
Opportunities to Address Information Poverty with Social Search

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Abstract

Information seeking is a central part of human life, and search engines are the dominant method of information seeking on the Internet. Although recent years have seen the rise of social search systems as a promising alternative, their application for populations across the digital divide that are starved for information has been overlooked. Drawing on research on social search, information search, and information poverty, we identify three dimensions of information poverty in web search, and hypothesize affordances of social search platforms that could address the details of each issue. Finally, we propose research questions and two associated studies to investigate these hypotheses.

Author Keywords

Social search; digital divide; information seeking; social q&a; status message question asking; web search.

ACM Classification Keywords

H.5.m [Information interfaces and presentation]: Misc.

Introduction

Search engines are generally considered the standard medium for online information seeking; as of 2012, almost 75% of Americans used search engines, and more than half of all adults were using a search engine on a given day [25]. However, since the growth of online social net-

works, users have turned to online social platforms to satisfy information needs that search engines could not address, a process termed ‘social search’ [18, 22].

While this trend has garnered significant interest from the HCI community, the existing work has overlooked the potential value of social search systems across the digital divide. According a recent Pew Report, almost half of US adults with limited access to the Internet have trouble finding information that they need, compared to one quarter of those who possess many methods of access [16]. Access is not the only issue, however. Elfreda Chatman’s theory of information poverty, which investigates outsider social groups—the information poor—argues that the major obstacles to successful information seeking for these populations are related to their vulnerable social circumstances [1, 2]. The central paradox is a mistrust of outsiders to provide applicable information, coupled with a fear of revealing vital needs that defy social norms, leaving no fruitful avenues to address their needs [2].

In this late-breaking work, we argue that social search platforms support methods of information seeking that circumvent these obstacles. Based on existing information seeking and digital divide literature, we propose five key issues in online information seeking that may be addressed by social search research. We conclude with approaches to further investigation of these issues.

Background

Social Search

Though the term social search has been used to refer to any web search that incorporates any sort of social interactions [10], Chi divides social search systems into social answering systems and social feedback systems [3]. He defines social answering systems as search systems that use

other individuals’ knowledge or opinions to answer particular questions, such as Stack Overflow or Yahoo! Answers; social feedback systems are systems that utilize social user data, such as page hits or user votes, to rank search results. In this work, we focus on social answering systems; we argue that they represent a more concrete category than social feedback systems, which have been increasingly incorporated into many search systems, including the social answering systems that we study. Consequently, we focus our work on status message question asking (SMQA) and social question-answering (Social Q&A), two representative classes of social answering systems that have potential to address information-related issues across the digital divide.

Status Message Question Asking (SMQA)

Asking questions of your social groups is a natural form of information seeking. As a more than two-thirds of US adults are now using social media platforms [13], SMQA must also be considered a natural form of online information seeking. In 2010, Morris et al. [22] found that, from a sample of 624 Microsoft employees, a majority wielded their online social networks to find practical information, and half had asked an explicit question in a status message. Since then, an increasing number of studies have explored the details of how users engage in this sort of behavior in online social networks such as Facebook and Twitter [12, 21, 23, 24, 31]. Despite continued interest, SMQA’s potential for information seeking is limited by the user’s existing social network, which is an issue for users with low social capital [2, 11, 5].

Social Question-Answering (Social Q&A)

Social Q&A services refer to online systems where individuals access a social community to find answers to existing or novel questions [18]. Examples of social Q&A systems are sites such as Yahoo! Answers (<http://answers.yahoo.com>),

Quora (<http://www.quora.com>), and Naver Knowledge-IN (<http://kin.naver.com>) [18]. These systems are closely related to forum-based communities such as Reddit and Stack Overflow, but strive to be (1) comprehensive in potential topics and (2) focused primarily on asking and answering, rather than discussion. The orientation of social Q&A systems towards novel connections is an exciting affordance for users without existing access to domain experts or diverse social connections.

Digital Inequality and Information Poverty

Despite attracting sustained interest from the HCI community, we find that studies that investigate information seeking behavior within these platforms overwhelmingly draw data from segments of the population that are likely to be highly educated, economically stable, and possess high social capital [12, 18, 19, 20, 22, 23, 24, 31]. In other words, research on social search has overlooked the impact of use across social and economic aspects of the digital divide, particularly how social search could support populations who experience information poverty.

Information poverty is a concept developed by Elfreda Chatman to describe the marginalized social groups—the information poor—who suffer from an inability to satisfy important information needs [2]. Among the key characteristics of the information poor is a limited social network; consequently, we turn towards social Q&A as a more promising type of social answering system than SMQA. Drawing on research on information seeking and the digital divide, we identify three categories of issues of information poverty that are relevant for information search. For each category, we argue that unique affordances of social Q&A systems may address the specific issues involved.

Inequality in Information Seeking

To understand how social search could influence the outcomes of information search across the digital divide, we sought research on social features of individuals who struggle to find information and on skill-related differences in Internet use and web search outcomes. Elfreda Chatman's theories surrounding information poverty are central to the discussion of social aspects of information seeking, but has not been incorporated into more recent discussions of social life in the Internet age. To address this concern, we support her arguments with Granovetter's seminal work on social ties [11], which has been considered in the context of social search [24]. However, since her work was carried out before the Internet's popular rise, we relied on reviews of literature on information search across the digital divide to find research on Internet search skills [14, 15]. These reviews led us to the works of van Deursen and others [29, 30, 28], which synthesize multiple directions of research on Internet skills to provide a framework of skills, and, using survey data representing the Dutch population, present differences in skills and outcomes associated with social aspects of digital inequality.

Based on these methods, we assert three dimensions of information poverty in the context of the Internet: (1) perceived social environment [1, 2], (2) social ties [1, 9, 11], and (3) search skills [15, 29, 30]. For each dimension, we elaborate on the specific issues with information seeking that users experience, and how specific affordances of social Q&A could alleviate them.

Dimensions of Information Poverty and Opportunities for Social Search

Perceived Social Environment

One of the central components of Chatman's information poverty is the relationship between individuals and their

social perceptions [2]. People who are information poor perceive a restrictive set of “normal” information needs, established by their social networks. They are afraid to defy these, as it would betray a failure to conform or to cope, which prevents them from requesting help for many problems from within their social networks. Unfortunately, that perception is accompanied by a belief that sources outside of an individual’s social network are neither interested in nor capable of assisting the individual with their information needs [2]. This lack of trust in both local and global sources of information, with the fear of exposing one’s abnormal information needs, discourage the information poor from seeking information and, consequently, from fostering relationships with valuable information sources or developing information-related skills.

Social search alternatives, where external actors can demonstrate targeted interest and vulnerable users can operate anonymously, may provide an inroad to supporting trust-related issues. One of the most promising affordances of social search is that additional context can be communicated beyond what’s possible in a search engine query. Though past research has shown that some search engines do adapt results based on their understanding of the user [7], those systems do not communicate this contextualization to users, or afford them any control. SMQA has been praised for its implicit personalization [22], but visibility of questions asked via SMQA to existing social connections may be a major barrier for the information poor [2]; social Q&A services tackle this issue by allowing users to ask and answer questions anonymously. While social Q&A systems do not automatically include as much context, they afford users more control. For example, Yahoo! Answers allows users to elaborate on the specific context of their questions, which Jeon and Rieh found was employed by users in multiple strategies to improve the responses to their ques-

tions [19]. Quora allows users to discuss both questions and answers in designated comments sections, and allows askers to revise and clarify their questions as needed.

Social Ties

Social connections are a vital part of social information seeking, and “weak bridging ties” are especially important for accessing novel information [9, 11]. Furthermore, these weak bridging ties are found much more often in socially advantaged populations [11], indicating a pronounced disadvantage to those with lower social capital as discussed in prior CHI research [5]. Chatman observed this in her study of janitors, noting that the subjects received information almost entirely from local, familiar sources, and lacked opportunities to connect with individuals beyond their networks [1]. Consequently, the information poor operate exclusively in small social networks that lack pertinent information and expertise.

Social Q&A systems, which rely on domain expertise and interest to establish connections and afford persistent social connections, offer a way to circumvent these social tie-related barriers. Jeon and Rieh identify the affordance of finding tailored or non-popular information as a key motivator for the use of Social Q&A systems over traditional web search [19]. Traditional web search engines use general relevance and popularity to sort search results [4], while social search systems are specifically designed to use social resources and data to enrich the sorting of potentially relevant information [3]. Furthermore, social Q&A systems allow users to explicitly target specific topics or users, improving their ability to access domain experts in addition to their questions’ coherence and visibility. This also allows users who lack bridging ties in their social networks to access external resources and innovative or novel ideas.

The use of Social Q&A systems may also address users' lack of weak bridging ties directly. Chatman found that a common feature of the life world of the information poor was a lack of opportunity to interact with people beyond their social circle [1]. Social Q&A systems such as Quora allow users to develop a social network within the site, affording the ability to connect with users they encounter through asking, answering, and reviewing questions. Engaging in the communities on social Q&A services may not only mitigate the impact of the social symptoms of information poverty, but provide opportunities to cure them.

Search Skills

Perhaps the most obvious challenge with handling information online is the disparity in information skills across social backgrounds. Though the Internet offers incredible potential to gather information from many sources, the way that information is presented makes results difficult to synthesize and organize [17]. In a study of Internet users in the Netherlands, van Deursen and van Dijk found that numerous aspects of "Internet information skill"—particularly, the formulation search queries, the management of search results, and the evaluation of specific results—were positively associated with education level [29]. These issues do not only hinder a user's ability to find information through traditional Internet search. Rieh's study of early Internet users suggests that difficulty with query formulation is a major obstacle to platform adoption [27]. Unlike the barriers due to perception and social networks, low skills can lead to information that may guide a user towards a more negative outcome than if they had received no information at all.

Social Q&A may support low-skilled information search by allowing users to observe, practice, and receive feedback on the formulation of queries, and by incorporating social feedback systems to relay answer quality to the user Web

search engines do not incorporate explicit feedback to most queries, which is a severe disadvantage to those users with low query formulation skill. On the other hand, social Q&A affords users the ability to discuss and revise questions; for a given question, potential answerers can request specific clarifications, and askers can satisfy those requests. These social interactions do not just allow users to improve their queries in situ; they represent learning opportunities in which users may improve their query formulation skill for future searches in other contexts. Social search platforms support users with low evaluation skill through social feedback systems, which allow other users to "like" or "upvote" existing answers that they agree with. Social Q&A systems utilize these data to sort answers, some going as far as to promote a "Best Answer" [26].

Directions for Future Work

In all of these dimensions, the affordances of social Q&A demonstrate a real potential to help the information poor, but no practical studies have explored this potential. Thus, we propose future work target populations that demonstrate a clear need for novel information sources and limited social networks, as likely representatives of the information poor. One example population that fits this description is job-seekers with low socio-economic status, who may be primarily hindered by a lack social connections and search skills, which could help them to discover better job opportunities or enhance their employability [6, 8]. To motivate future study, we present two designs for lab experiments that explore research questions related to our hypotheses.

Understanding Routing Decisions in Web Search

The first lab experiment that we propose would examine the platforms on which users choose to perform various searches. The experimenters could introduce various traditional and social search platforms to each participant, and

prompt them to find answers to a collection of problems using any combination of the introduced platforms. In a follow-up session (to provide time for responses to questions that were posed via social answering systems), participants would be given time to review and evaluate the results of their searches. In each session, experimenters could conclude with semi-structured interviews, investigating users' perceptions of different platforms.

Research Question A-1: What concerns or affordances motivate users to route questions to social answering systems versus traditional web search engines?

Research Question A-2: How does explicit social feedback, such as the identification of a "Best Answer," influence users' evaluation of search results?

Research Question A-3: How do users change their queries between traditional and social search platforms?

The interview held at the end of the first session could examine Research Question A-1, testing the validity of the dimensions of information poverty and our hypothesized affordances that may attract users. Research Question A-2 could be examined by varying the ranking of results in the follow-up session while controlling for initial question. The interviews of users could be used to investigate Research Question A-3, as could natural language processing.

Exploring the Dimensions of Skills in Social Q&A

Our second proposed lab study would investigate questions regarding Internet search skills. It would involve scenarios that require the use of a social Q&A service to gather information and evaluate the learning outcomes of each participant. Experimenters would capture social and demographic information, as well as measures of operational, formal, information, and strategic skill [29, 30].

Research Question B-1: How are dimensions of operational, formal, information, and strategic Internet skill associated with educational, economic, and other demographic characteristics?

Research Question B-2: How do skills in these four dimensions influence the information outcomes of users in social Q&A systems?

Statistical modeling on the demographic, skill, and outcome datasets could inform both Research Questions B-1 and B-2, and test our hypotheses that social Q&A reduces the barriers to success due to search skills.

Conclusion

While social search is a valuable tool for all Internet users, we see promising application for users who have difficulties with existing standards of Internet search. Beyond the understood barriers created by limited access, effective use of online information resources is affected by an individual's relationship with information. Social Q&A systems support people with limited search skills or social capital, as they can access novel users who provide explicit and pertinent feedback and share the disadvantaged user's goals. Beyond the integration of the theory of information poverty into the research on social search, our proposed directions may contribute to the theory of information poverty by examining this phenomenon in the modern context of networked life.

The term "social" is attached to a variety of social media. For the most part, those media merely extend users' social capital. In social Q&A, rather than "social" implying a dependence on social networks, it means that users have opportunities to reveal their information needs and seek exposure to outsider perspectives to achieve their search goals.

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