SNS Search in Under-Developed Countries - Survey and Statistical Analysis

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Abstract—The last decade has seen the emergence of the Social Networking Sites (SNS) and researchers are investigating the useful applications of this technology in various areas apart from its recreational value. Its ubiquitous presence has enabled people to obtain customized information seamlessly from their acquaintance. There have been many works that analyzed the types and topics of questions people ask in these networks and why. Topics like what motivate people to answer such queries, how to integrate the traditional search engines and SNS together are also well investigated. In this paper, we focus on the use of this technology in under-developed parts of the world and the new doors it has opened for its inhabitants. Based on a structured survey on 328 persons, we have tried to emphasize the differences between social search and traditional web-search. Our statistical analysis finds the correlations among different relevant parameters and provides insight that one might require to consider while developing any application for SNS based searching.

Keywords - Social Networking Sites, Search, Survey, Information.

I. INTRODUCTION

Individuals encounter a wide range of information needs in their everyday life. These include questions or queries, recommendations about career development, factual knowledge regarding sophisticated technologies, rhetorical thoughts of life events, opinions about a major purchase, etc. Despite of the digital revolution over the past three decades that has enabled us to store and maintain large collection of data in a tiny amount of space and the evolution of search engines (SE) that has made it possible for us to look into tremendous amount of information within seconds, the recent developments in social networking sites have opened a new dimension in information searching. Recent trends have shown that many people tend to turn to their social networks for information rather than using the formal searching tools. Social network sites (SNS) are connecting individuals to one another with whom they have a previously established offline connections or different degrees of relational closeness in online or in real life. Thus it is likely that people turn to SNS as an efficient way to tap these connections for information-seeking purposes.

In this study, we will use Facebook as an example SNS without losing any generality and seek to understand the extent to which Facebook users are likely to use the site for their information-seeking as well as information-retrieval activities. With one billion monthly active users and more than half a billion daily active users [1], currently (as of 14th April, 2013) it is the number two site in the world considering Internet traffic, according to Alexa ranking [2]. On an average, the users spend 10.5 billion minutes per day on it, make 421 million status message posts, 3.2 billion likes and comments, and have 140 friends in their network [3]. The average age of SNS users has also increased in recent years: among American Internet users, 70% of 30–49 year-olds, 51% of 50–64 year-olds, and 33% of those 65 or older now have a profile on a SNS.

SNS provide users with source of information that is complementary to that provided by search engines. Search engines provide information that comes from ubiquitous source, i.e., web, in contrast to SNS that can provide objective data from a variety of sources on a variety of topics and is highly tailored to an individual. Information obtained from SNS is also found to be highly trusted, as we know the individual behind the information too. We can simply ask the members of our social network and get useful information that the researchers found quick, useful, and in many cases, more robust.

For better understanding, we will emphasize on individuals’ question and answer exchange in their social networks. We will primarily focus on the developing regions of the world and see how SNS search has made significant changes in the way people access information here. We have conducted a survey of 328 people using Facebook. Our survey covered topics such as the types and topics of the questions asked, frequency of getting responses, reasonable response time of getting appropriate responses, frequency of questions asked, and motivations behind question asking on social networks.

We discuss the related works in Section II. Section III presents the changes that SNS search is bringing in the under developed parts of the world to eradicate the digital divide. We present our survey data and analysis with its implication in Section IV before concluding.

II. RELATED WORKS

Lampe et. al. [4] analyzed how the use of Facebook has changed over time, using three consecutive years of survey data and thorough interviews with a few of the survey people. They reported that though the uses of the site remain relatively constant over time, but the perceived audience for user profiles and attitudes about the site showed differences over the study period. They find that patterns of use, perception, and attitude somewhat changed over the time. Their study, consistent with
others, found that the number of friends and time spent on Facebook increased at first and then leveled off.

One of the important studies in SNS based information search is done by Efron et al. [5], who identified that microblogging services like www.twitter.com are gradually becoming a popular venue for informal information interaction. They showed that the act of asking questions in Twitter is not analogous to information seeking in more traditional information retrieval environments, which contextualize these articulations through analysis of a large body of tweets. Teevan et al. [6] discussed the types of information people used twitter to find, for example, breaking news, real-time content, popular trends, etc. This paper presented the systematic overview of search behavior on Twitter and differences with web search using questionnaire data along with analysis on query logs. They found that Twitter results included more social content and events, while web results contained more facts and navigation. Based on their study, they recommended that search engines can use trending Twitter queries to discover additional queries that have strong temporal components.

Lampe et al. [7] investigated the Facebook user characteristics based on a survey of 614 people who used it to ask something. They identified the perception of the relationships within network members as significant predictors of information seeking approach. They did not show any comparison between SNS and SE regarding obtaining any particular type of information. This question is addressed by Morris et al. [8]. They explored the pros and cons of using SNS as information source and compared user interaction when they search anything either on SNS or SE, involving 12 participants on their study. They find that 53% of the users received quick responses from SNS and 83% received responses eventually as well. The type of questions and answers in SNS are investigated by Morris et al. [9] using a study of 624 people about their Facebook usage experience. They also explored the relationships between answer speed and quality, properties of participants (age, gender, and social network usage habits), and their questions (type, topic, and phrasing). Their study complies with the findings of many other researchers that while traditional SE is good for objective queries, SNS shows better results and interactions for subjective queries. There are many motivations for asking questions in SNS - among them the most important reason was that people in our social network knows our context better, therefore may provide more relevant answers. Often people turn to SNS regarding objective questions if knowing the answer is not urgent, in the hope that some other friend in his network already knows the answer and will share his knowledge with him in due time.

Panovich et al. [10] evaluated the role of tie strength in question-response behavior as an indication of how close the relationship is - close friends are strong ties, while acquaintances are weak ties. In their study, they asked 19 participants to ask some technological recommendation questions through status messages. After the participants rated the received answers’ quality, they compared that with a tie strength metric, and found that stronger tie provides better answers than weaker ties, in general. Also, they found that friends who have expertise in the question topic provide more trustworthy answer irrespective of strong or weak ties.

Farnham et al. [11] studied the suitability of So.cl: a web application that combines web browsing, search, and social networking, designed for the purposes of sharing and learning around topics of interest by taking feedback from 32 college students. Their findings present the importance of social media for inspiring learning around new topics through social connections. They found the easy, lightweight integration of sharing around search in So.cl effectively fostered serendipitous, informal learning online.

None of these researches investigate the difference in question-answer behavior in different parts of the world. Yang et al. [12] addressed this issue and identified some key differences between SNS search in the Western and Eastern cultural hemisphere. Their survey included people from US and UK representing the Western culture and people from China and India representing the Eastern culture. They concluded that people in the Eastern culture are somewhat more likely to use SNS for getting objective information than their counterpart and use it more often for the purpose. They explained this phenomenon using existing and established knowledge from sociology study that Western cultures are associated with an analytic and low-context cognitive pattern, along with individualism, while Asian cultures are associated with a holistic, high-context cognitive pattern, along with interdependence and collectivist social orientation. Our initial findings match with them, except they did not include another possible explanation of this behavior - the existing web infrastructure deficit in the developing and undeveloped countries, commonly known as the Digital Divide. In our work, we will elaborate on this explanation.

III. UNITE THE DIGITAL DIVISION BY MEANS OF SNS

The term Digital Division indicates the difference in technological advancement between the developed and developing parts of the world. Availability of all sorts of computing devices in the developed region, especially the recent explosion in the smart-phone usage has made their web presence ubiquitous nowadays. Traditional search engines are very effective in capturing the required information regarding any
government or business services for them as it is already there in Internet.

The scenario is quite opposite in the other parts of the world where the web culture has not flourished yet. We may focus on the South-East Asia region as an example of the developing part of the world. Scarcity accessibility to Internet and unavailability of updated information there create twofold problem in information retrieval in this region. First, search engines cannot provide satisfactory response of queries, as the information is not there in the web. Second, people are not used to search their required piece of information even if it is available in Internet. Though the Governments in these countries are trying to eradicate this digital division, it is proved as not easy. The world remains ‘divided’ and probably will remain so for a long time from now unless some drastic measure is not taken.

To show evidence on how SNS can pave a way to end this ‘digital divide’, we consider ‘Bangladesh’ as a representative country from the South-East Asia. Bangladesh is ranked 3rd among the 8 countries in this region in the e-Government ranking. Internet access is available to only 5 percent of her citizens and many of those who have access to Internet use it seldom. But if we consider the SNS presence of the people in Bangladesh, they are not far behind [13], [14]. Roughly 43% of the Internet users in Bangladesh use Facebook, proving that a significant part of our Internet users are SNS user too. Though SE cannot give them the data that is not there in the web, through SNS, their query can reach hundreds of the people of their acquaintance. Perhaps this is not the end of ‘digital division’ mentioned earlier, but we are getting a bit closer to unify the world in terms of information searching and retrieval capacity.

IV. SURVEY RESULTS

We have conducted a structured survey on 328 people. Most of them are students from different universities and other reputed educational institutions in Bangladesh. Almost all of them have Internet access to various extents, and with negligible exceptions, all of them are SNS users. The results show interesting patterns in information retrieval experience through SNS. We have conducted both online and offline survey using the same questionnaire in English, which be found in [15].

A. Demographic Description of the Participants

We have collected 328 responses in total, all of which are undergraduate level students. 93 percent of our participants are from the age group of 18–24 years. The male-female ratio was not equal, 78 percent being male. This is the common and expected ratio of male and female students in the undergraduate level in Bangladesh. 98 percent of our survey participants were unmarried. We will see if these demographic properties have any impact on their Facebook usage pattern in later parts of this paper.

B. Question Asking Pattern through Facebook

Almost all of our participants (99.1%) have their own Facebook account and majority of them are using it for more than two years (Fig. 1). Majority of them have about 201–500 friends in Facebook (Fig. 2). When asked about how frequently
they update their Facebook status (Fig. 3), most of them said they hardly update their status (64%) or less than 3 times per week (22%). 73.8 percent of our participants have asked some questions or opinions through Facebook, 23.5 percent have never used Facebook for the purpose and 2.7 percent of the participants did not reply to that question.

Fig. 4 shows that 52% participants hardly post any question through Facebook and 25% of them posts less than three questions in a week. Though this scenario depicts that searching for information is not part of everyday use of SNS, the response time showed in Fig. 5 and Fig. 6 prove that SNS can be an influential source of information. More than 50% of the participants receive first response for their query and 45% of them receive satisfactory answer within 30 minutes. About 67% of the people has provided opinion that they get satisfactory response to their queries from friends most of the times, if not always and 26% people get it ‘sometimes’ (Fig. 8).

Technology, entertainment, and current events (Fig. 12) appear to be as most popular topic of asking questions. About 67% of the people has provided opinion that they get satisfactory response to their queries from friends most of the times, if not always and 26% people get it ‘sometimes’ (Fig. 11). The main motivation being helpful to others (Fig. 13). To assist others in their friend list, 49% of the people often do a Google themselves to provide an answer to a question posted in Facebook, while 24% said that they ask another friend personally to know the answer and let the asker know about it.

D. Inter-relation among the Parameters

We used chi-square test of independence to find out inter-dependencies among different parameters based on demographics and SNS usage pattern (Table I). Most of the tests and unavailability of information on web were reported as two major reasons behind asking questions (Fig. 9).

47% of participants said that the results obtained from SNS and SE might differ to some extents and SNS can add some additional information or perspective to the problem at hand. Majority of the people (56%) will choose Google for information searching, but 40% said that they would decide either Facebook or Google depending on the query under consideration. In case they have limited time or bandwidth, 67% will use Google, 27% will decide depending on the query, and only 5% will use Facebook solely. If they do not get satisfactory information from Facebook, most of them (46%) will ask someone personally about it, almost a similar percentage of people will search using traditional search engines (42%) (Fig. 10).

C. Answering Behavior

Most of the people response to a query they see, at least ‘sometimes’ (47%) (Fig. 11). The main motivation being helpful to others (Fig. 13). To assist others in their friend list, 49% of the people often do a Google themselves to provide an answer to a question posted in Facebook, while 24% said that they ask another friend personally to know the answer and let the asker know about it.
### TABLE I: Chi-Square test of independence on SNS question asking and answering behavior

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Independent of -</th>
<th>Chi-square value</th>
<th>degree of freedom</th>
<th>Dependent (Yes/No)</th>
<th>Comment</th>
<th>Z score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Question</td>
<td>Time to get first response</td>
<td>46.7</td>
<td>36</td>
<td>No</td>
<td>-1.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>40.8</td>
<td>35</td>
<td>No</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Time to get first response</td>
<td>1.59</td>
<td>4</td>
<td>No</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>6.6</td>
<td>5</td>
<td>No</td>
<td>-0.67</td>
<td></td>
</tr>
<tr>
<td>Type of question asked</td>
<td>3.88</td>
<td>7</td>
<td>No</td>
<td>0.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Facebook use</td>
<td>Time to get first response</td>
<td>14.7</td>
<td>16</td>
<td>No</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>26.5</td>
<td>20</td>
<td>No</td>
<td>-1.04</td>
<td></td>
</tr>
<tr>
<td>Importance of Facebook as information source</td>
<td>19.5</td>
<td>24</td>
<td>No</td>
<td>0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of query update in search engine</td>
<td>46.5</td>
<td>16</td>
<td>Yes</td>
<td>People who uses Facebook longer are likely to modify their query and search again</td>
<td>-3.77</td>
<td></td>
</tr>
<tr>
<td>Preferred source for information search</td>
<td>45.3</td>
<td>20</td>
<td>Yes</td>
<td>People who have been using Facebook for 'More than 2 years ago' shows slightly more inclination to use Facebook as an information source than others</td>
<td>-1.86</td>
<td></td>
</tr>
<tr>
<td>Time of questions asked</td>
<td>22.8</td>
<td>28</td>
<td>No</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of friends</td>
<td>Time to get first response</td>
<td>25.4</td>
<td>16</td>
<td>Yes</td>
<td>First response time decreases slightly with the increase in number of friends</td>
<td>-1.91</td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>24.1</td>
<td>20</td>
<td>No</td>
<td>-0.71</td>
<td></td>
</tr>
<tr>
<td>Importance of Facebook as information source</td>
<td>26.4</td>
<td>24</td>
<td>No</td>
<td>-0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of query update in search engine</td>
<td>40.3</td>
<td>20</td>
<td>Yes</td>
<td>People who have more friends modify their query more than others</td>
<td>-2.60</td>
<td></td>
</tr>
<tr>
<td>Preferred source for information search</td>
<td>129</td>
<td>25</td>
<td>Yes</td>
<td>Though Google is the first choice as an information source for all groups, people with moderate number friends (201–500) chooses it more than others</td>
<td>-6.0</td>
<td></td>
</tr>
<tr>
<td>Frequency of status update</td>
<td>Time to get first response</td>
<td>24.5</td>
<td>24</td>
<td>No</td>
<td>-0.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>28.3</td>
<td>30</td>
<td>No</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Importance of Facebook as information source</td>
<td>30.6</td>
<td>36</td>
<td>No</td>
<td>-1.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of posting questions</td>
<td>Time to get first response</td>
<td>48.2</td>
<td>24</td>
<td>Yes</td>
<td>Frequent askers get response quickly</td>
<td>-2.82</td>
</tr>
<tr>
<td></td>
<td>Time to get satisfactory response</td>
<td>26.6</td>
<td>18</td>
<td>No</td>
<td>-1.36</td>
<td></td>
</tr>
<tr>
<td>Importance of Facebook as information source</td>
<td>22.7</td>
<td>24</td>
<td>No</td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of questions asked</td>
<td>59.1</td>
<td>42</td>
<td>Yes</td>
<td>People who ‘Hardly post any question’ asks about ‘current event’ or ‘entertainment’ more than others</td>
<td>1.73</td>
<td></td>
</tr>
<tr>
<td>Response to others' questions</td>
<td>Importance of Facebook as information source</td>
<td>14.4</td>
<td>24</td>
<td>No</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>Preferred source for information search</td>
<td>45.8</td>
<td>20</td>
<td>Yes</td>
<td>People who always reply to others choose Facebook, but who ‘sometimes’ response to others choose Google more</td>
<td>-3.1</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 10:** Actions when no satisfactory answer is obtained from Facebook.

**Fig. 11:** Response to others’ queries.

showed independent behavior, for $p < 0.05$. When the test results showed dependency, it means, at least one of the samples deviate significantly from the other samples. The test does not identify where the differences occur or how many differences actually occur, so we calculated the Z-scores of different samples for that query to see the dependencies or anomalies among them.

Our analysis shows that though the gender ratio among the participants is not equal (78/22), their Facebook usage patterns, especially the first/reasonable response time are independent of their gender. And though the lifetime of the users’
Facebook account has no co-relation with response time and number of times they repost their queries, it is co-related with the information source they use for asking queries. People who have used Facebook for more than two years have considered using ‘both Facebook and Google’, depending on the query’ more than any other sample populations.

The length of Facebook usage or the number of friends has no impact on the topics of their posted questions. However, the more friends they have, the quicker the first response to their queries comes. But interestingly, the reasonable response time is independent of the number of Facebook friends. Also, according to our analysis, those who have more friends, prefer to use ‘both Facebook and Google’ as an information source more than the other sample groups.

The analysis shows that there is no apparent relation between the frequency of normal status update with first/reasonable response time, preferred source of information search, or question topics. However, frequency of question posting has some dependency with the first response time and question topics - people who posts question frequently gets their first response quicker than others and people who seldom posts queries are more interested in ‘current events’ and ‘entertainments’. We also found that the topic of question has no impact on first/reasonable response time or preferred source of information. Those who responds to others’ queries ‘most of the times’ or ‘sometimes’ choose ‘both Facebook and Google’ as their preferred information source.

V. CONCLUSION

SNS search is gaining popularity on its own merit, and researchers around the world are considering it as a big change in the way we access or search information. Our research has emphasized its differences and importance with respect to the under-developed parts of the world, focusing on the digital-gap it has with the developed regions. With our background studies and structured survey, we have identified the types and topics that draws significant interest, first and reasonable response times, preferred information source, etc. Our statistical analysis could show inter-relation among these parameters and provides insight into the system. We are now working on developing a Facebook app using these information that will assist the users to obtain real life information from Facebook in a better optimized way than now.

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