Information

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## ABSTRACT

An increasing number of users are performing searches on the Web in unfamiliar domains such as healthcare. However, because many users lack domain-specific search knowledge, their searches are often ineffective. An important remedy is to make domain-specific search knowledge in these new domains explicit and available. Towards that goal, healthcare and online shopping experts were observed while they performed search tasks within and outside their domains of expertise. The study: (1) identified domain-specific search strategies in each domain; (2) demonstrated that such knowledge is not automatically acquired from using general-purpose search engines. These results suggest that users should benefit from *Strategy Portals* that provide domain-specific knowledge to perform searches in unfamiliar domains.

## Keywords

Healthcare, shopping, domain-specific search strategies.

## INTRODUCTION

With the explosion of new domains on the Web ranging from healthcare to online shopping, an increasing number of users are performing online search tasks in unfamiliar domains. For example, the most common task on the Web today is searching for healthcare information [3], a domain in which few users have much search expertise. Given the presence of unreliable information on the Web [2], this often leads inexperienced users to perform ineffective searches for healthcare information.

Studies of search experts retrieving articles from citation indexes have shown that they have acquired domain-specific search knowledge that enables them to perform effective searches [4]. Such knowledge includes how to select the correct databases based on the nature of the question, and how to structure the search appropriately based on the scope and content of the database [1, 4].

While domain-specific search knowledge has been well articulated in the domain of literature search, there is a need

to make such knowledge explicit and available in new Web domains such as healthcare and shopping. This paper: (1) identifies domain-specific search knowledge in the domains of healthcare, and online shopping; (2) demonstrates that such knowledge is not automatically acquired from using general-purpose search engines.

## METHOD

Five healthcare search experts were recruited from three medical libraries on the University of Michigan campus. All five healthcare search experts had six or more years experience accessing medical information, used Web browsers on a daily basis, and were novices in online shopping. Similarly, four online shopping experts were recruited from the student and recently graduated student community. All had three or more years of experience in shopping on the Web, used Web browsers on a daily basis, and were novices in searching for healthcare information.

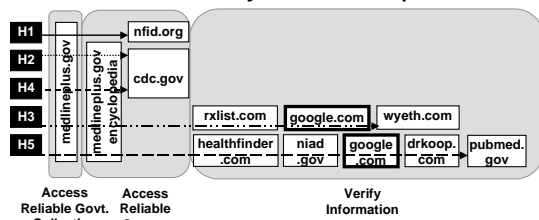
The participants were asked to perform eight tasks in two domains: four tasks related to healthcare, and four tasks related to online shopping. The task order was randomized within each domain, as was the order between the domains. Participants were told to perform the tasks, as they would normally do for themselves. They were asked to think aloud while performing the tasks, and the interactions were recorded using screen and audio capture tools. The current analysis will focus on one task in each domain where the participants had the most experience. These tasks were:

- (1) *Tell me three categories of people who should or should not get a flu shot and why?*
- (2) *Get two price quotes for a new digital-camera (3 or more megapixel and 2x zoom). Stop when you feel you have found the lowest prices.*

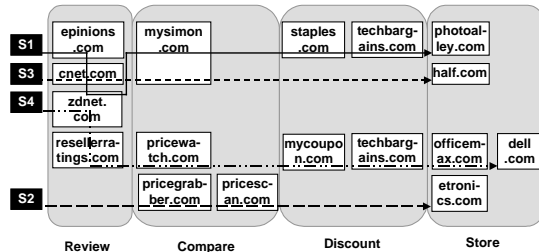
## RESULTS

The verbal protocols were transcribed to understand the goals of the participants, and the interactions were codified to record the websites they visited. As shown in Figure 1A, all five healthcare search experts while doing the *flu shot task*, demonstrated knowledge of how to sequence high-level goals, and of specific URLs. They first accessed a reliable government collection (*MEDLINEplus*) by directly typing in the URL. Next, they accessed reliable sources through *MEDLINEplus*, and finally two experts verified the information they had found by visiting other sites.

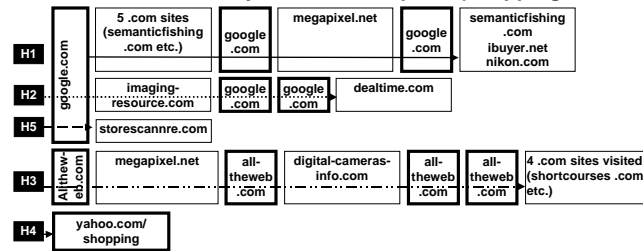
**A. Flu shot task done by healthcare experts**



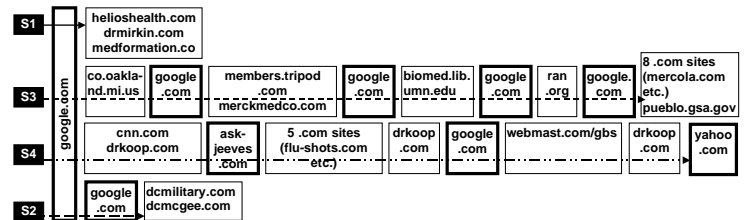
**B. Camera task done by shopping experts**



**C. Camera task done by healthcare experts (shopping novices)**



**D. Flu shot task done by shopping experts (healthcare search novices)**



**Figure 1. Websites visited by the participants while performing the flu shot task and the camera task. The black boxes represent the participants in the study, the white boxes represent websites visited, the arrows pass through the websites each participant visited during the search process, and the gray boxes represent the goal sequences as determined by the goals of the participants in their verbal protocols. Bolded white boxes represent the use of general-purpose search engines.**

Knowledge of goal sequencing, and of specific URLs for each goal were also present in the search behavior of the shopping experts performing the camera task. As shown in Figure 1B, 3 of the 4 shopping experts (S1, S3, and S4) first identified highly reviewed cameras by visiting review sites such as CNET and ZDnet. Next, they visited comparison sites like MySimon.com to identify vendors and prices of those cameras. Finally, two of the experts visited coupon sites such as techbargains to find discounts for different stores. A detailed analysis of S2's protocol revealed that he did not visit review or discount sites because he had checked those sites earlier in the day, which had revealed that they had no discounts. All the sites accessed by the shopping experts were through directly typing in the URLs.

The above goal sequencing and URL knowledge was absent in the behavior of these very same experts when they performed tasks outside their domain of expertise, demonstrating novice behavior. As shown in Figure 1C and D, the participants relied mostly on typing in queries in general-purpose search engines such as Google. Analysis of the queries revealed no evidence that the participants had a particular goal sequence in mind; the queries typically were of the kind "flu shot", and "digital camera" which did not yield important URLs known by the experts. Furthermore, these searches did not provide knowledge of which goals were important in each domain, and how to sequence them.

The absence of goal sequencing strategies, and knowledge of the URLs had a direct effect on the search results. The shopping experts found cameras on average at \$60 less than the healthcare search experts. In addition, all the healthcare experts found a comprehensive list of 9 categories of people from a few good sources, whereas none of the shopping experts found all the categories. Furthermore, none of the shopping experts accessed a reliable government site for healthcare information like MEDLINEplus.

**CONCLUSIONS**

The qualitative analysis of experts performing search tasks within and outside their domains of experience revealed: (1) the existence of domain-specific search knowledge in healthcare and online shopping. This knowledge consisted of goal sequencing strategies, and important URLs for each goal; (2) the difficulty of automatically acquiring such knowledge from just using general-purpose search engines. Because such knowledge is not available from typical search engines, these results suggest that users should benefit from Strategy Portals that provide domain-specific sequencing strategies, and the requisite URL knowledge for search tasks in different domains. The identification of sequencing strategies described in this paper is the first step towards building such a portal. Future research will explore whether such strategy portals can make users more effective when performing search tasks in unfamiliar domains.

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