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# Search systems and their features: What college students use to find and save information



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# ABSTRACT

College students have often been surveyed about their general information seeking behaviors. However, little has been done to explore what specific system features they use to find and save information when they are working on their real-life tasks. In this study, 32 college students were invited to an information interaction lab for a session in which they recalled a recently finished task and worked on a to-be-finished task using a computer in the lab. They were asked to complete questionnaires regarding what systems they used to finish their tasks and what features were helpful for searching and for saving information. Results showed that college students rely more heavily on the Internet sources than on library sources, even for their course related work. The study identified fourteen categories of system features helpful for information search and eight categories helpful for information saving. The findings have implications for designing systems that will better help people accomplish their tasks.

# 1. Introduction

Information search systems have become indispensable sources for people to use to locate and interact with information in their everyday lives. To help users better find information, search systems are continuously being augmented with various types of features and capabilities. Features making systems more user friendly, such as spell checking, keyword highlighting in search result pages, and so on, are now typically present in most search systems. Since the mental models of the designers and the users are likely to be different (Norman, 2013), system designers would benefit from learning what system features, especially new features, are thought to be helpful and favored by users.

College students, defined as postsecondary students, have been studied often for their use and perception of information systems (e.g., De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005, De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2006, De Rosa, Cantrell, Carlson, Gallagher, Hawk, & Sturtz, 2010; Georgas, 2013). While sharing with other user groups some common information system use behaviors, for example, favoring Google over library resources (De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005; Georgas, 2013), college students have also displayed some different behaviors from other users. For example, compared to other people (in studies of millions of individuals worldwide), college students were found to use public libraries more frequently and use more than one type of library more often (De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005).

Previous research on information search has mainly focused on search. However, information searching in real life is rarely an isolated activity, but is usually driven by some kind of task that arouses information need, and is often connected with information saving, use, and presentation. Kulthau's (1991) model of the information search process clearly demonstrates that search is initiated by lack of knowledge, followed by collection of pertinent information and presentation of the learned knowledge through the search. For example, a student searches the literature, saves helpful sources, and uses them to write a course paper. In the interactive information retrieval (IIR) research community, tasks involving information use are called work tasks, in comparison with search tasks that involve only information search (Ingwersen & Järvelin, 2005). Putting information search in its natural and broad context of work task completion affords more comprehensive approach to understanding people's information behaviors beyond merely information searching.

# 2. Problem statement

Although a significant amount of research has explored college

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students' search behavior, and compared their use of Internet and library sources, there is a research gap that arises in the research approach. Most studies of how college students use and value libraries and online information sources rely on data gathered from surveys of users' general information search habits. Rarely do they examine users' search behaviors connected with specific information tasks at the point in time when they are working on the tasks. The latter approach has the potential to provide more direct evidence about what systems students use and what they favor in search systems and features.

There is a goodly number of laboratory-based user studies that have examined factors influencing people's information behaviors when they work on information tasks (Karanam, van Oostendorp, Sanchiz, Chevalier, Chin, & Fu, 2017: Li & Belkin, 2010: Liu, Cole, Liu, Belkin, Zhang, Bierig, & Zhang, 2010; Walhout, Oomen, Jarodzka, & Brand-Gruwel, 2017). Many such studies use exploratory tasks that are general, open-ended, multi-faceted, and focus on learning and investigative search goals (Wildemuth & Freund, 2012). However, the tasks used in these studies are typically designed and assigned by the researchers, which does not situate users in a naturalistic environment. These studies do not serve to provide evidence of what information systems and features college students use and like in their everyday life tasks. Also, research on information behaviors has largely examined search system features that support information finding. Little research attention has been paid to system features that support additional tasks such as information saving, which is also important in completing tasks.

The present study was conducted with a view to exploring the following research questions:

RQ1. What information sources do college students use to search for information in order to accomplish their everyday life work tasks?

RQ2. What features of current search systems are helpful for college students to find information in order to accomplish their work tasks?

RQ3. What features of current search systems are helpful for college students to save information in order to accomplish their work tasks?

The study is unique in collecting data on college students' use of online systems to solve their real-life information tasks, and in identifying specific system features that help users find and save information. The findings will extend knowledge and understanding of college students' information behaviors, provide evidence for information system designers to improve their systems, and ultimately benefit college students in accomplishing their tasks.

#### 3. Literature review

#### 3.1. Search systems used by college students

Search engines such as Google have been reported in multiple studies as the primary source for college students to begin an information search (De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005, De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2006, De Rosa, Cantrell, Carlson, Gallagher, Hawk, & Sturtz, 2010; Hampton-Reeves, Mashiter, Westaway, Lumsden, Day, Hewerston, & Hart, 2009; Komissarov & Murray, 2016). Search engines have also been found to dominate the list of electronic sources most used by college students to find online content (De Rosa, Cantrell, Carlson, Gallagher, Hawk, & Sturtz, 2010).

On the other hand, while it may not be the first source college students turn to for information searching, the library has been cited as an important information source (De Rosa, Cantrell, Carlson, Gallagher, Hawk, & Sturtz, 2010). Academic library users have acknowledged the value of library systems, noting familiarity, convenience, currency, and authority, and have made the most of these values in their search strategies and behaviors (Dervin, Reinhard, Adamson, Lu, Karnolt, & Berberick, 2006; Dervin, Reinhard, Kerr, Song, & Shen, 2006; Connaway, Prabha, & Dickey, 2006; Prabha, Connaway, & Dickey, 2006).

Some of the reasons for Google being preferred to library search

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tools have been identified as speed and ease of navigation (Georgas, 2013). By contrast, library systems, especially online catalogs, have been reported to be difficult to use (Dervin, Reinhard, Adamson, Lu, Karnolt, & Berberick, 2006, Dervin, Reinhard, Kerr, Song, & Shen, 2006; Connaway, Prabha, & Dickey, 2006; Prabha, Connaway, & Dickey, 2006). Many participants in such user studies indicated that they found traditional library sources (e.g., books) through electronic mediation services such as Google or Facebook with friends. Students have often been found not to know what resources were available in libraries, and to be unable to differentiate library proprietary databases from the online sources available on the Internet.

# 3.2. Information search system features

Many studies examining users' behaviors in and perceptions of information systems focus on the exploration of general characteristics such as ease of use. For example, users prefer search engines to library systems for speed and convenience (De Rosa, Cantrell, Cellentani, Hawk, Jenkins, & Wilson, 2005; Dervin, Reinhard, Kerr, Song, & Shen, 2006, Dervin, Reinhard, Adamson, Lu, Karnolt, & Berberick, 2006), ease of access (Brophy & Bawden, 2005; Timpson & Sansom, 2011), and intuitive interfaces (Xie, 2004). Rowlands, Nicholas, Williams, Huntington, Fieldhouse, Gunter, & Tenopir, (2008) found that "library users demand 24/7 access, instant gratification at a click, and are increasingly looking for "the answer" rather than for a particular format" (p. 293). Rieger (2009) determined that the navigational, informational, and transactional features of search engines were most important to the users, and that users were satisfied with the performance of major search engines such as Google for fulfilling diverse information needs related to work, study, and daily life. Given the overwhelming size of search results, students expected Google to filter and limit search results and to include citation features. On the other hand, they expected the library federated search tool to be easier to navigate and faster (Georgas, 2013).

Some studies have explored specific system functions favored by users. For example, users reported that the advanced search option provided more precise results and ensured more successful search, and that faceted browsing helped refine searches (Calhoun, Cantrell, Gallagher, and Hawk, 2009). Bar Ilan (2005) created a comprehensive list of features that search engines should possess to satisfy the information needs of skilled users. These included coverage; reliability; timeliness; indexing of whole documents; objectivity (e.g., absence of advertisements or bias); robust retrievability; filtering options; full Boolean operators; additional features such as truncation, wildcards, and spell checking; search assistance, including relevance feedback, similar or related pages; personalization; ability to combine all the features in a single query and build sets based on previous results; and non-textual retrieval capabilities. While some of these features are specific and easily identified, for example, spell checking and truncation, many are general and elude measurement, such as coverage, and robust retrievability.

### 3.3. Information saving features

Information saving can be done in many ways. Oh & Belkin (2011) found that the ways people keep web information include sending emails, printing, bookmarking, saving the web page as a file, pasting into a document, adding to a personal web site, writing down URLs on paper, and so on. None of these is a feature of most search systems.

Users want search systems to provide features that can help them manage retrieved information (Rieger, 2009). There has been a line of research in the area of personal information management (PIM) about how people find and use saved information, and what systems or tools are designed to re-find and re-use saved information on personal computers. Early work by Adar, Karger, and Stein (1999) included the design of a personal inventory system called Haystack to support Download English Version:

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