

# A Comparison of Information Seeking Using Search Engines and Social Networks

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## Abstract

The Web has become an important information repository; often it is the first source a person turns to with an information need. One common way to search the Web is with a search engine. However, it is not always easy for people to find what they are looking for with keyword search, and at times the desired information may not be readily available online. An alternative, facilitated by the rise of social media, is to pose a question to one's online social network. In this paper, we explore the pros and cons of using a social networking tool to fill an information need, as compared with a search engine. We describe a study in which 12 participants searched the Web while simultaneously posing a question on the same topic to their social network, and we compare the results they found by each method.

## Introduction

There are many ways a person can satisfy an information need, including visiting a library, calling someone on the phone, or searching digital resources. Increasingly the Internet has become a key information source, and people find information online by browsing webpages, posting a question to a Q&A site, or using IM or email to contact someone directly. Search engine use is the most popular approach to online information seeking (Fallows 2008). However, the recent rise in popularity of social networking sites, such as Facebook, MySpace, and LinkedIn, has introduced a new option for finding information online – posing a question to one's network.

We present a study in which 12 participants posted a question to Facebook while simultaneously investigating the same question via Web search. We compare the information participants found with these two methods and participants' satisfaction with each experience. We conclude by discussing the implications of our findings for the design of next-generation search tools.

## Related Work

The term *social search* refers broadly to the use of social mechanisms to find information online. Social search can involve the use of search engines, if the engine indexes social media (e.g., public Twitter posts) or uses community members' actions to rank results (e.g., Heystaks by Smyth

et al. 2009 or Groupization by Morris et al. 2008). Social search engines can also be devised using the output of social tagging systems such as delicious (delicious.com).

Social search also encompasses active requests for help from the searcher to other people. Evans and Chi (2008) describe the stages of the search process when people tend to interact with others. Morris et al. (2010) surveyed Facebook and Twitter users about situations in which they used a status message to ask questions of their social networks. A well-studied type of social searching behavior is the posting of a question to a Q&A site (e.g., Harper et al. 2008, Liu et al. 2008) where other users (typically not known personally to the asker) can offer answers. Expertise-finding systems such as Aardvark (Horovitz and Kamvar 2010) or Collabio (Bernstein et al. 2009) can help a user find a person who is qualified to address their information need. Some searchers also receive assistance from professionals, like reference librarians (Taylor 1968).

In this paper we focus on a specific aspect of social search where the searcher asks a question to a group of people they know personally by means of a social network status message update. We compare this experience to searching for the same information with a Web search engine. Evans et al. (2010) conducted a between-subjects study where eight people searched using either social resources (e.g., phones, IM, social networks) or non-social resources (e.g., search engines). Our work differs in that we focus specifically on social search via status message questions. Also, our within-subjects design enables us to make comparisons not possible in Evans' study.

## Methodology

We conducted a lab study to compare social and non-social search for complex, self-motivated information seeking tasks. Twelve people (four female) participated, all U.S.-based Microsoft employees, aged between 23 and 42 years old (mean = 31.9). Five participants self-rated themselves as expert searchers, and seven as average. All participants were required to have at least 50 friends on Facebook, to ensure that their social network was sufficiently large to potentially provide answers to their questions. Network size ranged from 50 to 743 (mean = 260.3). All participants had been members of Facebook for at least a month, and nine for over a year. Two said they updated their status "rarely," eight "a few times a week," and two "daily."

The search tasks were self-selected by the participants,

who were asked to come to the session prepared with an information need (shown in Table 1). Shopping, travel, and how-tos were common topics. By using open-ended, self-motivated tasks, we ensured participants were engaged and able to judge the quality of the responses they found. At the beginning of the study, after completing a pre-study questionnaire, participants posted a question related to their chosen search task as their status message on Facebook. They then tried to answer the question themselves using non-social search methods.

The end time for the search task was self-determined; participants stopped searching when they felt satisfied with what they had found. Queries, URLs, and associated timestamps were logged by a custom browser plug-in. When they finished searching, we asked them to check their social network and capture a screenshot of the content and timestamps of any responses received to the question posted there. Participants then completed a questionnaire comparing the results their friends provided with the results they found on their own. Three days later, participants sent an updated screenshot, capturing any further Facebook responses received since the end of the lab session.

## Results

We begin with an overview of how participants searched and asked questions, and then compare the two approaches. Table 1 summarizes key performance data. Ratings use a five-point Likert scale (5 indicates a positive response). Non-parametric Wilcoxon tests are used to compare scores.

## Searching

Participants spent an average of 30.3 minutes on the Web search task. On average, they issued 6.5 queries and visited 35.4 pages from 12.3 distinct, non-search sites.

## Asking

When participants checked Facebook immediately after completing their Web search, they found an average of 1.4 responses waiting, and a maximum of 5 responses. Five participants received no responses. Consistent with Morris et al. (2010), the number of responses participants received was strongly positively correlated with network size ( $r = 0.78$ ), and was also correlated with time of day, with more responses likely in the afternoon ( $r = .30$ ).

By the three-day follow-up, participants had received an additional 4.1 responses on average, for a total of 5.5 responses. The total number of responses received ranged from 0 to 20. Two participants never received any responses. Of the ten people who did, the minimum time to first response was 5 minutes, the median was 17 minutes, and the mean was 188 minutes. Time to first response was negatively correlated with number of friends (more friends = shorter time to first response,  $r = -0.36$ ). Time of day did not correlate with time to first response ( $r = .004$ ).

## Searching Versus Asking

We now compare the answers participants found via the two approaches, and discuss the pros and cons of each.

Task (as expressed to the social network)	Network size	Initial responses	Total responses	Minutes to first response	Minutes searching
Is now looking for a new phone to get... Any suggestions???	466	3	20	15	38
any tips for tiling a kitchen backsplash?	231	3	7	8	29
Anyone know how to stop an in-car nav system from constantly rebooting???? Ugggggh	275	2	2	19	46
Does anyone know how to train for half marathon? Links...training...diet to follow would be great!	50	0	0	N/A	21
Lauren's going away for a month, anyone know any good vegetarian recipes?	401	1	10	36	36
So...after getting the PMP, what else is anyone doing to keep up their development?	96	0	2	1519	14
should I wait for ZuneHD or buy Ipod touch (to gift someone)?	104	1	3	7	32
is wanting to move away from Live Space for storing and sharing pictures... Any recommendations?	206	0	5	184	12
Can one defeat Seattle winter with a trip to New Zealand? Does anybody have the beta on bouldering there?	240	0	5	77	31
is looking for recommendations (restaurants and activities) in Cancun	143	2	2	5	49
is starting to plan my Thanksgiving trip to Disneyland...what are the must see attractions, especially for a 3-year that loves princesses? Any websites out there for planning other than disneyland.com?	743	5	10	8	22
Does anyone have any recommendations on a good medium to high end TV?	169	0	0	N/A	34
<b>Average</b>	<b>260.33</b>	<b>1.42</b>	<b>5.50</b>	<b>187.80</b>	<b>30.33</b>

Table 1. Questions posted to Facebook by the 12 participants, and related task performance data. Initial Responses counts the Facebook responses received during the Web search (Minutes Searching), and Total Responses counts the responses received within three days.

**Comparison** Prior to searching, all participants responded that they would normally use a search engine to complete their chosen task. Five (41.7%) said they would additionally ask their social network. Participants anticipated usefulness of a search engine high (median = 4.5), and the social network low (median = 3.0). The difference is marginally significant ( $z = -1.83, p = .067$ ).

After searching, 11 participants (91.7%) were more satisfied with the information they found through searching than via Facebook. The median score for, “How satisfied are you that your Web search successfully resolved your information need?” was 4.0, while the usefulness of the social network had median 2.0, indicating people felt the search engine was more useful ( $z = -2.51, p = .01$ ).

The search engine’s performance seemed to match people’s expectations; there was no significant change in usefulness score from the pre-search (median = 4.5) to post-search (median = 4.0) questionnaire. However, the social network underperformed peoples’ initial expectations (median 3.0 before and 2.0 after,  $z = -2.49, p = .01$ ). This may be due to the very short time frame that people on Facebook had to reply (a half hour, on average).

**Benefits of Searching** Participants indicated they would normally search first, expected to find what they were looking for via search, and were happy with what they found. Here we discuss reasons searching was successful.

Using a search engine provides the information seeker with control over the search process, such as response timing. One reason why participants preferred Web search to asking their social network was that they found answers faster with Web search; four people expressed this preference, although one acknowledged that, “Facebook might yield more responses given more time.”

Four participants pointed out that the search engine gave them the opportunity to refine how they expressed their information need as they learned more about the topic, which might be rude to do on Facebook because it results in multiple updates. For example, one user preferred search since, “I could jump from topic to topic and research new things as I stumbled upon them. It wouldn’t make sense to keep updating the question in Facebook.”

Two people mentioned that they thought a search engine was less biased than their social network. For example, one said, “It feels to me like sources from the internet are more likely to be ‘authoritative’ on the subject matter instead of the obviously biased opinions of friends.”

**Benefits of Asking** Although searching was generally preferred, there were a number of benefits we observed our participants received by questioning their social network.

Eight of the participants (66.7%) reported having asked questions to their social network before. Common motivations for doing so (reported by over half of these participants) include that it is fun, they trust their social network, they wanted opinion-type answers, and their social network knew additional context about them.

The only participant who preferred the results from Facebook to those found with a search engine liked the fact that her social network knew information about her, and thus was able to provide more customized answers. She explained that what she found, “was completely relevant because the people know me and my daughter and what we would like – a search engine isn’t going to know that.”

Social networks seem particularly useful for subjective questions. One participant noted he might prefer using his social network in such cases, stating, “If I were searching for something more opinions based (restaurants, etc.) then perhaps Facebook would be a more viable alternative.”

People considered the results from their social network highly trustworthy (median = 5). They generally received answers from people whom they knew very well (median of 4 for how well they know the person), and they trusted answers more from people they knew better ( $r = 0.23$ ).

Asking also provides social benefits. One participant noted, “[The replies] let me know what some of my friends’ plans are, and helped me catch up with them.” Even when participants didn’t think an answer was “useful,” they still found it relevant – many replies included social comments that were related to the topic but weren’t an answer. One friend replied to the question about career advice, “I have full confidence in you,” expressing support for the asker’s innate ability to advance her career. Such responses provide social, though not informational, value.

Although not everyone got results immediately from their social network, those that did often learned information that they did not find while searching. Eight of the ten participants with answers on Facebook reported that at least one answer (and as many as 7, average = 2.25) provided information that they did not encounter during their Web search. In contrast, only 1.7 (average) answers were redundant with information found via the search engine.

The unique information found via Facebook that had not been found by searching often provided value in ways a search engine could not. Many of the unique responses included opinions, further emphasizing the social network’s value in providing subjective information. For example, in response to the question about the Disney vacation, one person responded, “2nd vote for Mr. Toad’s Wild Ride... Pirates of the Caribbean may be too scary.”

Responders also commonly suggested alternatives not encountered via search. For example, one person suggested “Start your own consulting business,” in response to the question about career advancement. The participant reflected on this response, noting, “It allowed me to think that not only training was an option but also detach myself from corporate work and start my own business.”

Some of the relevant information provided by friends very likely did not even exist on the Web, and thus could not possibly have been found via search. Instead, it became instantiated in response to the participant asking. For example, the participant who asked about vegetarian cooking was offered access to a resource not available online: “I’ve

got HEAPS of really great vegetarian recipes!! Just yell when you need them!” And the participant planning a trip to New Zealand was invited to visit a friend (“No, no. Spend the winter bouldering with me in Hueco, Bishop, and Rocktown.”); such an invitation unquestionably could not be found via Web search.

**Benefits of Searching and Asking Together** Rather than one method being superior, searching and asking often were complementary. Asking, for example, was reported to provide valuable confirmation of results found via a search engine. On the pre-study questionnaire, two participants noted they would normally start their information seeking with a search engine and then ask their social network follow-up questions, saying, for example, “I usually start with a search engine. In case of ambiguity I ask my friends on social network/Twitter.” At the completion of the search portion of the study, one participant noted that he would want to use Facebook at that point in his search to get feedback on what he had discovered from the search engine, “I was able to find more options [with the search engine] that I can validate with my social network.” Another reported that the Facebook responses, “made me feel comfortable about my choices and my search results.”

### Design Implications

Our findings suggest that search engines and social networks each provide value at different stages in the search process. Users’ information-seeking experience could be improved by integrating these resources.

When a question posed to a search engine is better suited for a social network, the engine could point people there. For involved search tasks, people may want to take the first step on the engine, and then move to the social network, particularly when opinions or recommendations are required. Similarly, search engines could send floundering searchers to a social network to help them get new ideas about how to better express what they are looking for. Previous research suggests asking people to describe what they know about their target provides valuable information for the search engine (Kelly et al. 2005), so the question as posed to a social network could be used to further improve the search results returned.

Search engines could also pull back information from the social network to show to the user in the context of their search. This can be done by mining the social network for relevant information and experts. Or, by identifying a multi-query search session (e.g., Morris et al. 2008), a system could post a question and pull responses back to display alongside results from subsequent, topically-related queries. This is feasible given 58% of participants received responses before completing their search sessions.

Social networking tools can help people express questions to their social network by making it easy for people to quickly access some context on the question topic. They may also be able to direct people to search engines when a

need could be well solved by a search engine. Conceivably, a person could “friend” a search engine that would recognize questions that might be answered by a Web search, federate the question to a search engine, and include Web results as a response. Search engines may want to target ads on social networks to people who post questions to help them make the transition to Web search.

### Conclusion

We presented a study in which 12 people used search engines while simultaneously posing their question to their social network. Over half (58%) received responses from their network before completing their search, and 83% received responses eventually. Although subjects generally preferred searching, asking provided several benefits, including the delivery of personalized answers and increased confidence in the validity of the search results. Our findings suggest it may be desirable to simultaneously query search engines and social tools. Future work lies in exploring the impact of network composition in greater depth and testing our proposed systems.

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