

Exploring a Web Space for Consumer Health Information: Implications for Design

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ABSTRACT

Knowledge about people's natural or preferred ways of exploring a system could reveal cognitive paths through which users learn a system. This knowledge can also inform the design of interfaces that facilitate users' learning of the system and the design of training materials that better accommodate users' preferences. In the study, we investigate the behaviors of first-time users' behavior of exploring a web space for consumer health information, MedlinePlus, and discuss implications for designing consumer health information retrieval systems.

Categories and Subject Descriptors

H.1.2 [Information Systems]: User/Machine Systems – *human factors, human information processing*.

General Terms

Design, Human Factors

Keywords

Learning strategy, MedlinePlus, user training, consumer health information systems, mental models

1. INTRODUCTION

A Pew study reported that about 80% of Internet users in the US have searched for health information on the web [1]. With the growing demand from general consumers for health information, a large number of health information websites have been created in the past several years. However, there is still a lack of understanding of the impact of interface factors on users' adoption and use of such systems [2]. Designing effective interfaces for consumer health information systems not only requires in-depth understanding of users' information needs and preferences for resources, but also their inclinations and preferred ways of exploring and learning such systems [3].

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(HCI), there is a plethora of research on people's behavior of using information systems to solve assigned tasks and the usability of these systems. However, little is known concerning users' natural or preferred ways of exploring and learning about a system during the earliest stage of interaction, such as how they develop their perceptions about the system, what they do, what strategies they use, and whether their explorative behavior is random or follows some patterns [4].

This study reports a preliminary effort to investigate how first-time users of MedlinePlus, a web-based information system providing authoritative health information to the general public, explore and learn about the system. Knowledge about people's behavior and strategies of learning, at this early stage, could help reveal what users look for and what cues are most salient for them to developing an understanding of the system. This information could inform designers of consumer health information systems by suggesting how to effectively convey the most useful cues and information structures to engage novice users.

2. RESEARCH METHOD

MedlinePlus (Fig. 1) was created and maintained by the NLM (National Library of Medicine) in response to the general public's heavy access to MEDLINE in 1998. The main content of the system came from two sources: (1) the NIH's (National Institutes of Health) publications of consumer health information, and (2) publications of professional medical societies and voluntary health agencies without commercial motivations [5]. MedlinePlus also licensed content, such as medical dictionaries, encyclopedia, drugs and supplements, directories of health professionals, news, and interactive tutorials, from third-party content providers.

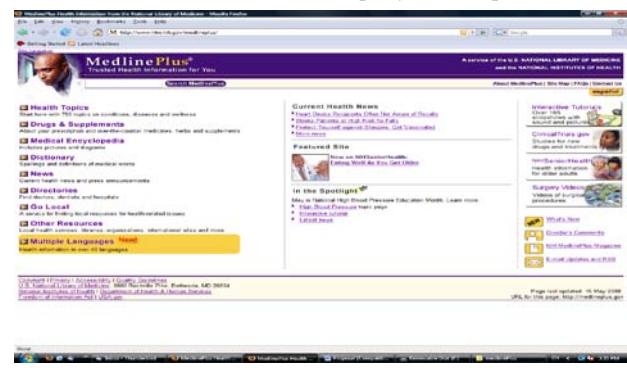


Figure 1. MedlinePlus homepage

Thirty-eight undergraduate students (20 females and 18 males) majoring in various non-medical-related subject areas, such as Art History, Business, English, Geography, Physics, and Psychology, participated in the study. Their ages ranged from 18 to 22 years old ($Mean = 21$, $SD = 1.07$). All of the participants reported that they had used the web for health-related information. The major online sources that they used were web search engines, WebMD, and Wikipedia. No participant had used MedlinePlus before the study.

At the beginning of the study, participants were asked to finish a demographic questionnaire. They were then instructed to spend five minutes exploring MedlinePlus, as they would normally do when they encounter a new website. Limiting the session to five minutes was due to the fact that people often spend less than five minutes on a site and this short period of time has a significant impact on users' adoption of the system [6]. The session was video-recorded. Participants' actions and steps of exploring MedlinePlus were coded and analyzed based on the videos. After the exploration, participants were asked to describe the most distinct features of MedlinePlus.

3. PRELIMINARY RESULTS AND IMPLICATIONS FOR DESIGN

There were nine main types of resources in MedlinePlus: health topics, drugs & supplements, medical encyclopedia, dictionary, news, directories, go local, other resources, and multiple languages (as shown on the left-side of Fig. 1). During the initial encounter with MedlinePlus, participants adopted browsing as the primary strategy to explore the system. Their browsing behavior followed two patterns. The first was traversing various types of information resources in the system. Participants with this pattern often made one or two clicks to get an overview of each source without looking at specific content contained in the source. This behavior suggests that during the first encounter, these participants' main purpose might be to learn the *scope* of the system [7, 8]. Additionally, participants exhibiting this behavior may have also attempted to *build a coherent mental model* of MedlinePlus by integrating individual components of the system. This was reflected by the fact that when navigating from one source to the other, these participants consistently used the main navigation bar on the homepage or the navigation tabs under the banner. The second pattern of browsing focused on exploring one or two types of resources, mainly health topics, drugs & supplements, or news. Participants utilizing this pattern went back and forth within the hierarchical structure of the source to view different health topics, drugs, or news articles. These participants were more likely to focus on the *content* and the *information structure* of these sources. During this short interaction, approximately a dozen participants also browsed "About MedlinePlus", "FAQs", and "Disclaimer".

The lack of domain knowledge might also contribute to the fact that browsing was adopted as the primary exploration strategy. The participants in this study were not majoring in medical-related areas. Over half of them (57.9%) accessed particular health topics by following the hierarchy of the anatomical classification schema: body location/systems. Other classification schemas, such as alphabetical list and diagnosis and therapy, were used by only a

couple of participants. At the same time, queries that participants submitted to the system were mostly simple words, such as "aids", "men's health", and "coffee".

The results suggest that general health information consumers have limited domain knowledge. When they first encounter a consumer health information system, they have the cognitive needs to learn the scope, component, or content of the system. They are also concerned about the trustworthiness of the site. It is the designers' consideration to convey these elements to users in a concise and clear manner. Furthermore, classification schemas that indicate semantic relationships between concepts are useful in helping users explore specific topics in this unfamiliar domain.

Among various information resources in MedlinePlus, participants paid the most attention to health topics, drugs and supplements, medical encyclopedia, and news. Participants also commented in the interviews after the session that they were impressed by the interactive tutorials and the local resources. General consumer health information sites may need to consider providing these resources to their users.

Participants' explorative behavior demonstrated in this study might have been influenced by the design of the interface of MedlinePlus. In future studies, we will look at how users explore a consumer health information system with a different interaction style to examine whether they demonstrate the same patterns of behavior.

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