Developing a Typology of Online Q&A Models and Recommending the Right Model for Each Question Type

Erik Choi, Vanessa Kitzie, Chirag Shah
School of Communication & Information (SC&I), Rutgers, The State University of New Jersey
4 Huntington St, New Brunswick, NJ 08901
erikchoi@gmail.com, vkitzie@gmail.com, chirags@rutgers.edu

ABSTRACT

Although online Q&A services have increased in popularity, the field lacks a comprehensive typology to classify different kinds of services into model types. This poster categorizes online Q&A services into four model types – community-based, collaborative, expert-based, and social. Drawing such a distinction between online Q&A models provides an overview for how these different types of online Q&A models differ from each other and suggests implications for mitigating weaknesses and bolstering strengths of each model based on the types of questions that are addressed within each. To demonstrate differences among these models an appropriate service was selected for each of them. Then, 500 questions were collected and analyzed for each of these services to classify question types into four categories – information-seeking, advice-seeking, opinion-seeking, and non-information seeking. The findings suggest that information-seeking questions appear to be more suitable in either a collaborative Q&A environment or an expert-based Q&A environment, while opinion-seeking questions are more common in community-based Q&A. Social Q&A, on the other hand, provides an active forum for either seeking personal advice or seeking non-information related to either self-expression or self-promotion.

Keywords

Online Q&A; Community-based Q&A; Collaborative Q&A; Expert-based Q&A; Social Q&A; Question type.

INTRODUCTION

From the early 2000s on, online Q&A services have become popular on the Web. According to the Hitwise report, there was an 889 percent increase in the U.S visits to online Q&A services between 2006 and 2008 [14]. Q&A services provide outlets for information retrieval where the users' information need is formed by natural language questions posed to a community whose members can answer the question or even offer feedback on the given responses, resulting in a personalized set of answers generated via the collective wisdom of many [3]. Due to the popularity of online Q&A services as an information-seeking method and availability of data from them, a rich body of research exists that generally utilizes research data sourced from one or two services to study a variety of topics, both from content-based (e.g., determinants of answer quality) and user-based (e.g., information-seeking behaviors) perspectives [13]. Despite the fast growth of Q&A services, there is a lack of research on providing a typology to classify online Q&A services into different model types and then comparing how these models differ from one another. The present poster addresses this important gap.

This poster will suggest a general typology of four distinct service models, with a description of the user behavior and content cultivated within each. A description of the types of questions posed within these different models will follow. Finally, a discussion of findings that possibly recommend the right online Q&A model to a given question type will conclude the paper.

PROPOSAL FOR ONLINE Q&A MODELS

To understand differences among various online Q&A services, they were investigated for their characteristics as well as how they are studied in the literature, resulting in the following proposal that divide them into four models.

A community-based Q&A model

A community-based Q&A model, sometimes referred to as a knowledge exchange community [1], constitutes a user-driven environment in which people searching for a personalized answer to an information need post various types of questions to the Q&A community. It consists of three components: (1) a mechanism for information seekers to submit questions in natural language, (2) answerers or responders who actively submit answers to questions, and (3) a community built around this exchange [12]. Most community-based Q&A models also archive question-answer pairs and make them publicly available to allow people to search these pairs and avoid duplicating previously asked questions and answers, saving time and effort for users [3].

Users' question-answering activities are driven by a variety of motivations within community-based Q&A. The study by [10] found that the most influential factor that motivated people to help others to satisfy information needs was altruism. Similar to her findings, [9] also find that altruism, as well as learning, and competency were reported to be the most frequent motivational factors question-answering in a community-based Q&A model. Moreover, this model encourages users to participate in various activities not only by asking and answering, but also by commenting on questions and answers, rating the quality of the answers, and voting for the best answers [6].

A collaborative Q&A model

Unlike a community-based Q&A model where every question-answer pair is separately located in an archived thread list, collaborative Q&A services facilitate the ability to edit and improve the phrasing of a question and/or the answer to a given question over time via user collaboration. An example of a collaborative Q&A service is WikiAnswers, which allow the users to rephrase existing questions and answers in order to best address information needs. Similar to a community-based Q&A model, WikiAnswers also prevents duplicate question that already exist in the system by displaying a list of similar questions that have already been asked on the site [2].

An expert-based Q&A model

As in the first two online Q&A models, an expert-based Q&A service allows users to ask questions and get direct responses from others. However, in this service, answers are provided by the group of experts, rather than an open community. Many services include pricing systems, referred to as a price-based knowledge market [4] for the various ranges of payment the answerer receives from the user based on the latter's perceived value of the answer; another factor that differentiates these types of sites from the other models (i.e., Google Answers' payments ranged from $2 to $200 with a non-refundable listing fee of $0.50). However, other expert-based Q&A models such as AllExperts allow an expert to voluntarily join the system and provide answers to questions based on his or her self-identified expertise. The Internet Public Library (IPL), an asynchronous digital reference service [11] can also be characterized as an expert-based Q&A model, since an expert, in this case a reference librarian, interacts with users to resolve information needs.

A social Q&A model

A social Q&A model utilizes the features of users' social networking sites to facilitate information inquiries by providing the opportunity to ask questions to friends or acquaintances within a social network. Arguably, social Q&A services share many of the same characteristics as community-based services with a few key differences. For example, according to [7] who studied users who post questions to social networking sites (e.g., Facebook, Twitter) not only does the user most likely trust the information source, since it is someone from his or her personal network, but also the information received is personalized based on the answerers' knowledge of the user.

STUDY: ANALYZING QUESTIONS TYPES AMONG FOUR ONLINE Q&A MODELS

Data Collection

In this study, four different services were investigated, one from each model – Yahoo! Answers, a community-based Q&A model; WikiAnswers, a collaborative Q&A model; the Internet Public Library (IPL), an expert-based Q&A model; and Twitter, a social Q&A model. From each site 500 questions were collected for a total of 2,000 questions in order to investigate which types of questions were posed to each service.

Coding

To classify question types among the four online Q&A models, a coding scheme was created using the previous research by [5]. Table 1 illustrates types of questions with an example for each. Information seeking questions solicit factual knowledge that presents the user with a limited amount of possible answers; advice-seeking questions seek assistance and/or instruction from other users, often based on personal experience; opinion-seeking questions most likely constitute an open-end question that solicits others' ideas, recommendations, and/or personal thoughts; and non-information seeking questions are less likely to seek answers than to express thoughts, invite other users to events, or socially/professionally connect others for networking.

A team of coders conducted content analysis for 2,000 collected questions to classify questions posed in each online Q&A model. Coders first coded 20% of the overall data set to ensure coding consistency throughout the process. Final coding agreement ranged from 90%-93% across the four models with the lowest agreement for expert-based Q&A and social Q&A, both at 90%.

Question Type	Example
Information-Seeking	How many sports and events are in the Olympic?
Advice-Seeking	How can we take payday loan at Christmas?
Opinion-Seeking	Coke or Pepsi?
Non-information-Seeking	Why are some people so negative when you being positive?

Table 1. Example of each question type.

Results

The distributions of frequencies for each type of question among the four online Q&A models were significantly different (χ^2=1593.404, df=9, p<0.001). This indicates that there is an observed disparity between the frequencies of types of questions posed to each of the Q&A models, suggesting that question types varied based on the service.

Overall, the specific distribution of these questions within the four different online Q&A models can be seen in Table 2. Given the same amount of questions for each model, the most significant distribution of information-seeking questions takes place in an expert-based Q&A model (n=436, 87.2%), followed by a collaborative Q&A model (n=253, 50.6%). For opinion-seeking questions, a community-based online Q&A model (n=250, 50%) and a social Q&A model (n=170, 34%) are the places where questions that that seek a more open-ended response that solicits thoughts, ideas, or recommendations are frequently distributed. The results also show that the number of advice-seeking questions is fairly equal in a community-based online Q&A model (n=204, 40.8%) and a collaborative Q&A model (n=192, 38.4%), Social Q&A models generate the highest number of non-information seeking questions (n=218, 43.6%), and users use this Q&A platform to express their thoughts, invite others to events, or even promote products or events.

Online Q&A Model	Information seeking	Advice seeking	Opinion seeking	Non-information seeking
Community	35 (7%)	204 (40.8%)	250 (50 %)	10 (2%)
Collaborative	253 (50.6%)	192 (38.4%)	55 (11%)	0 (0%)
Expert	436 (87.2%)	34 (6.8%)	30 (6%)	0 (0%)
Social	86 (17.2%)	170 (34%)	26 (5.2%)	218 (43.6%)

Table 2. Distribution of question types among four online Q&A models.

DISCUSSION

The observed prevalence of information-seeking questions within both expert-based and collaborative models indicates that users must have significant motivation influencing this use. Although further study needs to be completed to determine what these motivating factors could be, one observed commonality between both models is they facilitate communication between the asker and answerer(s) to extract contextual cues to formulate the best possible response. By encouraging this form of asynchronous reference interviews, perhaps these models encourage asking of fact-based questions since the impetus of these models is to formulate a good search to extract relevant information that is also curated for quality, either via expert opinion or collaborative input from the community. In addition, the prevalence of these questions posed to an expert-based and collaborative model also suggests a certain motivation among the askers to post information-seeking question types to these services. Therefore, these findings suggest that if the user's needs are relatively related to the intent of getting objective information or facts from others, a collaborative Q&A model and an expert-based Q&A model may provide a higher chance to get the questions resolved.

On the other hand, if someone is looking for other users' thoughts, ideas, or recommendations rather than objective information or facts, the findings suggest that people may visit either a community-based Q&A model or social networking sites to satisfy needs. A community-based Q&A model and a social Q&A model derive a variety of responses from other users. In this instance, soliciting others' opinions, recommendations, or personal thoughts in these models may be a more relevant option than collaborative or expert-based models because opinion-seeking questions may generate more than one response from the users, whereas information-seeking questions may only require interaction with one or a few answerers to resolve information needs.

This study also finds that for advice-seeking questions, most online Q&A models, with the exception of an expert-based online Q&A model (n=204, 40.8% for a community-based model; n=192, 38.4% for a collaborative model; n=86, 17.2% for a social model) may constitute an appropriate means through which to ask advice-seeking questions. Further study is necessary to determine whether actual satisfaction with answers to these types of questions differs among the platforms.

Another interesting finding is that some information-seeking questions in the social Q&A model look for personal information or facts about other users rather than the general factual knowledge (e.g., "What is your Zodiac sign?"). These questions might be prevalent within a social Q&A environment since it encourages social interaction, while simultaneously curating answer content; therefore providing an environment, which encourages a hybridity of social interaction with reference-based resources. Future studies may look the motivations for asking information-seeking questions soliciting personal information in a social Q&A environment.

Moreover, in a social Q&A model, some non-information seeking questions are related to either self-expression or self-promotion. For self-expression questions, the finding may reflect that 80% of Twitter users represent the "Meformer" archetype, who posts messages about themselves or their thoughts [8]. Compared to other types of online Q&A models, it seems that people in a social Q&A model tend to question themselves to express their ideas, opinions, or thoughts without expectations of which other users respond back to their messages. And, for self-promotion questions, it shows that it may be prevalent among organizations to attempt to utilize social media for promotional giveaways or new product announcements (e.g., "Are you looking for something fun to do in NYC on June 4th?! Join me, Jessica Ortner, Erin Stutland, and Alisa... http://fb.me/14spzBvRq"). Therefore, the findings may suggest that if people intend to post a question as a way to either express their thoughts or promote events/products, a social Q&A model is the most appropriate place to do so.

CONCLUSION

In this study, an attempt was made to categorize online Q&A services into four models – a community-based model, a collaborative model, an expert-based model, and a social model by identifying unique characteristics and features of each for satisfying the users' information needs. The study then classified questions posed in four different online Q&A services to determine whether the content differed between each model. It was found that significant differences existed in the distribution of question content among each model. The importance of this work is twofold. First, identifying different types of online Q&A services may be the primary step in establishing a general agreement of classification that can be used in current and future research. Such a framework will ameliorate the current lack of coherence existing in the literature when labeling distinct services owing to unclear boundaries between them. This work also constitutes a necessary step in improving services within each model by identifying the relative strengths and weaknesses of each model in order to pinpoint how services within each could become better integrated. Such findings can lead to several inferences from both a user and content-based perspective. For the former, which kinds of users ask a certain question type and/or employ one type of online Q&A service over another? For the latter, can the propensity of question failure rate be reduced simply by deploying a recommendation system based on self-identified question type?

Future research directions should address more specifically the strengths and weaknesses of these online Q&A models to assess the viability of each for addressing different types of questions. Another research direction based on the findings could be to observe frequencies of participants per question set within each model. Based on the findings it would be expected that community-based and social services would have a higher frequency of unique answerers to each question than expert-based and collaborative services, which may rely on only one to a few individuals with advanced knowledge to derive a genuine answer.

Another study focus pertains of the satisfaction derived for answers to each question type. For example, are users within expert-based Q&A services more satisfied with answers received to fact-based questions than other types of questions? Further, could this facilitate an explanation for motivation regarding user participation? Identifying such motivations and interactions within each Q&A type, from both a content and user-based perspective, will assist in the effort to identify how online questioning-answering processes continue to develop.

REFERENCES

[1] Adamic, L. A., Zhang, J., Bakshy, E., & Ackermen, M. S. (2008). Knowledge Sharing and Yahoo Answers: Everyone Know Something. *In Proceedings of WWW Conference,* 665-674.

[2] Bernhard, D., & Gurevych, I. (2008). Answering Learners' Questions by Retrieving Question Paraphrases from Social Q&A Sites, In *Proceedings of the 3rd Workshop on Innovative Use of NLP for Building Educational Applications in conjunction with ACL*, Columbus, Ohio, USA, 44–52.

[3] Bian, J., Liu,Y., Agichtein, E., & Zha, H. (2008). Finding the Right Facts in the Crowd: Factoid Question Answering over Social Media. In *Proceedings of WWW Conference*, 467–476.

[4] Chen, Y., Ho, T., & Kim, Y. (2008). Knowledge Market Design: A field Experiment at Google Answers. *Journal of Public Economics Theory 12*(4), 641-664.

[5] Harper, F. M., Moy, D., & Konstan, J. A. (2009). Facts or friends? Distinguishing informational and conversational in social Q&A. In *Proceedings of ACM CHI Conference*, 759-768.

[6] Kim, S., Oh, J. S., & Oh, S. (2007). Best-Answer Selection Criteria in a Social Q&A site from the User-Oriented Relevance Perspective. In *Proceedings of the ASIST Conference,* 1-15.

[7] Morris, M. R., Teevan, J., & Panovich, K. (2010). What do people ask their social networks, and why?: a survey study of status message q&a behavior. In *Proceedings of the ACM CHI Conference* (pp. 1739-1748). Atlanta, Georgia, USA: ACM.

[8] Naaman, M., Boase, J., & Lai, C. (2010). Is it Really About Me? Message Content in Social Awareness Streams. In *Proceedings of ACM conference on Computer supported cooperative work* (pp. 189-192). Savannah, Georgia, USA: ACM.

[9] Nam, K. K., Ackerman, M. S., & Adamic, L. A. (2009). Questions in, Knowledge iN?: A study of Naver's question answering community. In *Proceedings of ACM CHI Conference*, 2009, 779-788.

[10] Oh, S. (2012). The characteristics and motivations of health answerers for sharing information, knowledge, and experiences in online environments. *JASIST, 63*(3)*,* 543-557.

[11] Pomerantz, J., Nicholson, S., Belanger, Y., & Lankes, R. D. The Current State of Digital Reference. *Information Processing and Management 40,* 2 (2004), 347-363.

[12] Shah, C., Oh, J. S., & Oh, S. (2008). Exploring characteristics and effects of user participation in online social Q&A sites. *First Monday, 13*(9).

[13] Shah, C., Oh, S., & Oh, J. S. (2009). Research agenda for social Q&A. *Library & Information Science Research*, *31*(4), 205-209.

[14] Tatham, M. (2008). U.S. Visits to Question and Answer Websites Increased 118 Percent Year-over-Year Yahoo! Answers receives 74 percent of all U.S. visits. Hitwise. Retrieved from http://www.hitwise.com/presscenter/hitwiseHS2004/question-and-answer-websites.php