

Social Media Question Asking: A Developing Country Perspective

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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. Ubiquitous presence of SNS has enabled us to obtain customized information seamlessly from our acquaintance. There have been many works that analyzed the types and topics of questions people ask in these networks and why. Topics like what motivates people to answer such queries, how to integrate the traditional search engines, and SNS together are also well investigated. In this research, we focus on the use of this technology in underdeveloped parts of the world and the new doors it has opened for its inhabitants in terms of obtaining information. Analyzing 880 status messages collected from a widely used SNS, we have observed that, unavailability and inadequacy of information on web in developing countries play a significant role to motivate users using SNS for information retrieval. 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 Developing countries · Social query · Information search · Social networking sites

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1 Introduction

The supremacy of human race comes from their ability to think and ask questions. We encounter a wide range of information needs in our 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. For a long part of our history, helping one another in this quest was the only available way. Then we learnt to preserve, convey, and spread our knowledge through written and printed medium. The digital revolution over the past three decades has provided us with new power to store and maintain large collection of data in a tiny amount of space. Especially, the inception of search engines (SE) has enabled us to look into tremendous amount of information within seconds, a feat that our ancestors could hardly imagine about. These achievements lead many of us to believe that we are at the pinnacle of information search and retrieval, but as it comes out, it is hardly the truth. Many researchers are now wondering if history is repeating itself to bring us back to human intervention in information retrieval due to the emergence of social networking sites (SNS).

The past decade has seen the emergence of social networking sites (SNS), namely *Facebook*, *Twitter*, *Google+*, among many others. In this era of SNS, we are more connected with people around the world than ever before. Nowadays, it is no longer a source of entertainment and social connectivity only, it has paved a new way for information searching [1]. Apart from using the search engines that can merely use the already available information in the public sites crawled in its memory and some algorithm to search and index the results without much personalization, we can simply ask the members of our social network and get personalized and useful information that the researchers found quick, useful, and in many cases, more robust.

Using social networking sites as an information source have drawn the attention of the researchers for a while now. 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 research, we focus on a relevant but novel issue—how SNS search varies in developed and developing regions of the world and why. Analyzing 880 status messages collected from a widely used SNS, we have observed that, unavailability and inadequacy of information on web in developing countries play a significant role to motivate users using SNS for information retrieval. With established statistics of Internet usage, e-Governance, survey data, and our experimental data analysis, we have tried to emphasize the differences between social search and traditional web search in the developing country context and provided insight that one might require to consider while developing any application for SNS-based searching.

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. 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 naturally likely that people turn to SNS as an efficient way to tap these connections for information seeking purposes [2]. Information obtained from SNS is also found to be highly trusted, as we know the individual behind the information too.

In this research, we will use Facebook as an example SNS, without losing any generality. With one billion monthly active users and more than half a billion daily active users [3], currently (as of December 31, 2013) it is the number two site in the world considering Internet traffic, according to Alexa ranking [4]. On an average, the users spend 10.5 billion min per day on it, make 421 million status message posts, 3.2 billion likes and comments, and have 140.3 friends in their Facebook network [5]. 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 an SNS.

In this work, we emphasize this ubiquitous presence of SNS with special focus on developing regions of the world and see how SNS search has made significant changes in the way people access information here. We discuss the seminal works in this area in the next section. The problem of ‘digital divide’ is explained then along with the concept of less biased SNS world. Our experimental data along with methodology, interviews, analysis, and findings are explained in Sect. 5. Finally, we conclude after discussing and analyzing the implications of our survey data.

2 Related Works

Lampe et al. [1] 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, which from interviews, suggested that new users spend time adding people as friends and getting used to the site. After a while, this behavior lessens as time is spent more seeing what is happening to friends instead of expanding their friend base. Also, new users are more likely to use Facebook to “find people to date” or “meet new people” than long-term users.

One of the important studies in SNS-based information search is done by Efron et al. [6], who identified that microblogging services like *www.twitter.com* are gradually becoming a popular venue for informal information interaction. They showed that question asking in microblogs is strongly tied to peoples’ naturalistic interactions, which helped them to offer a taxonomy of questions in microblogs. They also 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. [7] 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 could use trending Twitter queries to discover additional queries that have strong temporal components.

Lampe et al. investigated the Facebook user characteristics based on a survey of 614 people who used it to ask something [8]. 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. [9], where 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 effects of community size and contact rate were studied for synchronous social Q&A involving 402 Microsoft employees by White et al. [10]. The study analyzed the effects of these variables in terms of objective and subjective measures, and from the standpoint of askers, answers, and all members' general perceptions of utility. Every metric showed improvement with increased community size, including increased fraction of questions answered, asking effectiveness, answer quality, and answer ratings, along with a corresponding decrease in the time to receive an answer, number of users who were bothered by incoming questions, and fraction of the community that was interrupted.

Jeong et al. [11] compared the 'friend-sourced' answers obtained from SNS with traditional 'crowd-sourced' answers and concluded that 'friend-sourced' SNS systems are at least as good as their paid 'crowd-sourced' for providing answer to its users' queries. Liu et al. [12] analyzed the extrinsic factors that may influence the response rate in social question-answering process.

The type of questions and answers in SNS are investigated by Morris et al. [13] 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 the belief 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. [14] 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 find that friends who have expertise in the question topic provide more trustworthy answer irrespective of strong or weak ties.

Farnham et al. [15] 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 and informal learning online.

Naaman et al. [16] examined 350 users' messages and some system data to understand the individual's activity using their own developed content-based categorization. Their analysis showed two common types of user behavior in terms of the content of the posted messages, and exposed differences between users in respect to these activities. But they did not address the relationship between social network structure and social influence to the type of content posted by users.

A controlled study conducted on 282 persons by Teevan et al. [17] analyzed effect of the factors: punctuation in status messages, scoping of audience, and precision on the response time, quality and quantity of response. Their key findings are that a higher portion of questions with a question mark received responses (88.1% vs. 76.3%, $p < 0.01$) and two-sentence questions received fewer and slower responses. They also noted that explicitly scoped questions resulted in better response.

Hecht et al. tried to combine the benefits of SE and SNS searching in their system named *SearchBuddies* [18], a system that responds to Facebook status message questions with algorithmic search results. They proposed two agents—Investigator (search on SE), that connects people with information, and Social Butterfly (Search on SNS), that connects people with other people who may have the desired information. After deploying their 'Socially Embedded Search Engine' on 122 users for 3 months, they believed that it provides highly relevant information in a social context. Horowitz et al. [19] presented *Aardvark*, a social search engine by which users can ask through email, message, voice, etc. Then Aardvark forwards that question to find the answer from someone expert and within asker's network, depending on the intimacy between them.

None of these researches investigate the difference in question–answer behavior in different parts of the world. Yang et al. [20] 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.

3 The Divided World

The term ‘Digital Divide’ indicates the difference in technological advancement between the developed and developing/undeveloped parts of the world. Computers and other computing devices are essential commodities for the people in the developed region for the past two/three decades and their web presence is ubiquitous nowadays. Recent explosion in the smart phone usage has enabled virtually everyone to remain connected to Internet round the clock. Nearly all the governmental and business services have their information published and updated in the web. Traditional search engines in that respect are very effective in capturing the required information as it is already there in the Internet.

The scenario is quite opposite in the other parts of the world where the web culture has not flourished yet. If we focus on the Southeast Asia region as an example of the developing part of the world, we can see from UN survey 2010 [21] that the average e-Governance ranking of the 8 countries in this region is 134, way beyond the developed regions. According to Ref. [22], about 8–10% people in this region have access to Internet. Even that is after the growth of Internet users in recent years, and the overall web presence is not good yet. Many important governmental and nongovernmental institutions do not have their information in the web and often do not update their information regularly, if there is any.

The problem is twofold. First, people in this developing region cannot find the required information from the web using traditional search engines as it is beyond its capacity to show any result that is not already in the web. Second, as the Internet culture has not flourished yet, many people are not used to search information in the web, or do not know how to find the right information if there is a lot of different search results. Though the governments in these countries are trying to eradicate this digital divide, it is proved as not that easy. The world remains *divided* and probably will remain so for a long time from now.

4 The Unified SNS World

In this section we will investigate the interaction of people from these undeveloped countries in the Internet. We consider ‘Bangladesh’ as representative country from Southeast Asia to provide some data on this. Bangladesh is ranked 3rd among the 8 countries of this region in the e-government ranking. Despite the efforts of the government to provide e-services to its citizens, the web presence of different government and nongovernment institutions is quite low. Internet access is available to only 5 % 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 [22, 23].

There has been dispute regarding the total number of Internet users in Bangladesh. But despite the dissimilarity about the total number of Internet users from different online sources, it is noticeable that the ratio of the total number of Facebook users to Internet users from all the sources are close and roughly 43 % of the Internet users in Bangladesh use Facebook. If we compare this ratio with other countries in the world (Table 1), we can see that the ratio is good enough. A significant part of her Internet users are SNS user too.

This connectivity among the users has paved a new way for information gathering and sharing for the people of developing countries like Bangladesh. SE cannot give them the data that is not there in the web, but through SNS, their query can reach hundreds of the people of their acquaintance, and as Yang et al. [20] has already mentioned, they are traditionally encouraged to share their query with others. Through SNS, we can obtain information that others already know, and clarify information that we can find in the vast amount of data in the web. This is a unique opportunity for the people in these regions, which was never there before. Though it is not the end of ‘digital divide’ mentioned earlier, but we are getting a bit closer to unify the world in terms of information searching and retrieval capacity.

Table 1 Internet and Facebook usage analysis (All figures are in millions or percentage)

Country	Population	Internet user	Ratio with population (%)	Facebook user	Ratio with internet user (%)
Australia	22.8	17.9	78.3	11.7	65.7
USA	314.8	243.8	77.4	168.6	69.2
UK	62.3	51.2	82.2	33.8	66.0
Nepal	26.6	2.7	10.3	1.9	69.2
India	1210.2	125.0	10.3	60.6	48.5
Pakistan	181.3	15.9	8.8	7.6	47.7
Sri Lanka	20.3	3.2	15.6	1.5	46.2
Bangladesh	152.5	7.5	4.9	3.2	42.6

5 Experimental Data

Our data collection process had three phases. In the first part, we made a request for volunteers through our research group, from which we selected 10 enthusiastic participants from two universities in Bangladesh. All our participants had more than 150 friends in their Facebook profile (average 270) and uses Facebook regularly in their day-to-day life. Our participants had many of their friends in common, as they belonged to different levels in two institutes. In total, we could observe 1362 unique Facebook profiles through these 10 volunteers.

The volunteers were instructed about the data collecting process. They monitored the data stream in their Facebook home pages *passively* for questions asked through status posts and recorded those status posts with responses after a couple of days of making that post. This was required as Facebook does not show the exact time stamp of the comments after a few hours of making the original post. We collected data for about 8 weeks and received 880 of such queries. Then we analyzed those questions according to the categories mentioned by Morris et al. [13]. We tried to search answers for those questions using traditional search engines and compared them with the answers obtained from Facebook. We are still gathering more data, so the explanation provided in this section are not claimed as complete. But it should give some indication, emphasize our logic, and provide future directions for work.

We analyzed each of our 880 data sheets and summarized it into a table, which was then imported to a relational database management system (DBMS). We applied different sql techniques to compute the statistical mean, variance, z -score, p -value, and chi-square tests. We will present these data along with their implications in the following sections. We compared our results with that obtained by Morris et al. [13]. The survey participants in Morris et al. [13] were all employees at Microsoft, 72.8 % full time and the remaining were university students working as summer interns. Male and female ratio was 3:1, 68.1 % of their respondents were aged between 18 and 35 years.

In our second phase, we choose 10 participants using our already collected data. Five of them have asked at least one question in the past one month, while the rest have responded to at least one query made in Facebook during that period. We tried to investigate the motivation behind using social network as an information source and the inspiration that worked behind answering in it. Our interview data strongly supported our previous findings and also supported the findings made by Morris et al. [13]. In the third phase, we conducted a structured survey with students of some private and public universities in Bangladesh and analyzed those data.

Table 2 shows some analyses of our obtained data. The data has good similarities with the data obtained by others. Specially, like Yang et al. [20], our data also indicates that people in the eastern culture asks less subjective queries than people in the western countries. However, unlike many other works, our study shown later finds that significant part of the queries is related to finding factual information. When we analyzed the queries of such kind, we could understand the reason. Though these questions are objective and have definite answers, the users could not find the

Table 2 Question types and response analysis

Question type	Average first response (min)	Average total response	Appropriate answer	Time required to search through SE
Recommendation	8.5	6.2	Choice with reason	About 30 min searching
Opinion	4.7	9.5	No defined answer	No defined answer
Factual knowledge	7	6.9	Accurate in the 91.3 % cases, the rest are unanswered	No information for 56.5 % queries, about 5 min for others
Rhetorical	5	12	Not applicable	Not applicable
Invitation	4.2	15.5	Min. 1 positive reply	Not applicable
Favor	5.1	7.1	Min. 1 positive reply	Not applicable
Social connection	5	15	Yes	SE were not suitable
Offer	4.3	8.2	Yes	Not applicable

information in the web, and thus turning to SNS was the only option, aside contacting specific persons for it. As indicated by Morris et al. [9], people often do a Google search before asking anything through SNS, probably this was the case with our queries too. But the ratio of such queries is quite high in this region and considering the fact that web culture here has not expanded that much, it was somewhat expected.

When we analyze and compare our question types with that in Morris et al. [13] in Table 3, we can understand the validity of our claim. The queries asking about factual information comprises of the highest portion in our collected data, also supported by its high *z*-value (1.561). We can also see that there are significant differences in the

Table 3 Comparison in question type analysis with Morris et al. [13]

Question type	Percentage in Morris et al. [13]	Percentage in our data	<i>z</i> -score
Recommendation	29	7	-0.663
Opinion	22	20	0.914
Factual knowledge	17	25	1.561
Rhetorical	14	12	-0.042
Invitation	9	3	-1.128
Favor	4	18	0.605
Social connection	3	13	0.036
Offer	1	2	-1.284

Table 4 Comparison in question topic analysis with Morris et al. [13]

Question topic	Percentage in Morris et al. [13]	Percentage in our data	z-score
Technology	29	24	1.675
Entertainment	17	24	1.624
Home and Family	12	13	0.363
Professional	11	11	0.105
Places	8	5	-0.641
Restaurants	6	0	-1.182
Current events	5	11	0.105
Shopping	5	2	-1.001
Ethics and Philosophy	2	6	-0.383
Miscellaneous	-	4	-0.666

ratio at which people seek information regarding recommendation, invitation, favor, and social connection—supporting the arguments presented by Yang et al. [20]. A chi-square test value of 32.8 for $\alpha = 0.05$, which is far above the expected value of 14.067 also supports that our hypothesis is correct.

The question topics shows more similarity when we compare it with Morris et al. [13] indicating that people here face similar sort of queries in their daily life like their western counterparts. From Table 4 we can see that in most categories, our data shows considerable similarity with the data gathered by Morris et al. [13]. This observation is also supported by the chi-square test value of 14.4, which is less than 15.507 (from chi-square table) for $\alpha = 0.05$.

Then we have analyzed our data to identify if the factual queries posted by the people around us can actually be answered by searching in traditional search engines. We found that answers to 79.57% of such queries cannot be found through SE, whereas 69.79% of them got satisfactory answer through Facebook. Our analysis shows that 90.43% queries got at least one answer and 20.64% gets answer which might not be adequate or are unsatisfactory.

There are many queries on different topics that we could not find specific answer in the web. Some examples were like “When is the next performance by Shiron-amhin/James?” (two popular bands in Bangladesh). In the developed countries, we can expect that the music providers keep record of their future events and update it frequently. But here in Bangladesh, we could not find any specific site maintained by them. But when people asked it in Facebook, they got the information almost instantly (within 5 min).

Fig. 1 Example of question–answer in Facebook. Here a nontrivial question is asked that provoked discussion and important suggestions for the asker. Also the question was set in the local context where people from that locality could use their daily experience in replying to it



Another of the interesting queries and responses was about the traffic situation in a particular day. A person was on a very tight schedule to attend a workshop in Dhaka, Bangladesh. He was supposed to land in Dhaka Airport at 8:00 am, and his speech was scheduled at 10:00 am in front of the government dignitaries. So he was asking people in this locality about possible real-life traffic scenario during that time, describing the challenge he has to face. This kind of traffic information for Bangladesh is not available through Google map or any other service. But his friends could make valuable comments (Fig. 1), including an effective suggestion to get a front row seat while taking boarding pass, so that the queue in front of him in the immigration remains small. During interview, he pointed that this is one of the reason he prefers to ask such questions in Facebook as it may show unorthodox but unexpectedly useful solutions.

Another interesting query we find was about “Does xx University publish any journal?” Using Internet, we were able to find three journals published from that university. But in Facebook, the comments contained information about six journals. We contacted the relevant departments to verify that the information from those Facebook comments were accurate indeed. Those journals being local hard copy only had no online presence, and thus quite hard to find using search engines (Fig. 2).

Fig. 2 Another example of question-answer in Facebook. This is one of the examples showing that not all person has the same skill for searching in the web. So the information, though available in the web and could be found using search engines, the question setter was not able to do that (mentioned in the 3rd comment)



Local information is another kind of information that people seemed to seek through SNS. Queries like “Has there been any accident in xx Road?”, “Do we have class test tomorrow?”, “What movies are now showing in xx cinema hall?”, etc., are such examples. These queries are answered promptly by friends in the SNS, but we could not find answers to them through searching the web (Fig. 3).

We also analyzed the response time of queries asked through SNS. We analyzed the queries and responses to record the time required for first response and for obtaining sufficient or satisfactory response. Both of these two data showed similar pattern. More than 40 % of the queries got some response before 20 min and about 70 % got the first response before 100 min had elapsed (Fig. 4). It also shows that queries that had not got the response by 10h have very low chance of getting it later. The analysis data for reasonable response time shows similar pattern too (Fig. 5) with majority of the queries getting expected response by 2h.



Fig. 3 Another example of question–answer in Facebook. The question was asked in Bangla, written using English alphabets in phonetic form. It asked about the price and availability of micro SIM cutter in a local market

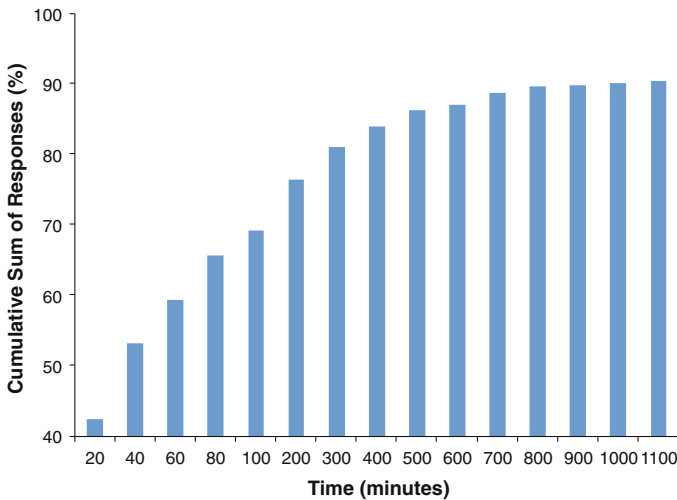


Fig. 4 Cumulative first response time versus time

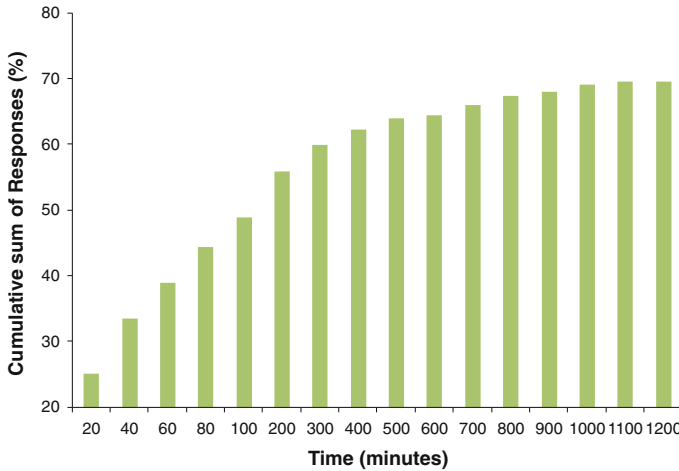


Fig. 5 Cumulative reasonable response time versus time

6 Interview Data

Ten participants were selected through personal connection with the researchers, each being a Facebook friend of at least one of us. Five of them have asked at least one question that we used in the first part of the study and five of them answered at least once. The interviews took place at a time and place convenient for the participants. We took shorthand notes during the interviews, which were then shown to the participants with no significant objection received. All the transcript of interviews and researcher notes was coded based on grounded theory approach, in order to find the main themes. In this section, we present a qualitative analysis of these interviews along with the main themes we found.

6.1 Local Information Is Limited

A lot of the queries analyzed in the previous section have some local origin, as emphasized by the amount of questions related to factual information and current events. When we asked our participants about why they have chosen Facebook to ask the questions, all of them agreed to the fact that traditional search engines do not satisfy many of their queries. While dealing with objective questions, they usually go through Google first. When they cannot find the information there, or are uncertain about the validity of it, they turn to Facebook to get the answer.

When I could not find it in the web sites, I was not worried much. I have more than 400 friends in Facebook. Some of them must know it.

This firm believe on the social connection is seen in many cases. Even in the face of an emergency, when one of our participants needed to contact an army base station to know the whereabouts of her dear ones and found that the contact number provided in their web sites are not updated, she did not lose hurt. She went for help through her social network saying it was urgent and got the correct phone number within minutes. It provided her additional benefits too, as identified later in this section. Later she recalled,

At some point, I was quite at a loss about what to do. Then I thought, many people among my Facebook friends are related to military services. Some of them should know the updated phone number, and it worked!

This faith on the availability of information from the social network has shown some issues too, discussed in the next section. In general, SNS has shown itself to work fine as an alternative source for local information, which is often either not available, or not updated regularly in Bangladesh.

6.2 Over Dependency on SNS

A person made a query about the location of the service center of a particular mobile operator. He got prompt reply from his friends. That information was available in the web and could be found easily. In fact, his friends have searched it for him and gave him the answer. When we asked him about it, he told us that this information was not urgent for him, and as he passes a lot of time using Facebook, he just made a post in the hope that someone may know it personally. He did not expect that this information is already available in the web and can be searched for. This shows that there is a gap in understanding the flourish of web technology in this region and often people are not aware what have changed around them in the past decade.

This has been a challenge for developing e-Services in developing countries like Bangladesh. The e-Services produced by the Government are used by too few people to make it a success. Identified by earlier research [24], though the Government in investing much resource and efforts in developing e-Services, many of its populace are not aware of these services and they do not believe that the computerized services are easier than previous systems. So in almost all cases, the Government is forced to keep both the legacy system and present e-Services, causing much more expense than earlier days.

It is relatively easy to get the answer from SNS, and we have seen a lot of people doing so despite the availability of information in the web. Their friends did provide the answer out of good gesture, but one of our participants got rebuked by his teacher.

I got the answer, with a warning to Google it before I ask the community. But it was from my teacher, you know.

6.3 Motivation Behind Replying

Strong ties like close friends, work peers, neighbors are more encouraged to reply to queries in Facebook, supporting the earlier research works. Another important motivation for replying is to make a positive introduction of oneself to the asker. People are often more motivated to answer the queries made by their seniors, or someone with which they want a more positive relation with. And of course people often do it selflessly for a friend, or to show others about his expertise in the relevant topic. It is in the nature of human beings to help others, and that will remain as the driving force behind the success of SNS search.

There has been many research works that emphasized on the identification of expertise among the friend base to direct any social query. But we should remember that tie strength plays a major role in social networking sites as well as real social life. All ‘friendships’ are not equal, hence any algorithm to exploit this friend base in SNS will require to fine-tune the balance between social tie and expertise to effectively spread the query.

6.4 Social Connection Is Far More Significant Than Search Results

People I know are so supportive and caring; not only I got the answer to my query, many of my friends later inquired about the wellbeing of my mother during the next weeks.

Answers to our queries are important of course. But the side effect of posting some queries often provide unique social resources and benefits, which we find is far reaching the expectations of the asker. For example, one of our participants asked for recommendation about some dentists in his locality. What happened next was well above his expectations. He obtained several name and addresses within the hour, of course, but there were a lot of people making queries about his well being too. When he confirmed that he is looking for a dentist for his mother, he obtained a lot of social support from his Facebook friends (many of which are his offline friends too).

Another of our participants jocularly made a point:

Google provide me answers; Facebook provided me food, lodging, and company of a close friend during my visit to USA. Now, it is something hard to beat by a search engine.

He happened to go through Hong Kong in transit to his final destination in USA. He felt confused after reading the requirements for a transit visa. He sought the help of his friends who had similar experience. After some discussion in that thread, he came to know the real requirements and alternate scenarios. Then, from that post, some of his friends living in USA got to know that he is going to visit near their place and invited him to stay with him during the visit. Finally, he had a pleasant visit in addition to obtaining the information he required to know.

Similar things were observed with another participant asking for contact number in case of an emergency. Many friends came to know about her personal events from her social network and provided much needed emotional support.

We can consider another case of social empathy and support. When one of our participants burned an electrical equipment in his home and tried to figure out what electronic part he has burned in the circuit board, he uploaded a picture of it with his question. He asked, “The blue thing, is that an inductor?” The first reply came within seconds said, “that’s the blue pill which keeps you in this matrix” (alluding to the famous movie ‘The Matrix’). Despite his misfortunes, he could not resist the humor.

I was badly looking for the answer, yet the first reply got me off-guard, and I could hardly stop laughing.

The requirement of considering social media question asking (SMQA) as a ‘social’ process, where the social connections play a much bigger role than being merely an information source is emphasized both in our experimental data and interviews.

6.5 Stray Discussions

Not all queries were fruitful. Some often provoked discussion in quite unwanted ways. When one of our participants asked for companion to some work, the discussion went astray. It ended in some political squabble, loosely related to that particular work. Though he did not take this matter seriously, saying “The discussion went to a different direction, but enjoyable anyways,” because all who made comments are his friends, it shows some unexpected potential danger in exploiting social media for everyday queries.

6.6 Challenge in Contextual Interpretation

All the existing systems (for example, [18]) designed to provide automated answers in social media has largely failed due to contextual misinterpretation, providing irrelevant links as the answer. One big reason behind this discrepancy is the incomplete information provided in the query, which is often understood by the people from implicit contextual information or previous knowledge about the asker. One example we considered is this, where the asker posted: “Is there any place to get Starbucks coffee in Dhaka?” People came to understand immediately that he is not asking about Starbucks coffee outlet, because there is not any in Dhaka, the capital of Bangladesh. They interpreted the query that he is looking for Starbucks coffee beans rather than the brand outlet and answered accordingly. There were many such examples providing partial or very little information, specially about local or current events, thus making the interpretation of context very challenging.

7 Survey on SNS Q/A Usage

We have also conducted a structured survey on students from different private and public universities in Bangladesh to understand the use of SNS in getting information. These people constitute a significant portion of the populace that use social networks and other technological tools. The results show interesting opinions about SNS Q/A behavior. We have conducted both online and offline survey using the same questionnaire in English, which can be found in Ref. [25].

We have collected 328 responses in total, all of which are undergraduate level students. 93% of our participants are from the age group of 18–24 years. The male–female ratio was not equal, 78% being male. This is the common and expected ratio of male and female students in the undergraduate level in Bangladesh. 98% 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. However, these population does not represent all the Facebook users of Bangladesh, and the following analysis is not conclusive to be generalized, but will provide a good indication of the subject matter.

Almost all of our participants (99.1%) have their own Facebook account and majority of them are using it for more than 2 years (Fig. 6). Majority of them have about 201–500 friends in Facebook (Fig. 7). When asked about how frequently they update their Facebook status (Fig. 8), most of them said they hardly update their status (64%) or less than 3 times per week (22%). 73.8% of our participants have asked some question or opinion through Facebook, 23.5% have never used Facebook for the purpose and 2.7% of the participants did not reply to that question.

It appears from Fig. 9 that posting queries through Facebook is not a part of its day-to-day usage for the participants as majority of them (52%) hardly post any question through Facebook and 25% of them post less than three questions per week. However, the response time for queries posted in Facebook is quite good, as emphasized in Figs. 10 and 11. This phenomenon is elaborated in more details in later parts of our survey. We can see that more than 50% of the participants expect to

Fig. 6 Percentage of Facebook usage period

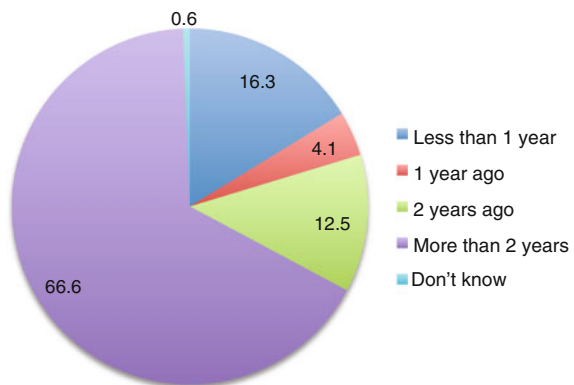


Fig. 7 Number of Facebook friends

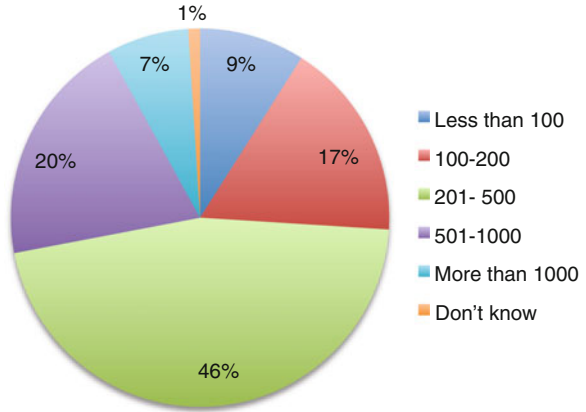


Fig. 8 Facebook status update (per week) statistics

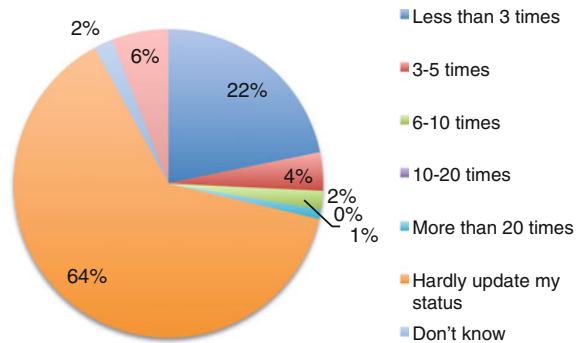
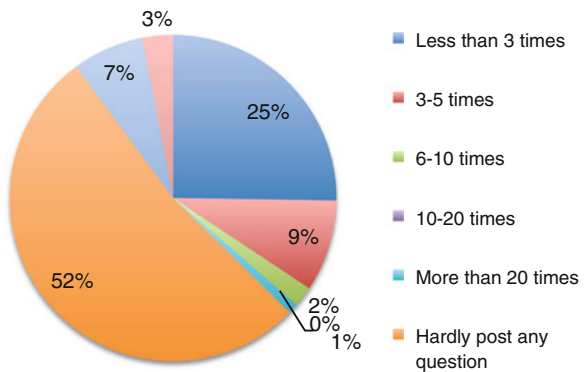


Fig. 9 Frequency of posting query in Facebook



get the first response for their query by 10 min only. When asked about the amount of time to obtain a satisfactory response, majority of the responses (28 %) were that ‘I do not remember’ and about 45 % of them get satisfied with the responses obtained within 30 min of making their query.

Fig. 10 First response time for the queries

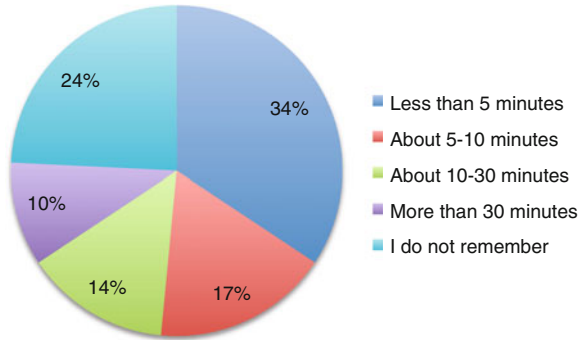


Fig. 11 Satisfactory response time for the queries

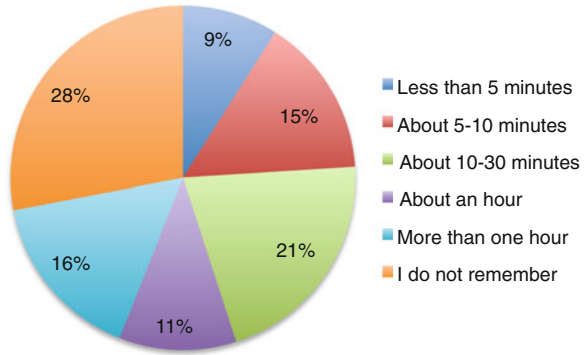
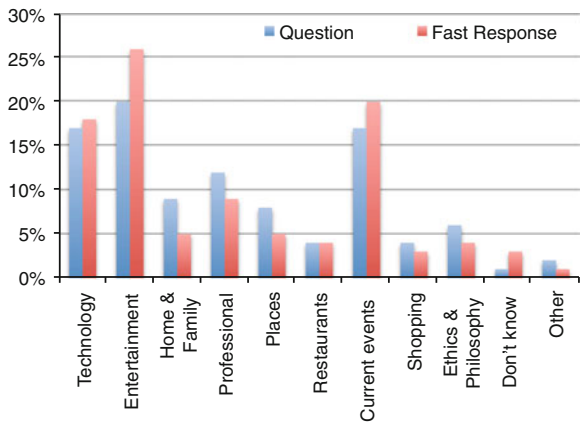


Fig. 12 Question topic and response preference



We also asked about the topics they post questions about. Three major areas are technology, entertainment, and current events (Fig. 12). They are also the topics where they get quick answers from their friends, as depicted in Fig. 12 too. About 67% of the people 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. 14).

Fig. 13 Rating of the responses received

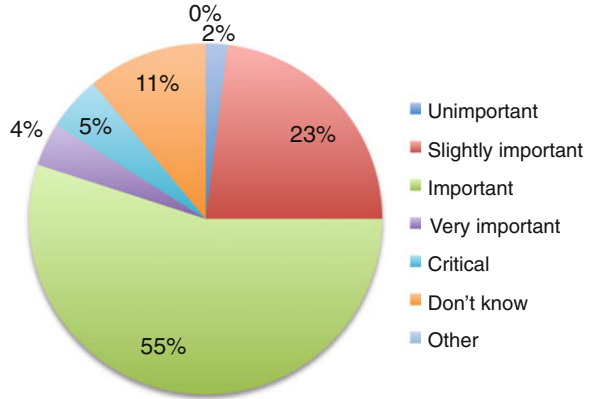
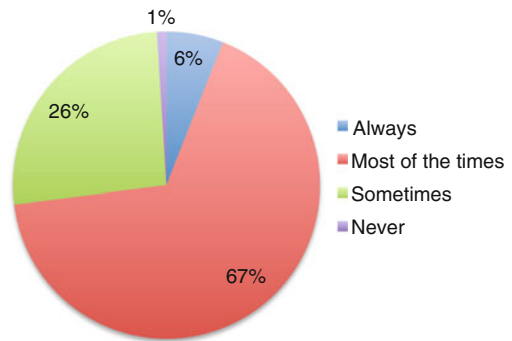


Fig. 14 Ratio of satisfactory response

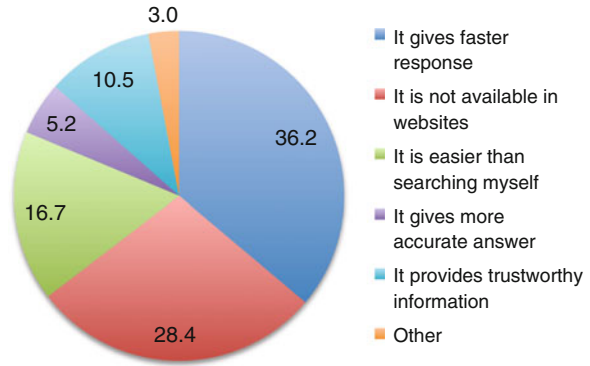


Again, majority of the participants (55%) rate the answer they get from their friends as *important* (Fig. 13). 52% of the participants said that they also have obtained valuable information *many times* from the questions other people posted, whereas 35% have said ‘a few times’ for the same.

When asked about the reason behind posting questions in Facebook, the most popular two reasons came out as ‘it gives faster response’ and ‘it is not available in websites’ (Fig. 15). Other popular options were that it is easier than searching and we can get more trustworthy answers from our friends.

Then we tried to compare the results people get from SNS and traditional search engines. Though 30% of the participants agreed that both of them provide similar results, 47% of them are not so sure about it and said that the results might differ 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. At the first sight, this data seemed contradictory to our original understandings that people use Facebook for informational purposes a lot more than that. However, our

Fig. 15 Reason behind using Q/A in Facebook



survey population is the university students, most of them use computing devices for many tasks during their everyday life. So, they are constant users of the search engines, and considering the overwhelming number of queries they make during the whole day, these ratios are probably not misleading. 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. 16).

To understand the advantage of SNS over SE, or vice versa, 27 % people think that Google enjoys the advantage that it can crawl a vast amount of data that is far beyond the capacity of human being. But Facebook queries are more tailored to my needs as our friends understands the context of the question (35 %) and through Facebook we can get the information that is available not in the web (34 %) —both factors strengthening Facebook as an information source.

Most of the people response to a query they see, at least ‘sometimes’ (Fig. 17). The main motivation is being helpful to others (Fig. 18). To assist others in their friend list, 49 % of the people often do a search themselves to provide an answer,

Fig. 16 Actions when no satisfactory answer is obtained from SNS

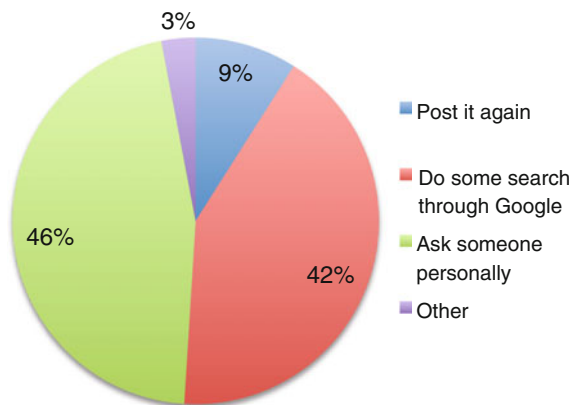


Fig. 17 Response to others' queries

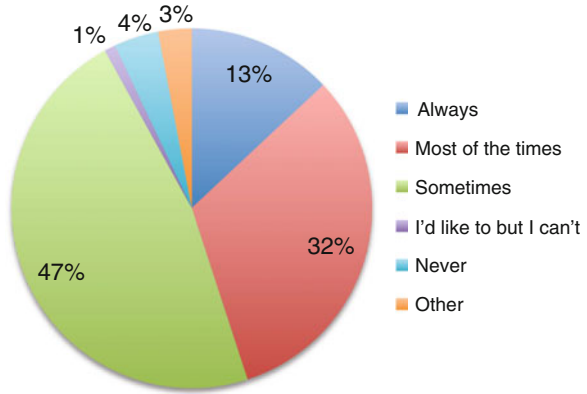
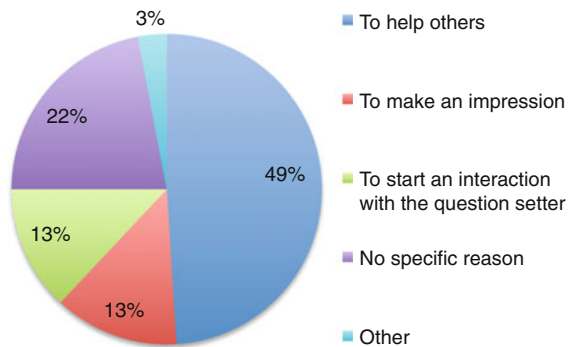


Fig. 18 Motivation behind responding to others' queries



while 24% said that they ask another friend personally to know the answer and let the asker know about it.

8 Interrelation Among the Parameters

We used chi-square test of independence to find out interdependencies among different parameters based on demographics and SNS usage pattern (Table 5). Most of the tests 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, specially 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

Table 5 Chi-Square test of independence on SNS question asking and answering behavior

Null hypothesis	Independent of–	Dependent?	Comment
Type of Question	Time to get first response	No	
	Time to get satisfactory response	No	
Gender	Time to get first response	No	
	Time to get satisfactory response	No	
	Type of question asked	No	
Length of Facebook use	Time to get first response	No	
	Time to get satisfactory response	No	
	Importance of Facebook as information source	No	
	Number of query update in search engine	Yes	People who uses Facebook longer are likely to modify their query and search again
	Preferred source for information search	Yes	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
Number of friends	Type of questions asked	No	
	Time to get first response	Yes	First response time decreases slightly with the increase in number of friends
	Time to get satisfactory response	No	
	Importance of Facebook as information source	No	
	Number of query update in search	Yes	People who have more friends modify their query more than others
Frequency of status update	Preferred source for information search	Yes	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
	Time to get first response	No	
	Time to get satisfactory response	No	
update	Importance of Facebook as information source	No	

(continued)

Table 5 (continued)

Null hypothesis	Independent of–	Dependent?	Comment
Frequency of posting questions	Time to get first response	Yes	Frequent askers get response quickly
	Time to get satisfactory response	No	
	Importance of Facebook as information source	No	
	Type of questions asked	Yes	People who ‘Hardly post any question’ asks about ‘current event’ or ‘entertainment’ more than others
Response to others’ questions	Importance of Facebook as information source	No	
	Preferred source for information search	Yes	People who always reply to others choose Facebook, but who ‘sometimes’ response to others choose Google more

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 responses to others’ queries ‘most of the times’ or ‘sometimes’ choose ‘both Facebook and Google’ as their preferred information source.

9 Design Implications

Combining the strength of SNS and SE is an ongoing research topic with yet any good usable solution to appear. Designing such a solution has many challenges and requires accurate understandings of the users' demands from these systems along with their responses to them. There has been very few works about cross-cultural studies on this topic, and our research emphasizes the importance of it before developing any successful platform to combine SE and SNS.

First of all, any such system needs to be aware of the cultural differences across the globe; it should not assume that one shoe fits all. Challenges of information validation in the underdeveloped regions will be of great importance due to lack of available information in the web. Depending on the friend base of a person also poses challenges, the issues of strong and weak ties need to be investigated and understood well. And the *Dunbar Number* phenomenon comes into consideration, as our study shows that having higher number of friends does not ensure quicker response. So randomly selecting from the friend list may not work as expected. The complex interpersonal relationship and ties need to be understood for making it a success.

One novel finding of our research is that question topics in different cultures and regions of the world do not vary much, indicating that people all over the world have similar queries in their day-to-day life and search for answers. However, question types vary significantly and anyone designing for SNS search applications may require keeping that in mind. We also identified the challenges in contextual interpretation of questions in social media, requiring nontrivial mechanisms for developing automated response systems in social media question asking.

10 Conclusion

In this work, we have focused on differences of the SNS searching habits in different regions of the world based on their economic context. We showed that the motivation for SNS search in developing regions could be quite different than in the developed parts. The lack of information availability has played a major role in peoples' turning to SNS to get answer than from traditional search engines. Whether other factors like culture, religion, etc., play a significant role alongside these factors remain as a major research challenge. We are now working on developing a Facebook app using this information that will assist the users to obtain real-life information from Facebook in a better way than now.

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