ANSWERERS' MOTIVATIONS AND STRATEGIES FOR PROVIDING INFORMATION AND SOCIAL SUPPORT IN SOCIAL Q&A: AN INVESTIGATION OF HEALTH QUESTION ANSWERING

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ABSTRACT

SANGHEE OH: Answerers' Motivations and Strategies for Providing Information and Social Support in Social Q&A: An Investigation of Health Question Answering
(Under the direction of Barbara M. Wildemuth)

Social Q&A allows people to ask and answer questions for each other and to solve problems in everyday life collaboratively. The purpose of the current study is to understand the motivations and strategies of answerers in social Q&A. Thus, three research questions were investigated:

1) Why do answerers participate and contribute in social Q&A?
2) What strategies do they use to provide effective answers in social Q&A?
3) What are the relationships between motivations and strategies?

The domain of health is chosen because health is one of the most popular topics that people search information and support online. A model of answering behaviors has been proposed with a composition of 10 motivations and 32 strategies related to five steps of answering behaviors – question selection, question interpretation, information seeking, answer creation and answer evaluation.

Two research methods – a survey and content analysis – were used. A survey questionnaire was distributed to top answerers and recent answerers in the health category of Yahoo! Answers. Answers of the survey participants were additionally collected in order to analyze the types of health messages and the sources of the answers.

Altruism was found to be the most influential motivation, followed closely by Enjoyment and Efficacy. Answerers select questions based on their confidence or interest in the topic of the question. When interpreting questions, answerers believe that they understand the question most

of the time. When seeking information for answers, most of the sources of answers are from the answerers' own information and experiences. When creating answers, accuracy and completeness are the most frequently used criteria for evaluating information sources. When evaluating answers, answerers review responses to their answers from questioners, other answerers, and other members in Yahoo! Answers. Additionally, motivations and strategies of all participants, top answerers, and health experts and the relationship between motivations and strategies are reported.

Findings from the current study have practical implications for promoting the use of social Q&A as well as other similar Q&A services. The other important research implication is its contributions to the body of knowledge on information providing behaviors.

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CHAPTER I. INTRODUCTION

1.1. A Story of Karen Parles

Karen Parles was a patient with advanced lung cancer and a librarian who had been actively searching for information about her condition on the Internet in order to fight her disease. As soon as her doctor was suspicious about the possibility of her having cancer and recommended a biopsy, she started collecting information. At the beginning, it was all confusing and frustrating because she was not sure what kinds of information she had to look for on the Internet, but she kept trying and found information that seemed to match her condition. With this information, she was prepared when she was diagnosed with cancer after the biopsy, and from then on, her searching for information became clearly targeted to lung cancer. She felt more in control and that her situation was manageable as she found more information about her kind of cancer. There were many articles, some not peer-reviewed or some written without evidence, on the Internet. She sometimes found they were useful, but was always cautious about the possibility of misleading information. She compared information from different sources, and brought the Internet articles to her doctor to consult about them.

She found an online cancer discussion group to be the most important and valuable source of information. In the discussion group, she was able to immediately contact people who were in a similar or more advanced stage of lung cancer, and shared information and experiences of symptoms and treatments with them. Thanks to the group participation, her anxiety and fear about the disease were gradually alleviated and she was able to be more productive and aggressive in receiving treatment. She consulted fully with her doctor about the eligible protocols that she had found on the Internet, but eventually it was concluded that no other options were available for her.

However, Karen's Internet use of information searching continued, not for her sake, but for others. She used the online support group as a venue to help others and share her experiences and information. In addition, she created a Website called Lung Cancer Online[1], invited medical experts as an advisory board, and developed it as a hub site to make links to an extensive volume of Internet sources about lung cancer, based on the questions and discussions that she had with people in the online support group. With the same source of information, she also published a book called "100 Questions and Answers about Lung Cancer" (Parles & Schiller, 2006). Thus, the social support group had been a central source through which she and others found information as well as shared experiences, opinions, advice, and emotional support.

[1] http://www.lungcanceronline.org

> After an eleven year struggle with lung cancer, Karen died on February 16, 2009, but her dedication to information provision and dissemination about the disease was praised. The Lung Cancer Online Foundation continues to run the Website and it has been used as a valuable resource by lung cancer patients, as well as by friends and families of those who suffer from the disease.

Karen's story about her journey of information seeking and provision was told in an article published by a group of health care providers in the oncology department at Massachusetts General Hospital, based on an interview with Karen about her use of Internet sources (Penson, Benson, Parles, Chabner, & Lynch, 2002). Since she was a librarian during her entire career, she was an advanced and sophisticated searcher for information. Furthermore, by nature, being a librarian, she was focused on helping others acquire information, which may have encouraged her to be active in distributing information to help people who suffer from the same disease. In the real world, there may be only a few people who are as dedicated and capable of making a remarkable contribution like what Karen did as creating a Website or publishing a book, but there are many people who want to discuss issues and problems and share knowledge and experiences in order to help others through a variety of venues on the Internet.

With this background, the target subjects of the current research are those who are willing to help others by answering questions online. Social Q&A, a new type of online question asking and answering service which enables people to find, provide, and share information on the basis of collaboration with fellow users, was studied in order to understand the motivations and strategies of people who spend their time and effort to generate information and knowledge in the form of answers for the sake of those whom they will never meet in their real lives.

1.2. Problem Statement

The advent of Web 2.0 has dramatically changed the way people handle information. Traditional Internet technology allows people to access the sheer volume of information on the Internet, but it is limited in ways to search for information. A fine line between information providers and information users exists, and most of the Internet population falls into the user

group. In the Web 2.0 era, however, new applications and tools enable ordinary people to actively participate in creating and disseminating various types of content on the Web. The concept of the Wisdom of Crowds (Surowiecki, 2004), in which small contributions made by a large number of people can be better than the contributions of a few experts, serves as the fundamental principle for developing social software to encourage massive collaboration among Internet users generating information and knowledge on almost every topic in the world.

Social Q&A is an online service enabled by Web 2.0 principles. It is purposefully designed to support human-mediated question asking and answering (Q&A) in online environments. It allows people to ask questions and lets other users of the services respond to questions. In fact, human-mediated Q&A services existed prior to the advent of social Q&A. Reference librarians receive questions from clients and assist them in finding information. Thanks to the new technologies of the Internet, digital reference services enable people to access reference librarians more easily and conveniently. In addition, a number of online Q&A services are available to assist Internet users, such as online help for customer services in commercial Websites, and expert services which respond to questions in certain domains. In the traditional online Q&A environments, a few information experts, librarians, or consultants who have been officially trained or qualified with certain degrees or certificates have been responding to answer questions asked by a majority of people on the Web.

The most unique characteristic of social Q&A, as distinct from these traditional Q&A services, however, is that all of the questions are answered by fellow users. Answerers are those who voluntarily spend their time and effort to answer questions asked by others. They intentionally visit a certain social Q&A service, read a list of questions in a certain domain in which they are interested, select questions to answer, and provide customized answers responding to the needs of questioners, consulting their own knowledge or experiences. No degree or training or controlling process to evaluate the qualifications of answerers is necessary to provide answers in social Q&A. It disregards the stereotypes of answerers in traditional environments, and throws

questions to the public totally depending on the effect of the Wisdom of Crowds. Despite the concerns of credibility, truthfulness, and responsibility of answers in the online environment, it has been successful, drawing the attention of Internet users, and the usage of the social Q&A services has dramatically increased. In particular, in the United States, the market share of social Q&A services among other Web services increased 889 percent over the past two years (Hitwise, 2008).

As the popularity of social Q&A has grown, so have the interests of researchers trying to understand the context for this phenomenon. Although the number of social Q&A studies is still relatively small due to its short history, a variety of topics in research have been introduced over recent years, focusing on users, content, and systems in social Q&A. However, there are few studies which delve into answerers as the main subject of research. The active contribution of answerers is the key component of the success of social Q&A services, because the answerers are in charge of creating the content of the information and the knowledge in the answers. Questions will not be resolved until answerers provide appropriate information. The greater the number and the higher the quality of answers provided, the more the service can thrive.

Therefore, the focus of the current study is centered on answerers. The purpose of the study is to understand the motivations and strategies of answerers as they provide information in social Q&A. Answerers are those who voluntarily participate in reading questions and creating answers based on their own information, experience, suggestions, opinions and knowledge. Their motivations and strategies for providing answers are highly sophisticated. Thus, in order to understand answerers better, my dissertation research pose three research questions:

1) Why do answerers participate and contribute in social Q&A?
2) What strategies do they use to provide effective answers in social Q&A?
3) What are the relationships between motivations and strategies?

An answer is a piece of information created by an answerer based on his or her knowledge and efforts to look for information on behalf of a questioner. Information or knowledge exchange is the main purpose of social Q&A. Questioners come to social Q&A in

order to find information, and answerers respond to their questions. More importantly, a social Q&A service is not only for information sharing and exchange, but is also a social space where people seek social and emotional support through the process of sharing personal experiences, feelings, opinions and advice.

For answerers, it is important to consider both the information and the social support dimensions when they provide answers because it is what questioners expect to receive from answers (S. Kim & Oh, 2009). Even without consideration of questioners, answerers may naturally be willing to provide support to questioners in many ways. Answerers want to provide useful and effective answers to help questioners. At the same time, they may want to share their experiences and feelings related to the issues raised in questions in order to give comfort and support to questioners.

These characteristics of answerers in social Q&A mimic the general information behaviors of people in relation to health information. As described in Karen Parles' story, those who are in situations of health information seeking actively participate in social support groups, either online or offline, in order to obtain information from others' experiences as well as comfort, encouragement, and emotional relief.

Therefore, the current study starts with an assumption that the motivation and strategies of answerers are closely related to the dual aspects of information and social support in social Q&A. What kinds of motivations or strategies answerers have could influence the selection of questions and the creation of answers, by providing either information or social support or by offering both of them.

For this attempt to understand the motivations and strategies of answerers, the domain of health is chosen. Health is a critical issue in everyday life. People may not be able to consult with their doctors when they have questions. They may look for solutions through sources with easy access and be willing to rely on others' experiences with the same problems. In some sense, this may be risky since relying on incorrect information could cause critical damage to someone's

health. Nevertheless, health is one of the most popular topic categories in social Q&A, with a lot of traffic of both questions and answers. Additionally, value information sharing and social support as equally important has been observed in various kinds of health communities in online environments. Thus, it is expected that answerers in health can be a representative group of answerers who support the dual functions of social Q&A to provide both information and social support for questioners.

1.3. Conceptual Background

Social Q&A is an online service for information sharing and social support. The roles that users take as questioners, answerers or other participants can easily be switched from one to another, depending on the situation and on the information being sought or supplied. They continually exchange information and support one another. When users assume the position of answerers, they provide information and support not only to the questioner but also to others who would benefit from the answers. Answerers are motivated to participate in sharing information and support and to engage in strategies that provide answers as they search for information for others.

The main focus of the current study is answerers who voluntarily participate in responding to questions from fellow users and provide information and social support in the form of answers. Answerers are individuals who access social Q&A with their personal motivations to contribute. They may have their own unique tendency or strategies for reviewing questions and providing answers in social Q&A. At the same time, they are social beings who interact with other users constantly in the context of social Q&A. The motivation of answerers could be from self-interest or for altruistic reasons for the good of the community, and their strategies to provide answers can be continually evolving, based on their interaction with the community. Thus, in order to understand the motivations and strategies of answerers, both personal and social aspects of information seeking, providing and sharing behaviors of answerers should be analyzed in depth.

Social theories are useful in identifying the critical factors influencing the collaborative behaviors of answerers as they share information and provide social support for others. In addition, the theories and models related to information seeking behaviors and information providing behaviors can be used to examine the personal traits of answerers.

1.3.1. The Social Construct of Information Sharing and Social Support

Social Q&A is an online space which supports question asking and answering on any topic. Of course, question asking and answering has always been the common way that people communicate and share information in real life as well as in virtual communities. In this sense, social Q&A spaces resemble virtual communities. Rheingold (1994) defined virtual communities as "social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (p.5). The definition emphasizes the social relationship building and communication among the members of virtual communities. Rheingold believed the most valuable feature of virtual communities was to bring to them "the sense of community" that can occur in real life (Ellis, Oldridge, & Vasconcelos, 2004), and a variety of electronic media, such as message boards, email lists, chatting, and video conferencing tools, have been used to enable communication in virtual communities.

One of the common attributes inherent in both social Q&A and virtual communities is that the interaction in both contexts happens among strangers on the Web, who are rarely known to each other in real-life (Wellman & Gulia, 1999). Due to the anonymous nature of the users, there have been many research studies attempting to understand people's participation in and contributions to virtual communities, exploring how people build relationships among strangers, and whether it is meaningful to sustain virtual communities. Therefore, studies seeking to understand the social relationships in virtual communities from the aspect of strong ties or weak ties have been conducted. In general, the weak tie relationship has prevailed in virtual

communities, because members want to communicate with others who have information, even though they are strangers who do not have strong relationships with each other (Constant, Sproull, & Kiesler, 1996; Wellman & Gulia, 1999).

Social Q&A is distinct from virtual communities, however, in a number of ways. First, in social Q&A there is no interaction and no communication initiated without questions or answers. Second, the topics covered in a social Q&A service are diverse and comprehensive, while members in virtual communities tend to have common interests in a particular subject domain or practice. Social Q&A topics cover anything from mundane problems of everyday life, such as parenting, friendship, marriage, health, car repairs, to entertainment, school projects and business problems. The variety of topics gives freedom to users to choose any topic in which they have questions or answers. Third, since it allows anyone to participate in question asking and answering, the number of members and the number of questions and answers generated by social Q&A site members are tremendous. For example, Yahoo! Answers, the most popular social Q&A service in the U.S., reported that they have about 135 million users worldwide and 500 million answers have been provided as of March 2008 (McGee, 2008). Another social Q&A service, AnswerBag, had about 7 million unique users during the month of November 2008 (Gazan, 2008).

Due to the scalability of social Q&A services in terms of topics and number of users, it may be hard for users to develop intimate or strong relationships with one another because the chance that they will interact with a certain user repeatedly is pretty low. The role of a user, either being a questioner or an answerer or other participant, is not static but changes dynamically. Also, users can easily move to another topic category, depending on the need for information or motivation at any moment. Recently, Kang & Gloor (Under Review) conducted an analysis to evaluate the tie relationships among users in three types of interactions: providing answers, co-answering (more than two answerers provide answers to one question) and receiving answers. As a result, it was found that answerers have positive relationships with questioners in general since answerers obtain a reputation based on the evaluations of the questioners. However, the

relationships are more generalized between answerers as a group and questioners as a group, and no positive relationships were observed between individuals. Another interesting result of the study is that answerers do not have positive relationships among themselves. The researchers concluded that the reason is because answerers are competitive about maintaining their reputations in social Q&A.

It is not surprising that no strong tie interactions among users have been observed in the context of social Q&A because the interface of social Q&A is not designed to encourage interaction beyond question asking and answering. Questioners create a thread per question in a message board in a topic category, and multiple answers can be attached to the thread. There is no other option for discussion or interaction among questioners and answerers about the issues in the questions, except the simple voting/rating tools. No features or mechanisms are available to gather questioners or answerers without creating a thread for a question. Sometimes it is observed that answerers post questions asking the questioners to clarify the meaning of a particular question, or answerers discuss among themselves the issues in the questions, but the interface is still limited to using the answer space for these purposes.

Although social Q&A users are not able to easily communicate and build strong and positive relationships with one another, they continually visit social Q&A for two reasons, information sharing and social support. Information sharing – both receiving and providing – is a key factor in sustaining social Q&A because it is designed to benefit the experiences and expertise of the majority of Internet users and to help them solve problems collaboratively. In virtual communities, Rheingold (1994) viewed "information as the currency that keeps community flowing"(Ellis, et al., 2004, p. 146). Wellman and Gulia (1999) also admitted that information provision is a central factor that entices people to join and participate in virtual communities. Considering their emphasis on information and knowledge sharing, the effectiveness of virtual communities has been studied in various environments, such as organizations, corporations, communities of practices, and open source communities. In order to

understand knowledge sharing in virtual communities, various social theories, such as social cognitive theory (Bandura, 1986, 1989), social capital theory (N. Lin, 2001), and social exchange theory (Emerson, 1962, 1976), have been adopted to develop models of the motivations and behaviors of active contributors. Among the theories, social exchange theory seems to provide the best foundation with which to explore motivations for information and knowledge sharing of answerers in social Q&A.

The original theory of social exchange (Emerson, 1962, 1976) emphasizes an aspect of one's self-interest: individuals evaluate the potential cost and benefit of any series of exchanges with others in order to obtain the best value out of the exchange (Hall, 2003). However, according to Blau's (1964) point of view, social exchanges cannot be fully explained by the economic aspects of the "give-and-take". People do not always expect tangible benefits and rewards from their interactions with others. They are willing to exchange their expertise for intangible rewards such as status, respect, compliance and obligation (Blau, 1964), placing more emphasis on the social relationships with others than on immediate rewards.

Constant, Kiesler, and Sproull (1994) developed a theory of information sharing on the basis of social exchange theory in order to explain the factors which enforce or restrain information sharing in virtual communities in organizations. The theory assumes that people in organizations treat information as an object to exchange. Their theory emphasizes that people's attitudes about information sharing can be affected by organizational culture and politics as well as by personal factors (Constant, et al., 1994). The long-term impact of social status, image, and future relationships with others are counted when they share information in organizations.

Constant et al. (1994) indicated two main factors, self-interest and reciprocity, as reasons for information sharing in virtual communities. In particular, reciprocity is an interesting factor that emphasizes the social aspects of the exchange theory. In the tradition of social exchange theory, reciprocity is interpreted in one-to-one relationships (Blau, 1964). A person helps the other because he or she expects to receive help from that particular person. However, in a social

environment, the relationship is expanded from one-to-many. A person helps the other, but does not expect to receive help in return from the same person. Instead, the person has a belief that someone in the community would help him later whenever a need arises. This phenomenon is called generalized reciprocity (Ekeh, 1974). Generalized reciprocity has been found to be one of the important factors that motivate people to participate in knowledge sharing in different types of virtual communities (T. H. Davenport & Prusak, 1998; Jarvenpaa & Staples, 2000; Kollock, 1999; Wasko & Faraj, 2005).

Both the theory of social exchange and of its use in understanding knowledge and information sharing have definitely influenced the building of the context of social Q&A research. Each set of question and answers becomes the content of information that the social Q&A users share. In particular, the concept of generalized reciprocity may explain the massive user participation in social Q&A. Answerers would not expect a return from a certain questioner to whom they had provided information. Rather answerers would believe that someone else in the community would help them when they need information in the future. Questioners, also, would not intend to pay back the answerer, but would be motivated to help others who are in need. The generalized interaction between questioners and answerers would influence the motivations and strategies of answerers. Answerers would expect to interact with a large number of anonymous users in social Q&A, and their motivations and strategies would be related to how to anticipate the common needs of questioners and to respond to them immediately and effectively.

Another important reason that people may participate in social Q&A is for social support, which indicates one's emotional concern and caring toward the other. In general, social support indicates "the degree to which a person's basic social needs are gratified through interaction with others" (Thoits, 1982, p. 147). House (1981) refers to it as "a flow of emotional concern, instrumental aid, information, and/or appraisal (information relevant to self-evaluation) between people" (p.26). In real life, people receive emotional and social support constantly from family,

friends, colleagues, and neighbors in many ways. In addition, people join a social support group in order to discuss their concerns with others experiencing similar problems.

In the era of the Internet, the chances that people communicate with a large number of others who have similar concerns and problems have increased and their expectations and desires to provide and receive social support from others have not been changed. People participate in various kinds of online support or discussion groups and share their thoughts and feelings with anonymous others. Social Q&A has been known as a place where people obtain information based on others' expertise and experience. At the same time, people interact with each other in order to provide social and emotional support. According to Kim and Oh's (2009) study about questioners' criteria for evaluating answers and selecting the best ones for their questions in social Q&A, the socio-emotional value of showing appreciation for questioners' statements, such as agreeing with their opinions or ideas, providing emotional support, or expressing positive attitudes to questions, was the criterion most frequently used to evaluate answers in general, although there were some variations across the topic categories. In particular, questioners in the domain of health pursue a great deal of dynamic information and social support. Kim and Oh (2009) found that health questioners consider both content (using information-oriented criteria, such as accuracy, specificity, completeness, clarity, etc.) and socio-emotional perspectives of answers as almost equally important in evaluating answer quality. They combine these two criteria with a third, utility (efficiency and effectiveness of answers), and use them to select the best answers to their questions.

Considering the dual functions of information exchange and social support, people's motivations and strategies of contribution among different groups of people in online environments were reviewed from literature in order to identify appropriate factors with which to examine the motivations and strategies of answerers in social Q&A. A comprehensive review of the studies about motivations of participants and contributors in virtual communities of practice,

open source groups, Wikipedia and a health support group was conducted to develop the proposed model of answerers.

1.3.2. Personal Aspects of Information Seeking and Providing Behaviors

Social Q&A is a new context in which people look for information, but question asking is a natural form of information seeking, which is "the purposive seeking for information as a consequence of a need to satisfy some goal" (Wilson, 1999b). Taylor (1968) investigated why and how people ask questions at reference service desks, and found that people usually develop their information needs from vague and abstract ideas into refined and communicable statements. Questions that people bring to reference librarians are representations of people's compromised needs. However, users' information needs are not always clearly expressed in the questions. Thanks to the development of keyword-based search engines, people have become more and more accustomed to transforming their information needs into keywords (search queries) and search engines look for documents that match best with the search queries. However, question forming is still the most natural way that people can express their information needs, and social Q&A supports it.

Theories and models of information seeking behaviors can be widely applied to explain the behaviors of questioners and answerers who look for information in social Q&A. Questioners visit social Q&A sites with needs for information. They may use social Q&A as one type of information source to look for information. Information seeking behaviors of answerers is of interest because they look for information on behalf of questioners. How do answerers interpret questions and understand the needs of questioners? How do they conduct searches and use information to create answers?

As an initial attempt to understand the use of information sources in creating questions, Oh, Oh and Shah (2008) adapted the models of information sources used by different groups of people in information seeking, and investigated what kinds of information sources (e.g., human,

Internet, media, etc.) people use when they provide answers in social Q&A. As a result, it was found that human expertise and experiences (56.4%) were the most frequently cited sources, and they were followed by Internet sources (38.1%). In the domain of health, the dependency on human-related sources was particularly prominent (61.5%), and was followed by Internet sources (36.1%). Thus, it can be affirmed that answerers prefer to provide answers based on what they already know or have experienced, and may not conduct further searches for finding answers to questions. In the current study, an in-depth analysis was carried out to understand the use of information sources and related strategies for providing answers.

In social Q&A, answerers are mainly information providers. Although information providing behaviors have not been defined explicitly and have not been frequently explored in the field, the concept has often appeared as an important component in theories of information seeking behaviors. For example, in Wilson's first (1999a) model of information seeking behavior, it was explained that information is transferred to other people and information exchange happens among people. In the situation of exchange, information providers were identified as important sources of information in various situations. Krikelas's (1983a) model of information seeking behaviors is centered on the process that occurs as information needs evolve and on the use of information sources. There is a concept, called information giving, that is defined as "the act of disseminating messages [which] may be communicated in written (graphic), verbal, or tactile forms" (Krikelas, 1983a, p. 13). Belkin's (1980) model of the cognitive communication system for information retrieval was balanced on two sides: one is the authors' point of view when creating documents (with the author as information provider), and the other is the information seeker's point of view when accessing documents. His later research has mostly centered on understanding the information seeking behaviors of information seekers based on the ASK (Anomalous Stage of Knowledge) model. Nevertheless, little attention has been paid to developing the model of information providing behaviors as the main theme of research. This is because, in the traditional environment of information seeking, information is mostly represented

as documents and they are retrieved by information retrieval systems or search engines. There are situations in which information is provided by other people, but those people are mostly small numbers of specialized experts, like reference librarians or subject experts. Thus, conceptions of information providing behaviors have never been expanded and applied to the behaviors of the general population.

Thanks to the advent of Web 2.0, however, the population of information providers has rapidly expanded to anyone who has access to the Web. People started blogging in order to post their thoughts, opinions, and the information collected from various sources. Wikipedia allows people to develop the content of knowledge collaboratively. The concept of user-created content (UCC) has spread to various forms of media. YouTube enables people to distribute video materials that they created. People can create texts, images, or videos of their area of expertise in solving problems or in fixing broken items, and post them on eHow.com. A number of studies examining user behaviors in these applications have been conducted recently, but there are few studies focusing on answerers.

Despite the scarcity of the research on information providing behaviors, the studies of reference services offer valuable insights into information providing and answering behaviors. The area of reference services has been investigated in a wide range of studies of service development and adaptation of new technologies. In particular, the research on digital reference services is important to consider in order to build a model that represents answerers. The role of reference librarians who provide information is almost the same as that of social Q&A answerers. Also, questions and answers are the major communication format through which information is provided in both groups, although the purpose and use of the services are different. Thus, in the literature review, digital reference services were compared to social Q&A services, highlighting the similarities and the differences. Research and practice about guidelines, service strategies, and sources used by reference librarians to provide information to users were reviewed and used to build the model to represent social Q&A answerers.

1.4. Significance of the Study

The impact of social Q&A on people's information seeking and sharing behaviors is highly promising. Social Q&A fully supports the natural behaviors of question asking and answering, in which people easily engage when they want information or social support from others. In the Internet era, search engines have been extremely useful for people to find information, but people are forced to transform their needs into several concepts and keywords and use them for information search. In social Q&A, they do not need to make this transformation. They ask questions in natural language, and explain their situations and conditions as much (or as little) as they wish. Answers are another unique feature of social Q&A. While people receive static documents from search engines, answers in social Q&A are dynamically generated, responding directly to the question, and questioners can receive customized answers from several different answerers. Thus, a hallmark of the answers is the variety of the content. They may contain information, knowledge, experiences, opinions, advice, recommendations, feelings, and social and emotional support. Furthermore, the topics covered by a social Q&A service encompass almost everything in life. People ask and answer questions about car repair, school projects, future careers, business solutions, chronic disease, cancer, childcare, pregnancy, parenting, physics, animals, news issues, computer hardware/software, social relationships and many more. Thanks to these characteristics, social Q&A has huge potential to support information seeking and sharing, and to be selected and used by people as one of their critical information sources in everyday life.

The current study of answerers is a significant endeavor in promoting the use of social Q&A. This study is beneficial to Internet users in investigating the intentions and attitudes of answerers who distribute knowledge and information in the domain of health and in evaluating the current status of social Q&A services. By understanding the motivations and strategies of answerers in social Q&A, people will be able to identify the characteristics of answerers, to examine the advantages and disadvantages of the use of social Q&A, and to develop their own

skills for evaluating the content of answers and applying the answers to their real life problems. In addition, this study provides recommendations on the development of current social Q&A services. The findings about answerers' characteristics on motivations and strategies identify the factors that promote answering behaviors in social Q&A. This knowledge can be applied to designing and developing the interfaces of the services to enable answerers to be actively engaged in providing information and social support to questioners as well as other activities in social Q&A.

Moreover, the findings from the current study are helpful in understanding the past and current practice of other types of online Q&A services and in improving the quality of future services. In digital reference services, the role of librarians is comparable to that of answerers in social Q&A. Answerers in social Q&A may have more freedom than librarians in creating answers as they add their personal experiences and thoughts to answers, while librarians focus on providing accurate and objective sources of information in their answers. Digital reference librarians will be able to learn from answerers' strategies to produce effective and appealing answers for questioners and apply the findings to improving their services. In the domain of health, a number of online Q&A services have been facilitated by experts in the area, such as health care professionals, medical researchers, social workers, etc. By understanding answerers in the context of social Q&A, experts will be able to understand the needs of people in real life situations and improve their services.

Finally, this study serves as a basis for developing a research framework for investigating answerers in other subtopics in health, as well as other disciplines. Answerers in other domain areas may have different motivations and strategies for providing effective answers with information and social support. The findings from future studies will identify the unique characteristics of answerers in other disciplines and develop ways to promote social Q&A services in each area.

The rest of the dissertation is organized as follows. In Chapter 2, a literature review has been developed to explore theories and practices related to developing a model of answerers in social Q&A. It includes an introduction to health information use on the Internet, an overview of online Q&A services, and a comprehensive review of literature related to the topics of motivations and strategies for answering questions. Based on the literature review, a proposed model of motivations and strategies of health answerers in social Q&A has been developed. In Chapter 3, the structure and the components of the proposed model are explained. Chapter 4 introduces the research methods used in the current study – survey and content analysis. Chapter 5 reports the results of the investigations of answerers' motivations and strategies. Chapter 6 discusses a summary and synthesis of the findings, as well as the limitation of the study. Chapter 7 concludes this study with implications and future research.

CHAPTER II. LITERATURE REVIEW

The current literature review is developed to explore theories and practices related to developing model of answerers in social Q&A. Since the current study tests the model in the domain of health, an introduction to health information use on the Internet is provided in Section 2. It is followed by an overview of online Q&A services, including social Q&A in Section 3. The next two sections, Sections 4 and 5 provide a comprehensive review of literature related to the topics of motivations and strategies for answering questions.

2.1. Health Information and Social Support on the Internet

Health has long been recognized as a critical topic of concern among situations of everyday life and people have sought for information about it from a number of different sources. According to the large scale surveys about the information seeking circumstances of the general population that were carried out in the early 1980s, health problems were one of the most common issues about which people looked for information along with several other topics, such as family/friends, managing money, shopping, and learning (Chen & Hernon, 1982; Dervin, Ellyson, Hawkes, Guagnano, & White, 1984).

In the past, the primary source to which people looked for health information was personal contacts (Case, Johnson, Andrews, Allard, & Kelly, 2004). People consulted with health care professionals about their illnesses and obtained factual information about conditions, symptoms, and treatments. Family members, friends, neighbors, or colleagues were also prevalent sources of information to which people referred, mostly for social and emotional support. Accessibility has been shown to be the most influential factor in selecting information sources for

solving problems in people's everyday lives (J. D. Johnson, 1997). Personal contacts were simple and safe sources of information with easy access, but were limited in regards to accessing newly updated information or highly specialized information.

Thanks to the advent of the Internet, ubiquitous access to online health information has significantly influenced and changed the way that people deal with health information. Pew Internet & American Life Project reported that the proportion of people intending to look for health information on the Internet was about 55% in November 2000, and increased to 62% in 2002 (Fox & Rainie, 2002). A similar trend of high interest in online health information has been observed in Europe, and a survey about Internet use administrated by Stanford University reported that 40% of adults had used the Internet to access health information (Baker, Wagner, Singer, & Bundorf, 2003). According to the most recent survey result from Pew, about 80% of Internet users search for health information on a daily basis (Fox, 2006). As opportunities increase to be exposed to a massive volume of information sources extending far beyond personal contacts with doctors or family and friends, patients have taken an active role in seeking information about their conditions on the Internet and are involved directly in the process of making decisions about their health care and treatment for their illness (Brennan & Starren, 2006; Mears & Sweeney, 2000).

By nature, people do not ordinarily make decisions from single sources of information, but constantly search and access a diverse range of sources (Pescosolido, 1992). The search will be terminated when they find appropriate sources that solve the original problems or they give up the search because of exhaustion. For health information seeking, people go to see doctors to be diagnosed and to receive expert opinions on their conditions. They talk with their families about their concerns to gain emotional support. Internet sources, such as search engines and Websites of medical portals or institutions, are used to access factual documents containing health information. People participate in online support groups to share information and support among those who are dealing with similar problems. In addition, the concept of health 2.0 and medicine 2.0 has

recently been introduced to describe the new emphasis on active participation and collaboration of health care providers, researchers, patients, and their family members, for the purpose of advancing health treatment and practice, using Web 2.0 applications and services. Therefore, the likelihood that people discuss health problems and issues with diverse groups of people on the Internet has significantly increased.

Social Q&A is a new type of Web 2.0 service which enables people to seek information and support on the Internet. The most interesting feature of social Q&A in health information seeking is that it is a place where people can access both factual information and social support from anyone available on the Internet, including health care professionals, lay persons who are interested in particular health topics and, most importantly, those who have similar experiences with health concerns or illnesses. Thus, health information seekers can benefit from a number of different types of social Q&A answerers with diverse ranges and levels of knowledge and experience in the health care field.

The purpose of the current section is to examine people's use of health information sources on the Internet for obtaining information as well as support, and to identify the function of social Q&A as an important source of information for health information seeking. In Section 2.1.1, an overview of the use of information sources has been provided, focusing on source preferences and quality of health information. Since social Q&A is a Web-based service, the main focus of the review is on people's perceptions and uses of Internet sources. In Section 2.1.2, literature on the use of online support groups in health is reviewed, because social Q&A has, in common with online support groups, the creation of online environments where people share both information and emotional support among members. Based on the reviews from Section 2.1.1 and 2.1.2, the key function of social Q&A as an Internet source to distribute information and support pertaining to health problems and issues is discussed in Section 2.1.3.

2.1.1. Health Information Sources

The use of information sources is one of the most heavily studied areas in information seeking behavior research, because patterns in information seeking behaviors can be inferred from the interactions between information seekers and the sources of information they use. Information source gathering and selection criteria in various domains have been investigated extensively, e.g., academic research (Fidel & Green, 2004; Flaxbart, 2001; Hallmark, 2001; Rice & Tarin, 1993; Talja, 2002; Yitzhaki & Hammershlag, 2004), everyday information seeking (Chen & Hernon, 1982; Hektor, 2003; Kari & Savolainen, 2003), and health information seeking (B. R. Bates, Romina, Ahmed, & Hopson, 2006; Case, et al., 2004; Warner & Procaccino, 2004). In addition, the issues related to source accessibility (Fidel, Mark Pejtersen, Cleal, & Bruce, 2004; Xu, Tan, & Yang, 2006), source credibility/authority (B. R. Bates, et al., 2006), source quality (Choo, Detlor, & Turnbull, 2000; Rieh, 2002), and source preferences (Kirkelas, 1983; Rees & Bath, 2001) have been widely reviewed and studied. The main interest of the current study is focused on the use of health information sources, but a brief review of the different types of sources and source preferences of everyday life information seeking in general is also addressed, since health has been a central topic in daily inquiries.

2.1.1.1. Source Preference

In the early 1980s, two large-scale surveys (Chen & Hernon, 1982; Dervin et al., 1984) were conducted with the general population in order to investigate information seeking behaviors when solving problems in everyday life. Chen and Hernon (1982) surveyed 2,400 residents in New England and Dervin et al. (1984) interviewed 1,040 residents of California. People indicated that their own memories or experiences are the primary source that they access. As for the sources that they look to when they cannot retrieve information from their memories, people referred most often to other humans as sources. First, they ask for help from acquaintances who are immediately available to them, such as family members, friends, neighbors and colleagues.

When it is necessary, they turn to experts or professionals, such as doctors, librarians, and teachers. The use of media sources, such as TV, radio, newspaper and televisions, were also popular at that time.

The most interesting finding from these surveys is that accessibility matters significantly when choosing sources. People would first ask their acquaintances because they were usually nearest to them, and could communicate face-to-face (Krikelas, 1983b). When they needed information about a certain professional domain, they looked for experts within their community. It seems that people used human contacts for personalized, situation-specific information and advice while referring to media for general information, news, and trends.

The advent of the Internet suddenly expanded the amount and variety of information available and has had a huge impact on traditional ways of information seeking, as it gradually replaced some use of personal contacts and traditional media with the diverse channels of Internet sources (Hektor, 2003; Hewins, 1990; Kaye & Johnson, 2003). The accessibility of the Internet, which can be easily and conveniently available whenever people need information, is the number one reason that people have started to use the Internet frequently (Hektor, 2003). Even for political information seeking, which is highly dominated by media sources such as TV, radio, and newspapers, people have begun to use the Internet because of its convenience. People don't have to wait to watch TV or listen to the radio according to the station's programming schedule. They turn on their computers, and information is accessible through a couple of clicks (Kaye & Johnson, 2003).

Despite the increased attention and wide usage of the Internet for information seeking on a daily basis, the primary source that people consult is still personal contacts, while the use of printed media sources has decreased. The Internet is often considered as a space to find information and substitutes for other sources, rather than as a new type of information source (Hektor, 2003). Savolainen and Kari (2004) investigated how Internet users utilize information for solving problems in their everyday lives and applied a model called an "information horizon"

to illustrate the patterns of information source use. Savolainen and Kari (2004) adopted the framework, renaming it "information source horizon." The subjects were asked to place their sources in three zones, (1) most significant sources, (2) intermediate sources, and (3) peripheral sources, and to illustrate the different uses of the information sources in each zone. It was found that people still preferred to use human resources in general, followed by print media materials like newspapers and books, and other sources available on the Internet. Recently, Savolainen (2007) examined the source preferences of environmental activists with a modified framework of an "information source horizon," and the result was consistent with his previous study. This indirect approach of considering Internet sources, in particular search engines, as a substitute for traditional information sources was confirmed by the study of Kink and Hess (2008).

The use of health information sources in everyday life information seeking has been the focus of many studies. In general, people turn to their acquaintances to discuss health problems (Lenz, 1984; Reagan & Collins, 1987), but information seeking is more geared toward medical doctors or health professionals than family members, friends, or neighbors. In a couple of European surveys about health information seeking, the majority of patients and health information seekers reported that their main source of health information was health care professionals or practitioners (45%-64%) (Rokade et al., 2002; Spadaro, 2003). When Dolan et al. (2004) also found that health professionals were the most frequently accessed source for patients to obtain information about certain illnesses, while they preferred media sources, such as magazines, TV, newspapers as well as health professionals, to finding general health information.

Most interestingly, the use of Internet sources was quite influential on people's health information seeking behaviors. The Internet is a place where people often search for information about diseases, symptoms, treatments, doctors, and clinics (Fox & Rainie, 2000; Sciamanna, Clark, Houston, & Diaz, 2002). The anonymity of the Internet enables people to search for information about sensitive problems without compromising their privacy (Goffman, 1959). Thanks to search engines, people can create queries, sometimes complex ones, that will locate the

information that they want. Availability of up-to-date information about new diagnoses and treatments is another reason that people are fond of using the Internet (Dolan, Iredale, Williams, & Ameen, 2004).

The use of the Internet for health information rapidly and continually increases (H. Taylor, 2002). For adolescents, the Internet was important for health information seeking, and it was useful in particular when they looked for health advice on sensitive and stigmatized illnesses (Berger, Wagner, & Baker, 2005; Klein & Wilson, 2002). Furthermore, the Internet has influenced people to make decisions related to health care (Baker, et al., 2003). Patients often bring health information on the Internet to their health care professionals and discuss it with them in relation to their conditions and treatments (Murray et al., 2003).

Despite the popularity of Internet sources for health information, whether people turn to the Internet first and use it as the primary source of information is highly debatable. In several studies, the use of the Internet as the primary source of health information was relatively low, ranging from 2% in the survey from Pew Research (Fox & Rainie, 2000), to 3% in the Stanford study (Baker, et al., 2003). According to Dolan et al. (2004), the ratio of frequency of using Internet sources was relatively lower than the two other types of sources – people and media. On the contrary, Case et al. (2004) found that the Internet was the most preferred source among people looking for information about genetics and diseases and constituted 45% of the first choice sources, followed by medical doctors (18.4%), a public library (14.1%), family members (10.6%), medical sources (8.7%) and mass media sources other than the Internet (1%).

One way to explain the conflicting results from the studies is that, when looking for health information, a majority of people prefer to explore more than one type of source and to consult multiple sources of information in order to find the best solution for their situations. When Case et al. (2004) examined the use of sources for genetics information, 63% of the respondents identified at least two sources, and 34% of them identified three. Although people considered health professionals as the primary source of information to access, heavy use of the

Internet before (27%) and after (34%) visiting medical doctors was reported, and for other health questions for which they feel there is no need to consult with doctors, they turned to the Internet for searching (Fox & Rainie, 2000).

Sillence et al. (2007) found that people responded differently to the use of information sources in accordance with different phases of information seeking. First, when patients felt they needed to check something on health, they would search for information on the Internet in order to have basic knowledge about the topic. Next, they would talk to and get advice from health care professionals or friends about their symptoms. With the information obtained from both online and offline sources, patients would have a more targeted and sophisticated approach to evaluating sources and to approaching support groups in order to find alternatives. Sillence et al. (2007) emphasized the importance of the doctors as the most central sources of advice. They also argued that those who look for Internet sources tend to find information which can confirm their original points of view, and few of them made changes in their thoughts or behaviors based on information that they found on the Internet.

2.1.1.2. Source Quality

As the use of Internet sources for searching health information has exponentially increased, the quality of health information on the Internet has come under scrutiny. Due to the possibility of people's risk of being influenced by unreliable and harmful information and of misusing information for self-diagnosis, researchers have serious concerns about whether the information is credible enough for self-diagnosis of health problems (Crocco, Villasis-Keever, & Jadad, 2002; Dolan, et al., 2004).

A number of studies have introduced measures to evaluate the quality of online health information. Since the use of poor quality information is related to people's ability to evaluate and select information on the Internet (Eysenbach & Kohler, 2002; Risk & Petersen, 2002), user

perceptions of online health information as trustworthy sources for their health care and decisions also have been widely investigated.

Results of evaluations of the overall quality of information available on the Internet are quite disappointing (Gagliardi & Jadad, 2002). According to Eysenbach et al.'s (2002) meta-analysis of the results from a number of studies related to the quality of health information on the Internet, 70% of the results were negative about the quality, 22% were neutral, and 9% were positive about the quality of Web sources. Judging from the fact that the Internet is full of information posted by anyone without control of its quality, the negative conclusion about the quality of health information is not surprising. A study of the reliability of scientific information on the Internet reported that 10% to 34% of the information was inaccurate, 20%-35% was misleading, and 48% to 90% was provided without citing appropriate references (Allen, Burke, Welch, & Rieseberg, 1999).

Therefore, serious problems can be caused when people use the health information on the Internet without recognizing the possible risks. The majority of health information seekers believe that they can trust the information and advice they find on the Internet (Mead, Varnam, Rogers, & Roland, 2003). According to Diaz et al.'s (2002) investigation of the level of trust in health information on the Internet, 68% of patients considered it either 'excellent' or 'very good'. More surprisingly, no one evaluated the Internet sources as 'poor'. Dolan et al. (2004) also reported that there were only 7% who reported that they refused to use Internet sources for health information because of a lack of trust. Although people are aware of the possibility of obtaining defective information, their criteria for evaluating Internet sources are sometimes limited to examining the appearance of the Website's interface, failing to criticize the authority of the information providers (Eysenbach & Kohler, 2002; Stanford, Tauber, Fogg, & Marable, 2002).

Due to concerns over users' perceptions of Internet sources, researchers have developed different sets of criteria to evaluate Internet sources and have applied them to measuring the quality of those sources. The quality of the Website content as well as the usability of Website

interfaces have been considered and used to develop criteria for evaluation. Eysenbach et al. (2002) collected 79 empirical studies about health information seeking, and analyzed the criteria used by researchers to evaluate health information on the Internet. Among 86 different quality criteria, accuracy, completeness, readability, interface design, disclosure, and references were most frequently used for the quality assessments.

Accuracy is "the degree of concordance of the information provided with the best evidence or with generally accepted medical practice"(Eysenbach, et al., 2002, p. 2695). It was often measured by the comparison of literature or external sources to health documents found on the Internet. The documents with unclear sources or personal opinions can be detected through the process of accuracy evaluation. They are then noted as the lower level of sources due to the fact that the field appreciates the sources highly specialized in certain domains of health.

Completeness refers to the scope of documents and whether they include appropriate amounts of information related to the topic (Eysenbach, et al., 2002). The proportion of documents which include specific elements or topics described in documents was identified and used for the evaluation of completeness, and in some studies, rating scales or checklists of the topics covered in a document were used. Completeness is often measured in combination with accuracy, although they are not dependent on each other.

Readability indicates the reading level of a document. It is mostly measured based on the length of the words and sentences, and the complexity of the vocabulary. According to the analysis by Eysenbach et al. (2002), the Flesch-Kincaid (FK) Grade Level Index is most frequently used to evaluate the readability of health documents on the Internet. Other measures, such as the SMOG Readability Formula, the Fry Readability Graph, the Gunning-Fog Formula, and the Lexile Framework, have been used as well. Writing style can be an important measure to evaluate the quality of health information, but it is not measured through readability evaluation. Fitzmaurice and Adams (2000) defined a good writing style for health information on the Internet as "personalized, unbiased, and every day, rather than scientific and [it] should avoid jargon that a

lay reader might not understand, verbs should be active rather than passive as these are clearer to the majority of the publication"(p.260).

The design of the interface is another important criterion with which to evaluate the quality of a Website, since it may or may not attract people to the Website. The visual cues, design features, layout, or navigational functions can be evaluated. Eysenbach et al. (2002) explained that design has been reviewed by several studies, but the standards to evaluate the design aspects of health Websites are mostly subjective, and it is hard to find consensus on what constitutes good-quality design of interfaces of health Websites.

Eysenbach et al. (2002) identified disclosure as an important criterion used by studies of health information evaluation. This concept is concerned with accessibility of information considering information organization, metadata, attribution, currency, etc. Due to the ready access and ease of publication on the Internet, how frequently the information is updated or when it was last updated could be an indication of the quality of information given by health Websites. In addition, whether information in the Website is organized systematically with appropriate use of metadata or attributes to represent the content of information have been used as measures of disclosure.

Reference information indicates the source of the information published in Web documents. Source documents, whether they are peer-reviewed or scientific sources, and Website owners, such as medical institutes or organizations, schools and universities, government, drug companies, medical services, can be a cue to evaluating the quality of the health information available on a Website.

Not only researchers, but patients also evaluate Internet sources, although they seem to be trusting in general. Compared with researchers, health information seekers have somewhat similar approaches for identifying the authority and expertise of sources of information, but they are also concerned with more practical aspects of the use of information, that is, they emphasize how useful the information is in their individual circumstances.

Expertise and credibility of Websites are important for patients to evaluate health information on the Internet. Eysenbach and Kohler (2002) found that people mainly selected Websites from official organizations or institutes and used the references on the Websites to trace further information. Peterson, Aslani, and Williams (2003) found that people are very much aware of the possible bias and deception caused from poor quality information on the Internet, and preferred information from Websites of governments, professional or disease-focused organizations, and universities. The level of evaluation was more sophisticated when interpreting the bias of information available on pharmaceutical company Websites, although not all of the study participants acknowledged it. These results are consistent with the findings reported by Sillence et al. (2007). When evaluating Websites, people considered the motives behind the information, the written language, and the feasibility of using the information for their health problems. Search engines were the primary tools for accessing health information on the Internet, but alternative sources have been used by experienced searchers (Peterson, et al., 2003).

Personalization is another important factor that builds trust in the information on the Web (Briggs, Burford, De Angeli, & Lynch, 2002). Personalization is "a process that changes the functionality, interface, information content, or distinctiveness of a system to increase its personal relevance to an individual" (Sillence, Briggs, Fishwick, & Harris, 2005, p. 9). Health information seekers have high expectations of personalized health information that will be applicable to their health conditions or symptoms. Health Websites can implement automated personalization tools to adopt different levels of personalization, ranging from obtaining basic personal information, such as gender, age, height, or weight, to requiring quizzes for the assessment of an individual's current health status. With the information collected by the tools, the systems classify users into certain groups or levels and provide services correspondingly. However, patients expect to receive highly customized and individualized responses and have the need to consult someone about their health conditions through the Web services. Human-mediated services provided by health professionals could be a solution for sophisticated personalization services, but they are

rarely available from health Websites. Sillence et al. (2005) found that patients were willing to reveal more personal information to obtain health advice on the Web, but the Websites that they often visited for health information did not fully satisfy their need to obtain personalized responses or advice related to their individual health conditions. Sillence and his colleagues (2007) also found that patients intentionally seek people who have similar experiences or stories because they handle situations from the same points of view and share highly relevant and useful information related to those situations and conditions.

The high demand for personalized advice and answers to individual questions leads people to look for channels beyond search engines or Websites. As for the venue where patients can discuss their common problems, support groups have played an important role to gather patients, and to engage them socially for sharing information and emotionally supporting one another (Pennbridge, Moya, & Rodrigues, 1999).

2.1.2. Online Support Groups

Although the literature about health information seeking describes the exponential growth of the use of Internet sources for consultation on various types of problems and issues related to health care, online support groups have not been frequently cited as information sources in the literature. It has been reported that the participation rate in health support groups is pretty low (3.9%), compared with use of the Internet for information searching (Hesse et al., 2005; Hewitt, Breen, & Devesa, 1999).

There are two factors that explain this result. First, most studies of information sources have considered the Internet as a new type of media for presenting health information, comparing it to people, print materials, mass media (e.g., TV, newspapers) or institutions (e.g., governments, or schools), and all of the different types of information accessible via the Internet were referred to as “Internet sources”. These studies did not explore the role of online social support groups separately from other types of Internet sources. There is a possibility that the survey or interview

questionnaires were designed to ask for the perceptions of the use of the Internet as an information source, without detailing particular sites or services that the Internet facilitated. There are only a few studies which identified participation in support groups as a way to deal with health information and advice (Hesse, et al., 2005; Luker, Beaver, Lemster, & Owens, 1996).

Another reason that online support groups have not received attention in studies of health information sources is that participation in online support groups has been considered as attracting mostly those who have symptoms of certain diseases or illnesses (Pennbridge, et al., 1999). In several studies, people expressed their need to obtain advice from experts or non-experts about their conditions and to communicate with those who have similar symptoms or conditions (Sillence, et al., 2007). From the surveys or interviews with the general population about their health concerns, however, online support groups are rarely mentioned as examples of Internet sources. This may be related to experiences of searching for health information on the Internet. Online support groups are often not easily searchable by keywords on search engines, unless the group has a related Website or Webpages to explain the support group with appropriate terms that match the search keywords. In addition, it was found that those who are in early phases of health information seeking prefer to collect documented information on the Internet. As they move to later phases, they seek people with whom to consult about the information that they have found (Sillence, et al., 2007).

Social support groups in the domain of health are mostly for patients with certain diseases (e.g., cancer, diabetes, depression, eating disorders, etc.) or an addiction problem (e.g., alcohol, drugs, etc.), or those who are gathered with a common health-related interest (e.g., quitting smoking, losing weight, pregnancy, etc.). There are also support groups for patients' family members (e.g., spouse, parents, etc.). Support groups can be created by individuals who want to share information and support with those who are in similar situations. Clinics or institutes create and administrate support groups for treatments, but the degree of facilitation varies from direction by health professionals in the overall process to having a moderator who is trained to some degree

to manage discussions and questions (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004). In self-support groups, there is the freedom to share experiences and thoughts without the intervention of administrators, but there is also the possibility that members can be exposed to misleading information posted by non-experts (Pereira, Koski, Hanson, Bruera, & Mackey, 2000). Information shared in support groups administered by health professionals may be reviewed thoroughly during the process of exchange, and the quality can be controlled and the likelihood of exposure to harmful information is lower than in other kinds of self-help groups.

As the interest in wellness increases, healthy people also join support groups to promote their healthy life styles. The participation of healthy people is encouraged due to the increase of the channels through which people look for information on and services supporting wellness on the Internet. The group or club services offered by Yahoo!, Google, or MSN or other social network services, such as MySpace or Facebook, enables people to easily create a forum on a certain topic. People can access a number of different types of health-related communities addressing individual needs for medical care and health interests, which is one of the most popular topic categories in these services.

The advantages and disadvantages of participating in health support groups on the Internet are often compared to face-to-face groups. Basically, Internet support groups have the benefit of online communication, where there are no distance or time barriers. The availability of support 24 hours a day and 7 days a week is unique, in particular, because the face-to-face groups are typically scheduled and meet members in an assigned space during limited hours (Sparks, 1992). According to Ferguson (1996), the most popular time for online support group participation is between 7:00 pm and 1:00 am, an impossibility for face-to-face meetings because they continue after midnight. In addition, Internet support groups provide opportunities to gather and discuss the issues with a heterogeneous group of people with different social and cultural backgrounds, experiences, and opinions (Coulson, 2005). The Internet also enables international

access to those who have rare diseases; patients benefit from communication with peers, obtaining information and support (JA Powell, Darvell, & Gray, 2003).

In most cases, the members of online support groups use pseudonyms during the discussion, and the anonymity gives freedom to the members to easily expose their delicate and embarrassing issues, and creates an environment of exchanging honest and intimate messages. People can be less distracted by age, gender and social status when exchanging information and support (Madara & White, 1997). Eysenbach (2005) predicted that anonymity may help to attract male participants, who have social and cultural tendencies of not asking others for help in their real life situations. The result is higher participation rates of men in online groups, compared to that of face-to-face groups (Klemm et al., 2003).

The written format of the messages allows members to provide thoughtful replies, as they spend some time writing and editing their messages. As a results, the messages exchanged in Internet groups were clearer and more profound than instant conversations in face-to-face groups (King, 1994).

Due to its written communication with creative and non-hostile messages, Braithwaite (1999) indicated that online support groups can be safer and less risky places than face-to-face groups. Recorded messages are also useful because members can store and reuse information written in the messages (Spark, 1992). This benefits not only those who post and respond to messages, but also lurkers who just come to visit in order to read messages without further participation (Coulson, 2005). Although members use pseudonyms for their identification, they can make themselves recognized and build reputations as they actively participate in the group's discussion. Burnett (2004) stated that the relationships built based on the exchanges, led people to know one another, and allowed them to have a strong sense of presence in virtual communities.

Concerning the effect of support groups, little evidence is available that would confirm a significant influence on promoting individuals' health. Eysenbach et al. (2004) collected 55 studies about Internet self-help groups in health and investigated the influence of support groups

on health outcomes. The results were debatable. Although researchers analyzed the findings about the effects of support groups in various programs addressing depression, weight loss, smoking cessation, diabetes control, and eating disorders, no consensus was found across studies; some reported significant improvement in health status, but others didn't.

There are also potential disadvantages to participation in online health support groups. Lack of physical contact and proximity sometimes makes members feel disconnected (Han & Belcher, 2001). In face-to-face groups, social cues and interactions create bonds among members that affirm their participation, but these are not available through Internet support groups. The "noise" messages which are off the topic, unrelated responses, and spam messages can be circulated, and members may feel discouraged when they receive full copies of messages from other sources without additional comments, or messages with negative attitudes in their responses (Han & Belcher, 2001). In addition, members can feel disappointed when they have no or only a few responses to their own postings. More importantly, there is a possibility that inaccurate information can be shared; this could be critical in self-help groups that are not monitored by health professionals and experts (Culver et al., 1997; White, 2000).

Even so, in the qualitative studies of online health support groups, obtaining anecdotes from participants about their experiences, positive comments have been made about many aspects of support groups. From the psychological point of view, support groups have been recognized as playing an important role in relieving depression or loneliness and in improving the quality of life of patients as well as family members (Eysenbach, 2003; Lieberman et al., 2003; McLean, 1995; Spiegel, Bloom, Kraemer, & Gottheil, 1994). Online support groups also have reduced social isolation and encouraged personal empowerment and the self-esteem of patients (Klemm, Reppert, & Visich, 1998; Weinberg, Schmale, Uken, & Wessel, 1996). Support groups have enhanced the chances of people accessing a variety of sources, because they not only receive citations of sources, but also discuss the sources that they found with those who have similar concerns (Eysenbach, 2005; Landro, 1999; Penson, et al., 2002). Consulting and discussing with lay

persons in informal environments also helps people recognize their problems and encourages them to seek an official diagnosis from health professionals (J Powell, McCarthy, & Eysenbach, 2003), although those who rely too much on advice from peers tend to delay meeting with health professionals (Eysenbach, 2005).

The primary functions of support groups are information exchange and emotional support (Eysenbach, 2005; Klemm, et al., 2003; Weinberg, et al., 1996). Online support groups can offer alternative personal contacts through which information and support can be obtained beyond an individual's family members, friends or health care providers (Helgeson, Cohen, Schulz, & Yasko, 2000; Plass & Koch, 2001; Winefield, Coventry, Lewis, & Harvey, 2003; Winefield, Coventry, Pradhan, Harvey, & Lambert, 2003). People in support groups have access to a collection of useful information accumulated from the past, and can discuss new information that they find. Advanced patients or survivors in support groups can share critical and beneficial information from their own experiences with newly diagnosed participants (Landro, 1999).

Support groups have been recommended to patients as a way to receive psychological peace (Cella & Yellen, 1993), but Krizek et al. (1999) argued that the most important reasons that patients join support groups are 1) to learn more about diseases, 2) to compare situations with other patients, and 3) to share concerns with others. Klemm et al. (1998) analyzed messages posted on a cancer support group site and found that 80% of the messages were composed of information giving/seeking, personal opinions, encouragement, and personal experiences, and the rest of the messages were thank you notes, humor, prayer and others. Sharf (1997) identified three main categories of discussion among breast cancer groups – shared information, social support, and personal empowerment. As for other types of information identified in online support groups, Weinberg et al. (1996) divided each message into statements of facts, ideas, attitudes, emotions or questions. In general the messages included both medical and personal statements, emotional aspects of having cancer, supportive statements to group members and medical situations.

Weinberg et al. (1995) also found hope, group cohesion, and universality as prominent therapeutic factors at work.

Most of the information and support provided in online support groups actually comes from lay persons. Culver, Gerr, and Frumkin (1997) analyzed the sources of information contained in messages on an online health discussion board, and found that 89% of the messages had come from members without medical training, and one third of the information was about personal experiences. There were few health professionals who provided advice to members in those groups, but members often do not cite sources of information related to their advice. Although researchers' concerns about the quality of health information shared in online support groups have increased due to the distribution of information by lay persons or peer patients (Jadad & Gagliardi, 1998; McClung, Murray, & Heitlinger, 1998; Silberg, Lundberg, & Musacchio, 1997), some patients in online support groups emphasized the value of sharing ones' experiences to build trust among people and bind them as members in a support group (Cella & Yellen, 1993; Leavitt, Lamb, & Voss, 1996).

2.1.3. Health Information and Support in Social Q&A

The context of human contacts has been expanded from only family or close friends to anyone who is available on the Internet. People can benefit from their contacts with anonymous people on the Internet, because it is easier to be connected and share information with people who have similar conditions or experiences of illness. Family and friends could be the best people to provide care for patients emotionally and physically, but patients may feel isolated from them due to the feeling that they are not in the same situation (Gordon, 1990; Peters-Golden, 1982; Wortman & Dunkel-Schetter, 1979). In social Q&A, the chance that people meet those who are in similar situations is highly increased thanks to open access to the services. In cases of rare symptoms or diseases, it may be much more useful to share related information, because there are only a few places or sources from which to obtain information.

The need for personalized advice concerning health matters can be an important reason that people ask questions of fellow users in social Q&A. People may want to talk about their concerns or conditions with health experts, but search experts may not be readily available. Social Q&A can be an easy and immediate way to receive responses from others. When posting questions, people can elaborate on their conditions as much as they care to and receive responses from those who have some knowledge or similar experiences. Although answerers may not be health professionals or experts, information obtained from answers can be useful for the questioners to understand their conditions.

Answers from social Q&A can provide several advantages to questioners. First, the lay-person language of answerers could help patients to easily understand medical information. Internet documents, in particular those related to serious or rare diseases, often contain many medical terms that normal people would find difficult to understand. For example, Case et al. (2004) found that most of the Internet sources that people use for genetics information is not typically written for lay persons. Second, answerers would be able to provide information considering questioners' individual conditions or circumstances. Questioners can obtain information from answerers who have similar medical histories of their own or in family members. Third, social Q&A users can ask and answer questions to one another with natural expressions and statements. Questioners do not need to transform their information need into several keywords, and answerers would be able to freely describe their answers without any format to follow. Fourth, questioners can receive help from answerers at almost any stage of seeking health information. Those who are new to a certain domain can ask for help and receive introductory information. Also, those who have sources of information already can ask for confirmation.

In order to examine the characteristics of social Q&A as a useful source of health information, answerers' perceptions on the quality of the answers and their strategies to provide effective answers was investigated in the current study. In addition, the content of a sample of

answers were collected and answerers' expressions and statements used in providing information and social support was analyzed as well as the information sources used to create answers.

2.2. Online Questioning & Answering

Since the advent of the Internet, a number of online Q&A services have been developed that aimed to assist people who are looking for information on the Web. Some of these services have disappeared from the market, but some are still alive and popular. Social Q&A is a relatively new type of online Q&A service that has evolved along with the development of Web 2.0.

The online Q&A services that are discussed in this section are human-mediated questioning and answering services. People ask questions in plain language, in some cases with detailed narrative explanations of what they want to know. Other people provide customized answers which are dynamically created responses to the question asker's individual needs. Automatic question answering systems, such as those involved in TREC QA studies (Prager, 2006; Voorhees, 1999), are excluded from the scope of this review because they are information retrieval systems that search for snippets of documents and provide them as answers for the searches.

In this section, the historical and technical background of different types of online Q&A services, including social Q&A, are reviewed. First, an overview of the different types of online Q&A services is provided, and their specialized features and functions are compared and contrasted in Section 2.2.1. Second, in Section 2.2.2., social Q&A, the main topic of this study, is examined further by discussing a working definition, the available services, and trends in current research. Overall, the promise of social Q&A as a new way to encourage people to seek and share information on the Web is emphasized in Section 2.2.3.

2.2.1. Online Q&A

Online Q&A services are designed to support human-mediated question asking and answering behaviors on the Web. The basic principle is simple: a Q&A session is usually initiated by a questioner submitting a question, and is terminated when one or more answerers respond to the question. In reality, the process becomes a great deal more interesting and dynamic when it is applied to different types of services.

Three types of online Q&A services – digital reference services, expert services, and social Q&A services – are introduced in this section. The common factor is that they serve the public. Questioners can be anyone who has access to the Web. However, each is unique in terms of the service policies and the adapted technologies. Most importantly, the answerers, who are the main body of the services and control the quality of information, are different from one another. Background information on each service is summarized in the following sections. At the end of this section, the features and functions of each service are compared.

2.2.1.1. Digital Reference Services

Reference services are one of the traditional information services provided by libraries and have served the library users over hundreds of years, finding information through a variety of strategies. Reference librarians are information intermediaries between the library users and the library collections. They are specially trained to understand/interpret the information needs of library users and to guide them in locating appropriate information that responds to their needs. Bunge and Bopp (2001) emphasized that such personal and customized assistance is the essence of reference services. Reference librarians have face-to-face interviews with users, consulting about their information needs. Telephones and faxes have been used to supplement the face-to-face interviews, but the limitation imposed by physical distance from libraries has remained an obstacle to reaching remote users. However, this limitation was somewhat resolved due to the advent of digital reference services in the 1980s.

Digital reference services (a.k.a. electronic reference services, virtual reference services) refer to reference services which are provided online. Lankes (2003) defined digital reference as "the use of human intermediation to answer questions in a digital environment"(p. 302), and listed the five core components of digital reference services: 1) human expertise (subject or process knowledge), 2) cost efficiency and effectiveness to provide services with the resources available, 3) digital reference systems to support the interaction between users and reference librarians, 4) questions as the incomplete representation of user information needs, and 4) answers that are given in response to user information needs.

Thanks to the adaptation of new technologies, digital reference services enable library users to access such services more easily and conveniently, 24 hours a day, 7 days a week through various Web applications (e.g., message boards, email, chat, video-conferencing, etc.). The informal environment of email exchange or chat services enables users to be comfortable asking questions and helps those who are shy to avoid personal contact when asking questions (Straw, 2000).

In digital reference services, answerers are reference librarians. They mainly provide answers corresponding to direct questions, but sometimes they forward questions to subject experts and let them answer, if those questions require in-depth knowledge of particular subjects. Triage is an automated or manual process used by reference services to classify and assign questions to reference librarians or subject experts (Jeffrey Pomerantz, Nicholson, Belanger, & Lankes, 2004). In terms of their qualifications as answerers, reference librarians have been professionally educated and trained to respond to questions properly to provide the necessary information to users; also, they serve as consultants about users' information needs.

Questions represent the information needs of users, but users often do not fully or adequately explain what they want when they ask their questions (R. Taylor, 1968). Thus, reference librarians need to identify the information needs from these incomplete questions through the question negotiation process. In the traditional settings of reference services,

librarians conduct face-to-face interviews with users at that moment of information inquiry in order to understand what users need. In digital reference services, the process is a bit more challenging. First, the visual, verbal, or non-verbal cues needed to understand implicit expressions of users are absent (Straw, 2000). Second, the exchange of additional comments regarding questions and answers are not easily accessible, if at all. For example, in the case of email reference services, it is not recommended that reference librarians ask questions back to users in order to clarify the questions, because the response rates to the questions of librarians are pretty low. Third, reference librarians need to be ready to respond to various types of questions asked by anyone around the world, without restriction on topics, resources, or the time and physical locations of users (McClennen & Memmott, 2001; Straw, 2000). At the same time, as the expectations of users who access digital reference services are growing, the appropriate levels of staffing and training for digital reference services have been raised as issues requiring discussion (Janes, 2008). In spite of the challenges, digital reference services continuously put effort into reaching more users through new technology. Furthermore, in order to enable users to access services over longer periods of time or in broader subject areas, a number of collaborative services at institutional, regional, statewide, national and international levels have been provided (Janes, 2008).

Digital reference systems are unique and different from other information systems in that they support communication between users and reference librarians through the exchange of questions and answers (Lankes, 2003). A number of synchronous and asynchronous communication tools in digital environments have been used by libraries for providing digital reference services, and extensive research about the adaptation and utilization of these tools has been conducted in the field (e.g., digital reference technology in general (Richardson, Fletcher, Hunter, & Westerman, 2000; Smith, 2001; Tenopir, 2001), emails (Fishman, 1998; Schilling-Eccles & Harzbecker, 1998; Sloan, 1998), live-chatting (Francoeur, 2001; C. M. Johnson, 2004), and Second Life (Joint, 2008)).

Basically, library services are targeted to registered users of a particular library or institution, or residents in a regional domain in the case of public libraries. Thanks to the online availability of digital reference services, the physical and bureaucratic boundaries of services are not clear. For example, the digital reference services of public libraries are most often available to anyone regardless of their affiliation (Mon, 2000). In addition, there are digital reference services intentionally designed to serve the public online (e.g., Ask an IPL Librarian of the Internet Public Library[2], the Educators' Reference Desk[3]).

Digital reference services occur based on one to one interactions between a reference librarian and a user, and the overall process is confidential. In some cases, the archives of questions and answers that do not contain personal information are available to the public for searching and browsing, but the available contents are often limited. According to the standards of the Virtual Reference Desk AskA Consortium, libraries are encouraged to maintain archives of the previously asked questions and answers and to make them publically accessible (Kasowitz, Bennett, & Lankes, 2000). White (2001) investigated access to the archival contents of 20 digital reference services and found that 15 libraries (75%) made the archives publicly available, but only two libraries provided full access to all of the questions asked and the answers provided. In most cases, not all of the questions submitted by users were available in the archives. White (2001) calculated that 27% of them limited access to frequently asked or most often asked questions and related answers. A few years later, Pomerantz, Nicholson, Belanger, and Lankes (2004) found that 20 among 44 digital references services (42%) collected and stored the questions and answers for administrative purposes, but it was not known whether they were made available to the public.

A number of potential benefits are possible when digital reference services maintain archives of all of the questions and answers. From the perspective of service efficiency, the

[2] http://www.ipl.org/

[3] http://www.eduref.org/

archives can be used for detecting duplicate questions and generating answers automatically when a knowledge base analysis is available. However, Pomerantz *et al.* (2004) found that there are few reference services that automatically search the previously asked questions. For the users, public access to the questions and answers enables them to access the contents whenever they need information immediately without waiting for a response from librarians. When users find the questions and answers readily available from the archives, they may feel relieved knowing that there are people who have similar information needs. This may influence the building of a community of users and cause them to continuously visit the service. There are, indeed, privacy issues concerning exposing one's confidential inquiries to the public. Basically, the anonymity of questioners should be maintained and the process of deleting personal information should be included for the public display. Additional policy or management standards should be developed.

In fact, the openness of the overall process of question asking and answering is common in other types of online Q&A services. In order to compete with these services, digital reference services may have to adapt their strategies to attract users and build strong communities around the services. Further comparison of digital reference services and other types of online Q&A services is presented in Section 2.2.1.4.

2.2.1.2. Expert Services

Historically, reference services in libraries have played a major role in helping people to find information. In the digital age, face-to-face services were upgraded to digital reference services and accessibility by people physically outside library buildings was enhanced. At the same time, commercial online Q&A services, called expert services, appeared in the market in the early 2000s, and they have started to compete with digital reference services since then.

Expert services (a.k.a., ask-an-expert services, 'ask-a' services, expert Q&A) are question asking and answering services offered by various types of commercial and noncommercial organizations, other than libraries, such as professional societies and organizations, schools,

corporations, and even individuals in specific subject domains. Janes, Hill, and Rolfe (2001) believe that the reason that people visit expert services is to obtain some help from real people who have expertise, after they failed in their searches on the Web.

While answerers of digital reference services were trained and certified librarians, answerers of expert services are subject experts. The qualifications of subject experts vary depending on which organizations or companies provide the services. Subject experts can be those who have academic degrees or have received professional training (e.g., health care professionals, lawyers, government agents, realtors, accountants, etc.), or those who self-declared their specialized knowledge or skills in regard to a particular subject area (e.g., running a particular business for certain years, interested in a particular domain, etc.). Thus, the subjects covered by these services are diverse, depending on the expertise that the experts claim.

Expert services can be divided into two categories – free and fee services. As for the free services, government agencies or non-profit organizations have been involved heavily in responding to questions on the Web. For example, government agencies, like the U.S. Department of State and the Department of State Foreign Affairs Network (DOSFAN) provide an email-based "Ask a Question" service responding to questions about technical problems, department services, foreign policy, diplomatic history, countries, and international issues (Mon, 2000).

In the domain of health, health organizations or education programs facilitate online expert Q&A services. NetWellness[4] offers ask-an-expert consulting services regarding health issues and problems. It is funded and supported by the U.S. government as well as several non-profit organizations (Marine, Embi, McCuistion, Haag, & Guard, 2005). As of March 2009, over 500 health professionals, including physicians, nurses, pharmacists, dieticians, dentists, genetics counselors, optometrists, athletic trainers, and social workers from several universities have voluntarily participated in the service and responded to questions posted by anonymous users.

[4] NetWellness: http://www.netwellness.org/

Nowadays, a number of nonprofit organizations accept questions from people online, and provide information, and they can all be counted as a type of expert service.

Go Ask Alice![5] is sponsored by the Columbia University Health Promotion program and is a good example of a free service. It was originally developed to answer questions from students in the university, but now it is open to the public on the Internet. Go Ask Alice! receives 1,100 questions per week from college and high school students, parents, teachers, professionals, and older adults. The topics covered by the service are general health problems of all ages such as sexuality, sexual health, emotional health, fitness, nutrition, alcohol, nicotine, and drugs. Answerers are health care professionals in a team at Columbia University. Information and research specialists in other health organizations also participate in producing answers, but their affiliations are not listed on the Website. Go Ask Alice! has been in service since 1993, and the program also published a book containing a collection of questions and answers from the service in 1998, titled *The Go Alice Book of Answers: A Guide to Good Physical, Sexual and Emotional Health* (Columbia University's Health Education Program, 1998).

In addition, health organizations or commercial health portal services, such as Web MD[6], provide Q&A services as a part of their programs for free. They display the profiles of associated medical doctors or professionals and let them respond to questions through message boards or email communication tools on their Websites.

Fee-based expert services are more likely to follow the person-to-person information consulting services model. Most of the fee-based services are commercial programs, while free services are not. The service companies provide a gateway through which users can access a group of experts in comprehensive topic areas, including health. Experts display their profile information and contact information, such as email addresses and phone numbers, and fee information noting whether they charge a fee per question or per minute for the consultation.

[5] Go Ask Alice!: http://www.goaskalice.columbia.edu/

[6] Web MD: Ask one of our experts: http://www.webmd.com/community/experts

They are often self-declared experts. There may be a link, called "Be an expert", in order to recruit experts to their Website. These services receive applications and examine the qualifications of candidates, but the selection criteria or standards are not known. At the company level, no systematic methods to control the quality of the answers or the services were known, but they often allow users to rate or leave comments on the experts or their answers.

AllExperts[7], JustAnswer[8], and PickAnswer[9] are examples of expert services available on the Web. The search engine companies are also actively offering expert services. Yahoo! launched Yahoo! Advice[10] in April 2002, which had a partnership with an online advice company called LiveAdvice (Wolverton, 2002). LiveAdvice[11] is a phone-based advice site that charges a fee. LiveAdvice recruits self-described experts in various subject areas such as accounting, business, education, computing and internet, counseling, diet, health, legal, etc. In each category, a list of advisors is posted with their IDs, subject areas, phone numbers, fees, and ratings scored by other questioners. Yahoo! Advice provided a gateway to access LiveAdvice.

Google launched Google Answers[12] shortly after Yahoo! Advice. It was a hybrid service that enabled both experts and fellow users to respond to questions. Google Answers was also a fee-based service, but the service structure was a little bit different from other expert services. First, the price assignment was a bit different from other expert services. In most expert services, the price was pre-fixed by askers, such as a one-time charge, or pay per minute prices. Google Answers allowed questioners to suggest the amount of money that they were willing to pay for the answers, ranging from $2 to $2,000, considering the level of the expertise required to answer

[7] All Experts: http://www.allexperts.com/

[8] Just Answer: http://www.justanswer.com/

[9] Pick Answer: http://www.pickanswer.com/

[10] Yahoo! Advice: http://advice.yahoo.com (This service is not accessible anymore)

[11] Live Advice: http://www.liveadvice.com

[12] Google Answers: http://answers.google.com/answers/ (The service is discontinued, but the archives of questions and answers are available on the Website.

the questions. In reality, the amount that the questioners were willing to offer mostly remained no more than $10-$20 (M. E. Bates, 2007).

A group of experts, called Google Answers Researchers, provided answers. Google Answers Researchers were independent contractors who were selected by Google Answers through an application process. The required qualifications were not publicly available, but the guidelines and standards for Google Answer Researchers provided basic answering strategies, such as what to include in answers, how to cite internet sources, and how to write answers (Google Answers, n.d.). They were not only allowed to answer questions, but also to monitor and report incorrect answers to Google Answers. The topic areas within the subjects were diverse and the 10 highest-level categories were Arts and Entertainment, Business and Money, Computers, Family and Home, Health, Reference, Education and News, Relationships and Society, Science, Sports and Recreation, and Miscellaneous.

Google Answers maintained an open access policy of question asking and answering, while in most expert services the contents of the questions and answers were confidential and closed to the public. In addition, the public was allowed to comment on the questions and the answers, although they are not allowed to directly answer questions. All of the questions, answers, and comments were archived and people can access them in order to search and browse the contents.

Currently, there are a number of fee-based expert services still available on the Web, although there are no recent data about the total or estimated number of expert services. However, it seems that the services have undergone changes in the market place. For example, most of the services identified as representative expert services in the previous studies are not currently available on the Web. As of March 2009, only one among five expert services investigated by Bivens-Tatum (2001) still provides service. Janes, Hill and Rolfe (2001) selected 10 commercial expert services for their analysis; presently, only one of those services is accessible.

In addition, both Yahoo! Advice and Google Answers do not provide their services anymore. Google Answers was discontinued in November 2006. No official statement about the service closure was provided, but Shah, Oh, and Oh (2008) speculated that it may have been because Google Answers allowed only limited numbers of Google Answers Researchers to respond to questions. In terms of the quality control of the answers, Google Answers Researchers might provide useful answers to questioners, but they were easily overwhelmed by the number of questions posted by online users. According to the data collected from the archive of Google Answers by Shah, Oh, and Oh (2008), 534 answerers were identified, and they were supposed to respond to questions posted by 83,454 questioners. It is obvious that the number of questions posted per day must have been unmanageable and a huge number of questions remained unanswered.

In the case of Yahoo! Advice, which had provided a traditional fee-based expert service, playing the role of a gateway to connect experts to users by phone or emails, it was discontinued, and a new service was launched later, called Yahoo! Answers. It was similar to Google Answers in that it opened up the process of question asking and answering and allowed others to search and browse the posted questions and answers in the archive. However, it also encouraged people to answer questions posed by their fellow users. It originated from the principle that anyone can be an expert about something, and recognized that the social factor of collaboration in sharing information could lead to success in the market. It is an example of social Q&A that I will discuss in the next section.

2.2.1.3. Social Q&A

Social Q&A is a community-based Q&A service, which is purposively designed to support people who desire to ask and answer questions, interacting with one another via a Website. In the traditional settings of online Q&A services, people ask questions of a group of

experts, either librarians in digital reference services or subject experts in a particular domain. In social Q&A, people ask questions of the public and expect to receive answers from anyone who knows something related to the questions, allowing everyone to benefit from the collective wisdom of many, called "the Wisdom of Crowds - Ask a hundred people to answer a question or solve a problem, and the average answer will often be at least as good as the answer of the smartest member" (Surowiecki, 2004, p. 11).

Thus, in social Q&A, answerers are those who can access questions and are willing to provide answers, sharing knowledge and information based on their voluntary participation. In fact, answerers do more than simply respond with answers that share the knowledge or information that they have. Although the purpose of social Q&A is question asking and answering, people also look for advice on friendship, discuss a presidential election, recommend a baby's name, and survey a favorite basketball player. Therefore, what is shared in social Q&A is not only information but also experience, opinions, and fun, indicating that key functions of such services include both information sharing and emotional support (Gooden & Winefield, 2007)

In terms of the quality control of the answers, there are no authorities or intermediaries to intercept the communications or interactions or to evaluate answers. Every action and all the content in social Q&A are created by its users and freely available to the public. While in other services, questioners have one-to-one relationships with answerers, in social Q&A questioners and answerers can have one-to-one or one-to-many relationships depending on how many answers are given to a question. Since the service allows anyone to ask and/or answer questions, the levels of knowledge, expertise and experience of both the questioners and answerers are varied. The topical coverage offered by the social Q&A services is also comprehensive and diverse, ranging from mundane issues in everyday life to school projects and business problems.

Social Q&A enables people to collaborate by sharing and distributing information among fellow users and by making publicly available the entire process and products involved in

asking and answering questions. Another feature of social Q&A is that it allows people to search the accumulated questions and answers. This encourages users to participate in various activities - not only simple questioning and answering, but also commenting on questions and answers, rating the quality of the answers, and voting on the best answers. Within the past few years, various types of social Q&A services have been introduced to the public and research interest in people's information seeking behaviors in those contexts has recently increased. Specific examples of social Q&A will continue in Section 2.2.2.

2.2.1.4. Summary

In Table 2.1, the features and functions of the three types of online Q&A services are summarized and compared to each other.

Table 2.1. A Comparison Chart of Online Q&A Services

	Digital reference services	Expert services	Social Q&A
Other names	Virtual reference services, electronic reference services	Ask-an experts, Expert Q&A	Community Q&A
Purpose of services	To assist library clients to find information and educate the information search strategies	To provide information	To create and maintain an online community of information/knowledge sharing
Questioners	Mainly library clients, but not limited to them	Anyone	Anyone
Answerers	Reference librarians	Subject experts	Anyone
Answerers' expertise	Mostly in search	Specific subjects/topic areas	Subjects, experience, searching or anything else
Criteria to select answerers	MLIS or related degrees of library Science	Self-declared experts or assigned experts in a topic area	None
Service charge	Free (supported by local or state taxes)	Free or Fee	Free
Applications	Email, chat, message board, etc.	Phone or email	Advanced message board application
Responsibility to answer	Reference librarians	Experts, maybe	Ride at one's own risk
Sources of answers	Open Web, primarily	Subject knowledge	Human experience, subject knowledge, open Web
Types of information shared	Fact-finding	Fact-finding	Fact-finding and more; sharing experiences, raising online discussion/surveys
Example services	Internet Public Library (IPL) Digital reference services in public, academic, school, and special libraries	JustAnswer.com Askme.com Google Answers	Naver Knowledge-iN AnswerBag Yahoo! Answers WikiAnswers Live QnA

2.2.2. Example Social Q&A Services

The history of social Q&A is short, but this application area is growing incredibly fast. According to the Hitwise report (Hitwise, 2008), the market share of U.S. visits to social Q&A sites has increased 118 percent for the week ending March 15 in 2008 compared to the same week in 2007. Over the past two years, between 2006 and 2008, social Q&A activity has increased 889 percent. The background and characteristics of the leading social Q&A services are reviewed in this section.

2.2.2.1. Naver Knowledge-iN

The oldest social Q&A service was released in South Korea. In 2002, a Korean language-based social Q&A service, Knowledge-iN[13], was launched by a top ranking search engine company, Naver, and it continues to be the most popular service in Korea. At the early stages of the service, it was doubtful whether the service would succeed in attracting enough people who would spend their own time and effort providing answers to others, but it was hugely successful in bringing people together to ask and answer questions of one another. By and large, the success of their social Q&A service contributed to spreading the reputation of Naver, from being one of the well-known search engines to being the best information service in Korea, and influenced other search engine companies to open their own social Q&A services, such as Empas Knowledge Exchange Market, and Yahoo! Korea Knowledge Search.

The popularity of social Q&A has been incredibly high in Korea and it swept away the market for search engines. According to the market share of search queries, it was found that Google's six-year-old Korean Language search service took a mere 1.7% of the queries made through the Net in Korea, while Naver was dominant with 68.7% of the market share. The experts declare that one of the reasons that Naver surpasses Google in Korea is the existence of Knowledge-iN (I. Moon, Woyke, & Elgin, 2006).

The reasons why social Q&A was able to obtain so much attention among Korean users and has more loyal users than general Web search engines have not been examined, but one of the reasons predicted by researchers is that the paucity of Web documents written in the Korean language may lead people to social Q&A. Researchers believe that there are not enough Webpages written in Korean and those that are do not include the kinds of information that people want. Therefore, people ask questions of others, and receive information this way (Y. S. Lee, 2006). Since the roles of answerers who generate information in Knowedge-iN are just as important as the roles of questioners, identifying what causes people to participate and provide

[13] http://kin.naver.com/

answers could be a key to explaining the popularity of this and similar services. An empirical study (Nam, Ackerman, & Adamic, 2009) has recently been carried out to identify the motivations of answering questions in Naver Knowledge-iN. They collected data from semi-structured phone interviews with 26 users of Knowledge-iN, and determined five categories of motivation– altruism, business motives, learning, hobby and personal competence, and point rewards. Since Knowledge-iN is a Korean based social Q&A service, the cultural aspects of motivation to participate in social Q&A may have influenced the study findings. It would be an interesting analysis to compare the motivational factors of Knowledge-IN to those which were tested in the current study.

2.2.2.2. AnswerBag

AnswerBag[14], the oldest English-based social Q&A service, launched its service in 2003. Since then, the number of users and Website traffic has continuously increased and, as of March 2009, there are about 915,000 users. In November 2008, it was reported that traffic includes over 7 million unique visitors per month (Gazan, 2008). A total of 21 subject categories and related subcategories for questions are listed, and there is an additional category called "Outside the Bag" for lighter fun and games with Q&As, with survey type questions (e.g., "What is the funniest sms you ever got?" or "Who would win, Harry Potter or Peter Pan?", etc.).

According to Gazan (2008), a researcher who has used AnswerBag for his research test bed since 2004, the earliest model of AnswerBag was a simple factual Q&A site. No comments were allowed to be added to either questions or answers. Only rating functions with which to evaluate answers were available for the purpose of collaborative filtering. However, users started to use answer fields, not only to post answers, but also to express their thoughts and opinions for communicating with questioners or the community in general. As a result, the service evolved into a social service, which embraced the social factors embedded within the communication, and

[14] http://www.answerbag.com/

allowed people to comment on the answers. All of the communications between questioners, answerers and evaluators are visible and Gazan (2008) believes that the answer comments lead people to be more deeply engaged with each question and answer, and encourage people to join the conversation.

2.2.2.3. Yahoo! Answers

Yahoo! Answers got into business a little later than other social Q&A services, released in December 2005. Within a year, it became the top ranking service, dominating with 96.10% of the social Q&A market (Prescott, 2006). Its market share was 47 times greater than the one that placed second, AnswerBag (2.04%). Window Live QnA, Wondir, Amazon.com's Askville, and Yedda.com followed, but the total of their market share was less than 2%. In addition, Yahoo! Answers was ranked 100th among the 500,000 most visited Websites in 2006 (Prescott, 2006). Interestingly, in the Education-Reference Category, Yahoo! Answers was ranked as the second most popular Website after Wikipedia. Yahoo! Answers received 53% of its traffic from search engines, thus the data in Yahoo! Answers are indexed and searchable by Yahoo! Search or Google(Prescott, 2006). The dominance of Yahoo! Answers continues to the present, and it has hosted 25 million users with 237 million answers in the United States and 135 million users with 500 million answers world-wide (McGee, 2008).

Although Yahoo! Answers is still the top ranking service according to the 2008 report (Hitwise, 2008), it has been challenged recently due to the advent of a new dark horse, Wiki Answers, in the market. As you see in Table 2.2, the percent of the market share was decreased to 74.5%, while WikiAnswers obtained 18.35% of the visits in its first year on the Web. An interesting competition between the two services is expected in the near future.

Table 2.2. Top 5 Social Q&A Sites Ranked by Market Share of U.S. Visits (from Hitwise(2008))

Rank	Service	March 15, 2008	March 17, 2007
1	Yahoo! Answers	74.50 %	94.25%
2	WikiAnswers	18.35 %	NA
3	AnswerBag	4.51 %	2.46 %
4	Ask MetaFilter	1.80 %	1.88 %
5	Askville	0.85 %	0.20 %

Yahoo! Answers has two advantages in winning market share. First, Yahoo! Answers has continuously promoted its service to a great number of existing Yahoo! users, and the existing users can easily access Yahoo! Answers without any additional registration process. Second, thanks to the global network of Yahoo!, Yahoo! Answers has been promoted and used worldwide in many languages reaching beyond the English-speaking world.

The general features of Yahoo! Answers are the same as other social Q&A sites. The topical coverage of Yahoo! Answers is quite broad. To embrace a wide spectrum of peoples' interests, Yahoo! Answers established 25 top-level categories and encourages people to post questions/answers under appropriate categories.

The most unique feature of Yahoo! Answers is that it allows a questioner to choose a "best answer" when more than one answer is given. Once a questioner determines the answer he or she likes most for whatever reason, it is tagged as the best answer, and his or her narrative comment can be left on it. When the questioner does not want to choose a best answer, the question can be put up to be voted on by the community. When a best answer is chosen, either by the questioners or by the community through a vote, the question becomes a resolved question and stays in the site for searching and browsing. Emphasizing that the comments shed some light on the relevance criteria used by questioners in selecting best answers, Kim and Oh (2009) analyzed the comments and developed a framework of answer selection criteria.

2.2.2.4. WikiAnswers

WikiAnswers is a wiki-based social Q&A service, which allows people to ask, answer and edit questions and answers, with the purpose of building a database of Q&A, based on the collaboration of users. The basic principle is the same as any Wiki. Everyone is collaborating to build the collection of questions and answers.

WikiAnswers was originally designed as a Website of a FAQ collection of information. Later, it was purchased by Answers Corporation, the owners of Answers.com, in November 2006. It appeared in the market most recently, as a part of Answer.com, but it is growing fast, ranked as the fastest growing Website of the top 1,500 in the U.S. in 2007 (Answer Corporation, 2008). Among the leading social Q&A services, it was ranked as the second most frequently visited service, controlling 18.6% of the market share in the U.S. (See Table 2.2). As of March 2009, 2 million users, 10 million questions and 3 million answers are available on its Website.

The Wiki technology makes WikiAnswers different from other social Q&A services in that (1) anyone can edit questions, answers or discussions (similar to comments on other services) and (2) users collaborate to create a unified answer per question. It is possible to track who contributes to the creation, editing or updating of answers, but it is not recognizable as much as in other social Q&A services, which indicate who posts which particular answer in the list of answers attached to a question. The unique functionality and context of WikiAnswers is an interesting contrast to other social Q&A services.

2.2.3. Empirical Studies of Social Q&A

As the popularity of social Q&A has grown in recent years, so has the interest of researchers in trying to understand the context for this phenomenon. In order to meet the needs of researchers and practitioners to develop the research community of social Q&A, the first international workshop on Question Answering on the Web (QAWeb) was held at the 2008 International World Wide Web Conference (Wenyin, Li, & Huang, 2008). It is predicted that

more active participation by researchers studying social Q&A will be presented in the following years.

Although the number of social Q&A studies is still relatively small due to its short history, a variety of topics in research have been pursued. They have centered on two major domains: (1) content (e.g., questions and answers), and (2) users (e.g., questioners, answerers, and the community in general).

The content-centered studies have mainly focused on two areas: (1) identifying different types of questions and answers (Harper, Raban, Rafaeli, & Konstan, 2008; Jeon, Croft, Lee, & Park, 2006; S. Kim, Oh, & Oh, 2007), and (2) evaluating the quality of answers (Agichtein, Castillo, Donato, Gionis, & Mishne, 2008; Harper, et al., 2008; Jeon, et al., 2006; Yuanjie Liu et al., 2008).

With concerns about credibility, truthfulness, and the responsibility of answers, researchers have evaluated the quality of answers with a distinct set of criteria and methods. Su *et al.*(2007) analyzed answers to 81 questions that they had posted on Yahoo! Answers, and found that the response rate was rather high, as 95% of the questions received at least one answer. When they evaluated the usefulness and correctness of each answer, a diverse range of quality was observed. Liu, Bian and Agichtein (2008) identified user satisfaction as an indicator for evaluating the quality of answers, and developed several systems with different algorithms to predict user satisfaction with answers. These featured data related to questions and answers, user profiles and topic categories, based on results from evaluations by human judges, domain experts and paid raters recruited from Amazon's Mechanical Turk.

Haper, Raban, Rafaeli, and Konstan (2008) also took a similar approach as Liu *et al.*'s (2008) study, but further compared the quality of answers in social Q&A to those of other types of online Q&A services, such as digital reference services and expert services. While Liu *et al.* (2008) recruited experts for the evaluation, Harper *et al.* (2008) asked undergraduate students to evaluate the quality of answers with a set of criteria based on correctness, confidence, helpfulness,

progress towards receiving an answer, monetary compensation, degree of personalization, and answerers' efforts. Interestingly, it was found that the reviewers believed that social Q&A sites provided a higher quality of answers than other types of services. This is due to the answerers' care and concern for the questioners and the topics of the questions, as expressed in the answers of social Q&A; this is rarely seen in answers obtained in digital reference or expert services.

Answerers' preferences for subjective answers and answers with emotional overtones were also observed in the study by Kim and Oh (2009). While researchers in the previous studies recruited third parties to evaluate the quality of the answers, Kim and Oh (2009) analyzed the criteria of the questioners when they chose the best answer from among all the answers given to their questions. The socio-emotional criteria, such as agreement, emotional support, attitudes, humor, effort, and taste, were recognized as the most frequently used criteria with which to evaluate answers, followed by criteria related to their contents and the utility of the answers. This result emphasized the uniqueness of answers offered in Social Q&A, that contain not only information, but also socio-emotional content that the users appreciate, such as feelings, emotions, contexts, interaction and communication.

In the user-centered approach to social Q&A research, the research topics are more diverse than in the content-centered approach. Research has been reported about the roles of social Q&A users (Gazan, 2006, 2007), authoritative user identification (Bouguessa, Doumoulin, & Wang, 2008; Jurczyk & Agichtein, 2007, 2008), user information needs shown in music questions (J. H. Lee, Downie, & Cunningham, 2005), and users' information sources used in answering questions (Oh, Oh, & Shah, 2008).

The two primary user groups in social Q&A are questioners and answerers. Gazan (2007) identified questioners as either Seekers or Sloths, based on the levels of interaction with answerers in obtaining information about their homework assignments. Interestingly, answerers detected the intentions and attitudes of questioners and preferred to respond to Seekers more than to Sloths. Gazan (2006) classified answerers as either Specialists or Synthesists, and found that

questioners would like to receive answers from both specialists and synthesists, receiving benefits from both expertise and information, rather than answers received from either specialists or synthesists alone. Bouguessa, Doumoulin, and Wang (2008), and Jurczyk and Agichetein (2007, 2008) were interested in filtering authoritative users from among others. They created and experimented with algorithms to examine the levels of authority; they developed diverse measures and user ranking systems.

A collection of questions can be used to analyze the information needs of people in a certain domain, since it is the set of data observed in a natural setting. Lee, Downie, and Cunningham (2005) obtained questions in the music category of a social Q&A service, Naver Knowledge-IN, and analyzed the music information needs described in the questions. Although it was an exploratory study to examine the questions in a certain domain, a full set of questions available from social Q&A sites could be used for further analysis of the information needs of people within various topic domains.

Additionally, exploratory studies that provide a statistical analysis of data generated by a social Q&A service (Gyongyi, Koutrika, Pedersen, & Garcia-Molina, 2008; Su, et al., 2007) have been conducted. There are also studies which have stretched the area of social Q&A research in conjunction with other domains, such as digital libraries (Gazan, 2008), social tagging (Rodrigues, Milic-Frayling, & Fortuna, 2008), and social network analysis (Adamic, Zhang, Bakshy, & Ackerman, 2008).

Motivation is a relatively new concept to explore in the context of social Q&A, but two groups of researchers have attempted to identify the motivational factors that encourage people to answer questions. Rafaeli, Raban and Ravid (2007) believed that incentives are the main factors that drive people to answer questions online, so they investigated the effects of economic and social incentives in Google Answers. The researchers traced the question answering activities of two groups of answerers, and investigated the influence of the incentive mechanism on their activities. A year later, Raban and Haper (2008) developed a framework of intrinsic and extrinsic

motivations which emphasized information sharing as the main goal of people who ask and answer questions online. A more recent study (Nam, et al., 2009) also has been carried out to identify the motivations of question answerers. They collected data from semi-structured phone interviews with 26 users of Knowledge-iN, and determined five categories of motivation– altruism, business motives, learning, hobby and personal competence, and point rewards.

Since motivation is one of the central topics of the current research, an in depth review of studies about motivations of answerers in social Q&A and other types of communities in online context has been provided in Section 2.3.

2.3. Motivation

Motivation has been a central and perennial topic of research for several decades in psychology because it is an essential factor that determines people's behaviors. When it was found that there is a consequential effect of motivation that maximizes people's performances, the scope of motivation research was expanded to the areas of research in human behaviors, such as education, management in business, and consumer behaviors, and its influence has been tested in various environments, such as classrooms (Newby, 1991), corporations (Herzberg, Mausner, & Snyderman, 1993), work environments (Tuten & August, 1998), clinics (Sheldon, Williams, & Joiner, 2003), libraries (Small, Zakaria, & El-Figuigui, 2004), etc.

In ILS, the research on motivation has been mostly carried out in the area of information seeking behaviors. Motivation is an affective factor that enables people to continue searching until they are satisfied with the results (Nahl, 2001, 2004). The research has focused on the motivations of various groups of people to initiate and stop searches (e.g., middle and high school students (Heinström, 2006), the Y generation (Weiler, 2004)), to use different information tools and sources (e.g., computers (Davis & Wiedenbeck, 2001; Selker, 2005), Internet technology (Teo, 2001), interface design (Watters & Duffy, 2005), search engines (Wu, Chuang, & Pin-Yuen, 2008), information literacy (Small, et al., 2004), and information sources (Small & Ferreira,

1994)), or to use a particular system or service (e.g., e-health system (Dutta-Bergman, 2004), collaborative information finding system (Shapira, Kantor, & Melamed, 2001)). Most of these studies emphasized the perspectives of information seekers, describing what motivates them to search for information, and how information services or systems can amplify the motivation to carry out searches better.

In the current study, the main focus was centered on information providers, namely answerers in social Q&A. Social Q&A has similar attributes to online communities in that it is an online platform of information sharing and social support, but is mainly designed to facilitate question asking and answering. No interaction or communication is initiated without questions or answers. Thus, the intentions of people to participate in social Q&A can vary depending on the purpose of their activities. The open environment of social Q&A may influence the willingness of people to serve as participants. The topics covered in a social Q&A service are so diverse that users don't have to make a commitment to any particular subject in order to participate in social Q&A. Since anyone can access and participate in social Q&A, the level of knowledge, expertise, and experiences of the participants are diverse according to the topics of the questions and answers. Thus, in-depth research focusing on the motivation of social Q&A users should be carried out, emphasizing both the intentions and behaviors unique to the social Q&A users.

The current study starts with an assumption that the motivation of answerers is closely related to the dual aspects of information sharing and social support in social Q&A. What kinds of motivations answerers have could influence the selection of questions and the creation of answers, by providing either information or social support or by offering both of them. Answerers of health questions have the opportunity to deal with both information and support, which are both important from the viewpoint of the questioners.

In fact, the motivation to share information and support has been widely investigated in various settings of online environments, such as newsgroups (Wasko & Faraj, 2000), online consumers (Hemetsberger & Pieters, 2001), hobby and recreation communities (Y. Wang &

Fesenmaier, 2003), communities of practice in corporations (Ardichvili, Page, & Wentling, 2003; Hall, 2001a, 2003), open source communities (Hars & Ou, 2001; Lakhani & von Hippel, 2003), wiki communities (Kuznetsov, 2006), and online support groups in health (Preece, 1999). A number of motivational factors have been identified from these studies, from diverse personal interests to gaining a reputation or reward, to the altruistic and mature goal of advancing knowledge in a certain domain. Under an assumption that answerers' motivations to contribute in social Q&A would be similar to the motivations of other online participants, especially contributors who help others in online communities or support groups, answerers' potential motivations in social Q&A have been inferred by reviewing the motivational factors identified in previous studies.

The remainder of this section is organized as follows. The fundamentals of the concept of motivation, such as its definitions and related theories are reviewed in Sections 2.3.1. and 2.3.2. Next, the practical studies investigating the motivations for participating and contributing in various types of online communities and support groups are examined in Section 2.3.3.

2.3.1. Definition of Motivation

The concept of motivation has been defined by researchers in various fields of study. From the psychological point of view, motivation indicates "energy, direction, persistence and equifinality [which causes] all aspects of activation and intention" (Ryan & Deci, 2000, p. 69). Emphasizing the practical aspects of motivation, Mitchell (1982) defined motivation as "the degree to which an individual wants and choose to engage in certain specified behaviors" (p. 82). When it is focused on a particular environment such as motivation to do better work, it was defined as "a cognitive persistence, the drive, tendency, or desire to undertake or complete a task, expend effort and do a quality job" (Gagne & Medsker, 1996, p. 168)

All of these definitions point to the fact that motivation is one's desire and energy that cause certain behaviors in task performance or learning. A highly motivated person performs

actions enthusiastically. On the contrary, without motivation, a person easily loses interest in performing actions and will perhaps discontinue doing them. Motivation is not static but dynamically changing and evolving, depending on the conditions or situations in which the actions occur. In ILS, motivation has been considered as an important factor with which to examine affective behaviors of information seeking (Nahl, 2001, 2004). A person may start searching with the motivation to look for some particular information. During the searches, one's motivation can be encouraged or alleviated depending on how much the person is cognitively and affectively stimulated by the search process and results. When the motivation to look for information disappears from one's mind, either by successfully finding the desired information or by being tired of searching, the searching process may be closed.

While the traditional approach to research on motivation in ILS was mainly aimed at an individual's inner motivation for conducting a search for his or her own information needs (or sometimes on the behalf of those who are related with, like family or friends), in social Q&A, people conduct searches and create answers for anonymous others. Thus, a social perspective on motivation to help others and to share knowledge, as well as personal desires, needs to be examined to understand the motivation of answerers in social Q&A. In fact, the impact of motivation to share knowledge has been extensively investigated, exploring how people share information in online communities, how employees share knowledge of practice within organizations or across organizations, and what motivates people to collaborate in disseminating knowledge in wiki's. A detailed review of motivations related to these types of knowledge sharing is provided in Section 2.3.3.

2.3.2. Motivation Theories & Models

In order to understand the background of motivation in research, three core motivation theories are reviewed: 1) Maslow's Hierarchy of Needs, 2) intrinsic and extrinsic motivation, and 3) Herzberg's two-factor theory (a.k.a. the motivation-hygiene theory). In addition, their

implications for the area of question answering are discussed. Maslow's Hierarchy of Needs is one of the classical and primary theories of motivation, indicating what kinds of inner desires an individual has, and it is mainly discussed as a way to understand human nature. On the other hand, the other two models are aimed at understanding motivation in relation to other people. They are intended to identify the motivational factors concerned with the purpose of promoting one's behavior during a particular task in a social context. Intrinsic and extrinsic motivation is not a theory, but rather a prevalent approach which emphasizes the rewards given in response to particular actions. Both internal and external rewards stimulate individuals' willingness to perform actions. Herzberg's Two-Factor Theory also discussed two aspects of motivation, but it is more focused on a work environment, encouraging people to work more and better.

All three theories have influenced the construction of the proposed model of answerers' motivations for answering questions in social Q&A. Maslow's Hierarchy of Needs speculates that there are individual aspects of motivation that drive the action of answering questions. Intrinsic and extrinsic motivation describe motivational factors influencing people to share information in online environments, focusing on rewards, either internal rewards for self-ego or incentives given by the external community. Herzberg's Two-Factor Theory separates motivation into two layers of motivation and environments and influences the identification of the personal and social factors that promote one's motivation. A detailed review of the three models follows.

2.3.2.1. Maslow's Hierarchy of Needs

Maslow (1943, 1970) made the assumption that it is important to understand human needs prior to doing further synthesis of different types of human motivation, because people are motivated to perform tasks in order to fulfill their needs. Thus, Maslow identified the five basic human needs as physiological, safety, being loved, esteem, and self-actualization, in that order. These needs are not independent, but rather related to one another, having a hierarchical

relationship that the upper level needs cannot emerge until the lower level needs are satisfied to some degree.

The physiological needs are the most fundamental needs that people have, in order to maintain an elementary living status. The biological needs for maintaining a stable condition of the human body (homeostasis), the needs for satisfying hunger and eating food (appetite), and the needs for sleeping, sexual desires, and other instinctual activities needed to survive are categorized in the area of physiological needs. They are the most primary and dominant needs because any deficiency in the physiological needs suppresses human craving for the upper level needs. The next level of the basic needs is the *safety needs*. People have physical needs to be safe and to maintain sound conditions, without being injured, attacked or threatened. In addition, they are concerned with the security of their families, their jobs, and their own social status, and are frustrated by unpredicted changes in the world. The need to have a religion or philosophy that explains the fundamentals of organization in the world also belongs to this category because it fulfills the need to pursue the reasons to feel safe. The third basic needs are the *love needs.* People want to be loved by a spouse, family, friends and colleagues. The concept of love is different from sex in that the love needs are social needs to have relationships with others while sex can be a pure physiological or instinctual need. In terms of the social aspect of the basic needs, the fourth level of needs, the *esteem needs*, are more intense than the love needs. While the love needs are satisfied by the affective aspects of interpersonal relationships, in the esteem needs, people want to be highly evaluated by others. The needs for self-respect, self-esteem and for the esteem of others belong to this category. The desires for reputation, prestige, recognition, attention and appreciation are esteem needs. With these needs, people have high motivation to achieve some goals and acquire self-confidence. Finally, people desire to carry out actions that will satisfy the highest level of their needs, the *self-actualization needs*. The motivations and needs to be an ideal mother, to become athletic, or to do innovative work as an artist or musician, are assigned to this category.

Each individual has different needs. Even within an individual, the needs can dynamically change, depending on situations or conditions. Although Maslow emphasized that the upper level needs cannot be fulfilled unless the lower level needs are satisfied, he admitted that some reversals in the hierarchy happen in the real world. For example, there are people who consider self-esteem as more important than being loved. People who concentrate on highly creative work may not be concerned with whether their basic needs, like the 'physiological needs' are fulfilled or not, and don't feel hunger, even forgetting to feed themselves. In some cases, the needs can be assigned consciously, and a person pursues the needs at a particular level purposefully, influenced by high social standards or values. One of the most interesting characteristics of human beings who are motivated by these needs is that multiple motivations and needs interplay together to result in a series of behaviors. For example, eating food is a behavior to fulfill a physiological need. At the same time, it can be a behavior providing comfort for oneself, which indicates the safety needs. Doing a noble work, such as helping others or sacrificing oneself, may be derived from the combination of the love needs, the esteem needs and the self-actualization needs.

Maslow's Hierarchy of Needs, as one of the most fundamental theories for understanding human needs, has been widely used and applied in almost every field of research to explain the dynamics of human needs and to develop practical models of motivation. In the context of information seeking, in particular, Maslow's hierarchy of needs can be used to conceptualize information needs, because people look for information in order to satisfy their needs as a human being. In the context of library services, the directions and guidelines for librarians are to promote services in order to satisfy user needs up to the level of self-actualization(Anderson, 2005; Sridhar, 1981). It is often compared to Horton's (1983) hierarchy of information needs – the needs of coping, helping, enlightening, enriching, and edifying information (Dowlin, 1993; Menou, 1995). Each level of needs in Maslow's and Horton's match to one another, from lower to higher, and evolve together as the level of needs advances. In particular, the higher the level of

Maslow's needs, the more advanced and sophisticated strategies and methods people use to find information (Marchionini, 2006).

Despite the popularity of the theory, Maslow's theory has been criticized in relation to two aspects. First, the hierarchy itself explains one's state of mind without considering how it can be influenced by human behaviors (Hendriks, 1999). Second, it does not reflect the social and environmental factors related to promoting human needs (Mitchell, 1982). An individual's motivation can surface due to one's inner desire, as well as be influenced by external factors caused by interactions with other people or situations that encourage or discourage certain actions. Due to these constraints, it has been limited to applications and tests in practical settings (Maccoby, 1988).

In social Q&A, for answerers who provide information and support the requests for information of others, the lower levels of needs are unlikely to be significant motivation for them to voluntarily participate in creating answers that help others. Answerers are more likely to be influenced by the higher levels of needs, such as self-esteem and self-actualization. Their desired self-esteem is related to being respected, to building a reputation, and to sustaining their social presence in online environments. In order to be a well-known answerer in the context of social Q&A, answerers devote time and effort to creating useful and effective answers for others. Both levels of needs could be important reasons for answerers to participate in social Q&A. However, answerers' motivations cannot be explained by only these two factors of needs. As individuals, answerers would have more diverse and complex reasons for contributing. As social beings, they may expect others to recognize their reputation as they interact with fellow users in social Q&A. Maslow's theory provides a good overview of human nature in general, but is not specific enough to explain the behaviors of question answering in online environments.

2.3.2.2. Intrinsic and Extrinsic Motivation

Maslow's theory on an individual's needs and motivations has been expanded to consider external factors, indicating how one's motivation can be influenced by external rewards given in particular situations or relationships with others. Based on the rewards used to promote one's behaviors, motivation can be classified into two categories - intrinsic and extrinsic motivation. Intrinsic motivation indicates the internal state of a human mind that leads to one's natural behaviors, while extrinsic motivation refers to the external conditions or rewards that stimulate the performance of activities.

Intrinsic motivation implies that people carry out actions simply because they like to do it. Those who are intrinsically motivated perform activities without apparent enforcement or external rewards other than self-encouragement or self-interest in the activities themselves or the processes of the activities. In some cases, those who are highly intrinsically motivated often pour all of their energies into performing a certain task and even lose track of time, space and other events (Davis & Wiedenbeck, 2001). Csikszentmihalyi (1975) identified this phenomenon as a state of flow or a flow experience, which means "a unified flowing from one moment to next, in which he is in control of his actions, in which there is little distinction between self-environment, between stimulus and response, or between past, present, and future" (p. 36). We still need to ask, what causes people to be in a stage of flow? What are the internal determinants in human minds that make them feel self-encouraged and self-interested, and induce them to perform certain activities?

At birth, people have the nature of being active, inquisitive, curious, and exploratory. This nature can be more clearly observed in the young. Children are always curious about everything around them and pour out questions to their parents (Deci & Ryan, 1985). Although the degree of curiosity may diminish as children grow, it is still the central force of intrinsic motivation. In addition, people have inherent tendencies to pursue playful and enjoyable tasks (Deci & Ryan, 1985). They are willing to spend their time and effort doing the things that they

like to do (Csikszentmihalyi, 1975). People enjoy their hobbies and play games for fun. Thus, enjoyment is an important determinant in intrinsically motivated behaviors. Not only do people perform tasks for pleasure, but they also seek out novelty and challenges (Deci & Ryan, 1985) . Some people like to be actively engaged in challenging work, rather than to passively consume products or services (Csikszentmihalyi, 2000). The optimal level of challenge associated with a particular activity, balanced with the level of one's capacity, can also maximize the level of enjoyment, and, as a result, highly promote intrinsic motivation (Deci & Ryan, 1985). Last but not least, Deci and Ryan (1985) emphasized the feelings of competence and self-determination as key determinants of intrinsic motivation.

In addition to the internal state of an individual, one's intrinsic motivation can be promoted by interpersonal relationships with others. Lepper and Malone (1987) were interested in designing learning environments which stimulate the intrinsic motivation of people. They identified several individual and interpersonal factors that influence people's learning behaviors: challenge, curiosity, control and fantasy. When people are in situations in which they need to collaborate and interact with others in learning, interpersonal factors, such as competition, cooperation, and recognition, can influence and promote motivation of individuals.

While intrinsic motivation refers to the inner state of the human mind, it cannot explain all of the various human behaviors (Ryan & Deci, 2000; Shapira, et al., 2001). Extrinsic motivation also plays an important role in making people perform and complete tasks. While intrinsic motivation is self-driven energy affecting people's behaviors, extrinsic motivation is mostly imposed by external parties. Relying on the reasons, situations, and conditions necessary to promote extrinsic motivation, the interested parties provide various types of external rewards. For example, companies provide monetary and non-monetary incentives as external rewards to employees in order to promote their work efficiency (Bartol & Srivastava, 2002). In schools, the rewards, such as gold stars, best student awards, honor rolls, and pizzas for reading, have been provided in order to reinforce students' extrinsic motivation to learn (Bartol & Srivastava, 2002;

Deci, Koestner, & Ryan, 2001). Similarly, reputation building mechanisms often stimulate people to contribute more in community activities (Eisentraut, Koch, & Möslein, 2001).

The effectiveness of intrinsic and extrinsic motivation has been tested in various studies and the findings are diverse depending on the contexts and situations. In education, it was found that intrinsic motivation influences people more strongly than extrinsic motivation. Those who were intrinsically motivated felt more interest, competency and excitement about doing their work than the extrinsically motivated people (Ryan & Deci, 2000). The task performance of the intrinsically motivated people was enhanced, and they produced persistent and creative outcomes (Ryan & Deci, 2000). Promoting external motivation alone, like giving praise without objective feedback on their performance, negatively affected students' performance (Black & Wiliam, 1998; Lepper & Hodel, 1989).

In work environments, it has been found that external motivation through rewards or incentives, whether it is direct or indirect, positively influenced people's effort and performance (Gibbons, 1997; Lazear, 2000). The effects of intrinsic motivation and extrinsic motivation sometimes are maximized when they are combined. Cameron and Pierce (1994, 1997) found that employees performed best when they were intrinsically motivated by doing work in which they had interest and felt challenged, and at the same time received extrinsic rewards, such as money. On the contrary, in some cases, the presence of extrinsic motivation in the middle of task performance which was originally driven by intrinsic motivation can induce lower performance as a result of decreasing the motivation effect (Deci & Ryan, 1985).

2.3.2.3. Herzberg's Two Factor Theory: Motivation & Hygiene Factors

While Maslow's Hierarchy of Needs and the intrinsic and extrinsic motivation approach discussed the general nature of human motivation to do activities, Herzberg developed the two factor theory for the purpose of adding an environmental perspective, explaining motivation in work environments, in particular.

Like other researchers, Herzberg (1966, 1987, 2000) believed that human needs drive motivation, and proposed two basic needs of people that affect work activities (Herzberg, 1987). The first one is *the biological needs*. Compared with Maslow's five needs categories, these biological needs include not only the physiological needs, but also the safety needs. According to Herzberg, people work and make money in order to satisfy their biological needs. The second one is the need for achievement. While the biological needs are the common needs observed for any kind of living creature, the need for achievement is a unique feature of human beings. Maslow's love needs, esteem needs, and self-actualization needs can be included in this category. Although the ways to categorize human needs are different, both Herzberg and Maslow admitted that human needs are continuously changing and evolving within their frameworks and attempted to find the motivational factors associated with these dynamic human needs (Tuten & August, 1998).

In order to identify the ways in which the motivational factors work, Herzberg investigated the positive and negative feelings of employees in their current situations. In particular, he examined the relationships between motivational factors and job satisfaction, which is defined as "a positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p. 1304). This perspective is based on the assumption that people's motivation to work varies in accordance with the presence of the factors that increase job satisfaction or that decrease job dissatisfaction in work environments.

As a result, two sets of factors – motivation and hygiene– were identified as influencing job satisfaction. Motivation factors are related to the inner desire of individuals to accomplish work successfully. They indicate a sense of achievement, recognition for achievement, the nature of the tasks, responsibility, and advancement. While motivation factors are mainly influenced by the work itself, hygiene factors refer to the external and environmental conditions where the work is being done, such as company policy, administration, supervision, interpersonal relationships with the other workers, salary, security and working conditions.

In terms of producing job satisfaction, the two sets of factors are independent of each other. Motivational factors are related to job satisfaction and have nothing to do with job dissatisfaction. When motivational factors are fulfilled, people are satisfied with their jobs. When motivational factors are insufficient, they may feel disappointed and unsatisfied, but it does not influence job dissatisfaction. On the contrary, hygiene factors are associated with job dissatisfaction only. When hygiene factors are insufficient, people are dissatisfied with their jobs. When hygiene factors are fulfilled, it does not influence one's job satisfaction. Thus, if a company wants to increase work efficiency by increasing job motivation, it is important to consider both factors. Lack of either one of the factors can cause poor performance among workers.

Herzberg's two factor theory has been widely tested in promoting the job motivation of various types of professionals, such as tour guides (Gnoth, 1997), teachers (Nias, 1989; Poppleton, 1988), and librarians (Plate & Stone, 1976), as well as corporate employees (Rantz, Scott, & Porter, 1996), and the effectiveness of the two-way approach as a management tool to increase the quality of work performance and the level of satisfaction has been demonstrated by a few other studies (Heckman & Oldman, 1975; Kopelman, 1986). In addition, the scope of areas to which the theory has been applied has expanded into various contexts, such as library instruction (Stamatoplos & Mackoy, 1998), consumer behaviors (Liang & Lai, 2002; Madox, 1981; Stamatoplos & Mackoy, 1998; Tuten & August, 1998), knowledge sharing (Hendriks, 1999), website design and evaluation (Zhang & von Dran, 2000), and search engine use (Wu, Chuang, & Chen, 2008).

2.3.2.4. Application of the Theories to Answerers in Social Q&A

All of the three motivation theories were included in this review because they provide the context within which to understand the general concept of motivation and the related factors that

influence motivation of human behaviors. They form the basis on which to build the conceptual framework of motivation of answerers in social Q&A overall.

In regard to Maslow's hierarchy of needs, it can be recognized that the higher levels of needs, in particular self-esteem and self-actualization, are likely to be related to answerers in social Q&A. Answerers are those who participate in sharing knowledge voluntarily. They may spend time and effort to construct answers for others in order to receive attention from others, and to be evaluated as knowledgeable persons. The need for self-esteem can be translated to understand the needs of answerers to be recognized and admired by others. Answerers in social Q&A are also likely motivated to engage in the actions of answering others' questions due to their own need for self-actualization. They are self-motivated and answering questions for others is an enjoyable activity for them.

Similarly, intrinsic motivation can explain the motivation that naturally comes from answerers' inner states of mind as they provide answers for others, and the needs for self-esteem and self-actualization can also be considered as important aspects of intrinsic motivation. The factors related to intrinsic motivation discussed above, such as one's interest, entertainment, engagement, determination, and competency, interplay somehow to motivate answerers to provide answers. Also, extrinsic motivation is important. No monetary compensation is provided to answerers in social Q&A, so it seems as though external rewards do not influence the motivation of answerers. However, the needs of self-esteem noted in Maslow's hierarchy indicate that human beings have the need to be recognized and admired by others in some way, and answerers may want to be known as knowledgeable or make themselves visible in the community of social Q&A. Thus, recognition or reputation can be an important extrinsic motivation for question answering. In fact, almost all of the social Q&A services provide scoring/grading systems to calculate the expertise of answerers based on the number of answers given or ratings regarding the quality of answers. The evaluations are made by questioners or other social Q&A

users, and it is assumed that the evaluations have been implemented to provide external motivation for answerers.

Herzberg's two factor theory concerns not only one's intrinsic and extrinsic motivation but also the influence from social factors that promote one's motivation to continue working, such as monetary compensation, company policy or interpersonal relationships among members. In social Q&A, the motivations of answerers can be significantly influenced by the social aspects of the service. Although answerers do not often collaborate with one another when they create answers (Kang & Gloor, Under Review), they do continually interact with questioners as they provide information and support to questioners. Through the interactions, answerers can have the feeling of helping others and of returning the favor that they received when they were questioners, and so would be highly motivated to provide answers. As for a social factor of motivation influencing answerers, building a reputation can also be important to encourage answerers to actively participate in social Q&A.

The proposed model of answerers' motivations to participate in social Q&A takes into account all three of the models.

2.3.3. Motivation to Provide Information and Support in Online Environments

With the theoretical background of these models in mind, motivational factors that have been identified in practical settings of communities of information and support sharing in online environments are discussed.

People participate in various kinds of online communities for different purposes. Ridings & Gefen (2004) collected and analyzed messages shared in 5 different topic areas of online communities (professional, personal interests, pet, health, and sports), and found the four most common reasons that people participate in online communities were information sharing, social support, friendship and recreation. They also found that the degree of emphasis differed across the communities. For example, participants in professional groups were most interested in

information sharing, and this was followed by social support. Even in recreation and personal interest groups, information sharing was the primary reason for attending online communities and friendship was the second most important reason. In health, interestingly, both information sharing and social support were valued as equally important.

Motivation has been a central focus of research to understand participants' behaviors in various kinds of virtual communities. Since the emphasis of the health communities in which we are interested is on both information sharing and social support, research on motivations of contributors in virtual communities of practice and social support groups is reviewed first. The main purpose of virtual communities of practice is knowledge and information sharing. The participants expect to gain knowledge and experience from peers in practice-based community settings. Although health is the main topic of the current research, the review of motivation factors was not limited to the domain of health for two reasons. First, motivations for knowledge sharing in virtual communities can be applicable regardless of the topic of the domain. Second, little is known about the motivations of health professionals who participate in virtual communities of practice for the purpose of information sharing and social support.

While virtual communities of practice are composed of professionals in certain fields with the purpose of information sharing, participants in social support groups are those who have various levels of background and experiences that they share in the support groups. Despite the distinct characteristics of social support groups, motivation to participate and contribute in health-related social support groups has rarely been explored. This may be because it is assumed that participants in social support groups have common interests and a need to learn about certain diseases and health issues, and these common interests motivate most of them to participate and contribute to social support groups. In the current review, the possible factors motivating participation in social support groups are discussed.

Additionally, motivations of contributors to Wikipedia are examined because contributors to Wikipedia are similar to answerers in social Q&A in that they create and develop written

documents (articles in Wikipedia, and answers in social Q&A). Further, these documents are in particular domains and are distributed to anonymous people in online environments.

There are also a couple of studies about the motivations of contributors in social Q&A. Although these studies are not focused on the domain of health, they are reviewed as introductory studies useful for developing the motivation framework for the proposed research.

2.3.3.1. Virtual Communities of Practice

One of the common attributes inherent in both social Q&A and virtual communities is that the interaction in both contexts happens among strangers on the Web, who are rarely known to each other in real life. Due to the anonymous nature of the users, there have been many research efforts designed to understand people's participation in and contributions to virtual communities, exploring how people build relationships among strangers, and whether it is meaningful to sustain virtual communities. In particular, the motivations of contributors who are willing to share information and provide support to the rest of the members have been a central topic of research on virtual communities.

Tedjamulia et al. (2005) proposed a contribution model of participants in online communities, and argued that motivation to contribute can be prompted by the personal characteristics of participants and environmental factors in online communities. Personal characteristics included self-efficacy, intrinsic motivation, need to achieve and trust. Environmental factors were usability, group identity, and personal responsibility. Wang and Lai (2006) assumed that knowledge sharing can be facilitated by one's motivation and capability to distribute information to other members in communities. Reputation, reciprocity, and altruism were identified as motivational factors in the model. Self-efficacy and professional experience were identified as important capabilities of contributors in online communities.

Researchers also have investigated motivational factors inherent within different kinds of virtual communities. Online communities of practice are one of the most popular contexts in

which to study the motivations of contributors who are willing to share knowledge and information with the rest of the members of the community to promote the advancement of the domain of practice. A community of practice refers to "a group of people who share a concern, a set of problems, or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermott, & Snyder, 2002). It is different from the communities formed for entertainment, because it lays out a place where people gain knowledge from their peers and enhance their own practice in a particular domain. Wenger (1998) emphasized that they are informal places where people are gathered to discuss and solve problems related to their shared interests. During the process of community participation, domain-specific knowledge is generated and transmitted to the rest of the community and it eventually reinforces the relationships among individual members and the community overall.

Thanks to the advent of the Internet, people can easily be connected to one another and knowledge and practice can be shared by a variety of online communications tools. In organizations, managers or employers create and manage online communities in order to enhance collaborative work among employees and to encourage them to share tacit knowledge and practices, which are critical assets of a corporation (T. H. Davenport & Prusak, 1998). Additionally, it supports communication among employees in organizations that are dispersed geographically (Constant, et al., 1996). The informal and remote environments created by online communities can contribute to promote collaboration as they enable people to have access to more than physical communities. Since the communities are created for organizational purpose, leaders or managers are often in charge of the activities, and the participation of members is not always voluntary. In some cases, an incentive or reward system for participation is offered by organizations.

The most interesting aspect of motivating employees to contribute to communities of practice is related to their attitudes concerning whether their knowledge is a personal asset or a public good. In organizations, community attachment/advancement has been identified as an

important factor in several studies. However, it was not a common feature across organizations, because it depends on the organizational culture. Jarvenpaa and Staples (2001) explained that, when people believe that the ownership of information and expertise belong to organizations, they have positive attitudes about sharing knowledge for the promotion of the organization in general. Within this environment, employees feel a moral obligation to the organization as a whole, and view it as a community of their professionals. Ardichvilli, Page and Wentling (2003) investigated motivation and barriers to participation in online communities of practice at a multinational corporation. The employees were motivated by a moral obligation to the company where they work and to the communal interests of their fellow professionals, rather than their self-interests. In addition, employees who considered themselves experts in the field were willing to contribute in communities because they believed that they are responsible for giving what they learned back to the younger generations of the community. Lin (2007) tested intrinsic and extrinsic motivations of employees in 50 organizations sharing information in communities of practice. He proposed that intrinsic motivation is related to self-efficacy and enjoyment in helping others, and extrinsic motivation is related to expected organizational rewards and reciprocal benefits. He also found that self-efficacy, enjoyment and reciprocal benefits significantly influenced employees' motivations and attitudes about sharing information.

On the other hand, Hall (2001b) believed that employees are mainly interested in personal rewards that they could receive as compensation for knowledge exchange in organizations. He proposed economic rewards, access to information and knowledge, and career advancement or security as explicit/hard rewards. As soft rewards, he suggested enhanced reputation and personal satisfaction. Davenport and Hall (2002) stated that employees decide to share knowledge when the rewards given by organizations match with their own value of knowledge. Hall (2001, 2003) placed the rewards into two categories – tangible and intangible, and the former includes reputation, career promotion, or financial incentives, and the latter refers to access to information, and enhancing practical skills.

Regarding external incentives or rewards from organizations, there is no consensus about the effect of motivation for knowledge sharing. Lin (2007) found that rewards did not significantly influence motivation. On the other hand, Milne (2007) tested the effect of incentive programs implemented by an organization for the promotion of knowledge sharing among members, and found that rewards significantly influenced motivation, performance, and interest in knowledge sharing in an organization.

There are also online communities of practice which are created by professionals in a particular domain in order to meet their own needs regardless of the organizations in which they are members. There are no organizations or corporations that control the creation and management of the communities. Anyone who is interested in the domain can join and the members share knowledge and practice voluntarily. They participate in communities not only for their personal needs, or to improve their knowledge and skills, but also for the enhancement of the community.

Wasko and Faraj (2000) investigated the motivation for knowledge sharing of three Usenet newsgroups on programming language and technology, and found that participants were motivated by tangible returns, intangible returns, and community interest. Tangible returns included access to useful information and expertise, answers to specific questions, and personal gain. Intangible returns included enjoyment/entertainment and learning. Community Interest included interaction with a community, multiple viewpoints, peer group, altruism, reciprocity, and advancement of the community. Five years later, Wasko and Faraj (2005) developed a model of knowledge contribution based on individual motivation and the theory of social capital. This new model included only three motivational factors – reputation, enjoyment, and reciprocity – from among the many factors that they had proposed in their previous studies.

Among a number of different topic domains of communities of practice, open source communities have been spotlighted in recent years due to their proliferation and contribution to the advancement of software technology. In open source communities, highly educated

programmers/engineers voluntarily participate in and collaborate with peers on developing products without the intervention of organizations or corporations (J. Moon & Sproull, 2002). Thanks to their independence, it results in a huge impact on the advancement of the public good in society, such as distributing open source software (e.g., Linux and Apache Web Server) free of charge. This community has also challenged the traditional commercial-value-oriented market approach to software development. The open source movement has flourished as commercial software companies (e.g., IBM, Sun Microsystems, etc.) have become part of the movement and started to reveal source code to the public (Hars & Ou, 2001).

Raymond (1999), a senior programmer who is one of the early, experienced contributors in open source communities, wrote an essay to illustrate the nature of the open source community. In it, he argued that programmers had three basic motives to develop open source software: 1) direct benefits from the source code development, 2) self-enjoyment, and 3) reputation enhancement (Lakhani & von Hippel, 2003). Since then a number of studies have been conducted in order to confirm Raymond's speculation.

Hars and Ou (2001) divided the motivations of programmers to contribute in an open source community into internal and external factors. Internal factors included self-determination, altruism, and community identification, and external factors were future rewards (selling products, human capital, self-marketing, peer-recognition) and personal needs for software development. Self-determination, such as the feeling of competence, satisfaction, and fulfillment, was the most influential as an internal factor, while altruism was less important. At the same time, many of them were interested in the external benefits of building a reputation for themselves and marketing their abilities in order to be recruited by human resources staff or senior engineers who are searching for talented programmers in open source communities. In another study, Lakhani and von Hippel (2003) tested generalized reciprocity, community interest, reputation, intrinsic rewards, and job responsibility as the main factors of motivation in open source communities.

They found similar results to Hars and Ou's (2001) study that both reputation and intrinsic rewards were recognized as important factors.

Additionally, learning is an important factor motivating programmers and engineers to contribute to open source communities. Learning in community is a benefit not only for the novice or inexperienced members, but also for members who have advanced levels of expertise and experience. In open source communities, programmers enhance their personal skills, capabilities and knowledge as they participate in the various activities of coding new and advanced programs. They can use the community participation as an opportunity to train themselves, ultimately leading to find better jobs, to increasing their salaries, and more (Hars & Ou, 2001). Ye and Kishida (2003) emphasized that participants in open source communities valued learning through experiences and engagement in the social, cultural and technical practice of the community. In addition, learning is an important factor that can provide both intrinsic satisfaction and extrinsic rewards for individuals, as well as address the social needs of gaining reputation and recognition among members as an advanced developer who has skills and knowledge in developing programs.

Product development, as an extrinsic reward, was also recognized as a benefit for members in open source communities. It is different from the financial incentives given as rewards in organizations, such as extra compensation as a result of participation. Product development is intentionally brought about by members to obtain recognition from the community (Hars & Ou, 2001; Hertel, Niedner, & Herrmann, 2003; Raymond, 1999).

Reputation has been known as one of the strong motives for active participation in knowledge sharing in general (Donath, 1999), as well as in online environments of professionals (Stewart, 2003). This assertion has been supported by the findings from Wasko and Faraj's (2005) finding that, in virtual communities of legal professionals, reputation was the key factor encouraging participation. However, according to Wang and Lai's (2006) study about the motivations behind the posting of Java-related topics on bulletin board systems, reputation is not

positively related to knowledge sharing; due to the anonymity of members in virtual communities, reputation does not motivate as effectively as in real-life communities. The reason for the difference is likely to be related to the method of dealing with one's identity in virtual communities. In the legal community in Wasko and Faraj's (2005) study, their real names were used to share information, while the online identification names were used in the technical group studied by Wang and Lai (2006). The differences between the domains, legal vs. technology, may also influence the results if they were tested in the same environment, but nothing has been tested yet.

The opposing results of the two studies may also be related to the influences of self-enjoyment and self-efficacy. In legal communities, self-enjoyment did not play a role in motivating participants to make contributions. In the technical community, however, self-enjoyment and self-efficacy were identified as influential factors. Enjoying helping others is one of the intriguing characteristics which is often found in electronic networks on the Internet in general (Kollock & Smith, 1996), but it was not true in legal communities. According to Wang and Lai (2006), self-enjoyment and self-efficacy were positive factors, but altruism was not. The researchers predicted that the size of the virtual community, about 50,000 participants, may deflect participation due to the participants' awareness of the number of bystanders.

Table 2.3. Motivational Factors of Participants in Virtual Communities of Practice

Category	Identified Factors	Literature
Personal Characteristics	Self-Enjoyment / Personal satisfaction	Constant et al. (1996); Lin (2007); Hall (2001, 2002); Wang & Lai (2006); Wasko & Faraj (2000); Hertel, et al. (2003); Lakhani & von Hippel (2003); Niedner, Hertel, & Hermann (2000); Raymond (1999) ;
	Self-efficacy / Self-competent	Kankanhalli (2005); Lin (2007); Wang & Lai (2006); Wasko & Faraj (2000); Hars & Ou (2001); Lakhani & von Hippel (2003); Lakhani & Wolf (2002)
	Altruism	Constant et al. (1996); Wasko & Faraj (2000); Hars & Ou (2001)
Personal Benefits	Learning / access to information	Constant et al. (1996); Hall (2001, 2002); Niedner, Hertel, & Hermann (2000); Wasko & Faraj (2005);, Wang & Lai (2006); Wasko & Faraj (2000); Hars & Ou (2001); Lakhani & Wolf (2002); Ye & Kishida (2003)
	Reputation/ Recognition	Constant et al. (1996); Hall (2001, 2002); Lerner & Tirole (2001); Niedner, Hertel, & Hermann (2000); Wasko & Faraj (2005); Wang & Lai (2006); Hars & Ou (2001); Hertel, et al. (2003); Lakhani & von Hippel (2003); Lakhani & Wolf (2002); Raymond (1999)
	Financial Incentives	Constant et al. (1996); Hall (2001, 2002); Kankanhalli et al. (2005); Milne (2007);
	Product Development	Johnson (2002); Niedner, Hertel, & Hermann (2000); Wasko & Faraj (2000); Hars & Ou (2001); Hertel, et al. (2003); Raymond (1999);
Community Interest	Reciprocity	Constant et al. (1996);Davenport & Prusak (1998); Kollock (1999); Lin (2007); Nonaka & Takeuchi (1995); Leonard & Sensiper (2000); Wasko & Faraj (2000); Lakhani & von Hippel (2003); Lakhani & Wolf (2002)
	Community attachment / advancement	Ardichvilli et al. (2003); Constant et al. (1996); Osterloh & Frey (2000); Preece (2000); Wasko & Faraj (2000); Hars & Ou (2001); Hertel, et al. (2003); Lakhani & von Hippel (2003)
	Gift-giving culture	Zeitlyn (2003); Raymond (1999)

Table 2.3 summarizes of the motivational factors identified by researchers of people who participate in virtual communities of practice. First, personal characteristics indicate inherent personal attributes of individuals. Self-enjoyment refers to people sharing knowledge because they like to do it and enjoy the situation of communicating with others. They feel pleasure and satisfaction from their own behaviors of helping others. Self-efficacy refers to ones' confidence about his/her capability to perform an action (Bandura, 1986). When people feel that they have enough knowledge and expertise in a particular subject, and that this will help others, it positively

influences them to participate in virtual communities. Altruism is another important concept to describe an internal aspect of human beings, indicating that people like to help others without thinking about any compensation or reward, only caring for others and the world in which they belong.

Second, people contribute in open source communities with an expectation of getting some benefits. Through community participation and contribution, people often expect that they can learn and obtain information about job opportunities, or enhance their professional skills related to their field or areas of interest. While learning something through activities in virtual communities is an indirect benefit that people obtain through participation, there are also direct benefits such as building recognition and reputation, receiving external rewards or incentives, and obtaining personal gains, such as selling or developing products of one's own.

While the previous two categories show the internal factors of individuals that motivate them to contribute to knowledge sharing, community interest emphasize the social and collaborative aspect of virtual communities. Reciprocity is a situation in which a person helps another because he or she expects to receive help from that particular person in return. However, in the context of knowledge or information sharing, the relationship is expanded from one-to-many. A person helps another, but does not expect to receive help in return from the same person. Instead, the person has a belief that someone in the community will help him or her later, when he or she needs it. This phenomenon is called generalized reciprocity (Ekeh, 1974). Community attachment or advancement, the feeling of the members that they want to be good members of a community instills in them the moral obligation and the feeling of responsibility to advance the community for the public good. The culture of an organization or community also can encourage people to do good things and to help one another, thus motivating people to contribute to knowledge sharing.

As you see in Table 2.3, there is a presumably comprehensive list of the motivational factors affecting knowledge sharing in virtual communities of practice. By and large, there is a

consistent distribution of factors across the three categories. However, there are variations in the findings of the motivation studies in the same category, because of the uniqueness of the features and functions of community systems and the environments in each community. In summary, several motivational factors influencing the contribution of knowledge sharing in virtual communities of practice have been identified and discussed, revealing both the common and the different features among the communities. Since virtual communities of practice have focused on the knowledge and skills of professionals, the motivational factors point members in the direction of enhancing their skills and presence in their domain of practice.

2.3.3.2. Health Support Groups

Researchers have investigated various aspects of online health support groups to understand the influence of support groups on enhancing the quality of life of participants with health problems. However, little is known about the motivations of people who participate and contribute to online health support groups because it is assumed that people are mainly attracted by the health issues they hold in common. Most of the members in social support groups are those who have or are interested in certain diseases. Contributors are often advanced patients with certain diseases or survivors who are willing to share advanced knowledge and experience with the rest of the members. Their motivations to participate in online support groups are quite different from those of participants in virtual communities of practice, which emphasize knowledge sharing in communities. Compared with the motivational factors in Table 2, self-enjoyment, self-efficacy, reputation, or financial incentives haven't been found as strong motivations of contributors to social support groups. However, their motivations may include altruism for helping other patients, learning about certain disease and health issues, community interest, and generalized reciprocity.

Additionally, empathy is one of the most distinct characteristics of online support groups; it provides motivation to participate in health support groups. Empathy is "the ability to identify

with and understand another's situation, feelings and motives."(Preece, 1999, p. 65). Goleman and Meza (1998) explained that empathy comes directly from one's experience or partially from indirect experience of hearing and understanding someone else's story. People also have empathy with those who have similar backgrounds of family, culture, and/or society. Preece (1999) argued that empathy is a compelling ingredient that enables people to initiate conversations with others and share information and support among those who have similar problems in online communities. Preece (1999) also emphasized the function of feedback in increasing empathy in one's mind, and further building trust among people in online communities. When a person receives feedback from others, responding to the person's feelings, the person feels relieved and cared for by others, and the relationship among members can be fortified based on trusting one another.

In online health support groups, empathy plays an important role in enabling people to share personal health problems and discuss concerns with those who have similar problems. Preece (1999) analyzed messages shared in an online health community and found about 44.8% of the messages were empathic comments that shared personal experiences and stories and provided supportive comments such as, "You will be fine", and "Good luck!". From the high portion of empathic messages, it can be assumed that the motivations of the answerers and contributors were influenced by their empathy toward people who have similar experiences and problems. Thus, empathy can be an important factor influencing motivations in online support groups that help others.

2.3.3.3. Wikipedia

Since the advent of Web 2.0 technology, collaboration in knowledge sharing has become easier. People participate and collaborate with others in creating content on the Web with a variety of formats (e.g., text, images, videos) through YouTube, Flickr, blogs and Wiki's -- all products of User Content Creation (UCC). Among the Web 2.0 tools, one of the fastest-growing

(NetRating, 2006) and most promising models of knowledge sharing and collaboration is Wikipedia (Nov, 2007). Wikipedia is an electronic version of an encyclopedia. The content is based on the collaboration of volunteers (called Wikipedians) to create, edit and update the content. It is managed and organized as a wiki -- open source software that provides a platform that enables people to collaborate in creating and manipulating contents. As of March 2006, 50,000 Wikiepdians have participated in publishing 1 million articles in English (Wagner & Prasarnphanich, 2007).

Wikipedians have a great deal in common with answerers in social Q&A. Wikipedia itself is a community and it is subdivided into a number of topic categories, similar to the format of social Q&A. Thus, the levels of knowledge, skills, expertise, and ability of Wikipedians vary depending on the individuals' capacities as well as the topic categories to which Wikipedians would like to contribute. Participation is anonymous overall, but contributors have cyber identifications which make it possible to collaborate with many other Wikipedians to develop content together. One main distinction between Wikipedians and answerers in social Q&A is that multiple Wikipedians collaborate with one another to create one article together. Answerers in social Q&A create their own individual answers, and they are compared to the answers given by others, but no one is allowed to modify the original answers except the answer creators. In Wikipedia, however, Wikipedians can create, modify, and delete contents without restriction. This is because the purpose of the service is to create a unified and integrated article on a topic through collaboration with others.

Since the proliferation and success of the Wikipedia service, a number of studies have been conducted to investigate the phenomenon of massive collaboration among Internet users. The studies have used various approaches (e.g., authorship (Emigh & Herring, 2005), content quality (Stvilia, Twidale, Smith, & Gasser, 2005) , learning (Forte & Bruckman, 2006), and collaborative knowledge building (Kittur, Suh, Pendleton, & Chi)). However, few researchers

have contributed to building a framework of motivational factors influencing people who spend time voluntarily in order to create and develop contents collaboratively with others in Wikipedia.

Kuznetsov (2006) considered Wikipedia to be a large scale project of online collaboration, and identified five factors that motivate Wikipedians – altruism, reciprocity, community interest, reputation, and autonomy – which are quite similar to the motivational factors in virtual communities of practice. Autonomy, the freedom of Wikipedians to select topics, and to create content in any level and in any space of the contribution, was a new factor added to the previous framework. Wagner and Prasarnphanich (2007) were especially interested in altruism, and tested it in three dimensions -- individualistic vs. collaborative, altruistic vs. selfish, and short-term return vs. long-term return -- in six cases, each pairing motivational factors. For example, individualistic, selfish motivation that one can obtain over a long period of time is reputation or recognition. As a result, it was found that collaborative and altruistic motivations are positively related to the motivations of Wikipedians.

Nov's (2007) approach is a bit different from other studies. He borrowed a framework of the voluntary activities of individuals and explained the collaboration of Wikipedians with the six categories of personal and social motivation developed by Clary et al. (1998). He explained the motivations for the Wikipedia content generation as values and altruistic behaviors, social engagement with others, learning new knowledge and skills, career opportunities, projecting self-ego, feeling guilty for not helping others, and the positive influence of enhancing one's self-ego. He also added two more factors related to collaboration, such as fun contributing to Wikipedia and the ideology of the free distribution of information. His study results indicated that fun and ideology were the top two factors, and that social engagement, career and protecting self-ego were not strong motivations. With regard to the correlations between the motivations and the contribution, however, all of the six factors related to the voluntary behaviors are positively correlated to knowledge contribution, but there is no significant correlation with the additional two factors of fun and ideology. Nov predicted that people would think it is important to make

information freely available and sharable, but the ideology itself may not be a strong enough motivation to cause people to actually collaborate in creating content in Wikipedia.

Rafaeli, Ariel and Hayat (2005) found that several cognitive (e.g., learning new things, and intellectual challenge) and affective (e.g., pleasure) motivations are positively related to Wikipedia contribution. While social engagement was not an important factor in Nov's (2007) study, the community interest, namely integrative motivation (e.g., contributing to others), were also found as a positive factor. Recently, Rafaeli and Ariel (2008) developed a use and gratification model of Wikipedians and identified five motivational categories – basic needs as a human being, personal growth/self-fulfillment (e.g., the need to belong to the community, self-actualization), personal taste/preference (e.g., self-enjoyment, intrinsic rewards), rituals (e.g., considering Wikipedia participation as a daily practice to carry out), and habitual (e.g., routine work to do).

2.3.3.4. Social Q&A

Motivation is a relatively new concept to explore in the context of social Q&A, but two groups of researchers have attempted to identify the motivational factors that encourage people to answer questions. Rafaeli, Raban and Ravid (2007) believed that incentives are the main factors that drive people to answer questions online, so they investigated the effects of economic and social incentives in Google Answers. Google Answers adapted multiple mechanisms of incentives, using both fee and free methods to price answers. Google Researchers, the pre-approved answerers, create answers for questioners and receive the payment offered by questioners and additional tips driven by the volitional gesture of gratitude. Tips are often generous, about 20% of the price of the answer. Fellow users also can respond to questions in the comment section. It is a free-style format of message exchanges among users to discuss the questions and answers, and it is based on the voluntary participation of users without any involvement of monetary incentives. The researchers traced the question answering activities of

both groups of answerers, and investigated the influence of the incentive mechanism on their activities. A year later, Raban and Haper (2008) developed a framework of intrinsic and extrinsic motivations which emphasized information sharing as the main goal of people who ask and answer questions online. Intrinsic motivations included perceptions of values, interaction, online social cognition, information ownership, reciprocity, and gratitude. Extrinsic motivations covered access to technology, generalized exchange, reputation, status, norms commonality, payment and social/cultural capital. Raban and Harper (2008) proposed the framework based on their observations of the interface structure of the current social Q&A sites as well as their review of literature on motivation in online communities. None of the factors, however, has been tested with empirical data to confirm the framework.

One empirical study has been carried out to identify the motivations of answering questions. Nam, Ackerman, and Adamic (2009) collected data from semi-structured phone interviews with 26 users of Knowledge-iN, and determined five categories of motivation– altruism, business motives, learning, hobby and personal competence, and point rewards. Since Knowledge-iN is a Korean based social Q&A service, the cultural aspects of motivation to participate in social Q&A may have influenced the factors. It would be an interesting analysis to compare the motivational factors of Knowledge-IN to those which were tested in the current study.

2.4. Answering Strategies

Question asking and answering is one of the most natural ways that people communicate with one another. Graesser, McMahen and Johnson (1994), the psychologists who have researched about the psychological functions of question asking and answering in conversational contexts, emphasized that "the question-answer adjacency pair is the most pervasive and systematic sequential pattern of speech acts in naturalistic conversation"(p.517). They explained that questions can be used for many different purposes, such as initiating conversation (e.g.,

"How are you?"), having someone perform certain acts (e.g., "Could you pass me the salt?"), expressing interrogative feelings (e.g., "Why don't you listen to me?") or seeking information[15]. Information seeking questions are inquiries asked by questioners with an assumption that answerers would have appropriate information that would solve their problems or that would help them make decisions in certain situations.

In the current research, the focus of question asking is on information seeking questions, particularly question and answer exchanges in written contexts. Compared to the narrative face-to-face environments of conversation, there are two challenges to be overcome to enable effective communication between questioners and answerers. First, how can questions and answers deliver the original intentions and information accurately from both questioners and answerers in written format? In face-to-face conversation, people continually receive information, signaled by visual expressions, and questioners and answerers can easily ask and answer repeatedly in order to understand each other better. In the written environment, the visual cues are missing. Question asking and answering is mostly done by one-time interaction, at least in the contexts that we are investigating in the current study of social Q&A. A second challenge is about time. There is a gap between the time that questions are written and sent (or posted), and the time that answerers search for information, create answers and send replies back to questioners. How long questioners can be patient while waiting to receive appropriate information can be an important matter that determines whether written communication of question asking and answering is being performed effectively. The speed of exchanging written questions and answers is much faster in online environments than the traditional method of letter exchanges, but as long as the communication occurs asynchronically through emails or a message board interface in social Q&A, the delay could be problematic.

In the traditional environments of online Q&A, question answering has long been one of the tasks of people who have significant levels of domain knowledge in certain topic areas. In

[15] The question examples are quoted from Graesser et al. (1994).

social Q&A, answerers are anyone who wants to contribute by sharing information and support for others, and little is known about the background knowledge of answerers. In the domain of health, the levels of expertise and experience of answerers vary, ranging from those who taught themselves because they are personally interested in topics on certain diseases or illnesses, lay persons with some experiences with certain diseases or illnesses, to medical experts who have been trained and received advanced degrees or certificates.

In health, extensive question asking and answering occurs in almost every conceivable context. People ask health questions of family members, friends, neighbors, doctors, nurses, or other health care professionals, and join support groups to listen to experiences and obtain advice from those who have similar experiences (See 2.1.Health Information Use on the Internet for descriptions of health information use in detail). The basic structure of questions and answers about health issues and problems would not be much different from other topic areas, but the topics of the questions and the answers are more focused on the medical problems of symptoms, treatments, and diagnosis.

Under the assumption that the answering strategies of answerers in social Q&A could be inferred from the strategies of experts in online Q&A services, the methods, guidelines, and management policy related to question answering of digital reference librarians and medical doctors who have been dealing with patients' questions in their clinics has been reviewed. Not only experts but lay persons answer questions, so the people who took roles as answerers in support groups or online communities have also been investigated to understand the attitudes and characteristics they possess that put them in the position of providing information and support for others.

2.4.1. Online Question Answering Strategies

The answering strategies in online environments of three groups of answerers are reviewed in this section. The first two subsections discuss the characteristics and strategies of

experts in searching and experts in the domain who answer health questions, that is, digital reference librarians and health care professionals, respectively. The next subsection describes lay persons who would like to seek information and share their experiences or opinions for others – answerers in online communities (or online support groups).

2.4.1.1. Search Experts: Digital Reference Librarians

Answering strategies of digital reference librarians have been rooted in the missions and practical guidelines from reference interviews in the traditional environments of face-to-face reference services. In reference services, reference librarians conduct reference interviews in order to serve users by helping them look for information. The reference interview is defined as "a conversation between a reference staff member and a user, the goal of which is to ascertain the user's information need and take appropriate action to satisfy that need through skillful use of available information sources" (Bopp & Smith, 2001, p. 47). The objective of the reference interview is "identifying the information needs and gathering information to permit a successful search for that information" (M.D. White, 1985). The conversation in reference interviews is composed of full question asking and question answering, with the reference librarians taking the main role as answerers. This does not mean, however, that a reference interview is performed during a one-time exchange of a question and an answer between a user and a reference librarian. Instead, during a reference interview, a series of questions and answers are exchanged between a reference librarian and a user until both of them agree on what the user is looking for and the user obtains the information sought. Reference librarians are specially trained to lead the conversation, asking meaningful questions of users to find out their information needs, listening carefully to users' responses, and answering user questions with appropriate information sources to satisfy the needs.

Digital reference is one of the fastest growing services in libraries. A number of academic, public, research and special libraries currently provide or plan to offer digital reference services.

Basically, the missions and purposes of serving users in face-to-face reference services have not changed in digital reference services. However, the most challenging and distinct area in digital reference services is question negotiation and information provision in online environments. In digital reference services, it is not easy to replicate reference interviews because the online interfaces of emails, chat, instant messages, or web forms are different from face-to-face interactions. Chat services can be performed synchronically in real time, but the exchanges of questions and answers in reference interviews occur through text messaging. Emails or Web forms of communication occur asynchronously. The iterative exchanges of question asking and answering between users and reference librarians are often limited. Reference librarians have to interpret the asker's information needs based on the text written in questions. Although reference librarians can contact users to ask for clarification of questions, it may not be guaranteed that the users will reply back to the reference librarians. In addition, time is another factor influencing question answering in digital reference services. There is a gap between the time users submit questions and the time that librarians provide answers. As follow-up emails are exchanged, the time at which questions are finally answered will be delayed even more.

In order to understand further the process of question negotiation and management in digital reference services, Figure 2.1 provides a general model of digital reference service. This model was originally introduced by (Silverstein & Lankes, 1999), but the figure is found in (J Pomerantz, Nicholson, & Lankes, 2003, p. 105).

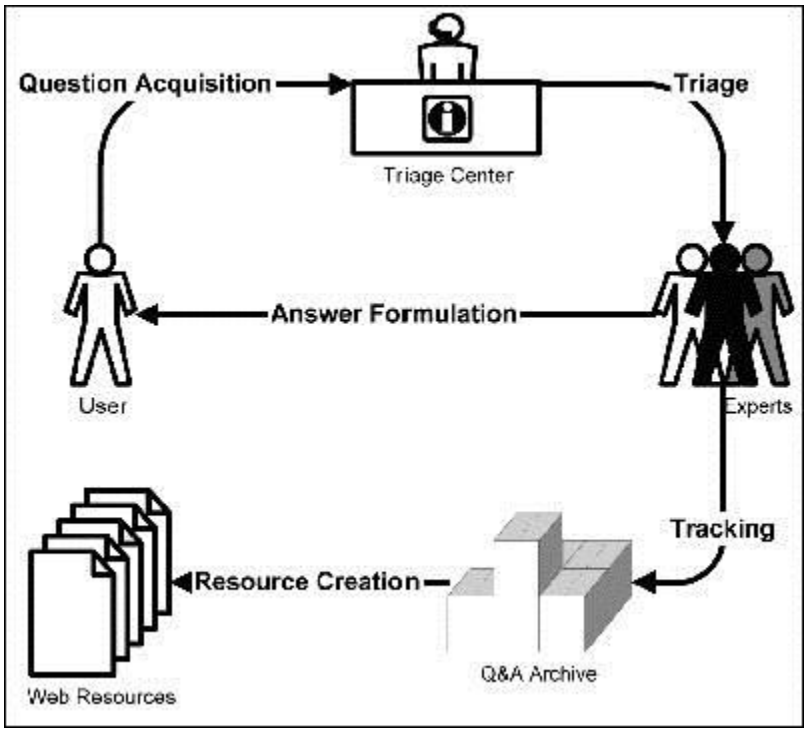

Figure 2.1. General Digital Reference Model

In the model, there are five steps to perform – question acquisition, triage, answer formulation, tracking, and resource creation. In digital reference, the service is initiated by a user who submits questions through the online applications that the service offers, such as email, chat, instant messaging, or web forms. The questions in digital reference services are diverse, and sometimes the scope of information is beyond the library's capabilities, since anyone can access the service from any place for any purpose to obtain information. Triage is an intermediary process between questioners or answerers in digital reference services to automatically or manually assign questions to reference librarians or domain experts who can provide appropriate information to users. While not necessarily included in all digital reference services, it is a common way to distribute questions among the potential answerers. Thanks to triage, digital reference services can be managed effectively because the quality of the answers can be controlled by referring questions to appropriate experts and by filtering out iterative questions or questions with errors or those that are out-of-scope. The next stage is that experts formulate

answers. Answerers track Q&A archives while they search for information related to answers in order to identify repeat questions or stored answers of previously asked questions. Q&A archives also can be used for detecting trends in the topics or the types of questions circulated in digital reference services. If appropriate, the entire collection of questions and answers can be reproduced for public access on the Web.

Among the five steps, the answering strategies of digital reference librarians can be observed in triage and answer formulation. In triage, there are a number of factors influencing decisions about to whom the questions should be assigned. Pomerantz et al. (2003) conducted a Delphi study with digital reference librarians who are in charge of assigning and distributing questions in selected libraries, and 15 factors are positively related to the decisions in triage. The three factors that received the most votes from participants were all related to the topic category - topic areas of questions, topic expertise of services and topic expertise of answerers. For questions, they reviewed the types of questions and the languages in which the questions were written. Answerers' experience in answering questions or providing customer service, and their past performance in providing correct and complete answers also influenced the question distribution. The overall impression and past history of certain digital reference services in the consortium network, such as the levels of assistance, response rates, numbers of questions assigned to certain services, the service's turnaround time, and the scope of the service collection were also used to assign questions.

Answer formulation indicates the practical strategies necessary to create good answers with which users are satisfied. The library associations, such as Reference and User Services Association (RUSA) and International Federation of Library Associations and Institutions (IFLA), provided basic guidelines to manage digital reference services. Although the scope of the guidelines is comprehensive enough to cover the overall process of implementing and maintaining digital reference services, the main focus of the current review is on the instruction related to behaviors and strategies of reference librarians when providing information in response

to online requests. Figure 2.2 is a brief version of Section 3.3, Service Behaviors in RUSA's Guidelines for Implementing and Maintaining Virtual References (2004) and Figure 2.3 is a summary of the list of items about general as well as content related instruction in the IFLA Digital Reference Guidelines (2003).

Service Behaviors

- Require the same communication and interpersonal skills necessary for other forms of reference.
- Standard guidelines of reference service (such as reference interviewing, exchange of questions between services, et al.) should prevail.
- Demonstrate skills in the effective use of online communication
- Exhibit the professional competencies
- Follow interpersonal communication practices
- Demonstrate awareness of the common potential problem areas
- Initial and on-going training should be offered to help staff learn and retain these effective online behaviors.
- Store transcripts or records, as private and confidential.

Figure 2.2. Section 3.3. Service Behaviors in RUSA's Guidelines for Implementing and Maintaining Digital Reference Services

(Reference and User Services Association Access to Information Committee, 2004)

General

- Be committed to providing the most effective assistance.
- Show professional courtesy and respect when answering questions.
- Uphold the principles of intellectual freedom.
- Provide patrons with responses as quickly as possible.
- Create and adhere to stated response turnaround policy.
- Comply with contractual licensing agreements
- Practice good search strategies.
  (See RUSA document: Guidelines for Behavioral Performance of Reference and Information Services Professionals)
- Respond to 100% of questions that are assigned, if only to say, *"I'm sorry I don't know, but you can try…"*

Content

- Be informative; Promote information literacy
- Maintain objectivity and do not interject value judgments
- Use a neutral questioning interview technique to determine *"the real question,"*
- Provide users with accurate answers, appropriate in length, level, and completeness to the need.
- Include notification that the question may be forwarded to consortial partners, if this is the case.
- For questions requiring more in-depth answers, assistance may be provided if appropriate.
- A well-structured written response has a heading, body and closure with signature.
- Avoid using jargon, acronyms, or Internet abbreviations (such as: BTW, IMHO).
- Write all responses clearly
- Offer accurate responses--check facts and know (evaluate) sources.
- Check spelling in written responses, and validate URLS.
- Select and cite only from authoritative resources:
- Add value to information either through analysis, description, keywords, pathways, or rewording.
- Do the best to locate and recommend at least one resource for every question.

Figure 2.3. The Practice of Digital Reference in IFLA Digital Reference Service Guideline
(International Federation of Library Associations and Institutions, 2003)

Both sets of guidelines include the basic principles that reference librarians should be acknowledged when they are consulted by users online. RUSA's Guidelines emphasize that digital reference services are a new type of reference services performed through online communication tools. Librarians should basically follow the principles of face-to-face reference services, and learn additional skills to manage online communication. In general, information given in the guidelines is a bit broad and theoretical. In contrast, IFLA's guidelines include more

specific instruction than RUSA's. They briefly mention librarians' attitudes, intellectual freedom, and search strategies. In addition, in the content section are listed the answering principles applicable to creating answers about informative responses, objectivity, accuracy, written structure, language use, and resource citations.

Interestingly, both sets of guidelines point to RUSA's Guidelines for Behavioral Performance of Reference and Information Services Professionals for further information about how to interact with users in reference services. There are 5 points that reference librarians should pay special attention to when they answer questions, such as approachability, interest, listening/inquiring, searching and follow-up. Approachability is about making people aware of digital reference services. In the design aspect of the service interface, the contact and application information about digital reference services should be placed in prominent locations and be easily accessible. The overall environment of the conversation should make users feel comfortable, avoiding creating environments that are risky, confusing or overwhelming. Reference librarians should be neutral in dealing with sensitive issues, but they need to express high interest in the topic of the question in order to communicate with users well. Proper comments about librarians' interests in topics, or acknowledgment of user questions can be included in their answers. Listening/Inquiring indicates that reference librarians have put great of effort into carefully listening, repeating, rephrasing, and identifying the needs of inquirers through the iterative process of communication. In digital reference services, such as emails or web forms, it is not easy to have on-going conversations with users. Thus, librarians should collect as much as information as they can from within the questions and use it to find answers. At the same time, librarians need to be cautious not to expose confidential or private information of the users during the process of information gathering. Searching involves not only the librarians' search strategies needed to locate appropriate sources of information and answer questions with sources but also the librarians' articulation of the searching process along with the answers to help users learn how to find sources for themselves in the future. Follow-up is about the responsibility of reference

librarians to confirm whether users receive appropriate answers to their questions and are satisfied with the information as well as with the services in general, and refer users to additional sources related to their questions.

In answer formulation, there are common criteria for evaluating the quality of answers. The most frequently used criteria are accuracy, completeness, timeliness and authority (Tyckoson, 2001). Accuracy has been the traditional value with which to evaluate reference services in general, focusing on whether reference librarians provide accurate and correct information (Hernon & McClure, 1985). Completeness (or thoroughness) indicates whether reference librarians provide enough information to cover alternative solutions to problems and provide additional sources to support those options. Timeliness is about how quickly answers can be delivered to users. If there is a definite time by which answers are required, there could be a critical problem when answers are delayed. Authority is related to information about sources. Answers can be given with additional sources to which questioners can then refer. Information regarding sources, such as author names, titles, publishers, or URLs, should be included in answers and recorded correctly.

Strategies used by librarians in triage and answer formulation in digital reference services may be applicable to answerers' strategies in social Q&A. Triage is a process of assigning questions to the personnel who would be able to provide the most relevant information to the questioners. The process of triage in reviewing questions can be similar to the process used by answerers in social Q&A in examining and selecting questions to answer. The difference between triage and an answerer's question selection is that answerers in digital reference services passively receive questions to answer through the triage process, but answerers in social Q&A actively select questions to answer by themselves. Pomerantz et al. (2003) found that triage personnel consider multiple factors to choose appropriate answerers in digital references. Some of the factors relate to the nature of the questions or the expertise of the answerers, such as question topic and type, topical expertise of answerer, answerer's experience in answering questions, and

the language of the question. These factors may also influence answerers' strategies for question selection.

Answerers not only select questions, but also reject questions. In digital reference services, questions posted each day often outrun the capacity of the reference librarians. According to a case study of a digital reference service (Carter & Janes, 2000), more than 50% of the questions were rejected due to being over quota. Time was another issue for rejecting questions because questioners wanted to receive answers faster than the period of time in which librarians could create answers (18%). There were also technical errors or miscommunication with invalid information for getting back to the users (7%). Digital reference services, which usually connect questions to domain experts, may not be able to answer some questions, in particular questions asking for expertise in law, medicine, or science.

Answerers in social Q&A do not intend to answer all of the questions posted in a service. They would have their own criteria for responding to or rejecting questions. The criteria could include the negative influences of the factors identified above. For example, when answerers feel that they do not have enough knowledge or experience about certain question topics, they may skip the question and move on to read others. Or, perhaps the written expressions in the questions cause negative feelings in the answerers and they would not like to provide answers to those questions. With the homework assignment questions, Gazan(2007) found that answerers detected from the written questions whether the questioners are intent on receiving the answers to complete assignments easily and tried not to provide information to those questions.

Answer formulation in digital reference services is another important aspect of the process that is applicable in understanding answerers' strategies for providing effective answers in social Q&A. Answerers who want to produce useful information for others and maintain their status as good answerers in social Q&A intend to create good answers, just as digital reference librarians are concerned with providing appropriate information to satisfy the needs of their users. The five main areas of concentration in digital reference services - approachability, interest,

listening/inquiring, searching and follow-up - can be applied to explain answerers' strategies for answer creation. Approachability in digital reference services is about the interface issues related to making the services visible, but answerers in social Q&A may demonstrate their expertise or experience in certain topic areas in the profile pages in order to draw the attention of questioners. Supportive comments or remarks can be a signal that answerers are interested in the topic of a question. Answerers may post additional questions to clarify the meaning of the original question and return and respond to the updated questions. Answerers do search for information for answers. They may retrieve information from their own memories to trace similar problems or related experiences. They may carry out Internet searches to point to appropriate Web pages to answer questions, and provide the source information to questioners. For follow-up evaluation to determine whether questioners are satisfied with answers, they would check how many points their answers received and read questioners' or others' comments about their answers. In addition, the criteria related to evaluating the quality of the answers in digital reference services - namely, accuracy, completeness, timeliness and authority - can be the standards used by answerers to create their own answers.

2.4.1.2. Health Care Professionals

Health care professionals ask and answer questions all the time when they are consulted by patients. Just as reference librarians ask a series of questions of library users in order to understand their information needs, doctors, nurses and other health care professionals initiate conversations with patients, asking questions to identify patients' concerns and symptoms, before and during the medical examination. Sometimes patients bring information that they found in external sources, including Internet sources, to health care professionals in order to receive advice.

The advent of the Internet changed the way that doctors manage questions asked by patients. The communication channel between health care professionals and patients has been expanded from face-to-face or telephone only to emails, chatting or voice conferencing. In

particular, email communication has become one of the important methods in medical practice to connect patients and doctors for interactions (JA Powell, et al., 2003).

Eysenbach and Diepgen (1999) investigated patients' motivations, expectations and misconceptions of email communication with medical doctors by analyzing email messages delivered from patients to medical doctors for medical advice in a hospital in Germany. Email communication definitely increased the chances for doctors to communicate with a diverse group of patients. The age of the patients ranged from 12 to 69, although most patients were between 20 and 29 years old. Although the setting was a hospital located in Germany, international patients from the United States, other Western European countries, South America, Australia and Asia sent emails. Not all of the emails sent to the clinic were answered by medical professionals. About 44% of questions required non-medical expertise, such as providing addresses, or general or standard information sources. The rest of the questions were divided into two groups; one group was questions which could be answered only with a medical examination, and the other group was questions that could be answered without a medical examination. Thus, 28% of the total email inquiries were answered by health care professionals via emails. Interestingly, patients emailed to health care professionals because they wanted to receive second or third opinions about their diseases and treatments. Most of the email messages included specific questions about treatment, referral to specialists, alternative medicine, causes, etc. Patients asked questions not only for themselves (44%) but also for their close friends, children or relatives (63%). There is still debate about whether the use of emails for medical consultation is effective in caring for patients. Doctors agreed that email communication with patients has benefits for enhancing disease management and care and for providing flexibility of communication (Patt, Houston, Jenckes, Sands, & Ford, 2003). At the same time, doctors expressed their frustration communicating with patients via emails because they are suspicious about whether email communication is effective in saving time and money for providing good quality medical services (Given, Girzadas, Bigalke, & Meiterman, 2002).

Although question asking and answering is an important part of medical consultation between doctors and patients in clinics as well as online communities, little is known about health care professionals' strategies for consulting with patients or answering questions online. As a way to understand the communication between doctors and patients better, Ely and his colleagues(Ely et al., 1999; Ely et al., 2000) developed a taxonomy of questions in medical services, but it delved into the questions asked by family doctors when examining patients or communicating with other health care professionals, rather than questions asked by patients in relation to their information needs. There are several studies about the impact or perceptions of online communication between doctors and patients, but there are few studies about question asking and answering involving health care professionals in online environments.

Another interesting change among health care professionals in their services in the Internet era is that health care professionals now have the chance to actively participate in the community of patients and provide advice to patients beyond their consultations in clinics. Not only do health care professionals passively respond to questions delivered by emails or other online communication tools in their own clinics, they open themselves to those who need help in online support groups or virtual communities of health and they provide medical advice on the Internet. In addition, some health professionals have been actively involved in the community of online Q&A, and voluntarily participated in producing answers to questions posted by anonymous users on the Internet.

NetWellness and Go Ask Alice! are online health Q&A services offered by health organizations or programs that are composed of volunteer medical doctors, nurses, specialists, researchers or other professionals who answer health questions submitted by Internet users. There are also medical doctors recruited by health portal sites, such as Web MD or the general expert services, who provide online consultation for answering questions (See Section 2.2.2. Expert Services for further information about online health Q&A services). In social Q&A, it is often observed that user profiles of answerers include their medical degrees or background information

about certain areas of expertise on a health topic. There must be some medical experts who, for altruistic purposes, are providing advice through the channel of social Q&A, in order to understand the needs of patients, to learn about trends in medicine or to help anonymous patients. In order to promote the participation of health care professionals in social Q&A, Naver Knowledge-iN recruited health care professionals and encourage them to answer questions in the categories of diseases and treatment (Ham, 2009) .

The current research is not focused on investigating the strategies of health care professionals to deal with questions and answers from patients. However, the demographic and professional backgrounds of answerers, that is, how many health care professionals are involved in social Q&A, were investigated and further analyzed in relation to the motivations and strategies of these answerers, compared with those who have little expertise in health care.

2.4.1.3. Answerers in Online Support Groups

Most of the health support groups on the Internet are open for anyone who is interested in sharing information and support among the rest of the members of the groups, unless there are restrictions for certain groups of people in clinics or organizations. The role of participants in online support groups can vary depending on the purposes or characteristics of the groups. There are support groups which assign definite roles to participants using official titles, such as group leaders, discussion facilitators, or health care professionals for medical advice, and the rest of the members freely share information and experiences without assigned roles.

Instead, the social role of participants, an implicit identification of participants naturally created by the frequency of participation or level of contribution, can be observed and identified within the groups, and researchers of online communities have identified different types of roles in order to analyze the characteristics of the participants and to understand the context of online communities better. Kim (2000) divided participants into groups labeled visitors, novices, regulars, leaders and elders according to the duration of time, the frequency of visits, and the

level of contribution to the group activities. Golder and Donath (2004) added a popularity value to the roles and identified participants as newbies, celebrities, lurkers, flamers, trolls, and ranters. Considering behaviors and contributions, participants can also be classified into groups called key contributors, love volume repliers, questioners, readers, and disengaged observers (Brush, Wang, Turner, & Smith, 2005), or initiators, contributors, facilitators, knowledge-elicitors, vicarious-acknowledgers, complicators, closers and passive- learners (Waters & Gasson, 2005)[16]. Although the types of social status of members in online communities can be identified in many different ways by the definitions of the roles, one's social role is not assigned permanently, but can switch to other roles at any time based on the behavioral or structural changes of online communities. For example, the status of newbies can be changed to either celebrities or lurkers according to the level of participation and contribution in online communities, or those who are newbies in one online community can be celebrities in another online community.

The role of participants in which we are interested in the current study is answerers, namely those who share information and support to others. Turner, Smith, Fisher and Welser (2005) analyzed the visual density and diversity of a news group with variations of hierarchies, newsgroups, authors and social networks, in order to understand the social structure of online communities. The representative types of participants who contributed to create contents and messages in Usenet were answerers, questioners, trolls, spammer/binary posters, and flame warrior/conversationalists. A year later, Turner and Fisher (2006b) analyzed the role of participants in a technical newsgroup based on the flow of information, authority and service, which are continually created, exchanged and shared in the community, and redefined the social types into questioners, answerers, community managers, and moguls.

According to the findings by Turner and Fisher (2006b), answerers are those who are most influential in online communities. They are active in responding to requests from other

[16] See Turner & Fisher (T. C. Turner & Fisher, 2006a) for an additional review of the social types suggested in studies.

members and creating content and information usable for the information sharing and support purposes of the community. Answerers are intrinsically motivated and enjoy being involved in communities and helping others without promise of compensation or rewards, although extrinsic rewards may encourage them to contribute more. Answerers not only contribute by providing information and support but also by enhancing the dynamics of the community in general as their assistances are visible and recognizable by the rest of members.

In online support groups related to health issues, the role of answerers is also important in maintaining and enhancing the functions of the groups. Answerers could be health care professionals who are monitoring or administering the groups, but answerers are not limited to them. Anyone who would like to share information and support with the group members can be an answerer. Since most of the research about social support groups has focused on understanding the general process and impact of the support groups in facilitating treatments for diseases, there is no statistical data about the background (knowledge and experience) of the answerers. Instead, it is predicted that the majority of answerers in online support groups are those who have advanced stages of a disease or further experiences dealing with symptoms or treatments, and are willing to help others who are inexperienced with the disease or relevant resources about it. Not only patients, but their family members would also participate in support groups and can be answerers as long as they are willing to respond to questions from others. One's role as a questioner or an answerer can be switched at any time, so participants in support groups can freely ask and answer questions of one another. Therefore, when answerers have regularly responded to others' questions and provided useful information, the answerers will be appreciated and recognized by individual questioners as well as by the group as a whole.

Answerers in online communities or support groups in health have been recognized as the key contributors who produce the contents to be shared and who promote the group's overall activities, and research has centered on encouraging answerers to be actively involved in various activities and building genuine relationships with the rest of the group members for the

advancement of the communities in general. Little is known, however, about their searching strategies or the strategies they use when offering information and support to others. Their willingness to share information and support without considering rewards has been acknowledged and appreciated as individual or cultural characteristics of the groups to which answerers belong, but there has been no further evaluation or investigation of their efforts to carry out noble actions pertaining to information sharing and social support.

2.5. Conclusion

Social Q&A is a venue where people look for both information and support in solving problems in their everyday lives. It is designed to serve users as a platform to share information and experiences related to a variety of topics. Previous studies have placed heavy emphasis on the quality of information contained in answers, and developed strategies to distinguish good answers from bad ones, indirectly, using various features generated by the activities of question asking and answering (Harper, et al., 2008; Jeon, et al., 2006). Despite the dynamic nature of the answers, little has been known about answerers.

As an attempt to understand motivations and strategies of answerers, in particular answerers who are active in sharing information and social support in the domain of health, the following have been reviewed: theories, models and related studies of health information sources, online Q&A services, motivations of contributors in various contexts of virtual communities and social support groups, strategies of experts (e.g., digital reference librarians, medical doctors) and answerers in online communities.

Based on the findings from the literature review, a model of answering behaviors in social Q&A with a special emphasis on motivations and strategies has been developed, and it was tested in the current study.

CHAPTER III. PROPOSED MODEL OF ANSWERING BEHAVIORS IN SOCIAL Q&A: MOTIVATIONS & STRATEGIES

Answerers communicate with multiple questioners and provide information and support to each questioner, responding to the questions posted in social Q&A. Answerers have individual motivations for reading questions and providing responses to questions and they carry out individual strategies in order to understand others' information needs, as well as to search for information and create answers. Figure 3.1 illustrates this description of answering behaviors and is a proposed model that was tested in the current study. A detailed explanation of each section of the model was followed.

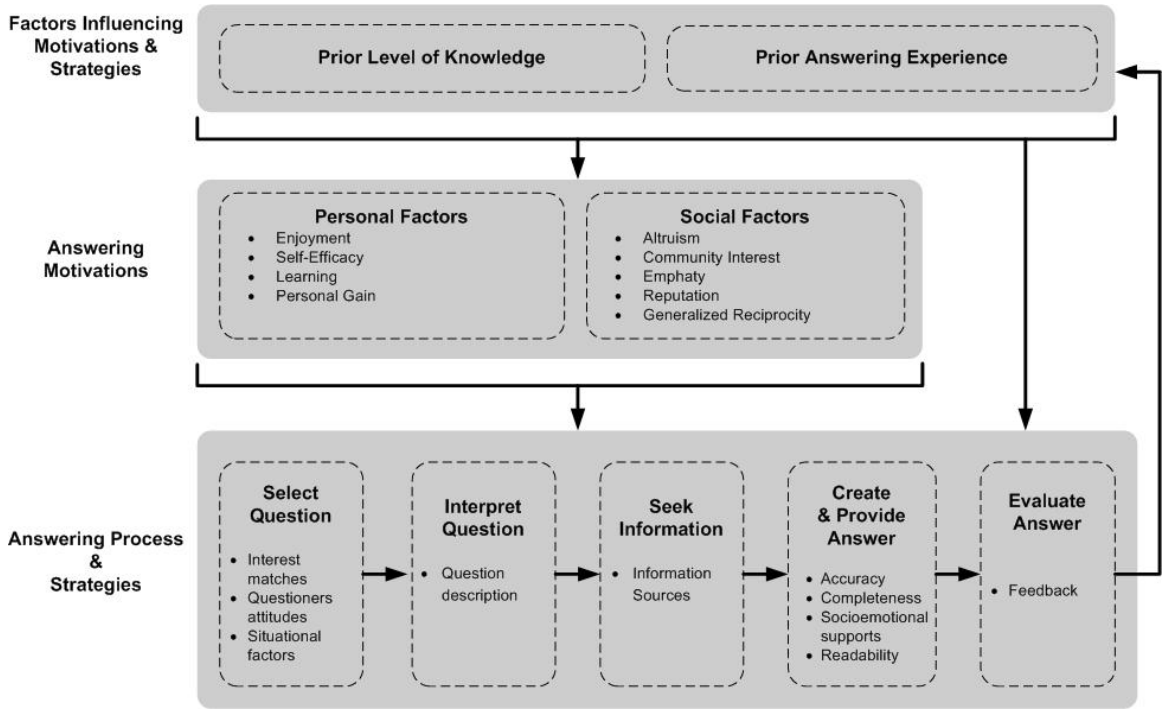

Figure 3.1. Proposed Model of Answering Behaviors in Social Q&A: Motivations & Strategies

3.1. Factors Influencing Motivations & Strategies

The upper box of the model in Figure 3.1 indicates answerers' standing before they delve into answering questions. In the current study, it is assumed that there are two important factors which influence the motivations and strategies of answering questions in social Q&A: 1) prior level of knowledge and experience about the topics on which answerers provide information and support, and 2) prior experience answering questions in social Q&A. The main interest of the current study is in the domain of health. In order to obtain data about prior levels of knowledge and experience of answerers in health topics, answerers' occupations and their prior education in the field of medicine were investigated. Social Q&A is designed to support the behaviors of question asking and answering. Those who have more experience in answering questions may have different motivations and strategies from those who have less experience in answering questions in social Q&A. Thus, the amount of time, the frequency as well as the level of contributions (2 to 7 levels) with which answerers have been involved in social Q&A was investigated. Finally, the relationship between the two factors and answerers' motivations and strategies to provide information and support was tested.

3.2. Motivation to Answer Health Questions in Social Q&A

The second box of the model in Figure 3.1 indicates that answerers come to social Q&A with their own motivations. From the review of various factors influencing the motivation to provide information and support in different kinds of communities and support groups in online environments, a model of answerers' motivation to provide health answers in social Q&A is proposed. In general, there are two categories – personal factors and social factors. As an individual, answerers' personal needs and interests in social Q&A can motivate them to contribute. Self-enjoyment, self-efficacy, learning, and personal gain are proposed as personal factors. As social beings, answerers want to communicate with questioners and help them by sharing information and support. Thus, social factors in the proposed model include altruism,

empathy, community interest, reputation, and generalized reciprocity. Each of these motivational factors is briefly discussed in this section.

3.2.1. Personal Factors

3.2.1.1. Self-Enjoyment

People participate in communities because they want to have fun and be entertained (Wasko & Faraj, 2000). In general, people prefer to be actively engaged in challenging work, rather than to passively consume products or services (Csikszentmihalyi, 2000). In open source communities, programmers feel competent and satisfied with their work because they enjoy the work of programming itself (Hars & Ou, 2001; Raymond, 1999). People consider the feelings of fun and competence to be intrinsic rewards and these findings motivate them to contribute in communities (Lakhani & von Hippel, 2003). In social Q&A, answerers may pursue the feeling of self-enjoyment, and self-entertainment through the experience of interaction with questioners. If answerers consider social Q&A as a hobby to enjoy in their free time, it may be because they are motivated by the factor of self-enjoyment.

3.2.1.2. Self-Efficacy

Bandura (1997) defined self-efficacy as "a judgment of one's ability to organize and executive a given type of performance" (p. 21). It is one's perceived capability to perform actions and complete tasks. Those who have self-efficacy believe that they can solve particular problems or improve particular situations. In social Q&A, answerers who have self-efficacy are willing to provide information and support to others because they believe that their knowledge and experience can be useful to others.

3.2.1.3. Learning

One of the main purposes for which people participate in a community is to obtain knowledge and learn about best practices as well as to be informed about changes and new inventions in their field (Wasko & Faraj, 2000; Ye & Kishida, 2003). Learning is an important element in communities of practice in that it is the basic mechanism that allows members to interact with one another in the community (Lave & Wenger, 1991). Since the current study focuses on answers' motivations to participate in social Q&A, whether learning is an important factor in promoting their participation was tested in terms of self-learning motivation. According to Wasko and Faraj (2000), programmers in open source communities mentioned that answering questions is a challenge because they have to refine their own thinking in order to produce appropriate answers. As a result, answering questions helps them to develop their own skills. Thus, it is expected that the desire to learn will encourage participation in social Q&A.

3.2.1.4. Personal Gain

According to Constant et al. (1996), some people are not willing to share knowledge in a community. However, if the person can personally gain from their participation in the community, he or she may share knowledge. For example, people may want to participate in communities and to build their reputations in order to sell projects or services related to their community activities. In the case of an open source community, individuals and companies who participated in the development of Linux started to offer commercial services like consulting, training, and distribution (Hars & Ou, 2001).

According to Nam et al. (2009), personal gains, such as selling products, have been identified by answerers as a reason that they provide answers in social Q&A, through this was not a strong motivation. Although there is no empirical data, it has often been observed from Knowledge-iN that medical clinics offered information in answers and noted their clinics as the

source of information. In addition, advertising one's personal blogs or online communities is a way to obtain personal gain from social Q&A.

3.2.2. Social Factors

3.2.2.1. Altruism

While the previous motivation of having fun and being entertained were individual needs to be involved in communities, altruism refers to humans as social beings. Ozinga (1999) defined altruism as "doing something for another at some cost to oneself," and conceptualized it as the opposite of selfishness. Altruistic behaviors indicate that people contribute to the improvement of others' welfare without expecting apparent compensation (Hars & Ou, 2001). Participating in online communities requires people to spend time and effort. In open source communities, programmers participate in writing code and developing programs for the public. They spend their own time and effort as well as incurring the opportunity costs of not earning money if they work on their own projects instead of working on the open source projects (Hars & Ou, 2001). However, such programmers are active members of online communities. Wasko and Faraj (2000) found that they help others because they believe it is the right thing to do and that it is better to share knowledge with others. In social Q&A, answerers' contributions that provide information and support to anonymous others also may be motivated by one's altruism.

3.2.2.2. Empathy

Empathy has been observed to be a critical factor that encourages people to participate in online communities, particularly in health support groups where people share their personal stories and concerns about certain diseases or topics of health (Preece, 1999). In social Q&A, people may be motivated by their empathy with others who are going through similar pain and stress about certain diseases. Thus, empathy caused by similar experiences and situations was tested in the current study as a factor of motivation.

3.2.2.3. Community Interest

The concept of community interest is similar to altruism in that people are willing to help others, but the reason is oriented toward maintaining or improving particular communities or professions as a whole. The sense of belonging to a community enables people to consider the communities' goals and values as their own (Hars & Ou, 2001). As members of a community, people are willing to help others at their own expense because they are motivated by the moral obligation that they need to take part in the advancement of the community (Wasko & Faraj, 2000). According to Etzioni (1988), people who feel moral obligations to a community participate more actively than people whose concerns are for their self-interests only. People believe that their participation in a community advances the nature of that group and of their profession more generally.

In addition, people appreciate that the community was created based on the common good, and they share their passion with other members (Armstrong & Hagell III, 1996). They do something for other members because they treat other members not as strangers but, rather, as close neighbors or kin. Hoffman (1981) called it "kin-selection altruism," which is one type of altruistic behavior observed in communities.

In the current study, we are interested in answerers in the domain of health. Their contribution to several sub-topics may be intended to improve the quality of information distributed throughout those health-related communities.

3.2.2.4. Reputation

Due to human nature, people have desires for status or prestige (Rheingold, 1993) and desires for fame or esteem among their peer groups (Maslow, 1946). They may be able to satisfy these needs through community participation. In online communities, all of the participation activities, such as asking or answering questions, providing information, and helping others, are

transparent and observed by the rest of the members all the time. The more actively a person participates, the more visible he or she is among others. Peer recognition of a person's expertise can promote one's self-efficacy and self-esteem, which makes one believe that he or she is an important person who has an impact on the community. These beliefs may serve as intangible rewards for community participation (Y. Wang & Fesenmaier, 2003).

Building a reputation is important for members in open source communities in particular, because it can be transformed into a future gain. Programmers may regard participating in open source projects as an effective way to advertise their capabilities, skills, and competence in programming. Thus, working for open source communities can be an investment in self-marketing (Hars & Ou, 2001). Those who have a high reputation in the community may be recommended for a new job, receive a consulting offer from clients who paid attention to the activities, or in other ways increase their value in the market.

In social Q&A, the concept of peer recognition and reputation is regarded as the most efficient way to promote participation, in that almost all social Q&A services provide services related to user reputation building. For example, in Yahoo! Answers, the scoring system tracks the points of individual users based on how many answers have been given, and how quickly they were posted, and whether they were recognized by the askers as the best answer among others. In addition, there is a top contributor icon, which is given to users who are recognized as knowledgeable persons, making the particular user more visible to others. A similar mechanism of scoring and selecting top contributors was applied to the AnswerBag's reputation building system. The reputation scores of WikiAnswers were hidden in that people have to click the user IDs in order to view their contribution and the trust scores of individuals, but WikiAnswers also considers reputation building as a method for keeping track of user participation. Since there have been no studies to test the efficiency of the reputation systems in social Q&A services, the results of the current study had important implications for the development and maintenance of reputation building mechanisms in current social Q&A services.

3.2.2.5. Generalized Reciprocity

According to social exchange theory, reciprocity means that a person provides help to another with the expectation that the other person will give assistance back (Blau, 1964). In online communities, people may not expect to receive the returned help from the original person that they had helped in the first place, but they may believe that someone else in the community will help them in the future. This is called 'generalized reciprocity'(Ekeh, 1974). Since the information needs of members as well as the level of their expertise vary, there is little chance that the information providers will encounter the recipient again in a community (Y. Wang & Fesenmaier, 2003). Nevertheless, people keep providing information and offering help to others because they know that they will receive help from someone else. At the same time, the person who received help from others may want to give back to the members of their community, because they want to pay back what they owe to the members who provided them with assistance.

In social Q&A, the roles of users are not static. They change dynamically, so that an individual may be a questioner or an answerer, depending on the need for information or motivation at any moment. Answerers may receive information or support from others when they ask questions in social Q&A and they may want to return the favor as they help others who have similar problems. Whether answerers are aware of the culture of generalized reciprocity may be an important motivational factor influencing answerers in social Q&A.

3.3. Answering Process & Strategies

The third box of the model in Figure 3.1 explains how answerers initiate, develop and evaluate their answers. In social Q&A, the role of users can be more easily recognized and defined than in online communities or support groups. Questioners submit questions with additional explanations about their information needs. Answerers provide information and support for which the questioners have asked. Each service has implemented a point system in

order to calculate the "score" of the answerers based on the number of answers posted and their quality, measured by votes on the answers from questioners or other members of the community; the rankings of contributing answerers are displayed in online boards or, sometimes, their IDs receive graphical icons to note that they are top answerers.

Although the existence of answerers is easily recognized in social Q&A, the role of answerers as information and support providers has not yet been explored; in the same vein, the strategies that they use to understand the information needs of others, and search for information and create answers on behalf of others have not been researched. Based on the previous review of answering or information providing strategies used by search or domain experts and answerers in online communities, a framework of answering processes and strategies has been developed and a model of answering behaviors in social Q&A is proposed.

Answering processes can be separated into five steps: select question, interpret question, seek information, create and provide answer, and evaluate answer. Answerers first need to select or deselect certain questions to answer. While browsing a list of the questions posted, answerers tend to select questions that match their interests. From the descriptions of the questions, answerers are able to detect the attitudes of questioners and decide whether to provide answers. Situational factor also are considered because there may be answerers who respond only to questions that are newly updated or to questions with no answers. When they select questions to answer, they examine the written descriptions of the questions and additional explanations of the questions in order to understand the information needs of the questioner. Answerers search their memories or experiences or external sources of information, and then create answers considering several dimensions pertinent to the content and social support aspects of the information. Question answering is not necessarily completed at the stage of answer provision. Answerers may want to know to what degree questioners are satisfied with the answers that they provided. They may review the questioner's comments or points given in response to their answers. All of the knowledge and experiences that answerers learn from the process of answering a question is

accumulated, and answerers use this knowledge and experience when they move on to the next question.

3.3.1. Selecting Questions

The most distinct characteristic of answerers is that answerers freely choose which questions to answer. When answerers read a list of questions posted in social Q&A, they may evaluate the information needs of a particular questioner and decide to provide an answer or skip to the next question. In other online Q&A services, reference librarians, experts or other information intermediaries are chosen by questioners and respond to the questioners' requests. In social Q&A, an array of questions posted by a number of questioners is available and waiting for answerers to respond. Answerers are not obligated to answer certain questions in certain topic categories. They have the freedom to choose the questions to which they want to respond and can create answers in their own ways. Question selection has been an issue in other online Q&A services, because they often experience shortages of personnel and budgets with which to handle the overwhelming number of questions asked by a large number of questioners. In digital reference services, rejections can often occur, with the percentage of the rejections depending on the amount of traffic the services experience. Carter and Janes (2000) analyzed the number of question rejections in the digital reference service of the Internet Public Library and found that more than half of the questions are unanswered due to the heavy traffic. The rest of the rejection reasons were related to mechanical problems, such as passing the deadline for receiving answers, and invalid emails. When the questions required the professional expertise of lawyers or medical doctors, they were also rejected.

In social Q&A, there is no rule for selecting or rejecting questions to answer that applies universally to answerers. Answerers have individual criteria for selecting questions matching their own knowledge in certain domains. As for the factors expected to influence the selection or rejection of questions, the current study proposes the following: interest matches, attitudes of

questioners, and situational factors. Interest matches indicates whether the topic of interest to an answerer matches the topic of interest to a questioner. When answerers read questions, they evaluate whether the question topics are of interest. In addition, answerers are willing to provide answers when they are confident that they know enough about the topic and can provide useful information and support to questioners. They also infer the attitudes of the questioners from the questions and additional descriptions. When answerers feel that questioners are insulting, rude, and arrogant or have other negative attitudes, they do not readily provide answers. In addition, answerers aren't able to answer questions adequately without enough information or explanation so that they can understand the topic of the questions or the situation of the questioners. A situational factor is listed because there may be answerers who respond to questions, which are newly updated only or to questions with no answers.

3.3.2. Interpreting Questions

Questions are representations of information needs (R. Taylor, 1968). In social Q&A, questioners write a sentence that is a question, together with a short description to explain what is wanted in detail and post them on the system in order to make them available to everyone who is interested in answering. In the human-mediated environment of online Q&A, answerers play important roles in understanding the information needs of others and in providing information and support that responds to questioners' information needs. In digital reference services, reference librarians conduct reference interviews. Taylor (1968) and others have emphasized the importance of including a question-negotiation process during the reference interview because the initial questions asked by library clients are often incomplete and different from what they actually want to know. When a question is asked of domain experts, similar processes may be involved. In health care situations, medical doctors or nurses have conversations, verbally or non verbally, asking a series of questions of their patients in order to understand needs that are hidden in the expressions of the questions asked by the patients. To better understand patients'

information needs, doctors exchange questions and answers with patients during medical examinations.

In social Q&A, there are several limitations to performing question negotiation interviews between questioners and answerers. First, all of the communication in social Q&A occurs in exchanges of written questions and answers. Answerers need to rely on written expressions only in order to understand the information needs of questioners. Second, the question asking and answering occurs anonymously without involving any interpersonal relationships among participants. Questioners and answerers have no chance to meet or communicate for further conversations unless they intentionally contact one another. In addition, the message-board style interfaces of social Q&A do not provide integrated functions through which to conduct the follow-up question negotiation between questioners and answerers, although there are informal ways to do it as answerers post follow-up questions in the answer section. An informal form of question negotiation is often observed in the thread of answers but little is known about how often it occurs and how effectively the negotiation is carried out considering the limited design of the interface. Thus, answerers' assessments of questioners' information needs mostly relies on sentence questions and passages of the explanations which have initiated the threads of question asking and answering in social Q&A.

Although missing chances to conduct a question negotiation interview seems very critical during the process of question asking and answering in social Q&A, it is not known whether it causes serious damage to the final actions and achievement of the goal of sharing information and support in social Q&A. Sometimes, questioners respond emotionally and blame answerers when answers unrelated to their questions are posted. By observing questioners' comments on answers, I have found that questioners were quite angry sometimes and expressed their dissatisfaction with the answers they received when they were supposed to comment on the best answers. In most cases, however, it seems that questioners are at least neutral or satisfied with answers and the related processes because they keep coming back to social Q&A site and posting more questions.

The current study address answerers' points of view about how they feel about missing such chances to ask further questions in the attempt to understand the information needs of questioners, and provide appropriate information and support when responding to the questions.

Another interesting aspect in assessing the information needs of questioners is anticipation. Answerers are those who participate in providing information and support voluntarily. Experienced answerers in certain topic categories may be able to observe naturally the trends in questions and popular topics in which people are interested. Sometimes answerers spend extra time learning about the topics for which they would like to answer questions in social Q&A, through reading professional articles or newspapers, Answers can be newly produced at the moment when answerers complete the search responding to the information needs of questioners. However, there are also cases when answerers reuse an entire answer or parts of answers that they provided in the past. This study also examines whether answerers have personal archives of answers and reuse them when they find questions that they had already anticipated due to their experience of repeated requests from other questioners.

3.3.3. Seeking Information

Depending on their levels of knowledge and experience, answerers will have different levels of information seeking skills. In particular, when an answerer is searching for information for a questioner based on a one-time written inquiry without further interaction or communication to negotiate the question, the answerer may encounter problems and difficulties while seeking additional information.

As a way to examine answerers' information seeking behaviors for finding answers for questioners, information sources used by answerers to provide information and support were evaluated. A preliminary study of the use of information sources by answerers has been conducted by Oh, Oh, and Shah (2008). The researchers collected the source information posted by answerers in Yahoo! Answers, and found that 56.4% of sources come from personal

experience, professional background, references from third parties, personal research and theory, and ethnic backgrounds. The second most frequently used source was the Internet (38.1%), such as commercial, organization, government, and educational Websites, search engines, and answers from Yahoo! Answers. The users of other types of sources were minor, namely, books (3.6%), and mass media (1.6%). In the domain of health, the use of human-related sources was even higher than the general distribution (61.5%). The use of the Internet (36.1%) was also high in the health category. In the previous study, there was a limitation in that researchers analyzed source information which was explicitly given by answerers as sources. The interface of Yahoo! Answers allowed people to post source information separately from answers. The cases in which information sources are embedded in answers are excluded from the study. For the current research, source analysis was conducted more thoroughly. In addition, the relationship with source use and the other factors related to motivations or strategies was investigated in depth.

3.3.4. Creating Answers

With a piece of information/knowledge or a set of information sources at hand, answerers are ready to create answers. Answers are distinct from other types of documents in that they are tailored and personalized gems of information specially produced for the needs of the questioners. Information is an important piece of any answer, but answers include subjective comments reflecting personal attitudes, emotions, and caring as well as information. When people read answers they may feel as if they are communicating with the answerers, rather than viewing static and objective documents. Thus, answerers' concerns when they provide answers would include the criteria of how the content of the information were evaluated by questioners as well as how questioners would feel about the answers, considering both of the information and the social support aspects of the answers.

In fact, questioners, participants in a recent study (S. Kim & Oh, 2009) valued the socio-emotional aspect of answers, and the related criteria (such as answerers' attitudes, effort,

experiences, agreement, emotional support, and humor) were the most frequently used to evaluate answers (29.8%). These were followed by the content criteria (26.1%), such as completeness, rationality, specificity, accuracy, clarity, writing styles and length, and utility criteria (23.3%), such as solution feasibility and effectiveness. In the health category, the distribution of socio-emotional, content and utility criteria was almost equally important. Considering the fact that there is no one criterion that highly surpasses the others, questioners in health used various approaches to evaluate answers, and answerers should be willing to satisfy the diverse needs of questioners if they want their answers to be useful and recognized as the best ones. If building their reputations is an important motivation for answerers to participate in social Q&A, they will want to provide answers with both a good amount of information and personal comments (i.e., social support) in the text.

In order to investigate their perceptions of the criteria that answerers use, a set of criteria considering both information and social support aspects of answers have been selected for the current research. As for the information-oriented aspect of answers, answerers' perceptions of accuracy, completeness, and information sources were examined. For the support-centered aspects of answers, answerers' experience, attitudes, emotional support, and agreement were tested.

3.3.5. Evaluating Answers

Answerers would like to know whether their answers were useful to questioners. If answerers' motivations are driven by obtaining more points in the reward system or building a reputation in a social Q&A site, they would be more willing to trace the responses from the questioners to their answers. Online Q&A services, such as digital reference services or expert services conduct evaluation surveys to discern satisfaction with their general service as well as with individual experts for dealing with questions and answers. In social Q&A, no systematic measure to evaluate the effectiveness of answers is available except the subjective comments or

voting from questioners or other answerers. In order to trace the reaction of questioners toward their answers, answerers would trace their answers and review the voting scores or comments from other users and this feedback may be reflected in the creation of answers the next time.

3.4. Conclusion

The current model of answering behaviors provides a conceptual framework of an answering process. It is composed of three sections – core factors influencing motivations & strategies (prior level of knowledge, prior answering experiences), answering motivations, and answering process and strategies. Each of the sections includes possible variables influencing the answering behaviors. The relationships among the variables were examined in the current study. Specifically, this study addresses three research questions:

1) Why do answerers participate and contribute in social Q&A?
2) What strategies do they use to provide effective answers in social Q&A?
3) What are the relationships between motivations and strategies?

CHAPTER IV. METHOD

The purpose of the current research is to explore the motivations and strategies of answerers who are willing to share information and provide support to others in social Q&A. From a comprehensive list of topic categories available in social Q&A, the current study focused on answerers of health questions. In order to investigate health answerers' motivations and strategies, surveys and content analysis were chosen as research methods.

Social Q&A shares characteristics inherent in other types of online communities, in that it allows people to voluntarily participate in disseminating information and support to anonymous others. Thus, the literature on motivations and strategies of experts and contributors in other contexts has been extensively reviewed to develop a plan for surveying answerers. For example, an exploratory study that carried out small-scale interviews with answerers was conducted by Nam et al. (2009) and provided a descriptive overview of the motivations of answerers in social Q&A. Based on a review of these studies, a list of factors applicable to answerers has been identified and these factors were represented in the survey.

In addition to responses obtained from the survey of answerers, the answers themselves contain a great deal of information related to the communication that occurs during information sharing and social support. A social Q&A service is a corpus of questions and answers that people have shared since the service was first launched. All of the questions, answers, and related information and activities are visible to the public, and available for research. Thus, answers posted by answerers who participate in the survey were collected. A content analysis of the answers provided a preliminary view of the ways in which answerers provide information and

social support and the sources of additional health information referred to by answerers. A detailed explanation of the proposed methods is provided in the following sections.

4.1. Test bed: Yahoo! Answers

For the current study, Yahoo! Answers was chosen as a test bed for the research. Yahoo! Answers is the top ranking social Q&A service, hosting 25 million users with 237 million answers in the United States and 135 million users with 500 million answers world-wide (McGee, 2008). Yahoo! Answers has two advantages in dominating the market of social Q&A. First, Yahoo! Answers has continuously promoted its service to a great number of existing Yahoo! users, and the existing users can easily access Yahoo! Answers without any additional process of subscription. Second, thanks to the global network of Yahoo!, Yahoo! Answers has been promoted and used worldwide in many languages reaching beyond the English-speaking world.

Furthermore, the general features of Yahoo! Answers are representative of other social Q&A services. A new thread of a question is created by anyone who has the need for information and support and multiple answers are linked to the question. A set of a question and related answers in Yahoo! Answers is composed of five elements (See Figure 4.1):

(1) Topic category: A questioner needs to choose a topic category in which he or she wants to post a question.
(2) Question: A questioner can post a question with additional explanation of his or her information needs. When he or she posts a question, a new thread of the question and related answers is created.
(3) Best answer: When a questioner receives multiple answers, he or she can choose the most appropriate answer for his or her question from among the others and the chosen answer can be noted as the best answer. When an answer is chosen as the best answer, it is moved to the position immediately near the posted question in the thread. In each answer, answerers can leave sources of information used for their answers. It can be a description of a source, such as a description of an answerer's expertise or experience (e.g., "a retired physician" or "my experience"), a URL of an Internet source, etc.
(4) Questioner's comment on best answer: The questioner can rate the quality of the best answer and leave comments on it, mostly about why they picked that one as the best answer.
(5) Other answers: The rest of the answers follow the question and best answers. The list allows people to access as much of the information as they desire and they can refer to it in the future.

In addition to these basic features, Yahoo! Answers allows third party users to rate answers. The thumbs-up or thumbs-down icons in each answer indicate how many people have expressed whether it is a good or bad answer. For the current study, questions and answers were collected and the content of answers and the sources mentioned in answers were analyzed.

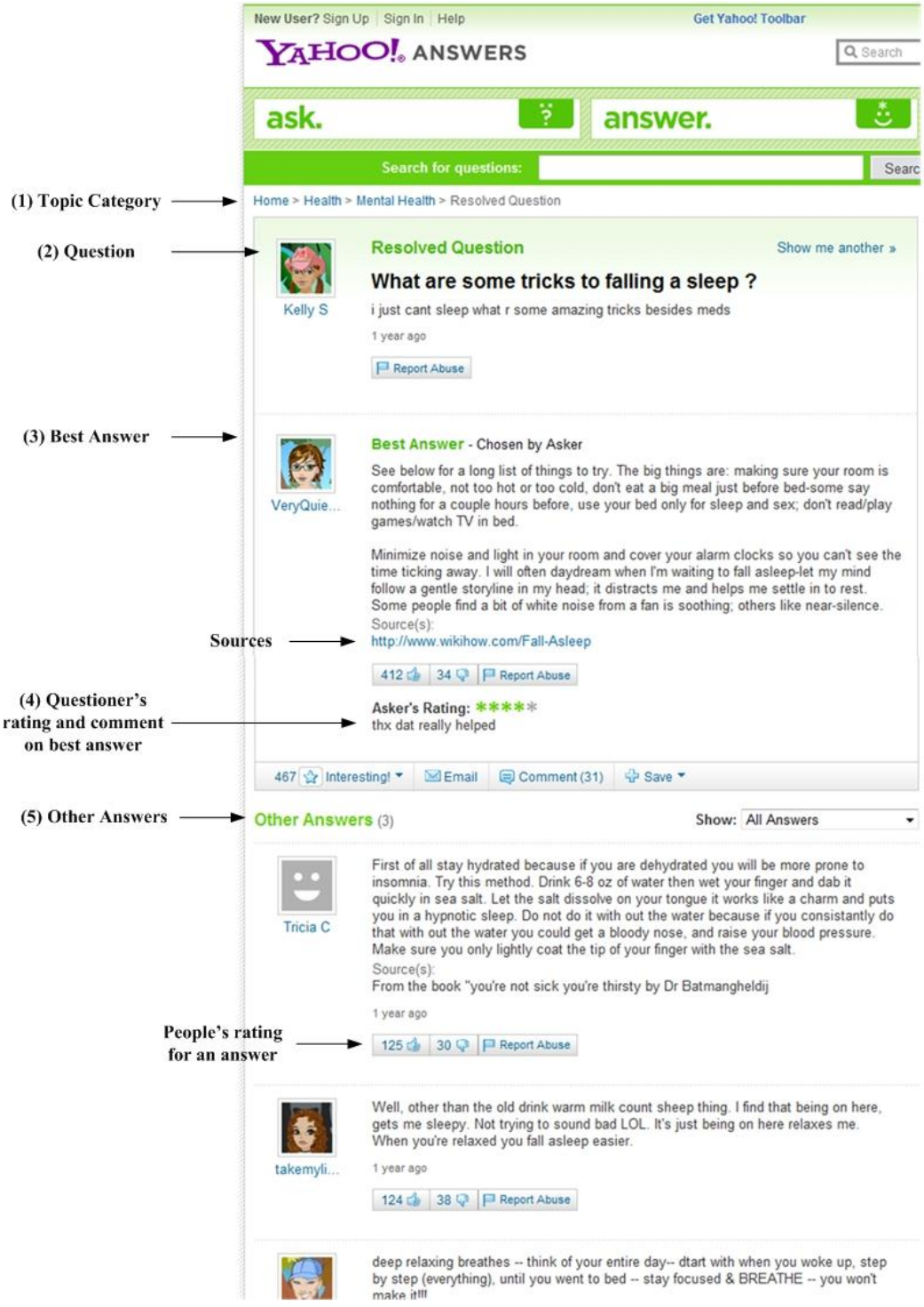

Figure 4.1. An Example of a Question and Related Answers in Yahoo! Answers

Another interesting feature of Yahoo! Answers is that it allows every user to have his or her profile page. The avatar picture of a user in a posted question or answer is linked to the user's

profile page, which includes background information about the user's contributions in Yahoo! Answers (See Figure 4.2). The profile page includes:

(1) ID: Yahoo! Answers users create their own identifiers and use them when they post questions and answers.
(2) Level and Points: Yahoo! Answers provide a scoring system which allows users to receive points for various activities, such as answering questions, having one's answer selected as the best answer, choosing a best answer for one's question, and voting for a best answer. The distribution of earned points is given in the section called Activity Summary. The levels range between 1 and 7 (1- lowest level with less contribution and 7 - highest level with more contribution).
(3) Contact Information: Yahoo! Answers users can be contacted via their email or Yahoo! messenger. In order to prohibit spam distribution through these channels, Yahoo! does not expose one's email addresses or messenger IDs. Instead, when clicking the active link in the profile page, people can send an email message to the user in the profile. Not all of the answerers allow these contact links to be active. They can choose to hide or open the links in their profile pages. For distribution of the current survey, this email link was used to contact answerers.
(4) List of Answers and Questions: All of the answers and questions posted by a user automatically accumulate and are linked to the profile page. A user can either open the list to the public or hide it from open access.

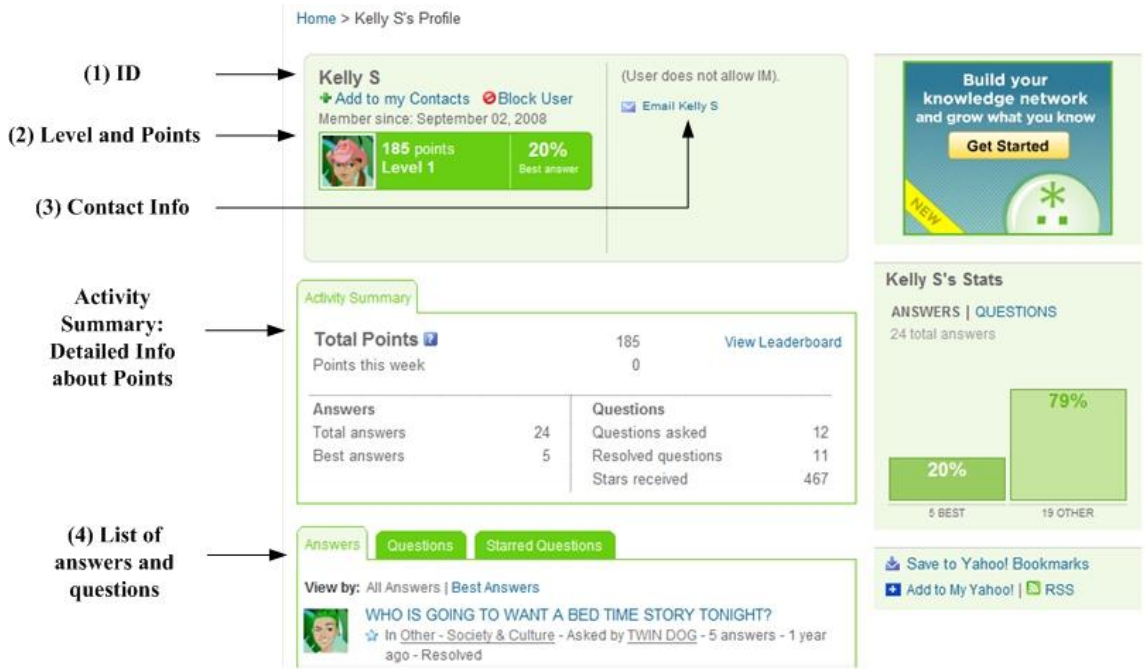

Figure 4.2. An Example of an Answerer's Profile Page

The topical coverage of Yahoo! Answers is quite broad. To embrace a wide spectrum of peoples' interests, Yahoo! Answers has established 25 top-level categories and encourages people to post questions/answers under appropriate categories. Under the Health category, there are 10

subcategories: Alternative Medicine, Dental, Diet & Fitness, Diseases & Conditions, General Health Care, Men's Health, Mental Health, Optical, Women's Health, and Other-Health (See Figure 4.3). The categories of Diseases & Conditions and General Health Care are subdivided even further with specific diseases, conditions or issues in health[17]. Thus, a total of 20 health-related topics are available. Answerers who have provided answers in these topic categories are the target population of the current study.

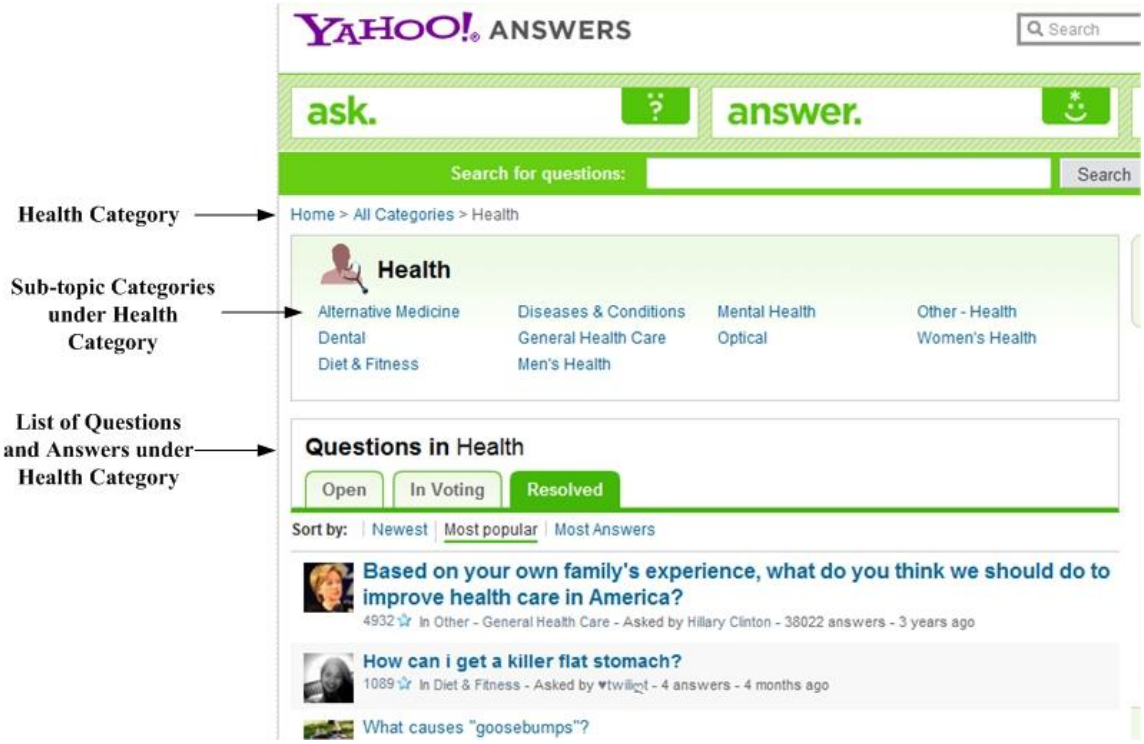

Figure 4.3. A List of Questions and Answers under the Health Category in Yahoo! Answers

4.2. Study Participants

Two samples of answerers were recruited – top answerers and recent answerers. Top answerers are those who have earned a high number of points based on their recent participation in providing answers in a particular category. Their avatars receive a graphical badge, marked as

[17] Diseases & Conditions is specified to Allergies, Cancer, Diabetes, Heart Diseases, Respiratory Diseases, STDs, Skin Conditions, and Other-Diseases. General Health Care is specified to First Aid, Injuries, Pain & Pain Management, and Other-General Health Care.

"top contributor", and the top 10 answerers are noted in each category. They are easily recognizable because a list of the top 10 answerers is displayed in Yahoo! Answers (See Figure 4.4).

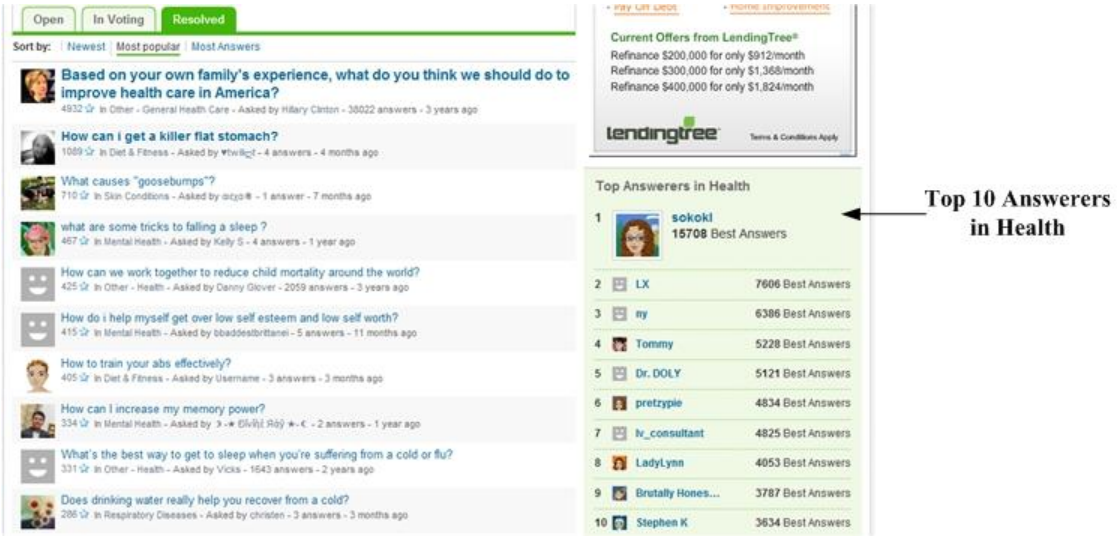

Figure 4.4. An Example of Top 10Answerers in Health

Under the Health category, 20 sub topics are available. Thus, the maximum number of top answerers who could be included in the target population of the research is 200. In the study, a total of 128 top answerers were identified as the population for the following reasons. First, there is likely to be overlap in the lists of top answerers because there are top answerers who are involved in more than one topic of health, since answerers have the freedom to participate in as many topics as they want. In addition, as mentioned earlier, there are answerers who refuse to be contacted and deactivate their email links. Online surveys for the current study were not delivered to those answerers. Therefore, they were excluded from the sample. When the survey was launched, in January 2009, 183 unique top answerers were identified under the health categories. Among them, 128 (70%) allowed people to contact them via their email links and were included as survey participants.

In addition to top answerers, a sample of recent answerers (i.e., those who have provided answers in the health category during the most recent two months) was included in the study.

Yahoo! Answers was launched in 2005 and has accumulated questions, answers and user information since then. Some of answerers may not be active anymore. In order to identify active answerers, a sample of recent answerers was selected and included in the study.

Recent answerers were randomly selected in two steps. First, a Web crawler randomly collected information about users who had posted answers in the most recent two months (December, 2009 and January, 2010). The number of answerers in the Health categories from this primary random sample selection was about 124,926. From the primary sample, those who do not have active email links in their profile pages were eliminated. Then, a stratified random sample was selected from the remaining recent answerers. The stratification was based on answerers' levels assigned by Yahoo! Answers. Answerers in Yahoo! Answers earn points based on their activities and are divided into 7 groups according to the level of their contributions and answering experience. Depending on the levels of their contributions, answerers' motivations and strategies may vary. Thus, recent answerers in each level need to be included in the study. There are 7 levels available (1-lowest, and 7-highest) in Yahoo! Answers. The higher the level of an answerer is, the more he or she has experience in answering questions. Users in level 1, a default level given to every user in Yahoo! Answers, were excluded from the sample selection based on the assumption that most of the population in this category was questioners who may have no or little experience in providing answers.

For this sample, 300 recent answerers available for email contact in each level (2 to 7) were randomly selected from the primary sample. Thus, 1,800 recent answerers were initially included in the study. For the comparison of motivations and strategies across levels, it is desirable to balance the number of participants in each level, so an equal number was recruited from each level. This plan is based on the assumption that each answerer would have an equal chance of participating in the study. In reality, this assumption was not true. Answerers in higher levels were more responsive than answerers in lower levels. Thus, 300 recent answerers in each level were recruited initially, and the second wave of recruitment in lower levels (levels 2 and 3)

continued until a valid sample (at least 30 responses at each level) had been recruited from each level. One hundred fifty more answerers in each of levels 2 and 3 were included in the sample. Thus, 2,100 answerers were the sample of recent answerers.

There were answerers who belong to both top answerers and recent answerers groups. Thus, the survey was distributed to a total of 2,139 answerers.

4.3. Data Collection

Two types of data were collected for the current study: 1) answerers' responses to a survey questionnaire about their motivations and strategies, and 2) their answers given in the natural context of Yahoo! Answers. The methods to be used to gather these data are described here.

4.3.1. Surveys

Surveys were chosen for the current study because they are useful tools to obtain direct responses from a large population of answerers about their motivations and strategies. Interviews can be another good method to collect subjects' responses, but they are limited to exploring a particular context based on the responses of a small number of subjects, in comparison with surveys. The goal of the current study is to understand the motivations and strategies of answers in the health domain, in general, so a survey was used to collect data.

4.3.1.1. Survey Distribution & Administration

An online survey, administered using Qualtrics[18], was distributed via the email links available on answerers' profile pages. As was mentioned earlier, answerers have the option to activate or deactivate the email links that allow for direct interaction with other users in Yahoo! Answers. Thus, answerers who have their email links open and available were included as the

[18] http://www.qualtrics.com/

potential sample for survey participation. A recruitment message with an online survey link (See Appendix A) was sent to the individual links available on their profile pages.

Since the survey distribution needed to be done manually by visiting the profile page of each answerer and submitting the message to the embedded email link individually, the estimated number of survey distributions was 100 messages per day. The planned 2,228 surveys were distributed over a period of about a month. (The distribution was initiated in January 30, 2010 and ended in February 28, 2010). Additionally two reminder emails (See Appendix B) were sent to answerers in the two weeks following the first survey distribution.

4.3.1.2. Survey Questionnaire

The online survey consisted of three sections: background, motivation factors, and answering strategies (See Appendix C: Survey Questionnaire). Answerers' background information includes demographic information such as age, gender, and education. In order to obtain data about prior levels of knowledge and experience of answerers in health topics, answerers' occupations and their prior education in the field of medicine were investigated. Social Q&A is designed to support the behaviors of question asking and answering. Those who have more experience in answering questions may have different motivations and strategies from those who have less experience in answering questions in social Q&A. Thus, the amount of time and the frequency with which participants answer questions in social Q&A, as well as the level of their contributions (Yahoo! Answers' levels 2 to 7), were investigated.

In the motivation section of the survey, two categories of motivation, personal and social motivation, were employed to evaluate individual factors of motivation. Personal motivations indicate the needs and the rewards that an answerer pursues without a relationship with questioners or other answerers. They include enjoyment, self-efficacy, self-learning, and personal gain. Since social Q&A is a place where people can build social relationships, there are also motivational factors which emphasize the social aspects of answerers' behaviors. Thus, social

motivations include altruism, community interest, empathy, reputation, and generalized reciprocity. (See Section 3.2 for a rationale for the inclusion of these factors).

Statements regarding the motivational factors are provided and the level of agreement or disagreement of answerers with the statements was collected on a 5-point Likert scale. The survey items related to each type of motivation have been identified by researchers in several previous studies of motivations in other types of online settings, such as communities of practice, open source projects, Wikipedia, online support groups, etc. (Hars & Ou, 2002; Kankanhalli, et al., 2005; Lakhani & von Hippel, 2003; Nov, 2007; Y. Wang & Fesenmaier, 2003; Wasko & Faraj, 2000). In Appendix C: Survey Questionnaire, each item selected from the previous studies is indicated. The reliability and validity of the motivational factors in several studies had been confirmed. Cronbach's alpha (Cronbach, 1951) was used to assess the reliability of questions in each factor of motivation and ranged from 0.85 to 0.96 (Kankanhalli, et al., 2005). The reliability and validity of the survey items in the current study were also re-tested and are reported.

In the case of answering strategies, there are few studies which have focused on answering strategies and developed factors related to those. Therefore, the model of the answering process for social Q&A was developed based on the findings of studies of digital reference librarians and domain experts in health. The five steps of answering questions (i.e., selecting questions, interpreting questions, seeking additional information, creating and providing an answer, and evaluating answer effectiveness) were used to develop statements regarding each step involved in answering questions. These statements were provided and the levels of frequencies of using strategies presented in the statements were collected on a 5-point Likert scale.

The survey questionnaire was pre-tested by 8 answerers who have experience in providing answers in social Q&A services or online communities. They were recruited by an email list at the School of Information and Library Science at the University of North Carolina at Chapel Hill. Most of them were either undergraduate or graduate students, as well as a couple of staff members at the School. Their participation was voluntary. A think-aloud method was used to

obtain responses of the recruited answerers on the survey questions. They went over the list of questions one by one and provided comments on how well the questions apply to the strategies and behaviors they use in answering questions in a social Q&A site. The time of completion and the validity of the survey items were evaluated by these pre-testers. Based on the results of the analysis, the survey questions about answering strategies were modified (e.g., clarifying ambiguity, etc.). During the pre-test, several answerers mentioned that their motivations to participate included the desire to be engaged in the community. Thus, Social Engagement was included as an additional motivation in the survey.

In addition to the survey, answers given by those who participate in the survey were collected in order to identify answerers' characteristics based on the answers that they provided in the natural environment of Yahoo! Answers. Thus, each survey given to a particular answerer was tagged by their user ID, which was known at the stage of sample selection. With the IDs of answerers who participated in the survey, their answers were additionally crawled and collected for later content analysis. Since all of questions and answers in a social Q&A service are available to the public, it won't be necessary to receive approval for the data collection as determined by a review already conducted by the University of North Carolina IRB[19]. However, it was necessary to receive permission from answerers to quote their answers and use them in publications because their particular wordings of answers are retrievable through the Yahoo! Answers search engine, and it may reveal their individual identities as survey respondents. Thus, a section granting permission to quote was included at the end of the survey. Since the surveys involve human subjects, the study design proposal was reviewed and approved by University of North Carolina Institutional Review Board (IRB) prior to subject recruitment and data collection[20].

[19] The study # of the IRB determination is 08-0768.

[20] The study # of the IRB approval is 10-0071.

4.3.2. Content Analysis

While the surveys collect data about the answerers' perceptions of their behaviors, the content analysis focused on analyzing the answers that have been produced by answerers in the natural setting of social Q&A. Specifically, the content analysis aimed to investigate the characteristics of answers in relation to the dual aspects of providing information and social support in social Q&A. Answerers may create answers with an emphasis on either information or social support or both. If they have different motivations and strategies, answerers may apply different strategies when creating answers with information or social support.

In addition, content analysis was used to identify information sources used in answering questions. Information sources can be an important indicator of the different strategies used by answerers in creating answers. According to their levels of knowledge, answering experience and motivations, answerers may use different types of information sources to create effective answers for questioners.

In summary, the content analysis was conducted from two perspectives: a content analysis of messages within answers and a content analysis of information sources mentioned in answers.

A content analysis of the collection of answers involved the following steps: identifying the frequency of terms expressed in the answers, classifying the terms into the categories of health messages, and determining the message type of an answer based on the term distribution. For the information source analysis, the source information embedded in answers, such as descriptions of information sources (e.g., my experience, 5 years' experience as a health care professional, etc.) or the URLs of Internet sources, was extracted and analyzed.

4.3.2.1. Answer Collection

When the surveys were returned, each of them included an answerer's user ID in Yahoo! Answers. This user ID was used to identify their answers posted in the health categories of Yahoo!

Answers. A Web crawler, using the Yahoo! Answers API, was used for collecting the answers. Answerers may produce only a few or a large number of answers when they contribute in social Q&A. Thus, one answer per answerer was randomly selected for the analysis, from the answerer's answers in the health domain.

4.3.2.2. Messages in Answers

Content analysis was conducted to understand the nature of the communication embedded in the answers, focusing on analyzing the characteristics of information sharing and social support provided by answerers. Among several typologies of communication in health communities, Klemm et al.'s (1998) four types of health messages were the basis for identifying the statements in the answers, and encapsulating the characteristics and functions of the content in the answers. The original schema was derived inductively from their data and divided into eight categories: 1) information giving/seeking, 2) personal opinions, 3) encouragement/support, 4) personal experiences, 5) thanks, 6) humor, 7) prayer and 8) miscellaneous. The top four categories have been most frequently observed in health messages (Klemm et al., 1998, Burnett & Buerkle, 2004) and were used for analyzing the content of answers in the current study (See Table 4.1).

Table 4.1. Four Types of Messages Expressed in Answers

Message Type	Description
Information giving	Answers with statements of definitions, symptoms, treatments and medication information on a particular disease or a health concern.
Personal experiences	Answers with statements of sharing personal experiences with a particular disease or a health concern
Personal opinions	Answers with statements of personal opinions about debatable issues and problems in the area of health, such as medical insurance and health politics.
Encouragement	Answers with statements of social and emotional support to encourage, reassure, and strengthen the mind of questioners, with positive attitudes and cheerful energy.

An answer can be characterized as one type of message, or an answer may incorporate more than one type of message. The proportion of statements in each answer was measured and used to present the characteristics of answers. In addition, the message types of statements dominant in an answer were analyzed to show the distribution of message types in answers.

To ensure reliability of the results, two coders participated in coding for the reliability test. Ten percent of the total number of answers used in the classification was randomly sampled and the intercoder agreement between two coders was computed. Cohen's K (Cohen, 1960) was used for the analysis.

4.3.2.3. Information Source Analysis

In addition to the message types of answers, the information sources used by answerers were analyzed based on the source identification in the answers. Social Q&A itself is a new type of Internet source in which people can consult with others about diverse issues and problems in their daily lives. At the same time, answers in social Q&A contain references to a number of information sources that answerers use for providing information and support to questioners. Thus, the health information sources of answerers can be traced by identifying the different types of information sources in the domain of health.

A preliminary study of the use of information sources by answerers has been conducted by Oh, Oh, and Shah (2008). The researchers collected the source information posted by answerers in Yahoo! Answers, and classified them into five groups -- human, book, mass media, Internet, and others (See Table 4.2 for the source type structure). Human sources were the most popular sources referred to in answers, followed by the Internet sources.

Table 4.2. Types of Information Sources Cited in Answers

Source Types[21]	Specifications
Human Sources	Personal /Situational Experiences Professional / Educational Background Third-party Research / Knowledge Ethnicity / Origin
Mass Media	TV, News, Magazines
Books	Books, including Bibles
Internet Sources	Commercial / Personal Websites (.com, .net) Organizational Websites (.org) Search Engines Yahoo! Answers Government Websites (.gov) Educational Websites (.edu)

In the previous study (Oh, Oh, & Shah, 2008), there was a limitation in that researchers analyzed source information which was explicitly given by answerers as sources. The interface of Yahoo! Answers allows people to post source information separately from answers. The cases in which information sources are embedded in answers were not included in the study. For the current study, source analysis was conducted more thoroughly and included sources described within answers.

4.4. Data Analysis

Data from the survey were collected and compiled by the Qualtrics software. Once all data had been collected, they were imported into SPSS and Nvivo. SPSS was used for the quantitative data analysis with the responses collected using a Likert scale. Nvivo was used for the qualitative analysis of participants' comments on open-ended questions in the survey. Additionally, answers posted by the survey participants in health categories of Yahoo! Answers

[21] The original structure of the source types in answers of social Q&A has been developed by Oh, Oh, and Shah, (2008).

were collected and analyzed using Nvivo for the content analysis of the types of messages embedded in answers.

With the collected data, five methods of statistical analysis were conducted: descriptive statistics, independent samples t-test, two-way contingency table analysis with chi-square test, Pearson's correlation coefficient and linear regression. Descriptive statistics were used to describe the basic features of the data. They provided an overview of the sample and the measures, such as demographic characteristics of the survey participants and the general distributions of motivations and strategies.

Independent samples t-test, chi-square test, linear regression, Pearson's correlation and Spearman's rank order correlation were used to evaluate the relationships between variables. These methods evaluate the statistical significance of the differences between the mean values of independent and dependent variables. An independent samples t-test evaluates whether the mean value of the test variable for one group is significantly different from the mean value of the test variable for the other group. The independent variables are the grouping variables. The dependent variables are the specific motivations and strategies. Therefore, independent samples t-tests were used to evaluate the motivations and strategies of top answerers (comparing top answerers and non-top answerers) and health experts (comparing experts and non-experts). There is a possible weakness of this approach, running many individual significance tests, because it may increase the likelihood of finding a relationship that doesn't really exist.

OLS regression evaluates how changes in one set of variables are related to changes in another set. A significance test can be used to evaluate whether the independent variable predicts the dependent variable in the population. OLS regression was used to evaluate the relationships between motivations and strategies, to evaluate whether motivations predict the use of particular strategies by answerers. Thus, the independent variables were motivations and the dependent variables were strategies.

A one-way analysis of variance (one-way ANOVA) is another method which evaluates mean values of differences between variables. An ANOVA F-test evaluates whether the group means on the dependent variable differ significantly from each other. The difference between ANOVA and linear regression is that linear regression is used to make predictions on the basis of one or more continuous predictor variables while ANOVA is used to make predictions on the basis of one or more categorical predictor variables. The independent variables which are addressed in the current study are motivations, which are (relatively) continuous variables measured by five-point Likert scales. In addition, linear regression offers a better representation of the relationship between variables. For example, in bivariate regression, it presents a regression equation; $y_1 = \beta x_1 + \alpha$, representing how two variables are linearly related such that a one unit increases in x_1 , is associated with, on average, a β change in y_1 (x_1 = independent variable, y_1 = dependent variable).

Based on a contingency table, the chi-square test compares the individual cell frequencies observed in the data set with frequencies expected, based on the marginal totals. It always assesses the null hypothesis that there is no significant difference between the expected and observed result. When they are too divergent, we can conclude that there is a relationship between the two variables.

Additionally, two correlation analyses methods were used: Pearson's correlation coefficient and Spearman's rank order correlation coefficient. Pearson directly assesses the strength and direction of a linear relationship between two variables. It assumes that both variables are interval or ratio data. Two Pearson correlation analyses were conducted – one within the 10 motivations and the other within the 32 strategies – in order to evaluate the relationships within each of the two sets of variables. Spearman's rank order correlation evaluates analogous relationships, assuming ordinal variables. There were two ordinal variables in the current study – income and education. Thus, it was used to evaluate the relationships between motivations and income/education, and between strategies and income/education.

4.5. Conclusion

Surveys were used to obtain direct responses from answerers about their motivations and strategies used in providing answers in a social Q&A site, Yahoo! Answers. Surveys were distributed to two different groups of answerers with different levels of knowledge and answering experiences: top answerers and recent answerers. In order to receive responses from active answerers, only answerers who had provided answers in the previous two months were included in the study. For the data analysis, descriptive statistics, independent samples t-tests, the two-way contingency table analysis with chi-square tests, Pearson's correlation coefficients, and linear regression were used. After survey responses from answerers were received, their answers posted in Yahoo! Answers were collected and analyzed in order to identify the types of messages in the answers, and the nature of their answers as sources of information and social support.

CHAPTER V. RESULTS

This chapter is organized as follows. First, in Section 5.1., the response rate to the current survey from answerers is reported. In Section 5.2, the characteristics of the survey participants are described. And then, the findings about motivations and strategies are presented, respectively, in Sections 5.3 and 5.4. The most interesting populations of the current study are top answerers and answerers who have health expertise (named health experts, hereafter). Therefore, motivations and strategies of top answerers and health experts are examined closely in these sections. In Section 5.5, the relationships between motivations and strategies of answerers are evaluated. Finally, the findings from the content analysis of answers are reported in Section 5.6.

5.1. Survey Response Rate

Since the current study is an initial attempt to investigate the motivations and strategies of answerers in social Q&A, there was no prior data available about how many answerers would be willing to participate. Thus, the recruitment plan was based on the survey response rate observed in previous studies about motivations in online communities. According to the previous studies, the response rate of surveys ranged from 20% to 40% (Wang & Lai, 2006; Hars & Ou, 2002; Wasko & Faraj, (2005); Lakhani & von Hippel, (2003); Nov, 2007), and the number of valid responses that researchers used for their analyses was around 300 (Wang & Fesenmaier, 2003; Chiu, (2006)). Considering the similarity between social Q&A and online communities, in that all of the services are provided online and managed by voluntary contributions of the participants, a 30% response rate was expected when this study was proposed. The survey response rate achieved in the current study was a bit different from the previous studies.

Two samples were selected when this study was designed – top answerers and recent answerers. There was a small amount of overlap between these groups because some answerers who are top answerers and those randomly selected as recent answerers overlapped during the process of the sample selection. For the data analysis, these answerers were classified as top answerers. The rest of the answerers, i.e., those who are not top answerers were renamed as non-top answerers and this term was used while describing data results in the following sections. Table 5.1 reports the response rates for top answerers and non-top answerers.

Table 5.1. Top Answerers and Non-top Answerers

Group	Distributed N	Collected N	Response Rate %
Top answerers	128	39	30.5 %
Non-top answerers	2,011	218	10.9 %
Total	2,139	257	12.0%

A total of 2,139 surveys were distributed and 257 participants responded to the surveys. Thus, overall, the survey response rate was 12.0%. In addition, differences in survey response rates were observed between the top answerers (30.5%) and the non-top answerers (10.9%). A chi-square test was conducted to evaluate the statistical significance of the difference, and the result of the test was significant ($\chi^2 = 43.86$, $p < .05$). We can conclude that the top answerers are more willing to respond to those who send information requests than non-top answerers.

In developing the sampling plan, the levels of answerers assigned by Yahoo! Answers, based on their contributions to asking and answering health questions, were also taken into account. Table 5.2 shows the response rate in each level.

Table 5.2. Survey Distribution and Collection

Level	Distributed N	Collected N	Response Rate %
2	450	29	6.4%
3	450	41	9.1%
4	301	38	12.6%
5	304	36	11.8%
6	309	45	14.6%
7	325	68	20.9%
Total	2,139	257	12.1%

The response rate varied by the level of the answerers. In general, the higher the level of answerers, the more willing they were to participate. As seen in Table 5.2, the response rate of answerers in levels 2 and 3 is lower than 10%. The lower response rates of the answerers in these levels were already observed when the survey was distributed. In each level, 300 surveys were distributed to obtain responses from at least 30 answerers in order to understand the characteristics of answerers in each level. When surveys were distributed to answerers in level 2 and 3, 150 more surveys had to be sent out in order to reach the required minimum of 30 for data analysis. Despite the effort to include a larger number of participants in these lower level answerers, the response rate was relatively low.

5.2. Characteristics of the Survey Participants

Demographic characteristics of the 257 survey participants are described first, followed by a description of the respondent characteristics that are related to their answering behaviors. The final two portions of this section present descriptions of the characteristics of the top answerers and of those describing themselves as health experts.

5.2.1. Demographic Characteristics of All Respondents

Almost equal numbers of male and female answerers participated in the survey. Among 257 answerers, 128(49.8%) were male and 126(49.0%) were female. Three (1.2%) answerers did not identify their sexes.

The average age of the survey participants was 40.7 (SD =15.9). The youngest participant was 18 because only adults were included in the study. There is a possibility that someone younger than 18 may have participated in providing answers in Yahoo! Answers, but it was not covered in this study. The oldest participant was 77.

The respondents were asked about their race/ethnicity. The majority of the survey participants were white (70.4%), followed by Asian (9.3%). The 23 (8.9%) answerers in the

Other category expressed that they belong to more than one racial category (e.g., white Hispanic, white Chinese, etc.). Table 5.3 shows the distribution in detail.

Table 5.3. Race Distribution

Category	N	%
White	181	70.4 %
Asian	24	9.3 %
Hispanic	9	3.5 %
Black	7	2.7 %
Other	23	8.9 %
Would rather not say	11	4.2 %
Missing	2	.7 %
Total	257	100.0 %

Yahoo! Answers is an English-based service and this limits participation based on language. In addition, Yahoo! provides a customized service for each country, such as Australia, Canada, UK, India, Japan, and Korea, with the support of their own languages and local information. Yahoo! Answers is a USA-based service, thus the majority of the participants were from USA (75.6%). However, answerers from English-based countries such as the UK (6.6%), India (3.5%), Australia (1.9%), and Canada (1.2%), as well as non English-based countries in Asia, Europe, and Africa participated in providing health answers and responded to the survey. Answerers from a total number of 26 countries were identified from the survey, including the USA, the UK, China, the Philippines, Pakistan, India, Australia, Japan, Canada, Trinidad, Zambia, the Dominican Republic, the Faroe Islands, Singapore, Egypt, the Libyan Arab Jamahiriya, Germany, the Virgin Islands, Puerto Rico, the Islamic Republic of Iran, Belgium, Sweden, the Netherlands, Ireland, Italy, and Spain.

The level of education of answerers was rather high. The majority of answerers (81.1%) had at least some college education. The educational categories in the survey were based on the U.S. system; two answerers who selected the Other category expressed that their education level didn’t correspond to any of the categories of the U.S. system. Table 5.4 shows the distribution in detail.

Table 5.4. Education Distribution

Category	N	%
12th grade or less (no diploma)	10	3.9 %
High school diploma	21	8.2 %
Some college, no degree	59	23.0 %
Vocational/technical school, associate degree (2 yr)	28	10.9 %
Bachelor's degree	68	26.5 %
Master's degree	29	11.3 %
Doctoral degree	8	3.1 %
Professional degree (MD, JD, etc.)	17	6.6 %
Other	9	3.5 %
Would rather not say	5	1.9 %
Missing	3	1.2 %
Total	257	100.0 %

Five categories of income ranges (in US dollars) were provided to the survey participants as options for describing their income levels. Table 5.5 shows the results in detail. The highest number of participants belonged to a group earning incomes between $25,000 and $49,000 (19.4%). It was closely followed by a group whose members earn less than $24,999 (17.8%) and a group whose members earn between $50,000 and $74,999 (15.9%). In addition, 69 answerers (26.8%) stated that they would rather not reveal their incomes.

Table 5.5. Income Range

Income	N	%
Less than $24,999	46	17.9 %
$25,000 - $49,999	50	19.5 %
$50,000 - $74,999	41	16.0 %
$75,000 – $99,999	19	7.4 %
$100,000 or more	31	12.1 %
Would rather not say	69	26.8 %
Missing	1	.4 %
Total	257	100.0 %

Two questions were asked about participants' occupations. Table 5.6 shows the responses to the first question about occupations. When asked to identify their occupations in a generalized category, student (23.0%) was selected most often. As the second group, the retired/not working group (16.0%) was identified. These two groups of answerers may have more free time for providing answers in Yahoo! Answers. Thus, a bivariate linear regression was used to evaluate

the relationship between their occupations and the percentage of time they use for providing health answers. However, there was no statistically significance relationship.

Table 5.6. Occupations, in General

General Category	N	%
Student	59	23.0 %
Educator	10	3.9 %
Homemaker	16	6.2 %
Health Care/Medical Professional	36	14.0 %
Technical Professional	34	13.2 %
Clerical/Administrative	13	5.1 %
Sales	4	1.6 %
Self-employed	27	10.5 %
Retired/Not Working	41	16.0 %
Others[22]	16	6.2 %
Missing	1	.4 %
Total	257	100.0 %

In response to the first survey question about occupations, 36 answerers (14.0%) described their jobs as part of the health care profession, but it was found that more health-related professionals participated in the survey when the specification of the health-related job title was asked in a second question. As shown in Table 5.7, a total of 75 answerers indicated their health-related job titles. It was an interesting discrepancy because answerers who identified themselves as students, technical professionals, or retired or non-employed medical experts did not indicate that they were health professionals when asked to choose a general category of occupation, while they revealed their expertise when asked to identify their health-related background in particular.

Table 5.7. Health-Related Occupations

Health-Related Occupation	N	%
Physician and surgeons	12	16.0 %
Registered nurses (RN, CRN), nurse assistants	11	14.7 %
Occupational therapist (e.g., physical, psychological, radiation, respiratory)	10	13.3 %
Dietitians and nutritionists	4	5.3 %
Dentists and dental hygienists	3	4.0 %
Personal trainers and counselors	3	4.0 %
Medical students	3	4.0 %
Pharmacists	2	2.7 %
Others	27	36 %
Total	75	100.0 %

[22] There were answerers who identified themselves as an artist, an engineer, a factory worker, a personal trainer, etc.

Among 257 participants, 75 (28.8%) answerers had health-related jobs, requiring at least some health expertise. There were several physicians, nurses, and therapists. In the Others category, answerers identified themselves as a health care administrator, a forensic scientist, a medic or medical aide, a biology researcher, a care giver or home care professional, a mental retardation specialist, dermatologist, phlebotomist, psychologist, ergonomist, medical statistician, gynecologist, etc.

5.2.2. Respondent Characteristics Related to Answering Behaviors

The average amount of time participants reported being active online per day was 4.2 hours (SD = 2.88). The hours ranged from .5 (30 minutes) to 15 hours. Most participants (62.2%) spent 2 to 4 hours per day being active online. Although it was small, there was a group of people (7.4%) who were active online more than 10 hours per day.

Participants were asked for the percentage of time online that they spent providing health answers in Yahoo! Answers. They reported that about 24.08% (SD = 22.61; N = 255), of the time online was used for providing health answers on average, although the range is widely spread from .3% to 96%. When closely observing the distribution, 101 answerers (39.6%) indicated that they are using equal to or less than 5% of their time online for providing health answers.

Participants were asked how many times they provide health answers per week, and a total of 231 answerers responded. The mean number of time was 14.6 (SD = 38.35; N=231). The distribution ranges widely, from 1 to 300. A total of 78.8% of answerers indicated that they provide answers less than 10 times per week. On the other hand, there were devoted answerers who offered answers more than 50 times per week, although the number was small (15 answerers, 7.2%). Additionally, several answerers expressed that they do not know how many times they provide health answers in particular, because they tend to answer any questions that they are interested in, in addition to the topic of health. Also, some of them responded that they provide health answers only when they have similar problems or experiences related to the questions.

A total of 241 answerers identified the typical duration time for providing a health answer. The average time of the duration was 10.4 minutes. It ranged widely from 1 to 120 minutes. The greatest number of answerers stated that they spent about 5 minutes (59 answerers, 23%), and the second highest number of answerers spent about 10 minutes (39 answerers, 15.2%). The average was 10.39 minutes (SD = 12.00; N = 231), and 74.3% of answerers spent equal to or less than 10 minutes per answer.

5.2.3. Characteristics of Top Answerers

Top answerers are one of the most interesting groups of answerers; this study focuses on identifying their motivations and strategies for providing health answers. Thus, the demographic characteristics of top answerers are evaluated here, using independent samples t-tests and chi-square tests. For each of the independent t-tests, one variable is being a top answerer or not; the other variable was one of the following: age, Yahoo! Answers level, health expertise, duration time being online per day, percentage of time providing health answers while online per day, number of times providing health answers per week, and duration time per session for answering a health question. For the chi-square tests, the second variables included sex, education and income.

5.2.3.1. Demographic Characteristics of Top Answerers

Descriptive statistics of the distribution of top answerers by sex are shown in Table 5.8. A chi-square test was conducted to evaluate the relationship between being top answerers and sex. No statistically significant differences were found.

Table 5.8. Distribution by Top Answerer Status and Sex

	Top answerers	Non-top answerers	Total
Males	16	112	128
Females	23	103	126
Total	39	215	254

An independent samples t-test was conducted to evaluate the possible relationship between top answerer status and age. The mean age of top answerers was 45.2 (S.D. = 2.17); the mean age of non-top answerers was 39.9 (SD = 1.12). No statistically significance difference was found.

A chi-square test was used to evaluate the hypothesis that there is no relationship between top answerers and level of education. The two variables were top answerers and the four levels of education (up to high school diploma, some college, bachelor's degree, advanced degree; the original eight levels of education were re-grouped because the expected cell frequencies were too small). Table 5.9 displays these frequencies. The chi-square test indicated that top answerer status and level of education are significantly related ($\chi^2 = 8.445$, $p = .038$). Examination of the frequencies suggests that top answerers are more likely to have an advanced degree than just a bachelor's degree.

Table 5.9. Level of Education for Top Answerers and Non-top Answerers

	Top answerers	Non-top answerers	Total
Up to high school diploma	2	29	31
Some college	12	75	87
Bachelor's degree	9	59	68
Advanced degree	15	39	54
Total	38	202	240

A chi-square test was conducted to evaluate the hypothesis that there is no relationship between top answerers and income (see Table 5.10). The two variables were top answerers and the five levels of income. No statistically significant relationship was found.

Table 5.10. Income for Top Answerers and Non-top Answerers

	Top answerers	Non-top answerers	Total
Less than $24,999	6	40	46
$25,000 - $49,999	8	42	50
S50,000 - $74,999	4	37	41
$75,000 - $99,999	3	16	19
$100,000 or more	8	23	31
Total	29	158	187

An independent samples t-test was conducted to evaluate the hypothesis that top answerers obtain higher Yahoo! Answers levels than those who are not top answerers. Both levels and being top answerers are measured based on points given by Yahoo! Answers based on one's contributions to asking and answering questions. Therefore, a strong relationship between these two variables was expected. The statistical test confirmed it. The test was significant ($t(255) = 6.687$, $p = .000$). The mean level for top answerers was 6.5 (SD = .79); the mean level for non-top answerers was 4.6 (SD = 1.71).

Participants were considered to be health experts if they had reported a health-related occupation on the second occupation question on the survey (N=75). Descriptive statistics of the distribution of top answerers by their health expertise is shown in Table 5.11.

Table 5.11. Distribution by Top Answerer Status and Health Expertise

	Top answerers	Non-top answerers	Total
Health experts	19	56	75
Non-health experts	20	162	182
Total	39	218	257

Among the 39 top answerers, 19 of them (48.71%) indicated that they have a job as a health professional. Among the 218 non-top answerers, 56 (25.68%) have health expertise. A chi-square test was conducted to evaluate the relationship between top answerers and health expertise. The test was significant ($\chi^2 = 8.490$, $p = .004$). Top answerers are more likely to have health expertise than those who are not top answerers.

5.2.3.2. Top Answerer Characteristics Related to Answering Behaviors

An independent samples t-test was conducted to evaluate the hypothesis that there is no relationship between top answerer status and the amount of time spent online per day. On average, top answerers spend 4.1 hours online per day (SD = 3.12); non-top answerers spend 4.2 hours online per day (SD = 2.83). The difference is not statistically significant.

An independent samples t-test was conducted to evaluate the hypothesis that there is no relationship between top answerer status and the percent of online time spent providing health answers. Top answerers devote an average of 26.53% of their online time to answering health questions (SD = 27.50); non-top answerers devote an average of 18.92% of the online time to answering health questions (SD = 21.48). The difference is not statistically significant.

An independent samples t-test was conducted to evaluate the hypothesis that there is no relationship between top answerer status and the number of health answers provided per week. The difference between top answerers and non-top answerers is statistically significant (t (229) = 5.171, p = .000). Top answerers (M = 43.41, SD = 66.79) respond to higher numbers of health questions than those who are not top answerers (M = 9.29, SD = 27.51). Because the number of answers provided is one of the criteria for designating a top answerer, this result is not surprising.

An independent samples t-test was conducted to evaluate the hypothesis that there is no relationship between top answerer status and the amount of time spent creating health answers per session. Top answerers spend, on average, 9.6 minutes per answer (SD = 9.04); non-top answerers spend 10.5 minutes per answer (SD = 12.49). The difference is not statistically significant.

5.2.4. Characteristics of Health Experts

Another interesting group of answerers in the current study is health experts, defined as those who reported a health-related occupation. They have put in the effort to share their expertise with anonymous people through the Internet. The demographic characteristics of health experts are evaluated here, relative to those who are not health experts. The variables of interest are sex, age, education, income, Yahoo! Answers level, duration time being online per day, percentage of time providing health answers while online per day, number of times providing health answers per week, and duration time per session for answering a health question.

5.2.4.1. Demographic Characteristics of Health Experts

Descriptive statistics of a distribution of top answerers by sex are shown in Table 5.12. A chi-square test was conducted to evaluate the relationship between health expertise and sex. There was no statistically significant relationship.

Table 5.12. Distribution by Health Expert Status and Sex

	Health experts	Non-health experts	Total
Males	39	89	128
Females	35	91	126
Total	74	180	254

An independent samples t-test was conducted to evaluate the relationship between health expertise and age. The mean age of health experts was 43.3 (SD = 16.01); the mean age of non-experts was 39.6 (SD = 15.77). There was no statistically significant difference.

A chi-square test was conducted to evaluate the relationship between health expertise and level of education (see Table 5.13). The result indicated that health experts and the level of education were found to be significantly related, Persons χ^2 (3, 240) = 27.35, p = .000. Answerers who have health expertise attained higher levels of education than those who do not. Specifically, health experts were more likely have some college education as opposed to up to high school diploma and they were more likely to have an advanced degree as opposed to a bachelor's degree. In order to get health expertise, answerers should at least be on a track of higher education (e.g., students in a medical school). Thus, the statistical finding confirms our expectations.

Table 5.13. Distribution by Health Expert Status and Education

	Health experts	Non-health experts	Total
Up to high school diploma	1	30	31
Some college	21	66	87
Bachelor's degree	18	50	68
Advanced degree	29	25	54
Total	69	171	240

A chi-square test was conducted to evaluate the relationship between health expertise and income (see Table 5.14. The two variables were health experts and the five levels of income. No statistically significant difference was found.

Table 5.14. Distribution by Health Expert Status and Income

	Health experts	Non-health experts	Total
Less than $24,999	9	37	46
$25,000 - $49,999	17	33	50
S50,000 - $74,999	13	28	41
$75,000 - $99,999	6	13	19
$100,000 or more	14	17	31
Total	59	128	187

An independent samples t-test was conducted to evaluate the relationship between health expertise and Yahoo! Answers level of participation. The average level for health experts was 4.9 (SD = 1.73); the average level for non-experts was 4.9 (SD = 1.75). There was no statistically significant difference.

5.2.4.2. Health Expert Characteristics Related to Answering Behaviors

An independent samples t-test was conducted to evaluate the relationship between health expertise and duration time (hours) of being active online per day. Health experts reported being online an average of 3.8 hours per day (SD = 2.34); non-experts reported being online 4.4 hours per day (SD = 3.06). There was no statistically significant difference.

An independent samples t-test was conducted to evaluate the relationship between health expertise and percent of online time used providing health answers. Health experts reported using 19.8 % of their online time answering health questions (SD = 21.54); non-experts used 20.2 % of their online time answering health questions (SD = 23.09). There was no statistically significant difference.

An independent samples t-test was conducted to evaluate the relationship between health expertise and the number of times health answers were provided per week. Health experts provided answers, on average, 20.8 times per week (SD = 47.02); non-experts provided answers 11.9 times per week (SD = 33.72). There was no statistically significant difference.

An independent samples t-test was conducted to evaluate the relationship between health expertise and duration of time for creating a health answer per session. Health experts took 12.2 minutes, on average, to create an answer (SD = 16.32); non-experts took 9.7 minutes to create an answer (SD = 9.71). There was no statistically significant difference.

5.3. Motivations

In this study, 10 possible motivations of answerers were investigated, namely: Enjoyment, Efficacy, Learning, Personal Gain, Altruism, Community Interest, Social Engagement, Empathy, Reputation and Reciprocity (See Section 2.3 for detailed descriptions of these motivations). In the surveys, the motivations of answerers were collected, based on their responses to a series of statements related to motivations, and answerers expressed their levels of agreement or disagreement with each statement on a 5-point Likert scale (from 1,strongly disagree, to 5, strongly agree). In general, 4 to 6 survey items were used to measure the strength of each motivation.

This section is organized as follows. First, in Section 5.3.1, the internal consistency of the survey items combined to measure each motivation was evaluated. In Section 5.3.2, an overview of the general distribution of motivations is introduced. Additional comments on the motivations of the survey respondents obtained from an open-ended question are also summarized in this section. In Section 5.3.3., the distribution of motivations is analyzed based on the characteristics of the survey participants. Top answerers and health experts are the main groups of interest in this study. Thus, motivation distributions by top answerers and health experts follow in Section 5.3.4 and 5.3.5, respectively. Finally, in Section 5.3.5, motivation distribution by a combination by top answerers and health experts is described.

5.3.1. Internal Consistency of Survey Items Related to Motivations

Cronbach's α was used to evaluate the internal consistency (reliability) of each measure of a motivation. This is based on an assumption that items measuring the same factor will be highly correlated with one another (Welch & Comer, 1988).

Table 5.15. Internal Consistency of Survey Items

Category	Motivations	N of Items	Cronbach's α
Personal	Enjoyment	5	.703
	Efficacy	4	.801
	Learning	6	.893
	Personal Gain	5	.900
Social	Altruism	4	.846
	Community Interest	6	.839
	Social Engagement	4	.829
	Empathy	6	.802
	Reputation	5	.935
	Reciprocity	4	.887

George and Mallery (2003) suggest a scale for a rule of thumb for evaluating alpha coefficients, excellent: >.9, good: >.8, acceptable: >.7, questionable: >.6, poor: >.5, and unacceptable: <.5. As you see in Table 5.15, the values of Cronbach's α of motivation scales range from the level of acceptable to excellent. Therefore, the items have the internal consistency necessary to be applied in this study.

5.3.2. General Distribution of Motivation

Descriptive statistics of the general distribution of motivations of answerers was analyzed.

Table 5.16. General Distribution of Motivations

Motivations	N	M	SD
Enjoyment	237	4.17	.62
Efficacy	240	4.00	.74
Learning	201	3.47	1.05
Personal Gain	196	1.36	.77
Altruism	249	4.69	.51
Community Interest	208	3.34	.98
Social Engagement	235	3.41	.93
Empathy	226	3.84	.82
Reputation	240	2.94	1.21
Reciprocity	228	2.80	1.45

As shown in Table 5.16, Altruism is the most influential factor that motivates answerers to provide health answers in social Q&A, followed by Enjoyment, Efficacy, and Empathy. Personal Gain was the least influential factor motivating answerers.

For further analysis of the relationships among motivations, Pearson correlation coefficients were computed among the 10 motivations. The results of the correlation analysis, presented in Table 5.17, show that 35 out of the 45 correlations were statistically significant and were greater than or equal to .144. In general, the motivations were correlated with one another, except Personal Gain; it was only correlated with Reputation.

Table 5.17. Correlations among 10 Motivations

	Enjoy	Effic	Learn	Gain	Altru	Com	Social	Empa	Reput	Reci
Enjoyment										
Efficacy	.520**									
Leaning	.226**	.393**								
Personal Gain	.023	.030	.172*							
Altruism	.412**	.353**	.158*	-.005						
Community Interest	.322*	.438**	.568**	.134	.308**					
Social Engagement	.421**	.459**	.442**	.106	.266**	.563**				
Empathy	.158*	.414**	.359**	-.005	.276**	.507**	.422**			
Reputation	.267**	.372**	.262**	.144*	.065	.402**	.437**	.064		
Reciprocity	.171*	.293**	.450**	.110	.166*	.547**	.510**	.354**	.469**	

- Key for motivations (row headings): Enjoy = Enjoyment; Effic = Efficacy, Learn = Learning, Gain = Personal Gain, Altru = Altruism, Com = Community Interest, Social = Social Engagement, Empa = Empathy, Reput = Reputation, Reci = Reciprocity.

The most influential motivation, Altruism, was statistically significantly correlated with the rest of motivations except Reputation and Personal Gain. On the contrary, the least influential motivation, Personal Gain was correlated only with Learning and Reputation. Reputation was correlated with all other motivations except Enjoyment and Altruism. Most of the strongest correlations (>.50) were between Community Interest and other motivations: Learning, Social Engagement, Reciprocity, and Empathy.

In addition to the Likert-scale ratings on proposed motivations, the survey respondents provided their subjective comments on motivation. Their descriptions of motivations vary from a

simple, personal or trivial reason to a specific and well-thought-through purpose of life. For example, some answerers were motivated merely to kill their boredom, or to make them concentrate on something without any feeling of responsibility. On the other hand, there was a group of answerers who had observed the needs of desperate people who are suffering many kinds of health and life issues and had taken action by providing answers, considering it a responsibility of health professionals or as someone who has experienced or suffered from a particular situation. They were concerned for those in desperate or dangerous situations, those who are suicidal, teenagers with drug or sexual problems, and those who suffer from rare diseases and have put effort into providing useful and professional answers.

Most of them explained their expertise and situations in detail, corresponding to the 10 motivations which were proposed in the current study. For example, in the case of altruism, answerers stated that:

> "I just really like helping people. … the points mean absolutely nothing, nor does being a top answerer."
>
> "I am in college to be a Psychologist and my goal with that is to help people."
>
> "I feel that it is part of my responsibility as a conscientious human being to help others if I have knowledge and experience that I can share with others that might help them."
>
> "[S]ometimes, people have little or no information, or are embarrassed to ask in person, and this is an easy, anonymous way to help."
>
> "I would like people to live a healthier lifestyle and overcome common misconceptions that detract from living a fuller[life],"
>
> "We all want to help, but the question is "How?" I believe that any question I answer has a potential for the asker to learn he or she is not alone and should try for the best information available."
> "I have never asked for or received payment but that knowledge that I helped to improve their health and wellbeing gives me such a great feeling that I cannot possibly put into words."

One of the most interesting findings was the answerers' concerns about the distribution of misleading/incorrect medical information. Answerers have observed questions and answers in a topic category in which they have expertise or experience or in which they are especially

interested. They believe that many people are misinformed by misleading or counterfactual answers, and they want to correct such cases.

> "My primary motivation is to fight back against a lot of the nonsense and woo that pollutes the knowledge pool on the Internet."
>
> "I am highly motivated to reduce disinformation, provide information doctors often do not talk about, help students. I want to provide facts, as evidenced by studies, often along with some anecdotal information, and to reduce bias and common misconceptions."
>
> "A LOT of my motivation is the incorrect medical advice that gets passed around."
>
> "I feel that lots of the people answering questions in the health section of Y!A in particular have no real experience and have no real idea what they are talking about and talk absolute nonsense within their answers."

5.3.3. Motivation Distribution by Characteristics of All Respondents

Based on the demographic information provided by the survey respondents, the distribution of motivations has been analyzed in depth, in order to understand answerers better. The demographic characteristics include sex, age, education, income, level, top answerer status, and health expertise. The characteristics related to answering behaviors include duration time being active online per day (minutes), percentage of time providing health answers while active online, number of times providing health answers per week, and duration time creating a health answer per session.

5.3.3.1. Motivation Distribution by Demographic Characteristics

Descriptive statistics for the motivations of males (N = 69) and females (N = 71) are presented in Table 5.18. As observed from the general motivation distribution in Section 5.5.2, Altruism was the most influential motivation among both males and females. An independent samples t-test was conducted to evaluate the difference in motivations between the male and the female answerers. The difference was statistically significant only for Reputation. Males were more influenced by Reputation than females.

Table 5.18. Distribution of Motivations by Sex

	Males		Females				
	M	SD	M	SD	t	df	Sig.
Enjoyment	4.13	.08	4.23	.06	-.751	232	.453
Efficacy	3.86	.08	3.99	.09	-.878	235	.381
Learning	3.39	.11	3.29	.15	.815	197	.416
Personal Gain	1.46	.10	1.30	.09	.613	191	.541
Altruism	4.71	.05	4.71	.06	.958	244	.339
Community Interest	3.26	.10	3.25	.14	.508	203	.612
Social Engagement	3.47	.09	3.37	.12	.812	230	.418
Empathy	3.64	.09	3.92	.10	-1.696	221	.091
Reputation	3.17	.13	2.77	.15	2.692	235	.008**
Reciprocity	2.86	.13	2.79	.15	-.282	223	.778

A series of bivariate linear regression analyses was conducted to evaluate the prediction of motivations according to the ages of answerers. The independent variable was age, and the dependent variables were the 10 motivations.

Table 5.19. Coefficients of Regression in Predicting Motivations by Age

	B	Std.Error	Sig.
Enjoyment	-.003	.003	.281
Efficacy	-.001	.003	.643
Learning	-.012	.005	.012*
Personal Gain	-.003	.003	.380
Altruism	-.002	.002	.349
Community Interest	-.013	.004	.004**
Social Engagement	-.008	.004	.046*
Empathy	-.007	.003	.045*
Reputation	-.010	.005	.043*
Reciprocity	-.010	.005	.047*

The relationship was statistically significant for Learning, Community Interest, Social Engagement, Empathy, Reputation, and Generalized Reciprocity. The regression equations are as follows.

Predicted Learning = -.012 Age + 3.960

Predicted Community Interest = -.013 Age + 3.868

Predicted Social Engagement = -.008 Age + 3.720

Predicted Empathy = -.007 Age + 4.133

Predicted Reputation = -.010 Age + 3.340

Predicted Reciprocity = -.010 Age + 3.170

The negative signs of the Beta weights indicate that younger answerers are more motivated by Learning, Community Interest, Social Engagement, Empathy, Reputation and Generalized Reciprocity than older answerers.

A series of Spearman's rank order correlation analyses were conducted to evaluate the relationships between motivations and level of education of the answerers. Table 5.20 shows a summary of the coefficients of the analyses. The relationships with level of education were statistically significant for Learning, Community Interest, Empathy and Reciprocity. Answerers with lower levels of education were more strongly motivated by Learning, Community Interest, Empathy and Reciprocity.

Table 5.20. Correlation Coefficients between Motivations and Level of Education

	Spearman's *rho*	N	Sig
Enjoyment	-.003	222	.967
Efficacy	-.081	224	.230
Learning	-.269	191	.000**
Personal Gain	.083	185	.260
Altruism	-.107	233	.103
Community Interest	-.156	198	.028*
Social Engagement	-.072	219	.289
Empathy	-.175	213	.011*
Reputation	.047	225	.482
Reciprocity	-.264	213	.000**

A series of Spearman's rank order correlation analyses were conducted to evaluate the relationships between motivations and level of income of the answerers. Table 5.21 shows a summary of the coefficients of the analyses. The relationship with income was statistically significant only for Reciprocity. Answerers with lower incomes were more strongly motivated by Reciprocity.

Table 5.21. Correlation Coefficients between Motivations and Level of Income

	Spearman's *rho*	N	Sig
Enjoyment	.051	173	.505
Efficacy	-.077	175	.314
Learning	-.038	154	.642
Personal Gain	-.055	148	.503
Altruism	.007	.928	.183
Community Interest	-.097	157	.225
Social Engagement	-.055	173	.475
Empathy	-.107	170	.166
Reputation	-.082	176	.282
Reciprocity	-.242	171	.001**

A series of bivariate linear regression was conducted to evaluate the relationship between motivations and Yahoo! Answers levels of answerers. The independent variable was a level from the 2nd to the 7th levels (a total of six groups). The dependent variables were the 10 motivations. The results are in Table 5.22.

Table 5.22. Coefficients of Regression for Motivations by Yahoo! Answers Level

	B	Std.Error	Sig.
Enjoyment	-.014	.023	.557
Efficacy	-.030	.027	.273
Learning	-.087	.044	.046*
Personal Gain	-.045	.033	.169
Altruism	-.006	.018	.729
Community Interest	-.092	.040	.021*
Social Engagement	-.031	.035	.386
Empathy	-.071	.032	.027*
Reputation	-.097	.045	.031*
Reciprocity	-.164	.043	.000**

The relationship was statistically significant for Community Interest, Empathy, Reputation and Reciprocity. The regression equations are as follows.

Predicted Community Interest = -.092 Level + 3.803

Predicted Empathy = -.071 Level + 4.191

Predicted Reputation = -.097 Level + 3.420

Predicted Reciprocity = -.164 Level + 3.603

The lower level answerers are more motivated by Community Interest, Empathy, Reputation, and Reciprocity than higher level answerers.

5.3.3.2. Motivation Distribution by Respondent Characteristics Related to Answering Behaviors

A series of bivariate linear regression analyses was conducted to evaluate the relationship between motivations and the time being active online per day. The independent variable was time being active online per day. The dependent variables were the 10 motivations. The results are in Table 5.23.

Table 5.23. Coefficients of Regression for Motivations by Time Being Active Online Per Day

	B	Std.Error	Sig.
Enjoyment	.015	.014	.263
Efficacy	.018	.017	.294
Learning	.061	.026	.019*
Personal Gain	.004	.020	.851
Altruism	.007	.011	.557
Community Interest	.049	.025	.047*
Social Engagement	.041	.021	.052
Empathy	.034	.020	.087
Reputation	.074	.027	.006**
Reciprocity	.072	.027	.009**

The relationship was statistically significant for Learning, Community Interest, Reputation and Reciprocity. The regression equations are as follows.

Predicted Learning = .061 Time Being Active Online Per Day + 3.213

Predicted Community Interest = .049 Time Being Active Online Per Day + 3.138

Predicted Reputation = .074 Time Being Active Online Per Day + 2.630

Predicted Reciprocity = .072 Time Being Active Online Per Day + 2.503

Therefore, those answerers who are active online longer are more motivated by Learning, Community Interest, Reputation, and Reciprocity than answerers who are active online for shorter lengths of time each day.

A series of bivariate linear regression was conducted to evaluate the relationship between motivations and percentage of time providing health answers online per day. The independent variable was the percentage of active online time spent providing health answers. The dependent

variables were the 10 motivations. The results are in Table 5.24. No statistically significant relationships were found.

Table 5.24. Coefficients of Regression for Motivations by Percentage of Time Providing Health Answers Online Per Day

	B	Std.Error	Sig.
Enjoyment	.001	.002	.501
Efficacy	.001	.002	.692
Learning	.000	.003	.971
Personal Gain	-.002	.002	.359
Altruism	.000	.001	.914
Community Interest	.001	.003	.667
Social Engagement	.005	.003	.076
Empathy	-.002	.002	.517
Reputation	.004	.004	.305
Reciprocity	.003	.003	.446

A series of bivariate linear regression was conducted to evaluate the relationship between motivations and number of times providing health answers per week. The independent variable was times providing health answers per week. The dependent variables were the 10 motivations. The results are in Table 5.25. No statistically significant relationships were found.

Table 5.25. Coefficients of Regression for Motivations by Number of Times Providing Health Answers Per Week

	B	Std.Error	Sig.
Enjoyment	.000	.001	.909
Efficacy	.001	.001	.400
Learning	9.571E-5	.002	.961
Personal Gain	.000	.002	.794
Altruism	.001	.001	.524
Community Interest	.000	.002	.862
Social Engagement	.001	.002	.596
Empathy	.001	.002	.673
Reputation	.001	.002	.660
Reciprocity	-.004	.002	.101

A series of bivariate linear regression was conducted to evaluate the relationship between motivations and duration time (minutes) for providing health answers per session. The independent variable was duration time (minutes) for providing health answers per session. The dependent variables were the 10 motivations. The results are in Table 5.26. No statistically significant relationships were found.

Table 5.26. Coefficients of Regression for Motivations by Duration Time (Minutes) Providing Health Answers Per Session

	B	Std.Error	Sig.
Enjoyment	.044	.033	.223
Efficacy	.005	.004	.217
Learning	.011	.007	.131
Personal Gain	-.003	.004	.472
Altruism	.002	.003	.436
Community Interest	.004	.005	.447
Social Engagement	.005	.005	.346
Empathy	.008	.005	.084
Reputation	.005	.007	.473
Reciprocity	.008	.006	.187

5.3.4. Motivation Distribution of Top Answerers

Descriptive statistics of the distribution of motivations between top answerers (N = 120) and non-top (N = 22) answerers are shown in Table 5.27. An independent samples t-test was conducted to evaluate the relationship between being top answerer status and motivations. The difference was statistically significant for Empathy and Reciprocity. Top answerers were less motivated than non-top answerers by Empathy and by Reciprocity.

Table 5.27. Motivation Distribution by Top Answerer Status

	Top Answerers		Non-top Answerers				
	M	SD	M	SD	t	df	Sig.
Enjoyment	4.10	.18	4.20	.05	-.406	235	.685
Efficacy	4.05	1.37	3.90	.07	.740	238	.460
Learning	3.08	.22	3.38	.10	-1.435	199	.153
Personal Gain	1.25	.11	1.40	.08	.571	194	.569
Altruism	4.68	.09	4.72	.04	.505	247	.614
Community Interest	3.25	.17	3.26	.10	-.933	206	.352
Social Engagement	3.33	.15	3.45	.09	-1.493	233	.137
Empathy	3.47	.19	3.85	.07	-3.271	224	.019*
Reputation	2.90	.22	2.99	.11	-.177	238	.860
Reciprocity	2.34	.21	2.91	.10	-3.173	226	.002**

5.3.5. Motivation Distribution of Health Experts

Descriptive statistics of the distribution of motivations between health experts (N = 100) and non-health experts (N =42) are shown in Table 5.28. An independent samples t-test was conducted to evaluate the relationship between being a health expert and motivations. The

difference was statistically significant only for Personal Gain. Health experts were more motivated by Personal Gain than non-health experts. This result indicates that health answerers were more interested in selling their products or services than non-health experts, but it is not known what specific kinds of personal gains these health experts were pursuing more frequently than non-health experts.

Table 5.28. Distribution of Types of Motivation between Health Experts and Non-Health Experts

	Health Experts		Non-health Experts				
	M	SD	M	SD	t	df	Sig.
Enjoyment	4.34	.07	4.11	.06	1.335	235	.183
Efficacy	4.05	.10	3.87	.07	.967	238	.334
Learning	3.52	.16	3.25	.11	1.231	199	.220
Personal Gain	1.69	.16	1.24	.07	2.524	194	.013*
Altruism	4.77	.06	4.69	.05	1.269	247	.206
Community Interest	3.37	.15	3.21	.10	.927	206	.355
Social Engagement	3.50	.12	3.40	.10	.853	233	.395
Empathy	3.70	.13	3.82	.08	-1.439	224	.152
Reputation	3.18	.19	2.88	.12	1.064	238	.289
Reciprocity	2.73	.17	2.87	.12	-1.104	226	.271

5.3.6. Motivation Distribution by a Combination by Top Answerers and Health Experts

Additionally, a 2x2 ANOVA was conducted to evaluate the motivations of the four groups of answerers, namely: top answerers who are health experts, top answerers who are not health experts, non-top answerers who are health experts, and non-top answerers who are not health experts. The means and standard deviations for their motivations are presented in Table 5.29.

Table 5.29. Descriptive Statistics by a Combination of Top Answerer Status and Health Expert Status

Motivations			M	SD	N
Enjoyment	Top	Health	4.30	.50	18
		Non-Health	3.95	1.03	18
	Non-Top	Health	4.23	.61	52
		Non-Health	4.15	.55	149
Efficacy	Top	Health	4.07	.71	17
		Non-Health	4.09	.68	18
	Non-Top	Health	4.07	.79	51
		Non-Health	3.95	.73	154
Learning	Top	Health	3.16	.99	17
		Non-Health	3.29	1.27	16
	Non-Top	Health	3.76	.93	46
		Non-Health	3.41	1.05	122
Personal Gain	Top	Health	1.52	.69	16
		Non-Health	1.35	.83	15
	Non-Top	Health	1.61	.98	45
		Non-Health	1.24	.64	120
Altruism	Top	Health	4.79	.37	17
		Non-Health	4.67	.35	19
	Non-Top	Health	4.74	.60	55
		Non-Health	4.66	.49	158
Community Interest	Top	Health	3.34	.86	17
		Non-Health	3.08	.95	20
	Non-Top	Health	3.47	.98	45
		Non-Health	3.33	.99	126
Social Engagement	Top	Health	3.32	.86	17
		Non-Health	3.05	1.01	17
	Non-Top	Health	3.55	.84	50
		Non-Health	3.41	.95	151
Empathy	Top	Health	3.25	.86	17
		Non-Health	3.81	.74	18
	Non-Top	Health	3.88	.78	48
		Non-Health	3.89	.80	143
Reputation	Top	Health	3.02	1.00	18
		Non-Health	2.80	1.29	18
	Non-Top	Health	3.09	1.30	51
		Non-Health	2.90	1.20	153
Reciprocity	Top	Health	2.11	1.01	17
		Non-Health	2.36	1.14	18
	Non-Top	Health	2.85	1.11	48
		Non-Health	2.91	1.14	145

The results of the ANOVA indicate that there is no statistically significant difference in motivations across the four groups (See Table. 5.30). One of the reasons may be that the sample sizes are very small. The number of those who belong to the group of top answerers with each of

the two levels of expertise is usually less than 20 people. Larger sample sizes with these groups of people may have different results.

Table 5.30. Tests of Between-Subjects Interaction Effects

	F	Df	Sig
Enjoyment	1.372	1	.243
Efficacy	.257	1	.613
Learning	1.327	1	.251
Personal Gain	.425	1	.515
Altruism	.257	1	.810
Community Interest	.110	1	.740
Social Engagement	.133	1	.716
Empathy	3.193	1	.075
Reputation	.004	1	.947
Reciprocity	.201	1	.654

5.3.7. Summary of Findings on Motivations

In the current section, 10 possible motivations of answerers – Enjoyment, Efficacy, Learning, Personal Gain, Altruism, Community Interest, Social Engagement, Empathy, Reputation and Reciprocity – were evaluated. Altruism was the most influential factor, while Personal Gain was the least influential. Altruism was statistically significantly correlated with the rest of motivations except Reputation and Personal Gain. Personal Gain was correlated only with Learning and Reputation. Reputation was correlated with all other motivations except Enjoyment and Altruism. Most of the strongest correlations were between Community Interest and other motivations: Learning, Social Engagement, Reciprocity, and Empathy.

The distribution of motivations varied by different characteristics of answerers. Male answerers were more influenced by Reputation than female answerers. Younger answerers were more motivated by Learning, Community Interest, Social Engagement, Empathy, Reputation and Reciprocity than older answerers. Answerers with lower levels of education were more strongly motivated by Learning, Community Interest, Empathy and Reciprocity than answerers with higher levels of education. Answerers with lower incomes were more strongly motivated by Reciprocity than those with higher incomes. The lower Yahoo! Answers level answerers were

more motivated by Community Interest, Empathy, Reputation, and Reciprocity than higher level answerers. Those answerers who are active online longer each day were more motivated by Learning, Community Interest, Reputation, and Reciprocity than answerers who are active online for shorter lengths of time each day.

The distribution of motivations also varied by top answerer status and health expertise. Top answerers were less motivated than non-top answerers by Empathy and by Reciprocity. Health experts were more motivated by Personal Gain than non-health experts.

5.4. Strategies

In the current study, the survey questionnaire related to answerers' strategies for providing health answers was originally designed to test the five steps of the answering process, namely, selecting questions, interpreting questions, seeking information, creating answers and evaluating answers. Possible strategies that answerers can use during each step were presented in the survey questionnaire and the participants were asked their frequency of using the strategies. The rating scale ranged from 1to 5 (1-never, 2- rarely, 3- sometimes, 4- often, 5-always). Additionally, participants described their own strategies in the open-ended questions and their responses were further analyzed.

5.4.1. Internal Consistency of the Survey Items Related to Strategic Factors

Most of the answering strategies were evaluated based on survey participants' responses on a survey single item, because each item describes a particular strategic behavior. There were also strategies which were evaluated from a combination of several (2 to 5) survey items. In the latter cases, Cronbach's α was used to evaluate the internal consistency (reliability) of each set of survey items. Table 5.31 summarizes a list of measures used for evaluating strategies, and provides an evaluation of the internal consistency of each measure.

Table 5.31. Internal Consistency of Survey Items

Category	Strategies	N of Items	Cronbach's α
Selecting questions	SE1: Answerers' confidence /interests (in topic, knowledge, experience)	3	.731
	SE2: Easy questions	1	-
	SE3: Difficult/challenged questions	1	-
	SE4: Questioners' positive attitudes (agreement, polite, nice, humor)	4	.795
	SE5: Questioners' negative attitudes (disagreement, impolite, depressed, desperate, aggressive)	5	.768
	SE6: No one answered	1	-
	SE7: Recently posted questions	1	-
	SE8: Purposed benefit (selling products, advertisements, homework)	3	.732
	SE9: Questions for information on behalf of someone else	1	-
Interpreting Questions	IN1: Monitoring the flow of topic in health	1	-
	IN2: Researching a health topic	1	-
	IN3: Understand the meaning of questions all the time	1	-
	IN4: If do not understand, answer anyway	1	-
	IN5: If do not understand, ask for clarification	2	.843
Seeking Information	SO1: Answerers' information	1	-
	SO2: Answerers' experiences	1	-
	SO3: Answerers' expertise	1	-
	SO4: Information that answerers searched on the Internet	1	-
	SO5: Someone else's information/experience	2	.881
	SO6: Answers from Yahoo! Answers	1	-
Creating Answers	CR1: Accuracy is important.	1	-
	CR2: Checking sources of answers to verify accuracy of answers	1	-
	CR3: Completeness is important	1	-
	CR4: Searching information to verify completeness of answers	1	-
	CR5: Maintaining neutral attitude in answers	1	-
	CR6: Expressing agreement/disagreement in answers	2	.795
	CR7: Expressing social supports	2	.913
	CR8: Creating new answer	1	-
	CR9: Reusing pre-existing answers	2	.826
Evaluating Answers	EV1: Reviewing feedback from other Answers	1	-
	EV2: Reviewing feedback from the questioners	3	.870
	EV3: Reviewing feedback from the community	4	.936

George and Mallery (2003) suggest a scale to use as a rule of thumb for evaluating alpha coefficients, excellent: >.9, good: >.8, acceptable: >.7, questionable: >.6, poor: >.5, and unacceptable: <.5. As you see in Table ( ), the values of Cronbach's α of motivation factors range from the level of acceptable to excellent. Therefore, the applicable items have internal consistency for evaluating strategies.

5.4.2. General Distribution of Strategies of All Respondents

5.4.2.1. Selecting Questions

Table 5.32 describes a set of nine strategies used for selecting which questions to answer, and shows the mean frequency (from 1, Never, to 5, Always) with which each is used by the survey respondents.

Table 5.32. Strategies for Selecting Questions

Strategies	M	SD
SE1: Answerers select questions when they are confident in the topic of a question	4.32	.64
SE2: Answerers select easy questions.	3.35	.95
SE3: Answerers select difficult/challenged questions	3.23	1.07
SE4: Answerers select questions when questioners have positive attitudes (nice, polite, humor)	3.38	.71
SE5: Answerers select questions when questioners have negative attitudes (disagreement, impolite, depressed, desperate, aggressive)	2.94	.70
SE6: Answerers select questions when no one answered a particular question.	3.28	1.05
SE7: Answerers select questions that are newly updated questions.	3.69	1.07
SE8: Answerers select questions when questioners intent to benefit from answers (selling products, services or homework assistants)	1.86	.78
SE9: Answerers select questions when questioners ask on behalf of someone else.	2.85	1.04

The mean values of the survey responses indicate that most of the strategies were used somehow during the selection of questions. Confidence in the topic and the question being recently posted were the most frequently used strategies for selecting questions. The least used strategy for selecting a question is selecting those questions from which the questioner intends to gain personal benefit from the answer.

In addition to the Likert-scale ratings on strategies proposed in the model, the survey responses provided answerers subjective comments on strategies for selecting questions. Most of the survey respondents provided detailed explanations on how they had selected questions, corresponding to the strategies proposed in the survey. In addition, there were answerers who provide answers because they found other answers were misleading. This is in line with answerers who commented that they are motivated to correct misleading and counterfactual information presented in answers.

Interestingly, answerers have their own strategies for not selecting questions to answer. Answerers have tried to avoid questioners who publish the same questions repeatedly to earn points.

> "I often check the questioner's history to see if they are a troll. I really hate putting time into an answer to find out later from their history that they are just trolling. So, if the history looks legit, I am more likely to answer."

> "I make sure it is a serious question and not just one to get extra points."

Answerers also reacted negatively to questions intending to sell or advertise products.

> "If they are advertising or selling products, I REPORT them, not answer them, as it is against the rules to use Answers that way. More often it is other answerers selling products, they get reported too. I probably report 5 for every 1 I answer, this keeps the site cleaner for other users, and easier to find genuine questions and answers."

In several cases, answerers responded that questioners' emotional states or attitudes influence them to select or not select questions, such as:

> "When they seem like a person who would answer my question and be truthful like I am."

> "I do like to answer the questions where the questioner is truly trying to get a proactive approach to their particular issue and is having difficulty."

Compared to these responses, there was a response from a librarian who explained her/his strategy in a more professional way, with less consideration of questioners' attitudes.

> "As a librarian, I answer questions. I try not to let the askers' attitudes affect how or whether I answer a question. I tend to pick questions where information rather than opinions have been asked for. If someone presents symptoms that seem serious, I suggest that the person seek the help of a medical professional."

5.4.2.2. Interpreting Questions

Table 5.33 describes four strategies for interpreting questions and the mean ratings of frequency with which each strategy is used. Answerers believe that they understand the question most of the time, and are reluctant to answer a question that they don't understand. In addition, they only rarely ask for clarification of a question that they do not understand.

Table 5.33. Strategies for Interpreting Questions

Measures	M	SD
IN1: Answerers observe the flow of the topic in which they are interested	2.90	1.23
IN2: Answerers research the topic in which they are interested	2.08	1.18
IN3: Answerers believe that they always understand questions well	4.32	.70
IN4: Answerers respond to questions anyway when they do not understand questions.	1.74	.96
IN5: Answerers ask for a classification of the meaning of questions to questioners when they do not understand questions.	2.48	1.17

In addition to the Likert-scale ratings on strategies proposed in the model, the survey responses provided subjective comments on strategies for interpreting questions.

As for options for clarification of the meaning of questions, answerers develop their own strategies, such as posting a clarification question as an answer, as a comment on a question, or sending an email to questioners or leaving their email addresses or instant message IDs as an answer.

> "If the question is self-evident (has the answer in the question) then I place a counter-question."

> "If given only a little information regarding the person's problem, I provide several instant messenger addresses at which they may reach me to discuss the matter in private, one on one."

There are also answerers who provide several possible answers, rather than asking counter questions.

> "Sometimes I will state there are a couple of ways of interpreting the question - and then I will explain 'if you mean this, then...and if you meant that, then'."

> "I sometimes would take an either/or approach, answering both possibilities of what is asked."

> "Instead of just asking for clarification, it is often easier to say 'if X, then you should...but if Y then....' as this can cover most likely scenarios; often askers do not come back with the asked for extra details."

In terms of grammatical errors, several answerers mentioned that they had troubles sometimes with questions written by non-native English speakers since Yahoo! Answers is accessible around the world. An answerer mentioned that he/she is rather bothered by easy spelling errors.

"I tend to answer questions that are asked in plain, regular English, not "LOL speak." Grammar doesn't matter as much, but if a person doesn't care enough to actually spell out the words, then I don't need to waste my time."

5.4.2.3. Seeking Information

Table 5.34 describes six strategies for using additional information sources to develop answers and respondents' ratings of the frequency with which they use each strategy. Most of the sources of answers are from answerers' own information and experiences. Answers posted in Yahoo! Answers were also used as sources, but relatively fewer times than other sources.

Table 5.34. Strategies for Seeking Information

Measures	M	SD
SO1: Answerers' Information	4.47	.75
SO2: Answerers' Experiences	3.79	1.14
SO3: Answerers' Expertise	3.04	1.71
SO4: Information Searched	3.14	1.15
SO5: Information/Experiences Obtained from Someone Else	2.52	1.08
SO6: Answers posted in Yahoo! Answers	1.84	1.02

In addition to the Likert-scale ratings on strategies proposed in the model, the survey respondents commented on the sources of answers. These findings are further discussed in Section 5.6., with an analysis of the content of answers.

5.4.2.4. Creating Answers

Table 5.35 describes nine strategies that answerers use when they create answers and the frequency with which each is used. Accuracy and Completeness are the most frequently used criteria for evaluating information sources in various contexts. Answerers' perceptions and strategies of using these two criteria were investigated. Answerers reflect their attitudes to answers. Also, answerers' strategies of reusing answers that they previously posted in Yahoo! Answers were investigated.

Table 5.35. Strategies for Creating Answers

Measures	M	SD
CR1: Answerers believe accuracy of answers is important	4.73	.67
CR2: Answerers review sources of answers to confirm accuracy of answers	3.63	1.14
CR3: Answerers believe completeness of answers is important	4.42	.82
CR4: Answerers search additional information to confirm the completeness of answers	3.26	1.21
CR5: Answerers maintain neutral attitudes.	3.83	.97
CR6: Answerers express their agreements or disagreements with questioners	3.12	.88
CR7: Answerers express their social and emotional supports to questioners	3.77	.93
CR8: Answerers create new answers.	3.71	1.20
CR9: Answerers reuse previously posted answers.	2.08	1.08

Answerers responded that they considered accuracy and completeness of answerers very important, but they rather less frequently took action to confirm accuracy or completeness of answers. Answerers reuse answers that they had posted for other questions very infrequently.

In addition to the Likert-scale ratings on strategies proposed in the model, the survey respondents provided their subjective comments on strategies for creating answers. A number of criteria that answerers are concerned with when they create answers were suggested, such as truthfulness, supportiveness, factual, supportive comments, length, etc. Answerers put some effort into being responsive to individual questioners and providing customized answers.

> "If a person is desperate or in distress I try to be reassuring, I encourage pro-activity, and I encourage people to be part of their health team. If a questioner is biased or the question is illogical I often, very politely, indicate what the flaw is, and explain the subject simplistically."

> "Many of my answers that are recurring questions come from a "template answer" that matches the basic question, but I fine-tune every answer to that specific question as opposed to blind copy/paste based on the subject of the question (as some other members tend to do)."

> "Every case is as unique as every individual. Commonalities may exist between cases but that does not mean that two people from different backgrounds will process the same information the same way."

5.4.2.5. Evaluating Answers

Table 5.36 describes three strategies used in evaluating answers and the frequency with which each is used.

Table 5.36. Strategies in Evaluating Answers

Measures	M	SD
EV1: Answerers review other answers	3.91	.97
EV2: Answerers review responses from questioners	3.76	1.00
EV3: Answerers consider responses from other members in Yahoo! Answers	3.53	1.09

Answerers review responses to their answers from other groups of people. Answerers review answers which are posted on the questions for which they provided answers. They also review responses from the questioners for whom they provided answers. All of the questions and answers posted in Yahoo! Answers are open to the public. Thus, answerers also evaluate their answers based on responses from the community members.

In addition to the Likert-scale ratings on strategies proposed in the model, the survey respondents provided their subjective comments on strategies for evaluating answers as they come back to the questions to which they posted answers. They want to review questioners' comments on their answers to see whether their answers were really helpful, or to read other answers to see whether their answer was correct or incorrect.

The current interface of Yahoo! Answers limits the ways that answerers can come back to questions for which they provided answers. Answerers can have a list of the questions for which they provided answers in their profile pages, but it is impossible for answerers to revisit all of the questions that they answered all the time, especially for top answerers who post tens or hundreds of answers per day. An answerer suggested several possible features which may help them to provide and review their answers, such as setting a reminder of being informed of best answers, an update of a question when a questioner asks for an additional explanation or clarification on the question or an update of additional answers, etc.

5.4.2.6. Correlations among the Strategies

Pearson correlation coefficients were computed among the frequency scores on the 32 strategies. The results of the correlation analysis presented in Table 5.37 show that 280 out of 496

correlations were statistically significant. Some highlights of the correlation are described here. Within the types of strategies, C1, Accuracy, and C3, Completeness, are very highly correlated, as well as C2, Accuracy of Source, and C4, Completeness of Search. SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers, are very highly correlated with each other. All of the answer-evaluation strategies are very highly correlated with each other. There are a few other high correlations across types of strategies. IN2, Research, is highly correlated with SO4, Information Searched, CR2, Accuracy of Source, and CR4, Completeness of Search.

Table 5.37. Correlations among the 32 Strategies

	SE1	SE2	SE3	SE4	SE5	SE6	SE7	SE8	SE9	IN1	IN2	IN3	IN4	IN5	SO1	SO2
SE1: Confidence																
SE2: Easy	.154*															
SE3: Difficult	.121	.101														
SE4: Positive Attitudes	.185**	.235**	.387**													
SE5: Negative Attitudes	-.055	.226**	.242**	.347**												
SE6: No One Answered	.110	.186**	.250**	.384**	.207**											
SE7: Recently Posted	.084	.295**	.193**	.233**	.223**	.383**										
SE8: Purposed Benefit	-.128	.175**	.158*	.189**	.324**	.123	.189**									
SE9: Someone Else	.83	.319**	.432**	.338**	.356**	.297**	.238**	.302**								
IN1: Flow of Topic	.160*	.143*	.331**	.303**	.233**	.213**	.205**	.226**	.362**							
IN2: Research	.152*	.140*	.436**	.333**	.203**	.246**	.231**	.197**	.332**	.362**						
IN3: Understand All	.383**	.095	-.011	.065	-.051	.002	-.051	-.169*	-.019	.080	.205**					
IN4: Answer Anyway	-.014	.229**	.261**	.248**	.252**	.178**	.179**	.251**	.346**	.206**	.220**	-.158*				
IN5: Clarification	.059	.239**	.220**	.202**	.204**	.197**	.125	.136*	.184**	.063	.267**	-.017	.433**			
SO1: Information	.400**	.092	-.016	.158*	.021	.073	-.002	-.109	.044	.063	-.094	.228**	-.093	.040		
SO2: Experience	.082	.047	.023	.148*	.146*	.099	.007	.023	.133*	.95	.065	.037	.030	.127*	.348**	
SO3: Expertise	.282**	.140	.168*	.082	.135	.001	.005	.133	.080	.157*	.099	.222**	.008	.070	.253**	-.175*
SO4: Info Searched	.118	.190**	.340**	.334**	.217**	.178**	.175**	.199**	.326**	.149*	.620**	.044	.287**	.326**	.054	.183**
SO5: Someone Else	-.081	.229**	.305**	.317**	.265**	.148*	.190**	.285**	.347**	.252**	.274**	-.080	.336**	.256**	.062	.246**
SO6: Yahoo! Answers	-.063	.228**	.292**	.281**	.277**	.133*	.209**	.308**	.482**	.403**	.392**	-.065	.417**	.273**	.008	.206**
CR1: Accuracy	.404**	.018	.003	.081	-.087	.016	-.043	-.301**	-.007	.064	.175**	.324**	-.111	-.035	.292**	.053
CR2: Accuracy So	.201**	.025	.312**	.102	.096	.121	.094	.066	.260**	.232**	.576**	.164*	.109	.210**	.063	.186**
CR3: Completeness	.453**	.019	.099	.158*	.015	.064	.099	-.209**	.099	.166*	.314**	.325**	-.074	.082	.364**	.110
CR4: Complete -Search	.076	.083	.321**	.188**	.099	.097	.106	.148*	.343**	.258**	.546**	.035	.147*	.212**	.083	.206
CR5: Neutral Attitudes	.063	.066	.074	.063	.125	-.093	.004	.074	.026	.156*	.295**	.176**	-.021	.041	.072	-.065
CR6: Express Agree/Disagree	.175**	.182*	.182**	.286**	.344**	.121.	.170*	.189**	.350**	.233**	.352**	.089	.279**	.317**	.123	.117
CR7: Express Support	.167*	.168*	.273**	.219**	.214**	.087	.142*	.095	.365**	.258**	.268**	.097	.153*	.165*	.173**	.160*
CR8: New Answers	.136*	-.159*	.048	-.006	-.032	-.019	.123	-.104	-.013	.057	.051	.155*	-.014	.025	.201**	.084
CR9: Reuse Answers	.103	179*	.195**	.131	.243**	.065	.109	.229**	.211**	.225**	.260**	-.047	.353**	.310**	.016	.099
EV1: Other Answers	.066	-.024	.188**	.127	.001	.108	-.021	-.041	.119	.273*	.248**	.162*	.064	.040	.054	.142
EV2: Questioners	.087	.063	.192**	.241**	.100	.203**	.050	.086	.075	.249**	.194**	.103	.174*	.172*	.061	.125
EV3: Community	.096	.052	.251**	.267**	.130	.235**	.055	.116	.190*	.281**	.238**	.071	.198**	.093	.009	.148*

Table 5.37. Continued.

	SO3	SO4	SO5	SO6	CR1	CR2	CR3	CR4	CR5	CR6	CR7	CR8	CR9	EV1	EV2	EV3
SE1: Confidence																
SE2: Easy																
SE3: Difficult																
SE4: Positive Attitudes																
SE5: Negative Attitudes																
SE6: No One Answered																
SE7: Recently Posted																
SE8: Purposed Benefit																
SE9: Someone Else																
IN1: Flow of Topic																
IN2: Research																
IN3: Understand All																
IN4: Answer Anyway																
IN5: Clarification																
SO1: Information																
SO2: Experience																
SO3: Expertise																
SO4: Info Searched	.153															
SO5: Someone Else	.044	.528**														
SO6: Yahoo! Answers	.036	.472**	.599**													
CR1: Accuracy	.183*	.066	-.171**	-.072												
CR2: Accuracy So	.031	.483**	.204**	.222**	.312**											
CR3: Completeness	.230**	.099	-.094	-.055	.662**	.339**										
CR4: Complete-Search	.119	.463**	.282**	.294**	.126*	.656**	.336**									
CR5: Neutral Attitudes	.102	.170**	.039	.020	.214**	.278**	.237**	.289**								
CR6: Express Agree/Disagree	.085	.381**	.386**	.343	.172**	.310**	.231**	.296**	.115							
CR7: Express Support	.042	.228**	.291**	.227**	.246**	.354**	.339**	.319**	.271**	.497**						
CR8: New Answers	.057	.059	-.055	-.041	.281**	.111	.194**	.079	.096	.057	.157*					
CR9: Reuse Answers	.092	.303**	.363**	.453**	.018	.263**	.046	.238**	-.004	.401**	.150*	-.102				
EV1: Other Answers	-.225*	.120	.154*	.134	.140	.136	.190**	.180*	.011	.130	.145*	-.020	-.060			
EV2: Questioners	-.016	.212**	.209**	.160*	.136	.159*	.168*	.253**	-.038	.185*	.090	-.056	.180*	.622**		
EV3: Community	-.064	.252**	.274**	.216**	.046	.144	.119	.207**	.040	.184*	.080	-.099	.092	.683**	.813**	

5.4.3. Frequency of Strategy Use by Respondent Characteristics

Based on the characteristics of the survey respondents, the distribution of strategies has been analyzed in depth, in order to understand answerers better. The section is organized by strategy, with each subsection covering all the respondent characteristics listed here. The demographic characteristics include sex, age, education, income, and level. Characteristics related to answering behaviors include duration time of being active online per day (minutes), percentage of time for providing health answers while active online, number of times for providing health answers per week, and duration time for creating a health answer per session.

5.4.3.1. Selecting Questions

The distribution of strategies for selecting questions is presented for males (N =121) and females (N =122) in Table 5.38. An independent samples t-test was conducted to evaluate the difference in question-selecting strategies between the male and the female answerers. There were no statistically significant differences between males and females.

Table 5.38. Distribution of Question-Selection Strategies by Sex

	Males		Females				
Measures	M	SD	M	SD	t	df	Sig
SE1: Confidence/interests in topics	4.25	.65	4.40	.62	-1.851	241	.065
SE2: Easy	3.32	1.08	3.40	1.02	-.642	237	.522
SE3: Difficult	3.26	1.08	3.20	1.07	.429	245	.668
SE4: Positive attitudes	3.30	.71	3.44	.70	-1.411	199	.160
SE5: Negative attitudes	2.85	.08	3.05	.07	-1.157	196	.249
SE6: No one answered	3.25	.12	3.40	.11	-1.881	239	.061
SE7: Newly posted	3.71	.17	3.80	.10	-.522	236	.602
SE8: Purposed benefit	2.05	.09	1.83	.09	1.546	230	.124
SE9: Someone Else	3.02	.12	2.94	.10	-.475	223	.636

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies by the ages of the answerers. The independent variable was age, and the dependent variables were each of the strategies. Table 5.39 shows a summary of the coefficients of the regression models predicting strategies for selecting questions from age.

Table 5.39. Coefficients of Regression for Question-Selection Strategies by Age

Measures	B	Std.Error	Sig
SE1: Confidence/interests in topics	-.001	.003	.638
SE2: Easy	-.004	.004	.339
SE3: Difficult	-.003	.004	.532
SE4: Positive attitudes	-.007	.003	.028*
SE5: Negative attitudes	-.002	.003	.585
SE6: No one answered	-.011	.004	.008**
SE7: Newly posted	-.006	.004	.196
SE8: Purposed benefit	-.005	.003	.095
SE9: Someone Else	-.008	.004	.080

The relationships were statistically significant for SE4, Positive Attitudes, and SE6, No One Answered. Each of the bivariate correlations between age and these strategies is linearly related such that one unit increase in age is associated with a small decrease in use of these strategies. The regression equations are as follows.

Predicted Positive Attitudes = -.007 Age + 3.468

Predicted No One Answered = -.011 Age + 3.738

Thus, younger answerers select questions from questioners with positive attitudes more frequently than older answerers. Also, they select questions that no one has answered more frequently than older answerers.

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between answer-selection strategies and level of education of the answerers. Table 5.40 shows a summary of the coefficients of the analyses. The relationship with level of education was statistically significant only for SE9, Someone Else. Answerers with lower levels of education more frequently select questions asking for information on behalf of someone else.

Table 5.40. Coefficients of Regression for Question-Selection Strategies by Level of Education

Measures	Spearman's *rho*	N	Sig
SE1: Confidence/interests in topics	.099	231	.133
SE2: Easy	.044	229	.506
SE3: Difficult	.032	234	.627
SE4: Positive attitudes	-.092	192	.205
SE5: Negative attitudes	-.057	438	.189
SE6: No one answered	-.035	229	.598
SE7: Newly posted	-.080	226	.186
SE8: Purposed benefit	-.101	219	.135
SE9: Someone Else	-.175	214	.010*

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between answer-selection strategies and level of income of the answerers. Table 5.41 shows a summary of the coefficients of the analyses. The relationship with income was statistically significant only for S4, Positive Attitudes. Answerers with lower income more frequently select questions where the questioners have positive attitudes than do answerers with higher income.

Table 5.41. Coefficients of Regression for Question-Selection Strategies by Level of Income

Measures	Spearman's *rho*	N	Sig
SE1: Confidence/interests in topics	.085	178	.259
SE2: Easy	.044	178	.562
SE3: Difficult	-.037	181	.617
SE4: Positive attitudes	-.191	148	.020*
SE5: Negative attitudes	-.142	148	.086
SE6: No one answered	-.082	117	.279
SE7: Newly posted	.007	175	.931
SE8: Purposed benefit	-.078	171	.311
SE9: Someone Else	-.141	165	.071

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies by the Yahoo! Answers levels of the answerers. The independent variable was level, and the dependent variables were each of the strategies. Table 5.42 shows a summary of the coefficients of the regression model.

Table 5.42. Coefficients of Regression for Question-Selection Strategies by Yahoo! Answers Level

Measures	B	Std.Error	Sig
SE1: Confidence/interests in topics	-.006	.024	.808
SE2: Easy	.006	.035	.861
SE3: Difficult	-.041	.039	.296
SE4: Positive attitudes	-.041	.028	.158
SE5: Negative attitudes	-.066	.028	.018*
SE6: No one answered	-.051	.039	.190
SE7: Newly posted	-.032	.040	.427
SE8: Purposed benefit	-.060	.030	.043*
SE9: Someone Else	-.063	.040	.117

The relationships were statistically significant for SE5, Negative Attitudes, and SE8, Purposed Benefit. The regression equations are as follows.

Predicted Negative Attitudes = -.041 Level + 3.264

Predicted Purposed Benefit = -.060 Level + 2.156

Answerers with lower levels more frequently select questions from questioners with negative attitudes and questions where the questioners intended to receive benefit from the answers than answerers with higher levels.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies according to answerers' duration time of being active online per day. The independent variable was duration time of being active online per day (minutes) and the dependent variables were each of the strategies. Table 5.43 shows a summary of the coefficients of the regression model.

Table 5.43. Coefficients of Regression for Question-Selection Strategies by Duration Time of Being Active Online Per Day

Measures	B	Std.Error	Sig
SE1: Confidence/interests in topics	-.021	.014	.141
SE2: Easy	.014	.021	.515
SE3: Difficult	.018	.024	.441
SE4: Positive attitudes	.020	.017	.242
SE5: Negative attitudes	.049	.017	.004**
SE6: No one answered	.037	.023	.112
SE7: Newly posted	.012	.024	.616
SE8: Purposed benefit	.061	.018	.001**
SE9: Someone Else	.032	.024	.174

The relationships were statistically significant for SE5, Negative Attitudes, and SE8, Purposed Benefit. The regression equations are as follows.

> Predicted Negative Attitudes = .049 Duration Time of Being Active Online Per Day + 2.734

> Predicted Purposed Benefit = .061 Duration Time of Being Active Online Per Day + 1.600

Thus, answerers with longer duration times more frequently select questions where the questioner has negative attitudes and questions where the questioners intended to receive benefits from the answers than answerers with shorter duration times.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies according to the percent of the answerer's active online time spent providing health answers. The independent variable was percent of active online time spent answering health questions, and the dependent variables were each of the strategies. Table 5.44 shows a summary of the coefficients of the regression model.

Table 5.44. Coefficients of Regression for Question-Selection Strategies by Percentage of Time Providing Health Answers Per Day

Measures	t	df	Sig
SE1: Confidence/interests in topics	-.005	.002	.010*
SE2: Easy	.002	.003	.453
SE3: Difficult	.002	.003	.583
SE4: Positive attitudes	-.000	.002	.986
SE5: Negative attitudes	.002	.002	.304
SE6: No one answered	.000	.003	.914
SE7: Newly posted	.001	.003	.830
SE8: Purposed benefit	-.002	.002	.381
SE9: Someone Else	.002	.003	.449

The relationship was statistically significant only for SE1, Confidence/Interests in Topics. The regression equation is as follows.

> Predicted Confidence/Interests in Topic = -.005 Percent of Time for Providing Health Answers While Active Online + 4.420

Thus, answerers who spend a higher percent of their online time answering health questions more frequently select questions in which they are confident of the topic or interested in the topic, than do answerers who spend a lower percent of their online time answering health questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies according to the number of times the answerer provides health answers per week. The independent variable was the number of times health answers were provided per week, and the dependent variables were each of the strategies. Table 5.45 shows a summary of the coefficients of the regression model.

Table 5.45. Coefficients of Regression for Question-Selection Strategies by Number of Times Providing Health Answers Per Week

Measures	B	Std.Error	Sig
SE1: Confidence/interests in topics	.001	.001	.567
SE2: Easy	.000	.002	.794
SE3: Difficult	.006	.002	.002**
SE4: Positive attitudes	.002	.001	.084
SE5: Negative attitudes	.002	.001	.155
SE6: No one answered	.004	.002	.023*
SE7: Newly posted	.003	.002	.120
SE8: Purposed benefit	-.002	.001	.089
SE9: Someone Else	.001	.002	.536

The relationships were statistically significant for SE3, Difficult Questions, and SE6, No One Answered. The regression equations are as follows.

Predicted Difficult = .006 Number of Times for Providing Health Answers per Week + 3.131

Predicted No One Answered = .004 Number of Times for Providing Health Answers per Week + 3.216

Thus, answerers who provide health answers more often per week select difficult questions and questions no one answered more frequently than answerers who provide health answers less often each week.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-selection strategies according to the duration time for creating a health answer per session. The independent variable was the duration time for creating a health answer per session, and the dependent variables were each of the strategies. Table 5.46 shows a summary of the coefficients of the regression model.

Table 5.46. Coefficients of Regression for Question-Selection Strategies by Duration Time of Creating a Health Answer Per Session

Measures	B	Std.Error	Sig
SE1: Confidence/interests in topics	.004	.003	.266
SE2: Easy	.001	.005	.813
SE3: Difficult	.014	.006	.014*
SE4: Positive attitudes	.009	.004	.034*
SE5: Negative attitudes	.002	.004	.704
SE6: No one answered	-.004	.006	.542
SE7: Newly posted	.005	.006	.407
SE8: Purposed benefit	.007	.004	.119
SE9: Someone Else	.002	.006	.761

The relationships were statistically significant for SE3, Difficult Questions, and SE4, Positive Attitudes. The regression equations are as follows.

Predicted Difficult Questions = .014 Duration Time for Creating a Health Answer per Session + 3.071

Predicted Positive Attitudes = .009 Duration Time for Creating a Health Answer per Session + 3.274

Thus, answerers who spend longer to provide an answer per session more frequently select difficult questions and questions where the questioner has positive attitudes than do answerers who spend a shorter time per session providing an answer.

5.4.3.2. Interpreting Questions

The distribution of strategies for interpreting questions is presented for males and females in Table 5.47. An independent samples t-test was conducted to evaluate the difference in question-interpretation strategies between the male and the female answerers.

Table 5.47. Distribution of Question-Interpretation Strategies by Sex

	Males		Females				
Measures	M	SD	M	SD	t	Df	Sig.
IN1: Flow of topic	2.78	1.17	3.02	1.29	-1.528	241	.128
IN2: Research	2.97	1.26	3.19	1.10	-1.453	247	.148
IN3: Understand all	4.27	.07	4.38	.70	-1.191	249	.235
IN4: Answer Anyway	1.64	.86	1.85	1.01	-1.641	243	.102
IN5: Clarification	2.31	1.14	2.65	1.19	-2.299	245	.022*

The relationship was statistically significant in IN5, Clarification. The female answerers were more frequently used strategies for clarification than the male answerers.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies by the ages of the answerers. Table 5.48 shows a summary of the coefficients of the regression models.

Table 5.48. Coefficients of Regression for Question-Interpretation Strategies by Age

Measures	B	Std.Error	Sig.
IN1: Flow of topic	-.013	.005	.013*
IN2: Research	-.008	.005	.117
IN3: Understand all	.000	.003	.851
IN4: Answer Anyway	-.009	.004	.027*
IN5: Clarification	-.004	.005	.437

The relationships were statistically significant for IN1, Flow of Topic and IN4, Answer Anyway. Each of the bivariate correlations between age and these strategies is linearly related such that one

unit increases in age is associated with, on average, these strategies decrease. The regression equations are as followed.

Predicted Flow of Topic = -.013 Age + 3.415

Predicted Answer Anyway = -.009 Age + 2.088

Thus, younger answerers monitor the flow of health topics more frequently than older answerers. When they do not understand the meaning of questions, they provide answers more frequently than older answerers.

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between questioner-interpretation strategies and level of education of the answerers. Table 5.49 shows a summary of the coefficients of the analyses. No relationships were statistically significant.

Table 5.49. Coefficients of Regression for Question-Intepretation Strategies by Level of Education

Measures	Spearman's *rho*	N	Sig.
IN1: Flow of topic	-.079	231	.231
IN2: Research	-.068	235	.300
IN3: Understand all	.097	237	.135
IN4: Answer Anyway	-.099	231	.231
IN5: Clarification	-.035	233	.598

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between questioner-interpretation strategies and level of income of the answerers. Table 5.50 shows a summary of the coefficients of the analyses. No relationships were statistically significant.

Table 5.50. Coefficients of Regression for Question-Intepretation Strategies by Level of Income

Measures	Spearman's *rho*	N	Sig.
IN1: Flow of topic	-.029	179	.700
IN2: Research	.013	183	.859
IN3: Understand all	.024	185	.747
IN4: Answer Anyway	.010	182	.890
IN5: Clarification	.015	184	.837

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies by the Yahoo! Answers levels of the answerers. Table 5.51 shows a summary of the coefficients of the regression model.

Table 5.51. Coefficients of Regression for Question-Interpretation Strategies by Yahoo! Answers Level

Measures	B	Std.Error	Sig.
IN1: Flow of topic	-.085	.045	.059
IN2: Research	.007	.043	.863
IN3: Understand all	.004	.026	.868
IN4: Answer Anyway	.021	.035	.545
IN5: Clarification	.089	.042	.036*

The relationships were statistically significant for IN5: Clarification. The regression equation is as follows.

Predicted Clarification = .089 Level + 2.042

Answerers with higher levels more frequently ask questioners for clarification of the meaning of questions than answerers with lower levels.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies according to answerers' duration time of being active online per day. Table 5.52 shows a summary of coefficients of the regression model.

Table 5.52. Coefficients of Regression for Question-Interpretation Strategies by Duration Time Being Active Online Per Day

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.018	.028	.517
IN2: Research	.086	.025	.001**
IN3: Understand all	-.011	.015	.457
IN4: Answer Anyway	.034	.021	.106
IN5: Clarification	.039	.026	.132

The relationship was statistically significant for IN2, Research. The regression equation is as follows.

Predicted Research = .086 Duration Time of Being Active Online Per Day + 2.719

Thus, answerers with longer duration times more frequently conduct research to learn about the health topics of questions than answerers with shorter duration times.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies according to the percentage of time of providing health answers per day. Table 5.53 shows a summary of the coefficients of the regression model.

Table 5.53. Coefficients of Regression for Question-Interpretation Strategies by Percentage of Time Providing Health Answers Per Day

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.007	.004	.042*
IN2: Research	.004	.003	.265
IN3: Understand all	-.004	.002	.028*
IN4: Answer Anyway	.005	.003	.069
IN5: Clarification	.007	.003	.047*

The relationships were statistically significant for IN1, Flow of Topic, IN3, Understand All, and IN5, Clarification. The regression equations are as follows.

> Predicted Flow of Topic = .007 Percent of Time for Providing Health Answers While Active Online + 2.770
>
> Predicted Understand All = -.004 Percent of Time for Providing Health Answers While Active Online + 4.406
>
> Predicted Clarification = .007 Percent of Time for Providing Health Answers While Active Online + 2.351

Thus, answerers who spend a high percent of their online time answering health questions more frequently monitor the flow of health topics in which they are interested and ask questioners to clarify the meaning of questions, than do answerers who spend a lower percent of their online time answering health questions. On the contrary, answerers who spend a lower percent of their time answering health questions more frequently believes that they understand the meaning of all of the questions that they post answers, than do answerers who spend a high percent of their online time answering health questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies according to the number of times the answerer provides health answers per week. Table 5.54 shows a summary of the coefficients of the regression model.

Table 5.54. Coefficients of Regression for Question-Interpretation Strategies by Number of Times Providing Health Answers Per Week

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.006	.002	.008**
IN2: Research	.003	.002	.206
IN3: Understand all	.000	.001	.451
IN4: Answer Anyway	.004	.002	.020*
IN5: Clarification	.004	.002	.034*

The relationship was statistically significant for IN1, Flow of Topic, IN4, Answer Anyway, and IN5, Clarification. The regression equations are as follows.

> Predicted Flow of Topic = .006 Number of Times for Providing Health Answers per Week + 2.850
>
> Predicted Answer Anyway = .004 Number of Times for Providing Health Answers per Week + 1.694
>
> Predicted Clarification = .004 Number of Times for Providing Health Answers per Week + 2.434

Thus, answerers who provide more number of health answers per week observe the flow of topics in health more frequently than answerers who provide less number of answers. When answerers do not understand the meaning of questions, answerers who provide more number of answers more frequently answer questions anyway. At the same time, they more frequently ask back to questioners for clarifying the meaning of questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of question-interpretation strategies according to the duration time for creating a health answer per session. Table 5.55 shows a summary of the coefficients of the regression model.

Table 5.55. Coefficients of Regression for Question-Interpretation Strategies by Duration Time for Creating a Health Answer Per Session

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.013	.007	.044*
IN2: Research	.016	.006	.009*
IN3: Understand all	.002	.004	.665
IN4: Answer Anyway	.000	.005	.912
IN5: Clarification	.004	.006	.503

The relationships were statistically significant for IN1, Flow of Topic and IN2, Research. The regression equations are as follows.

> Predicted Flow of Topic = .013 Duration Time for Creating a Health Answer per Session + 2.756
>
> Predicted Research = .016 Duration Time for Creating a Health Answer per Session + 2.917

Thus, answerers who spend longer time per session monitor the flow of health topics that they are interested in Yahoo! Answers and research about the topics more frequently than answerers who spend shorter time.

5.4.3.3. Seeking Information

The distribution of strategies for seeking information for answering questions is presented for males and females in Table 5.56. An independent samples t-test was conducted to evaluate the difference in strategies of seeking information between the male and the female answerers.

Table 5.56. Distribution of Strategies of Seeking Information for Answering Questions by Sex

	Males		Females				
Measures	M	SD	M	SD	T	Df	Sig.
SO1: Information	4.40	.81	4.55	.69	-1.599	248	.111
SO2: Experiences	3.63	1.16	3.95	1.10	-2.210	241	.028*
SO3: Expertise	3.09	1.18	3.00	1.70	.333	161	.739
SO4: Information Searched	3.08	1.20	3.20	1.11	-.761	242	.447
SO5: Someone Else	2.42	.99	2.62	1.15	-1.484	239	.139
SO6: Yahoo! Answers	1.79	.96	1.89	1.10	-.738	244	.461

The relationships were statistically significant only for SO2: Experiences. The female answerers were more frequently used experiences when they seek information for answering health questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of strategies of seeking information for answering health questions by the ages of the answerers. Table 5.57 shows a summary of coefficients of the regression model.

Table 5.57. Coefficients of Regression for Information-Seeking Strategies by Age

Measures	B	Std.Error	Sig.
SO1: Information	-.001	.003	.634
SO2: Experiences	-.012	.005	.010*
SO3: Expertise	.011	.009	.196
SO4: Information Searched	-.010	.005	.032*
SO5: Someone Else	-.020	.004	.000**
SO6: Yahoo! Answers	-.014	.004	.001**

The relationships were statistically significant for SO2, Expertise, SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. Each of the bivariate correlations between age and these strategies is linearly related such that one unit increase in age is associated with a small decrease in use of these strategies. The regression equations are as follows.

Predicted Expertise = -.012 Age + 4.295

Predicted Information Searched = -.010 Age + 3.552

Predicted Someone Else = -.020 Age + 3.326

Predicted Yahoo! Answers = -.014 Age + 2.403

Thus, younger answerers use their expertise in health, information that they searched on the Internet, information that they heard from someone else, and Yahoo! Answers as sources of answers less frequently than older answerers.

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between strategies for seeking information for answering health questions and level of education of the answerers. Table 5.58 shows a summary of the coefficients of the analyses. The relationships with education level were statistically significant for SO2, Experiences, SO3, Expertise, SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. Thus, answerers with higher educational attainment use their own expertise as sources of answers more frequently than answerers with lower education. However, answerers with lower educational

attainment more frequently use their experiences, information searched from the Internet, information heard from someone else, or answers from Yahoo! Answers as sources of their own answers than do answerers with higher education.

Table 5.58. Coefficients of Regression for Information-Seeking Strategies by Level of Education

Measures	Spearman's *r*	N	Sig.
SO1: Information	.011	236	.872
SO2: Experiences	-.230	230	.000**
SO3: Expertise	.276	155	.001**
SO4: Information Searched	-.149	230	.024*
SO5: Someone Else	-.189	227	.004*
SO6: Yahoo! Answers	-.216	233	.001*

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between strategies for seeking information for answering health questions and level of income of the answerers. Table 5.59 shows a summary of the coefficients of the analyses. The relationships with income level were statistically significant for SO5, Someone Else, and SO6, Yahoo! Answers. Answerers with lower income more frequently use information from someone else or answers from Yahoo! Answers as sources of their own answers than do answerers with higher income.

Table 5.59. Coefficients of Regression for Information-Seeking Strategies by Level of Income

Measures	Spearman's *r*	N	Sig.
SO1: Information	-.019	185	.798
SO2: Experiences	-.050	180	.509
SO3: Expertise	.016	.123	.858
SO4: Information Searched	.019	180	.796
SO5: Someone Else	-.204	180	.006**
SO6: Yahoo! Answers	-.219	184	.003**

A series of bivariate linear regression analyses was conducted to evaluate the prediction of strategies of seeking information for answering health questions by the Yahoo! Answers levels of the answerers. Table 5.60 shows a summary of the coefficients of the regression model.

Table 5.60. Coefficients of Regression for Information-Seeking Strategies by Yahoo! Answers Level

Measures	B	Std.Error	Sig.
SO1: Information	-.022	.027	.418
SO2: Experiences	-.112	.042	.008**
SO3: Expertise	.032	.081	.698
SO4: Information Searched	.014	.042	.742
SO5: Someone Else	-.087	.040	.031*
SO6: Yahoo! Answers	-.046	.038	.222

The relationships were statistically significant for SO2, Experiences, and SO5, Someone Else. The regression equations are as follows.

Predicted Experiences = -.112 Level + 4.335

Predicted Someone Else = -.087 Level + 2.947

Thus, answerers with lower levels more frequently use their experiences or information obtained from someone else than answerers with higher levels.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of strategies of seeking information for answering health questions according to answerers' duration time of being active online per day. Table 5.61 shows a summary of the coefficients of the regression model.

Table 5.61. Coefficients of Regression for Information-Seeking Strategies by Duration Time Being Active Online Per Day

Measures	B	Std.Error	Sig.
SO1: Information	-.022	.016	.192
SO2: Experiences	.030	.025	.228
SO3: Expertise	-.004	.046	.923
SO4: Information Searched	.108	.025	.000**
SO5: Someone Else	.055	.024	.020*
SO6: Yahoo! Answers	.055	.022	.014*

The relationships were statistically significant for SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Information Searched = .108 Duration Time of Being Active Online Per Day + 2.683

Predicted Someone Else = .055 Duration Time of Being Active Online Per Day + 2.290

Predicted Yahoo! Answers = .055 Duration Time of Being Active Online Per Day + 1.608

Thus, answerer with longer duration times more frequently use information searched from the Internet, answers heard from someone else, and answers from Yahoo! Answers than answerers with shorter times.

A series of bivariate linear regression analyses was conducted to evaluate the strategies of seeking information for answering health questions according to the percent of the answerer's active online time spent providing health answers. Table 5.62 shows a summary of the coefficients of the regression model.

Table 5.62. Coefficients of Regression for Information-Seeking Strategies by Percentage of Time Providing Health Answers Per Day

Measures	B	Std.Error	Sig.
SO1: Information	-.002	.002	.425
SO2: Experiences	.001	.003	.820
SO3: Expertise	-.004	.006	.492
SO4: Information Searched	.003	.003	.395
SO5: Someone Else	.007	.003	.020*
SO6: Yahoo! Answers	.004	.003	.184

The relationship was statistically significant only for SO5, Someone Else. The regression equation is as follows.

Predicted Someone Else = .007 Percent of Time for Providing Health Answers While Active Online + 2.387

Thus, answerers who spend a higher percent of their online time answering health questions more frequently use information or experiences that they heard from someone else as sources of answers than answerers who spend a lower percent of their online time answering health questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of strategies of seeking information for answering health questions according to the number of times the answerer provides health answers per week. Table 5.63 shows a summary of the coefficients of the regression model. No relationships were statistically significant

Table 5.63. Coefficients of Regression for Information-Seeking Strategies by Number of Times Providing Health Answers Per Week

Measures	B	Std.Error	Sig.
SO1: Information	.001	.001	.555
SO2: Experiences	-.002	.002	.273
SO3: Expertise	.001	.003	.689
SO4: Information Searched	.002	.002	.383
SO5: Someone Else	.001	.002	.725
SO6: Yahoo! Answers	.003	.002	.162

A series of bivariate linear regression analyses was conducted to evaluate the prediction of strategies of seeking information for answering health questions according to the duration time for creating a health answer per session. Table 5.64 shows a summary of the coefficients of the regression model. No relationships were statistically significant

Table 5.64. Coefficients of Regression for Information-Seeking Strategies by Duration Time Creating a Health Answer Per Session

Measures	B	Std.Error	Sig.
SO1: Information	-.002	.004	.595
SO2: Experiences	-.005	.006	.437
SO3: Expertise	.014	.010	.191
SO4: Information Searched	.010	.006	.121
SO5: Someone Else	.000	.006	.966
SO6: Yahoo! Answers	.003	.006	.584

5.4.3.4. Creating Answers

The distribution of strategies for creating answers is presented for males and females in Table 5.65. An independent samples t-test was conducted to evaluate the difference in answer-creation strategies between the male and the female answerers.

Table 5.65. Distribution of Answer-Creation Strategies by Sex

	Males		Females				
Measures	M	SD	M	SD	t	df	Sig.
CR1: Accuracy	4.67	.84	4.80	.44	-1.432	242	.154
CR2: Accuracy Source	3.43	1.20	3.84	1.03	-2.834	238	.005**
CR3: Completeness	4.36	.91	4.49	.73	-1.288	241	.199
CR4: Completeness Search	3.13	1.28	3.39	1.15	-1.179	240	.087
CR5: Neutral Attitudes	3.76	1.02	3.91	.92	-1.165	237	.245
CR6: Express Agree/Disagree	3.02	.87	3.21	.88	-1.721	223	.087
CR7: Express Support	3.52	.94	4.02	.87	-4.246	238	.000**
CR8: New Answers	3.53	1.36	3.93	1.02	-2.606	227	.010*
CR9: Reuse Answers	2.11	1.09	2.08	1.07	.208	227	.835

The relationships were statistically significant for CR2, Accuracy source, CR7, Express Supports, and CR8, New Answers. The female answerers were more frequently search sources of information to confirm accuracy of answers than the male answerers. Also, the female answerers more frequently expressed supportive comments in answers than the male answerers. The female answerers create new answers more frequently than the male answerers.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer- creation strategies by the ages of the answerers. Table 5.66 shows a summary of the coefficients of the regression model.

Table 5.66. Coefficients of Regression for Answer-Creation Strategies by Age

Measures	B	Std.Error	Sig.
CR1: Accuracy	.001	.003	.669
CR2: Accuracy Source	-.011	.005	.016*
CR3: Completeness	.002	.003	.503
CR4: Completeness Search	-.008	.005	.114
CR5: Neutral Attitudes	.002	.004	.597
CR6: Express Agree/Disagree	-.011	.004	.003**
CR7: Express Support	-.009	.004	.014*
CR8: New Answers	.005	.005	.303

The relationships were statistically significant for CR1, Accuracy Source, CR6, Express Agree/Disagree, and CR7, Express Supports. The regression equations are as follows.

Predicted Accuracy Source = -.011 Age + 4.091

Predicted Express Agree/Disagree = -.011 Age + 3.561

Predicted Express Supports = -.009 Age + 4.160

Thus, younger answerers more frequently search for additional sources for verifying accuracy of answers than older answerers. They also more frequently express agreement/disagreement or supportive comments to questioners than younger answerers.

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between answer-creation strategies and level of education of the answerers. Table 5.67 shows a summary of the coefficients of the analyses. The relationship with educational attainment was statistically significant only for CR7, Express Support. Thus, answerers with lower education more frequently express their supports to questioners than answerers with higher education.

Table 5.67. Coefficients of Regression for Answer-Creation Strategies by Level of Education

Measures	Spearman's *rho*	N	Sig.
CR1: Accuracy	.082	230	.213
CR2: Accuracy Source	-.078	226	.240
CR3: Completeness	.012	229	.859
CR4: Completeness Search	-.031	228	.644
CR5: Neutral Attitudes	.002	226	.979
CR6: Express Agree/Disagree	-.086	213	.209
CR7: Express Support	-.162	226	.015*
CR8: New Answers	.094	217	.166
CR9: Reuse Answers	-.107	216	.118

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationship between answer-creation strategies and level of income of the answerers. Table 5.68 shows a summary of the coefficients of the analyses. The relationship with income level was statistically significant only for CR2, Accuracy of Source. Answerers with higher income more frequently search for additional information to verify the accuracy of their answers than do answerers with lower income.

Table 5.68. Coefficients of Regression for Answer-Creation Strategies by Level of Income

Measures	Spearman's *rho*	N	Sig.
CR1: Accuracy	.119	180	.111
CR2: Accuracy Source	.157	177	.037*
CR3: Completeness	.056	180	.457
CR4: Completeness Search	.058	179	.442
CR5: Neutral Attitudes	-.016	175	.830
CR6: Express Agree/Disagree	-.026	166	.735
CR7: Express Support	-.119	179	.113
CR8: New Answers	.030	168	.698
CR9: Reuse Answers	.014	169	.860

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-creation strategies by the Yahoo! Answers levels of the answerers. Table 5.69 shows a summary of the coefficients of the regression model. No relationships were statistically significant.

Table 5.69. Coefficients of Regression for Answer-Creation Strategies by Yahoo! Answers Level

Measures	B	Std.Error	Sig.
CR1: Accuracy	.032	.024	.186
CR2: Accuracy Source	.027	.042	.515
CR3: Completeness	.012	.030	.701
CR4: Completeness Search	-.013	.045	.768
CR5: Neutral Attitudes	.023	.036	.530
CR6: Express Agree/Disagree	-.041	.033	.224
CR7: Express Support	-.063	.034	.065
CR8: New Answers	.045	.045	.319

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-creation strategies according to answerers' duration time of being active online per day. Table 5.70 shows a summary of the coefficients of the regression model.

Table 5.70. Coefficients of Regression for Answer-Creation Strategies by Duration Time Being Active Online Per Day

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.021	.015	.155
CR2: Accuracy Source	.059	.025	.019*
CR3: Completeness	-.022	.018	.226
CR4: Completeness Search	.065	.027	.016*
CR5: Neutral Attitudes	.009	.022	.677
CR6: Express Agree/Disagree	.012	.020	.539
CR7: Express Support	-8.435E-6	.021	1.000
CR8: New Answers	-.051	.027	.057
CR9: Reuse Answers	.045	.025	.071

The relationships were statistically significant for CR2, Accuracy Source, and CR4, Completeness Search. The regression equations are as follows.

> Predicted Accuracy Source = .058 Duration Time of Being Active Online Per Day + 3.383
>
> Predicted Completeness Search = .065 Duration Time of Being Active Online Per Day + 2.988

Thus, answerers with longer duration times more frequently conduct searches for additional sources of answers in order to verify the accuracy and completeness of answers than answerers with shorter duration.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-creation strategies according to the percent of the answerer's active online time spent providing health answers. Table 5.71 shows a summary of the coefficients of the regression model. No relationships were statistically significant.

Table 5.71. Coefficients of Regression for Answer-Creation Strategies by Percentage of Time Providing Health Answers Per Day

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.002	.002	.239
CR2: Accuracy Source	.000	.003	.962
CR3: Completeness	.001	.002	.633
CR4: Completeness Search	.001	.003	.870
CR5: Neutral Attitudes	.003	.003	.340
CR6: Express Agree/Disagree	.002	.003	.347
CR7: Express Support	.003	.003	.271
CR8: New Answers	-.003	.003	.379

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-creation strategies according to the number of times the answerer provides health answers per week. Table 5.72 shows a summary of the coefficients of the regression model.

Table 5.72. Coefficients of Regression for Answer-Creation Strategies by Number of Times Providing Health Answers Per Week

Measures	B	Std.Error	Sig.
CR1: Accuracy	.002	.001	.200
CR2: Accuracy Source	.001	.002	.569
CR3: Completeness	.002	.002	.319
CR4: Completeness Search	.003	.002	.247
CR5: Neutral Attitudes	-.001	.002	.550
CR6: Express Agree/Disagree	.001	.002	.651
CR7: Express Support	.002	.002	.286
CR8: New Answers	.001	.002	.725
CR9: Reuse Answers	.005	.002	.016*

The relationships were statistically significant for CR9, Reuse Answers. The regression equation is as follows.

> Predicted Reuse Answers = .005 Number of Times for Providing Health Answers per Week + 2.020

Thus, answerers who provide more number of health answers per week more frequently reuse answers they posted in Yahoo! Answers than answerers who provide health answers often each week.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-creation strategies according to the duration time for creating a health answer per session. Table 5.73 shows a summary of the coefficients of the regression model. No relationships were statistically significant.

Table 5.73. Coefficients of Regression for Answer-Creation Strategies by Duration Time Creating a Health Answer Per Session

Measures	B	Std.Error	Sig.
CR1: Accuracy	.000	.004	.912
CR2: Accuracy Source	.012	.006	.052
CR3: Completeness	.004	.004	.324
CR4: Completeness Search	.009	.007	.192
CR5: Neutral Attitudes	.001	.005	.822
CR6: Express Agree/Disagree	.007	.005	.122
CR7: Express Support	.002	.005	.686
CR8: New Answers	-.010	.006	.116
CR9: Reuse Answers	.000	.006	.880

5.4.3.5. Evaluating Answers

The distribution of strategies for evaluation answers is presented for males and females in Table 5.70. An independent samples t-test was conducted to evaluate the difference in strategies of answer-evaluation between the male and the female answerers. There were no statistically significant differences.

Table 5.74. Distribution of Answer-Evaluation Strategies by Sex

	Males		Females				
Measures	M	SD	M	SD	t	df	Sig.
EV1: Other Answers	3.80	.98	4.00	.95	-1.433	192	.153
EV2: Questioners	3.72	1.00	3.77	.99	-.404	199	.686
EV3: Community	3.44	1.10	3.59	1.08	-.917	185	.360

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies by the ages of the answerers. Table 5.75 shows a summary of the coefficients of the regression models.

Table 5.75. Coefficients of Regression for Answer-Evaluation Strategies by Age

Measures	B	Std.Error	Sig.
EV1: Other Answers	-.021	.004	.000**
EV2: Questioners	-.024	.005	.000**
EV3: Community	-.029	.005	.000**

The relationships were statistically significant for EV1, Other Answers, EV2, Questioners, and EV3, Community. The regression equations are as followed.

Predicted Other Answers = -.021 Age + 4.754

Predicted Questioners = -.024 Age + 4.666

Predicted Community = -.029 Age + 4.634

Thus, younger answerers more frequently evaluate their answers based on feedback from other answerers, questioners or community than older answerers.

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between answer-evaluation strategies and level of education of the answerers. Table

5.76 shows a summary of the coefficients of the analyses. No relationships were statistically significant.

Table 5.76. Coefficients of Regression for Answer-Evaluation Strategies by Level of Education

Measures	Spearman's *r*	N	Sig.
EV1: Other Answers	-.110	183	.139
EV2: Questioners	-.042	180	.571
EV3: Community	-.070	176	.355

A series of Spearman's rank order correlation analyses was conducted to evaluate the relationships between answer-evaluation strategies and level of income of the answerers. Table 5.77 shows a summary of the coefficients of the analyses. No relationships were statistically significant.

Table 5.77. Coefficients of Regression for Answer-Evaluation Strategies by Level of Income

Measures	Spearman's *r*	N	Sig.
EV1: Other Answers	-.024	145	.774
EV2: Questioners	-.058	142	.495
EV3: Community	.015	140	.858

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies by the Yahoo! Answers levels of the answerers. Table 5.74 shows a summary of the coefficients of the regression models.

Table 5.78. Coefficients of Regression for Answer-Evaluation Strategies by Yahoo! Answers Level

Measures	B	Std.Error	Sig.
EV1: Other Answers	-.144	.038	.000**
EV2: Questioners	-.137	.040	.001**
EV3: Community	-.191	.043	.000**

The relationships were statistically significant for EV1, Other Answerers, EV2, Questioners, and EV4, Community. The regression equations are as follows.

Predicted Other Answers = -.144 Level + 4.604

Predicted Questioners = -.137 Level + 4.409

Predicted Community = -.191 Level + 4.452

Thus, answerers with lower levels more frequently evaluate their answers based on feedback from other answerers, questioners or the community members of Yahoo! Answers than answerers with higher levels.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies according to answerers' duration time of being active online per day. Table 5.79 shows a summary of the coefficients of the regression models. No relationships were statistically significant.

Table 5.79. Coefficients of Regression for Answer-Evaluation Strategies by Duration Time Being Active Online Per Day

Measures	B	Std.Error	Sig.
EV1: Other Answers	.012	.023	.591
EV2: Questioners	.031	.024	.184
EV3: Community	.036	.026	.163

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies according to the percent of the answerer's active online time spent providing health answers. Table 5.80 shows a summary of the coefficients of the regression models.

Table 5.80. Coefficients of Regression for Answer-Evaluation Strategies by Percentage of Time Providing Health Answers Per Day

Measures	B	Std.Error	Sig.
EV1: Other Answers	.006	.003	.062
EV2: Questioners	-.005	.003	.101
EV3: Community	-.008	.003	.017*

The relationships were statistically significant only for EV3, Community. The regression equation is as follows.

> Predicted Community = -.008 Percent of Time for Providing Health Answers While Active Online + 3.928

Thus, answerers who spend a higher percent of their online time answering health questions more frequently evaluate their answers based on the feedback from the community of Yahoo! Answers than do answerers who spend a lower percent of their online time answering health questions.

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies according to the number of times the answerer provides health answers per week. Table 5.81 shows a summary of the coefficients of the regression models. No relationships were statistically significant.

Table 5.81. Coefficients of Regression for Answer-Evaluation Strategies by Number of Times Providing Health Answers Per Week

Measures	B	Std.Error	Sig.
EV1: Other Answers	-.001	.002	.502
EV2: Questioners	.001	.002	.602
EV3: Community	.000	.002	.839

A series of bivariate linear regression analyses was conducted to evaluate the prediction of answer-evaluation strategies according to the duration time for creating a health answer per session. Table 5.82 shows a summary of the coefficients of the regression models. No relationships were statistically significant.

Table 5.82. Coefficients of Regression for Answer-Evaluation Strategies by Duration Time Creating a Health Answer Per Session

Measures	B	Std.Error	Sig.
EV1: Other Answers	.003	.005	.582
EV2: Questioners	.007	.006	.233
EV3: Community	.005	.006	.481

5.4.4. Strategies of Top Answerers

A series of independent samples t-tests was conducted to evaluate strategies of top answerers, comparing them to those of non-top answerers. The independent variable in each case was top answerer status. The dependent variables were the various strategies introduced in Section 5.4.2.

When selecting questions to answer, top answerers are more likely select easy questions than those who are not top answerers. There were no statistically significant differences between top answerers and non-top answerers for any of the other question-selection strategies.

Table 5.83. Question-Selection Strategies, by Top Answerer Status

	Top Answerers		Non-top Answerers				
Measures	M	SD	M	SD	t	df	Sig
SE1: Confidence/interests in topics	4.50	.61	4.29	.63	1.848	244	.066
SE2: Easy	3.68	.90	3.28	.95	2.367	240	.019*
SE3: Difficult	3.33	.96	3.21	1.09	.641	248	.522
SE4: Positive attitudes	3.32	.79	3.39	.70	-.464	202	.643
SE5: Negative attitudes	2.86	.80	2.96	.68	-.697	199	.487
SE6: No one answered	3.28	1.09	3.28	1.05	-.031	242	.975
SE7: Newly posted	3.76	.93	3.68	1.09	.420	239	.675
SE8: Purposed benefit	1.75	.65	1.88	.82	-.879	232	.380
SE9: Someone Else	2.69	1.02	2.88	1.05	-1.018	226	.310

When interpreting questions, top answerers more frequently take action to clarify the meaning of questions than those who are not top answerers. There were no statistically significant differences between top answerers and non-top answerers for any of the other question-interpretation strategies.

Table 5.84. Question-Interpretation Strategies, by Top Answerer Status

	Top Answerers		Non-top Answerers				
Measures	M	SD	M	SD	t	df	Sig.
IN1: Flow of topic	3.08	1.18	2.87	1.24	.977	243	.329
IN2: Research	3.29	.96	2.04	1.21	1.190	249	.235
IN3: Understand all	4.31	.52	4.32	.73	-.120	251	.905
IN4: Answer Anyway	1.92	.83	1.71	.99	1.191	245	.235
IN5: Clarification	2.93	1.07	2.40	1.17	2.605	247	.010*

When seeking information, top answerers use their own health expertise more frequently than those who are not top answerers. There were no statistically significant differences between top answerers and non-top answerers for any of the other information seeking strategies.

Table 5.85. Information-Seeking Strategies, by Top Answerer Status

	Top Answerers		Non-top Answerers				
Measures	M	SD	M	SD	t	df	Sig.
SO1: Information	4.62	.54	4.44	.79	1.327	250	.186
SO2: Experiences	3.45	1.35	3.85	1.09	-1.738	243	.089
SO3: Expertise	3.93	1.51	2.86	1.70	3.326	163	.002**
SO4: Information Searched	3.39	.92	3.10	1.18	1.475	244	.141
SO5: Someone Else	2.38	.94	2.55	1.09	-.893	241	.272
SO6: Yahoo! Answers	1.79	.93	1.85	1.05	-.347	246	.729

When creating answers, top answerers consider accuracy more frequently than those who are not top answerers. Also, top answerers reuse previously posted answers more frequently than those who are not top answerers. There were no statistically significant differences between top answerers and non-top answerers for any of the other answer creation strategies.

Table 5.86. Answer-Creation Strategies, by Top Answerer Status

	Top Answerers		Non-top Answerers				
Measures	M	SD	M	SD	t	df	Sig.
CR1: Accuracy	4.89	.39	4.70	.70	2.273	244	.022*
CR2: Accuracy Source	3.65	1.14	3.63	1.14	.095	240	.924
CR3: Completeness	4.65	.63	4.38	.85	1.837	243	.067
CR4: Completeness Search	3.41	.99	3.23	1.26	.944	242	.349
CR5: Neutral Attitudes	3.84	.73	3.83	1.01	.068	239	.946
CR6: Express Agree/Disagree	3.16	.57	3.10	.92	.416	225	.678
CR7: Express Supports	3.90	.77	3.75	.96	1.040	240	.303
CR8: New Answers	3.86	.79	3.69	1.26	1.136	229	.260
CR9: Reuse Answers	2.65	1.18	1.99	1.03	3.370	229	.001**

When evaluating answers, top answerers review other answers to the questions that they have answered less frequently than those who are not top answerers. Also, top answerers review responses from other community members on their answers less frequently than those who are not top answerers. There was no statistically significant difference between the top answerers and the non-top answerers in the frequency with which they review the responses from questioners.

Table 5.87. Answer-Evaluation Strategies, by Top Answerer Status

	Top Answerers		Non-top Answerers				
Measures	M	SD	M	SD	t	df	Sig.
EV1: Other Answers	3.48	.93	3.99	.96	-2.697	193	.008**
EV2: Questioners	3.72	.81	3.76	1.03	-.239	189	.812
EV3: Community	3.09	.90	3.61	1.11	-2.861	186	.006**

5.4.5. Strategies of Health Experts

A series of independent samples t-tests were conducted to evaluate the strategies used by health experts, compared to those who are not health experts.

When selecting questions, health experts consider confidence and interest in the topic of the questions more frequently than those who are not experts. Also, health experts select both easy and difficult/challenging questions more frequently than those who are not experts. There were no statistically significant differences between health experts and non-health experts in other question selection strategies.

Table 5.88. Question-Selection Strategies, by Health Expertise

	Health Experts		Non-health Experts				
Measures	M	SD	N	SD	t	df	Sig
SE1: Confidence/interests in topics	4.50	.52	4.30	.67	2.910	244	.004*
SE2: Easy	3.57	.92	3.27	.96	2.222	240	.027
SE3: Difficult	3.51	1.01	3.11	1.08	2.725	248	.007*
SE4: Positive attitudes	3.40	.70	3.37	.72	.294	202	.769
SE5: Negative attitudes	2.96	.64	3.25	1.08	.179	199	.858
SE6: No one answered	3.25	1.08	3.30	1.04	-.314	242	.754
SE7: Recently posted	3.72	1.04	3.68	1.08	.277	239	.782
SE8: Purposed benefit	2.01	.88	1.80	.76	1.842	232	.067
SE9: Someone Else	2.99	.97	2.79	1.07	1.270	226	.205

There were no statistically significant differences between health experts and non-experts in the strategies they use for interpreting questions (see Table 5.89).

Table 5.89. Question-Interpretation Strategies, by Health Expertise

	Health Experts		Non-health Experts		t	df	Sig.
Measures	M	SD	M	SD			
IN1: Flow of topic	3.03	1.30	2.84	1.20	1.064	243	.288
IN2: Research	3.18	1.15	3.04	1.19	.832	249	.406
IN3: Understand all	4.43	.60	4.28	.74	1.565	251	.119
IN4: Answer Anyway	1.68	.99	1.77	.96	-.672	245	.502
IN5: Clarification	2.45	1.18	2.49	1.17	-.203	247	.839

When seeking information for answers, health experts use their own health expertise more frequently than non-experts. On the other hand, health experts use their experiences with health problems less frequently than those who are not experts. They also use information or experiences heard from someone else and answers posted in Yahoo! Answers less frequently than those who are not experts. There were no statistically significant differences between health

experts and non-experts in their use of the information they already know (SO1) or information that they researched (SO4).

Table 5.90. Information-Seeking Strategies, by Health Expertise

	Health Experts		Non-health Experts				
Measures	M	SD	M	SD	t	df	Sig.
SO1: Information	4.55	.80	4.43	.74	1.165	250	.245
SO2: Experiences	3.36	1.39	3.96	.99	-3.324	243	.001**
SO3: Expertise	4.23	1.21	2.10	1.45	10.304	163	.000**
SO4: Information Searched	3.14	1.16	3.14	1.15	-.012	244	.990
SO5: Someone Else	2.25	.99	2.64	1.09	-2.622	241	.009**
SO6: Yahoo! Answers	1.61	.85	1.94	1.08	-2.322	246	.021*

When creating answers, health experts consider accuracy more frequently than those who are not. There were no statistically significant differences between health experts and non-health experts in their use of other strategies for creating answers.

Table 5.91. Answer-Creation Strategies, by Health Expertise

	Health Experts		Non-health Experts				
Measures	M	SD	M	SD	t	df	Sig.
CR1: Accuracy	4.86	.38	4.67	.76	2.617	244	.009*
CR2: Accuracy Source	3.65	1.20	3.63	1.11	.149	240	.882
CR3: Completeness	4.57	.74	4.36	.85	1.848	243	.066
CR4: Completeness Search	3.34	1.29	3.78	.98	.707	242	.480
CR5: Neutral Attitudes	3.96	.94	3.78	.98	1.344	239	.180
CR6: Express Agree/Disagree	3.27	.80	3.05	.90	1.777	225	.077
CR7: Express Supports	3.92	.78	3.71	.98	1.775	240	.078
CR8: New Answers	3.76	1.20	3.69	1.20	.413	229	.680
CR9: Reuse Answers	2.10	.99	2.08	1.11	.156	229	.876

When evaluating answers, health experts consider other answers less frequently than those who are not. There were no statistically significant differences between health experts and non-experts in their use of other strategies for evaluating answers.

Table 5. 92. Answer-Evaluation Strategies, by Health Expertise

	Health Experts		Non-Health Experts				
Measures	M	SD	M	SD	t	df	Sig.
EV1: Other Answers	3.61	1.03	4.04	.91	-2.875	193	.004**
EV2: Questioners	3.63	1.02	3.80	.98	-1.117	189	.266
EV3: Community	3.37	1.03	3.60	1.11	-1.329	186	.186

5.4.6. Summary of Findings on Strategies

In the current section, 32 strategies in five steps of answering behaviors – selecting questions, interpreting questions, seeking information, creating answers and evaluating answers – were analyzed. The mean values of the survey responses indicate that most of the strategies were used somehow during the process of answering questions. When selecting questions, confidence or interest in the topic were the most frequently used strategies, while the least used strategy was selecting those questions from which the questioner intends to gain personal benefit from the answer. When interpreting questions, answerers believe that they understand the question most of the time, and are reluctant to answer a question that they don't understand. When seeking information for answers, the most frequently-reported sources of answers are the answerers' own information and personal experiences. Answers posted in Yahoo! Answers were also used as sources, but relatively fewer times than other sources. When creating answers, accuracy and completeness are the most frequently used criteria for evaluating information sources in various contexts. When evaluating answers, answerers review responses to their answers from other groups of people – questioners, other answerers, and other members in Yahoo! Answers.

The distribution of strategies by the characteristics of answerers was also analyzed. The female answerers more frequently search other sources of information to confirm the accuracy of their answers than do the male answerers. Also, the female answerers more frequently express supportive comments in answers than do the male answerers. Finally, female answerers create new answers more frequently than do male answerers.

Younger answerers select questions from questioners with positive attitudes and questions that no one has answered more frequently than do older answerers. They also monitor the flow of health topics more frequently than older answerers. Even when they do not understand the meaning of questions, they provide answers more frequently than older answerers. Younger answerers less frequently use their expertise in health, information that they searched on the

Internet, information that they heard from someone else, and Yahoo! Answers as sources of answers. They more frequently search for additional sources for verifying the accuracy of their answers than do older answerers. Younger answerers more frequently evaluate their answers based on feedback from other answerers, questioners or community than do older answerers.

Answerers at lower Yahoo! Answers levels more frequently select questions from questioners who express negative attitudes and questions where the questioners intended to receive benefit from the answers than answerers at higher levels. They more frequently use their personal experiences or information obtained from someone else than answerers at higher levels. They also evaluate their answers based on feedback from other answerers, questioners or the community members of Yahoo! Answers more frequently than do answerers at higher levels. However, answerers at lower Yahoo! Answers levels less frequently ask questioners for clarification of the meaning of questions than do answerers at lower levels.

Answerers with longer duration times online per day more frequently conduct research to learn about the health topics of questions than do answerers with shorter duration times. They more frequently use information searched from the Internet, answers heard from someone else, and answers from Yahoo! Answers than answerers with shorter times. They also more frequently conduct searches for additional sources of answers in order to verify the accuracy and completeness of answers than answerers with shorter duration.

Answerers who spend a higher percent of their online time answering health questions more frequently select questions in which they are confident of the topic or interested in the topic and monitor the flow of health topics in which they are interested and ask questioners to clarify the meaning of questions than do answerers who spend a lower percent of their online time answering health questions. They more frequently use information or experiences that they heard from someone else as sources of answers. They also more frequently evaluate their answers based on the feedback from the community of Yahoo! Answers than do answerers who spend a lower percent of their online time answering health questions. Interestingly, answerers who spend a

lower percent of their time answering health questions more frequently believe that they understand the meaning of all of the questions to which they post answers, than do answerers who spend a high percent of their online time answering health questions.

Answerers who provide a higher number of health answers per week observe the flow of topics in health more frequently than do answerers who provide a smaller number of answers. When answerers who provide a higher number of answers do not understand the meaning of questions, they more frequently answer questions anyway. At the same time, they more frequently go back to questioners to clarify the meaning of questions.

Answerers who spend longer to provide an answer more frequently select difficult questions and questions where the questioner expresses positive attitudes than do answerers who spend a shorter time providing an answer. They also monitor the flow of health topics in which they are interested in Yahoo! Answers and do research about the topics more frequently than answerers who spend a shorter time answering each question.

The distribution of strategies by top answerer status and health expertise was also analyzed. When selecting questions to answer, top answerers are more likely select easy questions than those who are not top answerers. When interpreting questions, they more frequently take action to clarify the meaning of questions. When seeking information, they more frequently use their own health expertise. When creating answers, they consider accuracy more frequently than those who are not top answerers. Also, they reuse previously posted answers more frequently than those who are not top answerers. When evaluating answers, they review other answers to the questions that they have answered and responses from other community members on their answers less frequently than those who are not top answerers.

When selecting questions, health experts consider confidence and interest in the topic of the questions more frequently than those who are not experts. Also, they more frequently select both easy and difficult/challenging questions than non-experts. When seeking information for answers, they more frequently use their own health expertise than non-experts. On the other hand,

health experts use their experiences with health problems less frequently than those who are not experts. They also use information or experiences heard from someone else and answers posted in Yahoo! Answers less frequently than those who are not experts. When creating answers, health experts consider accuracy more frequently than those who are not, and they consider other answers less frequently than those who are not experts.

5.5. Relationship between Motivations and Strategies

A series of bivariate linear regression analyses was conducted to evaluate the relationships between each motivation and the set of strategies for answering questions, where motivations (independent variable, predictor) are assumed to predict the strategies of answerers (dependent variable).

5.5.1. Enjoyment and Strategies

Table 5.93 shows a summary of the coefficients of the regression models predicting question-selection strategies from Enjoyment. .

Table 5.93. Coefficients of Regression for Question-Selection Strategies by Enjoyment

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.045	.069	.514
SE2: Easy	.181	.100	.073
SE3: Difficult	.471	.108	.000**
SE4: Positive attitudes	.190	.081	.020*
SE5: Negative attitudes	.007	.082	.936
SE6: No one answered	.396	.111	.000**
SE7: Recently posted	.401	.112	.000**
SE8: Purposed benefit	.073	.092	.429
SE9: Someone Else	.223	.113	.051

The relationships with enjoyment as a motivation were statistically significant for SE3, Difficult, SE4, Positive Attitudes, SE6, No One Answered, and SE7, Recently Posted. The regression equations of each model are:

Predicted Difficulty of Questions = .471 Enjoyment + 1.284

Predicted Positive Attitudes = .190 Enjoyment + 2.591

Predicted No One Answered = .396 Enjoyment + 1.633

Predicted Recently Updated Questions = .401 Enjoyment + 2.025

Therefore, the more strongly answerers are motivated by enjoyment, the more frequently they select difficult questions, questions where the questioner has positive attitudes, questions that have no answer or questions recently posted.

Table 5.94 shows a summary of the coefficients of the regression models predicting strategies for interpreting questions from Enjoyment. .

Table 5.94. Coefficients of Regression for Question-Interpretation Strategies by Enjoyment

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.427	.132	.001**
IN2: Research	.623	.119	.000**
IN3: Understand all	-.005	.074	.950
IN4: Answer Anyway	.267	.105	.011*
IN5: Clarification	.372	.124	.003**

The relationships with the Enjoyment motivation were statistically significant for IN1, Flow of topic, IN2, Research, IN4, Answer Anyway, and IN5, Clarification. The regression equations of each model are:

Predicted Flow of Topic = .427 Enjoyment + 1.095

Predicted Research = .623 Enjoyment + .480

Predicted Answer Anyway = .267 Enjoyment + .655

Predicted Clarification = .372 Enjoyment + .937

The more strongly answerers are motivated by enjoyment, the more frequently they observe the flow of topics and the more frequently they do research about the topic of interest. In a situation in which answerers do not understand the meaning of questions, answerers who are strongly motivated by enjoyment answer questions anyway more frequently than those who are less motivated. At the same time, they ask for clarification more frequently than those who are less motivated.

Table 5.95 shows a summary of the coefficients of the regression models predicting strategies for seeking information for answering health questions from the motivation factor, enjoyment.

Table 5.95. Coefficients of Regression for Information-Seeking Strategies by Enjoyment

Measures	B	Std.Error	Sig.
SO1: Information	-.009	.081	.916
SO2: Experiences	.031	.126	.807
SO3: Expertise	.234	.226	.301
SO4: Information Searched	.518	.122	.000**
SO5: Someone Else	.250	.120	.039*
SO6: Yahoo! Answers	.197	.110	.074

The relationships with the Enjoyment motivation were statistically significant for SO4, Information Searched, and SO5, Someone Else. The regression equations of each model are:

Predicted Information Searched = .518 Enjoyment + .994

Predicted Someone Else = .250 Enjoyment + 1.486

Therefore, the more strongly answerers are motivated by enjoyment, the more frequently they use information that they searched and information or experiences that they heard from someone else.

Table 5.96 shows a summary of the coefficients of the regression models predicting answer-creation strategies from Enjoyment.

Table 5.96. Coefficients of Regression for Answer Creation Strategies by Enjoyment

Measures	B	Std.Error	Sig.
CR1: Accuracy	.080	.076	.296
CR2: Accuracy Source	.253	.122	.039*
CR3: Completeness	.192	.091	.035*
CR4: Completeness Search	.476	.126	.000**
CR5: Neutral Attitudes	-.022	.106	.832
CR6: Express Agree/Disagree	.453	.103	.000**
CR7: Express Supports	.243	.104	.020**
CR8: New Answers	-.138	.141	.327
CR9: Reuse Answers	.265	.131	.045*

The relationships with the Enjoyment motivation were statistically significant for CR2, Accuracy of Source, CR3, Completeness, CR4, Completeness of Search, CR6, Express Agreement or Disagreement, CR7, Express Social Support, and CR9, Reuse Answers. The regression equations are:

Predicted Accuracy of Sources = .253 Enjoyment + 2.590

Predicted Completeness = .192 Enjoyment + 3.604

Predicted Completeness of Search = .476 Enjoyment + 1.274

Predicted Express Agree/Disagree = .453 Enjoyment + 1.206

Predicted Express Supports = .243 Enjoyment + 2.744

Predicted Reuse Answers = .265 Enjoyment + .982

Therefore, the more strongly answerers are motivated by enjoyment, the more frequently they find sources of information to confirm the accuracy of their answers. They also more frequently consider completeness as an important criterion for evaluating answers and perform searches on their answers to confirm their completeness. Answerers who are strongly motivated by enjoyment more frequently express their agreement/disagreement with questioners, express social support, and reuse answers that they previously posted.

Table 5.97 shows a summary of the coefficients of the regression models predicting answer-evaluation strategies from Enjoyment.

Table 5. 97. Coefficients of Regression for Answer-Evaluation Strategies by Enjoyment

Measures	B	Std.Error	Sig.
EV1: Other Answers	.307	.117	.009**
EV2: Questioners	.268	.121	.028*
EV3: Community	.308	.137	.025*

The relationships with the Enjoyment motivation were statistically significant for all of the answer-evaluation strategy variables. The regression equations are:

Predicted Other Answers = .307 Enjoyment + 2.609

Predicted Questioners = .268 Enjoyment + 2.645

Predicted Community = .308 Enjoyment + 2.259

Therefore, the more strongly answerers are motivated by enjoyment, the more frequently they consider responses from other answerers, questioners and the community.

5.5.2. Efficacy and Strategies

Table 5.98 shows a summary of the coefficients of the regression models predicting question-selection strategies from the motivation factor, Efficacy.

Table 5.98. Coefficients of Regression for Question Selection Strategies by Efficacy

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.121	.057	.035*
SE2: Easy	.174	.085	.041*
SE3: Difficult	.557	.087	.000**
SE4: Positive attitudes	.300	.067	.000**
SE5: Negative attitudes	.248	.067	.000**
SE6: No one answered	.372	.089	.000**
SE7: Recently posted	.281	.094	.003**
SE8: Purposed benefit	.050	.076	.511
SE9: Someone Else	.384	.091	.000**

The relationships with Efficacy as a motivation were statistically significant for all of the question-selection strategy variables except SE8, Purposed Benefit. The regression equations are as follows.

Predicted Answerers' Confidence = .121 Efficacy + 3.836

Predicted Easy = .174 Efficacy + 2.652

Predicted Difficult = .557 Efficacy + .991

Predicted Positive Attitudes = .300 Efficacy + 2.173

Predicted Negative Attitudes = .248 Efficacy + 1.943

Predicted No One Answered = .372 Efficacy + 1.800

Predicted Recently Posted = .050 Efficacy + 2.580

Predicted Someone Else = .384 Efficacy + 1.328

Thus, answerers with higher efficacy more frequently select questions in which they are confident or interested, questions that are easy or difficult, questions with positive or negative attitudes expressed by the questioners, questions with no answers, questions recently posted and questions posted on behalf of someone else.

Table 5.99 shows a summary of the coefficients of the regression models predicting strategies for interpreting questions from the motivation factor, Efficacy.

Table 5. 99. Coefficients of Regression for Question Interpretation Strategies by Efficacy

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.226	.111	.043*
IN2: Research	.486	.099	.000**
IN3: Understand all	-.041	.063	.821
IN4: Answer Anyway	.248	.086	.004**
IN5: Clarification	.258	.101	.011*

The relationships with Efficacy as a motivation were statistically significant for all of the question-interpretation strategy variables except IN3, Understand All. The regression equations are as follows.

Predicted Flow of Topic = .226 Efficacy + 2.005

Predicted Research = .486 Efficacy + 1.124

Predicted Answer Anyway = .248 Efficacy + .778

Predicted Clarification = .258 Efficacy + 1.435

Thus, answerers with high efficacy monitor the flow of the health topics that they are interested in and research the health topics of questions more frequently than answerers with low efficacy. When they do not understand the meaning of questions, they more frequently answer questions anyway than answerers with lower efficacy. At the same time, answerers with higher efficacy ask questioners to clarify the meaning of questions more frequently than answerers with low efficacy.

Table 5.100 shows a summary of the coefficients of the regression models predicting strategies for seeking information from the motivation factor, Efficacy.

Table 5.100. Coefficients of Regression for Information-Seeking Strategies by Efficacy

Measures	B	Std.Error	Sig.
SO1: Information	.081	.067	.226
SO2: Experiences	.177	.105	.093
SO3: Expertise	.576	.178	.002**
SO4: Information Searched	.581	.095	.000**
SO5: Someone Else	.368	.093	.000**
SO6: Yahoo! Answers	.399	.089	.000**

The relationships with Efficacy as a motivation were significant for SO3, Expertise, SO4, Information Searched Online, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Expertise = .576 Efficacy + .720

Predicted Information Searched = .581 Efficacy + .776

Predicted Someone Else = .368 Efficacy + 1.049

Predicted Yahoo! Answers = .399 Efficacy +.245

Thus, answerers with high efficacy more frequently use their health expertise, information searched online, information heard from someone else and answers from Yahoo! Answers than do answerers with lower efficacy.

Table 5.101 shows a summary of the coefficients of the regression models predicting strategies for creating answers from the motivation factor, Efficacy.

Table 5. 101. Coefficients of Regression for Answer-Creation by Efficacy

Measures	B	Std.Error	Sig.
CR1: Accuracy	.138	.057	.017*
CR2: Accuracy Source	.243	.100	.016*
CR3: Completeness	.188	.070	.007**
CR4: Completeness Search	.231	.108	.034*
CR5: Neutral Attitudes	.121	.087	.167
CR6: Express Agree/Disagree	.308	.081	.000**
CR7: Express Supports	.260	.083	.002**
CR8: New Answers	-.071	.110	.521
CR9: Reuse Answers	.270	.102	.008**

The relationships with Efficacy as a motivation were significant for CR1,Accuracy, CR2, Accuracy of Source, CR3, Completeness, CR4, Completeness of Search, CR6, Express Agreement/Disagreement, CR7, Express Support, and CR9, Reuse Answers. The regression equations are as follows.

Predicted Accuracy = .138 Efficacy + 4.188

Predicted Accuracy of Source = .243 Efficacy + 2.661

Predicted Completeness = .188 Efficacy + 3.676

Predicted Completeness of Search = .231 Efficacy + 2.339

Predicted Express Agreement/Disagreement = .308 Efficacy + 1.869

Predicted Express Social Support = .260 Efficacy + 2.742

Predicted Reuse Answers = .270 Efficacy + 1.003

Thus, answerers with high efficacy consider accuracy and completeness of answers as important factors in creating answers more frequently than answerers with lower efficacy. They also conduct additional searches to verify accuracy and completeness of answers more frequently than answerers with lower efficacy. In addition, they more frequently express agreement/disagreement with and support for questioners than answers with lower efficacy. Finally, answerers with high efficacy more frequently reuse answers posted in Yahoo! Answers in creating their own answers than do answerers with lower efficacy.

Table 5.102 shows a summary of the coefficients of the regression models predicting strategies for evaluating answers from the motivation factor, Efficacy.

Table 5.102. Coefficients of Regression for Answer-Evaluation Strategies by Efficacy

Category	Measures	B	Std.Error	Sig.
Other Answers	EV1: Other Answerers	.229	.093	.014*
Questioners	EV2: Questioners	.428	.102	.000**
Community	EV3: Community	.424	.112	.000**

The relationships with Efficacy as a motivation were significant for EV1, Other Answerers, EV2, Questioners, and EV3, Community. The regression equations are as follows.

Predicted Other Answerers = .229 Efficacy + 3.024

Predicted Questioners = .428 Efficacy + 2.045

Predicted Community = .424 Efficacy + 1.850

Thus, answerers with higher efficacy more frequently evaluate answers based on feedback from other answerers, questioners or the community members in Yahoo! Answers than do answerers with lower efficacy.

5.5.3. Learning and Strategies

Table 5.103 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Learning.

Table 5.103. Coefficients of Regression for Question-Selection by Learning

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.037	.042	.381
SE2: Easy	.114	.065	.081
SE3: Difficult	.444	.065	.000**
SE4: Positive attitudes	.230	.048	.000**
SE5: Negative attitudes	.163	.047	.001**
SE6: No one answered	.299	.071	.000**
SE7: Recently posted	.188	.074	.012*
SE8: Purposed benefit	.170	.053	.002**
SE9: Someone Else	.407	.069	.000**

The relationships with Learning as a motivation were significant for SE3, Difficult Questions, SE4, Positive Attitudes, SE5, Negative Attitudes, SE6, No One Answered, SE7, Recently Posted, SE8, Purposed Benefit, and SE9, Someone Else. The regression equations are as follows.

Predicted Difficult = .444 Learning + 1.713

Predicted Positive Attitudes = .230 Learning + 2.650

Predicted Negative Attitudes = .163 Learning + 2.348

Predicted No One Answered = .299 Learning + 2.229

Predicted Recently Posted = .188 Learning + 3.041

Predicted Purposed Benefit = .170 Learning + 1.263

Predicted Someone Else = .407 Learning + 1.446

Thus, answerers who are highly motivated by learning more frequently select difficult questions, questions with positive / negative attitudes of questioners, questions no one answered, questions recently posted, questions that questioners intend to obtain benefit from answers, and questions asking for information on behalf of someone else than answerers who are less motivated by learning.

Table 5.104 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Learning.

Table 5.104. Coefficients of Regression for Question-Interpretation Strategies by Learning

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.348	.082	.000**
IN2: Research	.393	.075	.000**
IN3: Understand all	-.032	.045	.480
IN4: Answer Anyway	.107	.066	.107
IN5: Clarification	.068	.079	.389

The relationships with Learning as a motivation were significant for IN1, Flow of Topic and IN2, Research. The regression equations are as follows.

Predicted Flow of Topic = .348 Learning + 1.714

Predicted Research = .393 Learning + 1.730

Thus, answerers who are highly motivated by learning monitor the flow of topics in health and research the topics more frequently than answerers who are less motivated.

Table 5.105 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Learning.

Table 5. 105. Coefficients of Regression for Information-Seeking Strategies by Learning

Measures	B	Std.Error	Sig.
SO1: Information	-.015	.053	.781
SO2: Experiences	.207	.077	.008**
SO3: Expertise	.183	.135	.178
SO4: Information Searched	.423	.074	.000**
SO5: Someone Else	.351	.068	.000**
SO6: Yahoo! Answers	.248	.067	.000**

The relationships with Learning as a motivation were significant for SO2, Experiences, SO4, Information Searched Online, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Experiences = .207 Learning + 3.061

Predicted Information Searched = .423 Learning + 1.693

Predicted Someone Else = .351 Learning + 1.258

Predicted Yahoo! Answers = .248 Learning + .982

Thus, answerers who are highly motivated by learning use experiences, information searched online, information/experiences heard from someone else, and answers posted in Yahoo! Answers as sources of answers more frequently than answerers who are less motivated by learning.

Table 5.106 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Learning.

Table 5.106. Coefficients of Regression for Answer-Creation Strategies by Learning

Measures	B	Std.Error	Sig.
CR1: Accuracy	.018	.047	.703
CR2: Accuracy Source	.336	.074	.000**
CR3: Completeness	.074	.055	.185
CR4: Completeness Search	.346	.076	.000**
CR5: Neutral Attitudes	.072	.063	.260
CR6: Express Agree/Disagree	.154	.061	.012*
CR7: Express Supports	.209	.064	.001**
CR8: New Answers	-.049	.086	.572
CR9: Reuse Answers	.056	.075	.459

The relationships with Learning as a motivation were significant for CR2, Accuracy Source, CR4, Completeness Search, CR6, Express Agreement/Disagreement, and CR7, Express Supports. The regression equations are as follows.

Predicted Accuracy of Source = .336 Learning + 2.457

Predicted Completeness of Search = .346 Learning + 2.043

Predicted Express Agreement/Disagreement = .154 Learning + 2.558

Predicted Express Support = .209 Learning + 3.044

Thus, answers who are highly motivated by learning search additional sources in order to verify accuracy and completeness of answers more frequently than answers who are less motivated by learning. They also more frequently express agreement/disagreement with and support for questioners than answerers who are less motivated by learning.

Table 5.107 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Learning.

Table 5.107. Coefficients of Regression for Answer-Evaluation by Learning

Measures	B	Std.Error	Sig.
EV1: Other Answerers	.145	.071	.045*
EV2: Questioners	.194	.073	.009**
EV3: Community	.237	.081	.004**

The relationships with Learning as a motivation were significant for EV1, Other Answerers, EV2, Questioners and EV3, Community. The regression equations are as follows.

Predicted Other Answerers = .143 Learning + 3.406

Predicted Questioners = .194 Learning + 3.090

Predicted Community = .237 Learning + 2.710

Thus, answerers who are highly motivated by learning more frequently evaluate their answers based on feedback from other answerers, questioners and the community of Yahoo! Answers than answerers who are less motivated by learning.

5.5.4. Personal Gain and Strategies

Table 5.108 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Personal Gain.

Table 5.108. Coefficients of Regression for Question-Selection Strategies by Personal Gain

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.052	.059	.380
SE2: Easy	.091	.089	.307
SE3: Difficult	.225	.097	.022*
SE4: Positive attitudes	.126	.075	.096
SE5: Negative attitudes	.113	.077	.143
SE6: No one answered	.234	.099	.019
SE7: Recently posted	-.024	.103	.814
SE8: Purposed benefit	.265	.079	.001**
SE9: Someone Else	.103	.099	.192

The relationships with Personal Gain as a motivation were significant for SE3, Difficult Questions, SE6, No One Answered and SE8, Purposed Benefit. The regression equations are as follows:

Predicted Difficult Questions = .225 Personal Gain + 2.869

Predicted No One Answered = .234 Personal Gain + 2.889

Predicted Purposed Benefit = .265 Personal Gain + 1.498

Thus, answerers who are highly motivated to obtain personal gain by answering questions more frequently select difficult questions, questions no one answered and questions where the questioners intend to obtain benefit from the answers than do answerers who are less motivated by personal gain.

Table 5.109 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Personal Gain. No relationships were statistically significant.

Table 5.109. Coefficients of Regression for Question Interpretation Strategies by Personal Gain

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.113	.120	.349
IN2: Research	-.002	.114	.985
IN3: Understand all	-.110	.063	.082
IN4: Answer Anyway	.116	.087	.185
IN5: Clarification	.022	.109	.842

Table 5.110 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Personal Gain.

Table 5. 110. Coefficients of Regression for Information-Seeking Strategies by Personal Gain

Measures	B	Std.Error	Sig.
SO1: Information	-.023	.074	.753
SO2: Experiences	-.045	.113	.693
SO3: Expertise	.427	.175	.016*
SO4: Information Searched	-.019	.113	.866
SO5: Someone Else	-.049	.103	.633
SO6: Yahoo! Answers	.029	.094	.755

The relationships with Personal Gain as a motivation were significant for SO3, Expertise. The regression equation is as follows.

Predicted Expertise = .427 Personal Gain + 2.312

Thus, answers who are highly motivated to obtain personal gain by answering questions more frequently use their own expertise in providing answers than answerers who are less motivated by personal gain.

Table 5.111 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Personal Gain. No relationships were statistically significant.

Table 5. 111. Coefficients of Regression for Answer-Creation Strategies by Personal Gain

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.054	.059	.354
CR2: Accuracy Source	.008	.107	.943
CR3: Completeness	.016	.078	.843
CR4: Completeness Search	-.010	.112	.927
CR5: Neutral Attitudes	.012	.090	.894
CR6: Express Agree/Disagree	.091	.086	.291
CR7: Express Supports	.169	.088	.057
CR8: New Answers	-.215	.115	.063
CR9: Reuse Answers	.147	.106	.169

Table 5.112 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Personal Gain. No relationships were statistically significant.

Table 5. 112. Coefficients of Regression for Answer-Evaluation Strategies by Personal Gain

Measures	B	Std.Error	Sig.
EV1: Other Answerers	-.086	.115	.453
EV2: Questioners	.043	.120	.724
EV3: Community	.113	.132	.391

5.5.5. Altruism and Strategies

Table 5.113 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Altruism.

Table 5.113. Coefficients of Regression for Question-Selection Strategies by Altruism

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.294	.079	.000**
SE2: Easy	.142	.121	.240
SE3: Difficult	.106	.135	.434
SE4: Positive attitudes	.285	.105	.008**
SE5: Negative attitudes	.117	.106	.271
SE6: No one answered	.316	.132	.017*
SE7: Recently posted	.262	.134	.053
SE8: Purposed benefit	-.170	.111	.127
SE9: Someone Else	.275	.133	.040*

The relationships with Altruism as a motivation were significant for SE1, Confidence/Interests in Topic, SE4, Positive Attitudes, SE6, No One Answered, and SE9, Someone Else. The regression equations are as follows.

Predicted Confidence/Interests in Topics = .294 Altruism + 2.935

Predicted Positive Attitudes = .285 Altruism + 2.038

Predicted No One Answered = .316 Altruism + 1.804

Predicted Someone Else = .275 Altruism + 1.575

Thus, answerers who are highly motivated by altruism select questions when they are confident/interested in the topic, questions in which the questioners express positive attitudes, questions no one has answered, and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by altruism.

Table 5.114 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Altruism.

Table 5.114. Coefficients of Regression for Question-Interpretation Strategies by Altruism

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.425	.158	.008**
IN2: Research	.449	.149	.003**
IN3: Understand all	.146	.090	.107
IN4: Answer Anyway	.201	.122	.100
IN5: Clarification	.489	.149	.001**

The relationships with Altruism as a motivation were significant for IN1, Flow of Topic, IN2, Research, and IN5, Clarification. The regression equations are as follows.

Predicted Flow of Topic = .425 Altruism + .901

Predicted Research = .449 Altruism + .985

Predicted Clarification = .489 Altruism + .182

Thus, answers who are highly motivated by altruism monitor the flow of health topics and do research about the topics more frequently than answerers who are less motivated by altruism. When answerers highly motivated by altruism do not understand the meaning of questions, they ask for information from questioners to clarify the meaning of questions more frequently than answerers who are less motivated by altruism.

Table 5.115 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Altruism.

Table 5.115. Coefficients of Regression for Information-Seeking Strategies by Altruism

Measures	B	Std.Error	Sig.
SO1: Information	.231	.095	.016*
SO2: Experiences	.217	.148	.144
SO3: Expertise	.411	.253	.106
SO4: Information Searched	.319	.148	.032*
SO5: Someone Else	.035	.139	.802
SO6: Yahoo! Answers	.220	.133	.099

The relationships with Altruism as a motivation were significant for SO1, Information, and SO4, Information Searched. The regression equations are as follows.

Predicted Information = .231 Altruism + 3.379

Predicted Information Searched = .319 Altruism + 1.641

Answerers who are highly motivated by altruism use their own information and information heard from someone else as sources of answers more frequently than answerers who are less motivated by altruism.

Table 5.116 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Altruism.

Table 5.116. Coefficients of Regression for Answer-Creating Strategies by Altruism

Measures	B	Std.Error	Sig.
CR1: Accuracy	.313	.086	.000**
CR2: Accuracy Source	.418	.145	.004**
CR3: Completeness	.442	.100	.000**
CR4: Completeness Search	.388	.155	.013*
CR5: Neutral Attitudes	-.057	.128	.660
CR6: Express Agree/Disagree	.245	.125	.051
CR7: Express Supports	.288	.121	.018
CR8: New Answers	.028	.160	.860
CR9: Reuse Answers	.161	.155	.298

The relationships with Altruism as a motivation were significant for CR1, Accuracy, CR2, Accuracy Source, CR3, Completeness, CR4, Completeness Search, and CR7, Express Supports. The regression equations are as follows.

Predicted Accuracy = .313 Altruism + 3.259

Predicted Accuracy of Source = .418 Altruism + 1.668

Predicted Completeness = .442 Altruism + 2.354

Predicted Completeness of Search = .399 Altruism + 1.447

Predicted Express Support = .288 Altruism + 2.409

Thus, answerers who are highly motivated by altruism consider accuracy and completeness as important factors in creating answers more frequently than answerers who are less motivated by altruism. They more frequently search additional sources to verify the accuracy and completeness of their answers than do answerers who are less motivated. Also they express supportive comments more frequently than answerers who are less motivated by altruism.

Table 5.117 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Altruism.

Table 5.117. Coefficients of Regression for Answer-Evaluation Strategies by Altruism

Measures	B	Std.Error	Sig.
EV1: Other Answerers	.297	.134	.027*
EV2: Questioners	.315	.154	.042*
EV3: Community	.235	.172	.175

The relationships with Altruism as a motivation were significant for EV1, Other Answers, and EV2, Questioners. The regression equations are as follows.

Predicted Other Answerers = .297 Altruism + 2.516

Predicted Questioners = .315 Altruism + 2.263

Thus, answerers who are highly motivated by altruism evaluate answers based on feedback from other answerers and from questioners more frequently than answerers who are less motivated by altruism.

5.5.6. Community Interest and Strategies

Table 5.118 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Community Interest.

Table 5.118. Coefficients of Regression for Question Selection by Community Interest

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.020	.044	.647
SE2: Easy	.128	.068	.062
SE3: Difficult	.429	.071	.000**
SE4: Positive attitudes	.266	.054	.000**
SE5: Negative attitudes	.159	.054	.004**
SE6: No one answered	.282	.074	.000**
SE7: Recently posted	.162	.077	.038*
SE8: Purposed benefit	.261	.057	.000**
SE9: Someone Else	.448	.071	.000**

The relationships with Community Interest as a motivation were significant for SE3, Difficult Questions, SE4, Positive Attitudes, SE5, Negative Attitudes SE6, No One Answered, SE7, Recently Posted, SE8, Purposed Benefit and SE9, Someone Else. The regression equations are as follows.

Predicted Difficult Questions = .429 Community Interest + 1.817

Predicted Positive Attitudes = .266 Community Interest + 2.476

Predicted Negative Attitudes = .159 Community Interest + 2.399

Predicted No One Answered = .282 Community Interest + 2.333

Predicted Recently Posted = .162 Community Interest + 3.162

Predicted Purposed Benefit = .261 Community Interest + 1.002

Predicted Someone Else = .448 Community Interest + 1.361

Thus, answerers who are highly motivated by community interest select difficult questions, questions with positive/negative attitudes expressed by the questioners, questions that no one answered, questions posted recently, questions where the questioners intend to obtain benefit from the answers, and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by community interest.

Table 5.119 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Community Interest.

Table 5.119. Coefficients of Regression for Question-Interpretation Strategies by Community Interest

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.534	.080	.000**
IN2: Research	.372	.078	.000**
IN3: Understand all	-.004	.047	.929
IN4: Answer Anyway	.102	.069	.139
IN5: Clarification	.150	.080	.064

The relationships with Community Interest as a motivation were significant for IN1, Flow of Topic, and IN2, Research. The regression equations are as follows.

Predicted Flow of Topic = .534 Community Interest + 1.158

Predicted Research = .372 Community Interest + 1.899

Thus, answerers who are highly motivated by community interest monitor the flow of health topics and research the topics more frequently than answerers who are less motivated by community interest.

Table 5.120 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Community Interest.

Table 5.120. Coefficients of Regression for Information-Seeking Strategies by Community Interest

Measures	B	Std.Error	Sig.
SO1: Information	.016	.056	.781
SO2: Experiences	.296	.079	.000**
SO3: Expertise	.213	.143	.139
SO4: Information Searched	.272	.082	.001**
SO5: Someone Else	.326	.074	.000**
SO6: Yahoo! Answers	.345	.069	.000**

The relationships with Community Interest as a motivation were significant for SO2, Experiences, SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Experiences = .296 Community Interest + 2.827

Predicted Information Searched = .272 Community Interest + 2.228

Predicted Someone Else = .326 Community Interest + 1.405

Predicted Yahoo! Answers = .345 Community Interest + .698

Thus, answerers who are highly motivated by community interest use their expertise in health, information that they search online, information heard from someone else and answers from Yahoo! Answers as sources of answers more frequently than answerers who are less motivated by community interest.

Table 5.121 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Community Interest.

Table 5.121. Coefficients of Regression for Answer-Creation Strategies by Community Interest

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.007	.049	.891
CR2: Accuracy Source	.157	.080	.051
CR3: Completeness	.092	.056	.100
CR4: Completeness Search	.253	.082	.002**
CR5: Neutral Attitudes	.123	.068	.071
CR6: Express Agree/Disagree	.234	.065	.000**
CR7: Express Support	.202	.068	.003**
CR8: New Answers	-.229	.087	.010*
CR9: Reuse Answers	.171	.084	.042*

The relationships with Community Interest as a motivation were significant for CR4, Completeness Search, CR6, Express Agreement/Disagreement, CR7, Express Supports, CR8, New Answers, and CR9, Reuse Answers. The regression equations are as follows.

Predicted Completeness of Search = .253 Community Interest + 2.414

Predicted Express Agreement/Disagreement = .234 Community Interest + 2.329

Predicted Express Support = .202 Community Interest + 3.111

Predicted New Answers = -.229 Community Interest +4.447

Predicted Reuse Answers = .171 Community Interest + 1.559

Thus, answerers who are highly motivated by community interest search for additional sources in order to verify the completeness of their answers more frequently than answerers who are less motivated by community interest. They also more frequently express agreement/disagreement with or support for questioners than answerers who are less motivated by community interest. Answerers who are highly motivated by community interest use answers that they posted in Yahoo! Answers more frequently than answerers who are less motivated by community interest. However, they less frequently use new answers than answers who are less motivated by community interest.

Table 5.122 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Community Interest.

Table 5.122. Coefficients of Regression for Answer-Evaluation Strategies by Community Interest

Measures	B	Std.Error	Sig.
EV1: Other Answers	.235	.079	.003**
EV2: Questioners	.152	.082	.065
EV3: Community	.268	.090	.004**

The relationships with Community Interest as a motivation were significant for EV1, Other Answers, and EV3, Community. The regression equations are as follows.

Predicted Other Answerers = .235 Community Interest + 3.094

Predicted Community = .268 Community Interest + 2.665

Thus, answerers who are highly motivated by community interest evaluate their answers based on feedback from other answerers and the community of Yahoo! Answers more frequently than answers who are less motivated by community interest.

5.5.7. Social Engagement and Strategies

Table 5.123 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Social Engagement.

Table 5.123. Coefficients of Regression for Question-Selection Strategies by Social Engagement

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	-.003	.045	.950
SE2: Easy	.092	.067	.174
SE3: Difficult	.514	.069	.000**
SE4: Positive attitudes	.231	.052	.000**
SE5: Negative attitudes	.117	.052	.026*
SE6: No one answered	.280	.073	.000**
SE7: Recently posted	.173	.076	.023*
SE8: Purposed benefit	.156	.056	.006**
SE9: Someone Else	.335	.072	.000**

The relationships with Social Engagement as a motivation were significant for SE3, Difficult Questions, SE4, Positive Attitudes, SE5, Negative Questions, SE6, No One Answered, SE7, Recently Posted, SE8, Purposed Benefit and SE9, Someone Else. The regression equations are as follows.

Predicted Difficult Questions = .514 Social Engagement + 1.468

Predicted Positive Attitudes = .231 Social Engagement + 2.553

Predicted Negative Attitudes = .117 Social Engagement +2.537

Predicted No One Answered = .280 Social Engagement + 2.290

Predicted Recently Posted = .173 Social Engagement + 3.079

Predicted Purposed Benefit = .156 Social Engagement + 1.288

Predicted Someone Else = .335 Social Engagement + 1.689

Thus, answerers who are highly motivated by social engagement select difficult questions, questions where positive/negative attitudes are expressed by the questioners, questions that no one else answers, questions recently posted, questions where the questioners intend to obtain benefit from the answers and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by social engagement.

Table 5.124 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Social Engagement.

Table 5.124. Coefficients of Regression for Question Interpretation Strategies by Social Engagement

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.452	.084	.000**
IN2: Research	.457	.079	.000**
IN3: Understand all	-.034	.049	.490
IN4: Answer Anyway	.240	.067	.000**
IN5: Clarification	.227	.081	.005**

The relationships with Social Engagement as a motivation were significant for IN1, Flow of Topic, IN2, Research, IN4, Answer Anyway and IN5, Clarification. The regression equations are as follows.

Predicted Flow of Topic = .452 Social Engagement + 1.340

Predicted Research = .457 Social Engagement + 1.514

Predicted Answer Anyway = .240 Social Engagement + .941

Predicted Clarification = .227 Social Engagement + 1.696

Thus, answerers who are highly motivated by social engagement monitor the flow of the topics in health and do research about the topics more frequently than answerers who are less motivated by social engagement. When answerers highly motivated by social engagement do not understand the meaning of questions, they more frequently provide answers anyway and ask questioners for clarifying questions than answerers who are less motivated by social engagement.

Table 5.125 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Social Engagement.

Table 5.125. Coefficients of Regression for Information-Seeking Strategies by Social Engagement

Measures	B	Std.Error	Sig.
SO1: Information	-.040	.051	.434
SO2: Experiences	.136	.080	.091
SO3: Expertise	.101	.150	.500
SO4: Information Searched	.295	.081	.000**
SO5: Someone Else	.298	.073	.000**
SO6: Yahoo! Answers	.271	.069	.000**

The relationships with Social Engagement as a motivation were significant for SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Information Searched = .295 Social Engagement + 2.120

Predicted Someone Else = .298 Social Engagement + 1.482

Predicted Yahoo! Answers = .271 Social Engagement + .900

Thus, answerers who are highly motivated by social engagement use information that they searched for on the Internet, information that they heard from someone else, and information from Yahoo! Answers as sources of answers more frequently than answerers who are less motivated by social engagement.

Table 5.126 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Social Engagement.

Table 5.126. Coefficients of Regression for Answer-Creation Strategies by Social Engagement

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.008	.045	.861
CR2: Accuracy Source	.139	.081	.089
CR3: Completeness	.118	.056	.037*
CR4: Completeness Search	.168	.084	.048*
CR5: Neutral Attitudes	.106	.068	.121
CR6: Express Agree/Disagree	.193	.064	.003**
CR7: Express Supports	.180	.066	.007**
CR8: New Answers	-.043	.087	.621
CR9: Reuse Answers	.103	.082	.211

The relationships with Social Engagement as a motivation were significant for CR3, Completeness, CR4, Completeness Search, CR6, Express Agreement/Disagreement, and CR7, Express Supports. The regression equations are as follows.

Predicted Completeness = .118 Social Engagement + 4.047

Predicted Completeness Search = .168 Social Engagement + 2.686

Predicted Express Agreement/Disagreement = .193 Social Engagement + 2.440

Predicted Express Supports = .180 Social Engagement + 3.168

Thus, answerers who are highly motivated by social engagement consider completeness as an important factor in creating answers more frequently than answers who are less motivated by social engagement. They also search additional sources of information to verify completeness of answers more frequently than answerers who are less motivated by social engagement. Answerers who are highly motivated by social engagement also more frequently express agreement/disagreement with or support for questioners than answerers who are less motivated by social engagement.

Table 5.127 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Social Engagement.

Table 5.127. Coefficients of Regression for Answer-Evaluation Strategies by Social Engagement

Measures	B	Std.Error	Sig.
EV1: Other Answers	.331	.073	.000**
EV2: Questioners	.281	.081	.001**
EV3: Community	.428	.083	.000**

The relationships with Social Engagement as a motivation were significant for EV1, Other Answers, EV2, Questioners, and EV3, Community. The regression equations are as follows.

Predicted Other Answers = .331 Social Engagement + 2.796

Predicted Questioners = .281 Social Engagement + 2.768

Predicted Community = .428 Social Engagement + 2.058

Thus, answerers who are highly motivated by social engagement evaluate answers based on feedback from other answers, questioners and the community of Yahoo! Answers more frequently than answerers who are less motivated by social engagement.

5.5.8. Empathy and Strategies

Table 5.128 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Empathy.

Table 5.128. Coefficients of Regression for Question-Selection Strategies by Empathy

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	.040	.049	.421
SE2: Easy	.107	.078	.171
SE3: Difficult	.302	.086	.001**
SE4: Positive attitudes	.239	.058	.000**
SE5: Negative attitudes	.296	.057	.000**
SE6: No one answered	.219	.087	.013*
SE7: Recently posted	.164	.088	.062
SE8: Purposed benefit	.107	.066	.104
SE9: Someone Else	.371	.084	.000**

The relationships with Empathy as a motivation were significant for SE3, Difficult Questions, SE4, Positive Attitudes, SE5, Negative Attitudes, SE6, No One Answered, and SE9, Someone Else. The regression equations are as follows.

Predicted Difficult Questions = .302 Empathy + 2.081

Predicted Positive Attitudes = .239 Empathy + 2.445

Predicted Negative Attitudes = .296 Empathy + 1.769

Predicted No One Answered = .219 Empathy + 2.421

Predicted Someone Else = .371 Empathy + 1.404

Thus, answerers who are highly motivated by empathy select difficult questions, questions where the questioners express positive or negative attitudes, questions that no one answers, and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by empathy.

Table 5.129 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Empathy.

Table 5.129. Coefficients of Regression for Question-Interpretation Strategies by Empathy

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.341	.100	.001**
IN2: Research	.379	.094	.000**
IN3: Understand all	.024	.056	.668
IN4: Answer Anyway	.139	.079	.082
IN5: Clarification	.192	.094	.042

The relationships with Empathy as a motivation were significant for IN1, Flow of Topic, IN2, Research, and IN5, Clarification. The regression equations are as follows.

Predicted Flow of Topic = .341 Empathy + 1.593

Predicted Research = .379 Empathy + 1.619

Predicted Clarification = .192 Empathy + 1.718

Thus, answerers who are highly motivated by empathy monitor the flow of topics in health and do research about the topics more frequently than answers who are less motivated by empathy. Also, when answerers highly motivated by empathy do not understand the meaning of questions, they ask questioners to clarify the meaning of questions more frequently than those who are less motivated by empathy.

Table 5.130 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Empathy.

Table 5.130. Coefficients of Regression for Information-Seeking Strategies by Empathy

Measures	B	Std.Error	Sig.
SO1: Information	.068	.063	.281
SO2: Experiences	.552	.085	.000**
SO3: Expertise	-.094	.187	.615
SO4: Information Searched	.291	.093	.002**
SO5: Someone Else	.298	.085	.001**
SO6: Yahoo! Answers	.282	.081	.001**

The relationships with Empathy as a motivation were significant for SO2, Experiences, SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Experiences = .552 Empathy + 1.695

Predicted Information Searched = .291 Empathy + 1.964

Predicted Someone Else = .298 Empathy + 1.346

Predicted Yahoo! Answers = .282 Empathy + .749

Thus, answerers who are highly motivated by empathy use their experiences, information that they searched from the Internet, information heard from someone else and information from Yahoo! Answers more frequently than answerers who are less motivated by empathy.

Table 5.131 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Empathy.

Table 5.131. Coefficients of Regression for Answer-Creation Strategies by Empathy

Measures	B	Std.Error	Sig.
CR1: Accuracy	.015	.049	.763
CR2: Accuracy Source	.263	.091	.004**
CR3: Completeness	.130	.063	.040*
CR4: Completeness Search	.239	.097	.015*
CR5: Neutral Attitudes	.065	.079	.416
CR6: Express Agree/Disagree	.330	.072	.000**
CR7: Express Support	.285	.075	.000**
CR8: New Answers	-.077	.101	.447
CR9: Reuse Answers	.271	.092	.004**

The relationships with Empathy as a motivation were significant for CR2, Accuracy Source, CR3, Completeness, CR4, Completeness Search, CR6, Express Agreement/Disagreement, CR7, Express Support, and CR9, Reuse Answers. The regression equations are as follows.

Predicted Accuracy Source = .263 Empathy + 2.632

Predicted Completeness = .130 Empathy + 3.953

Predicted Completeness Search = .239 Empathy + 2.314

Predicted Express Agreement/Disagreement = .330 Empathy + 1.841

Predicted Express Support = .285 Empathy + 2.676

Predicted Reuse Answers = .271 Empathy + 1.037

Thus, answerers who are highly motivated by empathy consider completeness as an important factor in creating answers more frequently than answerers who are less motivated by empathy. They also search additional sources of information to verify the accuracy and completeness of answers more frequently than answerers who are less motivated by empathy. Answerers who are highly motivated by empathy express agreement/disagreement with or support for questioners more frequently than answerers who are less motivated by empathy. In addition, they more frequently reuse answers that they posted in Yahoo! Answers.

Table 5.132 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Empathy. No relationships were statistically significant.

Table 5.132. Coefficients of Regression for Answer-Evaluation Strategies by Empathy

Measures	B	Std.Error	Sig.
EV1: Other Answers	.174	.088	.051
EV2: Questioners	.096	.093	.303
EV3: Community	.163	.105	.122

5.5.9. Reputation and Strategies

Table 5.133 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Reputation.

Table 5.133. Coefficients of Regression for Question-Selection Strategies by Reputation

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	-.001	.034	.976
SE2: Easy	.129	.051	.011*
SE3: Difficult	.215	.056	.000**
SE4: Positive attitudes	.177	.041	.000**
SE5: Negative attitudes	.119	.041	.004**
SE6: No one answered	.185	.056	.001**
SE7: Recently posted	.106	.059	.074
SE8: Purposed benefit	.251	.041	.000**
SE9: Someone Else	.198	.056	.001**

The relationships with Reputation as a motivation were significant for SE2, Easy Questions, SE3, Difficulty Questions, SE4, Positive Attitudes, SE5, Negative Attitudes, SE6, No One Answered, SE8, Purposed Benefit, and SE9, Someone Else. The regression equations are as follows.

Predicted Easy Questions = .129 Reputation + 2.956

Predicted Difficult Questions = .215 Reputation + 2.559

Predicted Positive Attitudes = .177 Reputation + 2.815

Predicted Negative Attitudes = .119 Reputation + 2.558

Predicted No One Answered = .185 Reputation + 2.718

Predicted Purposed Benefit = .251 Reputation + 1.111

Predicted Someone Else = .198 Reputation + 2.246

Thus, answerers who are highly motivated by reputation select easy and difficult questions, questions where questioners express negative/positive attitudes, questions that no one answers, questions where questioners intend to obtain benefit from the answers and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by reputation.

Table 5.134 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Reputation.

Table 5.134. Coefficients of Regression for Question-Interpretation Strategies by Reputation

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.261	.064	.000**
IN2: Research	.277	.061	.000**
IN3: Understand all	-.069	.037	.060
IN4: Answer Anyway	.154	.051	.003**
IN5: Clarification	.103	.061	.093

The relationships with Reputation as a motivation were significant for IN1, Flow of Topic, IN2, Research, and IN4, Answer Anyway. The regression equations are as follows.

Predicted Flow of Topic = .261 Reputation + 2.103

Predicted Research = .277 Reputation + 2.377

Predicted Answer Anyway = .154 Reputation + 1.286

Thus, answerers who are highly motivated by reputation monitor the flow of topics in health and do research about the topics more frequently than answerers who are less motivated by reputation. When they do not understand the meaning of questions, they ask for clarification from questioners more frequently than answerers who are less motivated by reputation.

Table 5.135 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Reputation.

Table 5.135. Coefficients of Regression for Information-Seeking Strategies by Reputation

Measures	B	Std.Error	Sig.
SO1: Information	-.047	.041	.249
SO2: Experiences	.062	.062	.319
SO3: Expertise	.205	.108	.060
SO4: Information Searched	.242	.060	.000**
SO5: Someone Else	.273	.056	.000**
SO6: Yahoo! Answers	.242	.053	.000**

The relationships with Reputation as a motivation were significant for SO4, Information Searched, SO5, Someone Else, and SO6, Yahoo! Answers. The regression equations are as follows.

Predicted Information Searched = .242 Reputation + 2.418

Predicted Someone Else = .273 Reputation + 1.721

Predicted Yahoo! Answers = .242 Reputation + 1.130

Thus, answerers who are highly motivated by reputation more frequently use information that they searched from the Internet, information heard from someone else and information from Yahoo! Answers than answerers who are less motivated by reputation.

Table 5.136 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Reputation.

Table 5.136. Coefficients of Regression for Answer-Creation Strategies by Reputation

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.041	.036	.257
CR2: Accuracy Source	-.068	.061	.266
CR3: Completeness	-.047	.045	.294
CR4: Completeness Search	.028	.065	.669
CR5: Neutral Attitudes	-.072	.053	.181
CR6: Express Agree/Disagree	.130	.047	.006**
CR7: Express Support	.004	.051	.943
CR8: New Answers	-.031	.066	.635
CR9: Reuse Answers	.153	.058	.009**

The relationships with Reputation as a motivation were significant for CR6, Express Agreement/Disagreement and CR9, Reuse Answers. The regression equations are as follows.

Predicted Express Agreement/Disagreement = .130 Reputation + 2.728

Predicted Reuse Answers = .153 Reputation + 1.635

Thus, answerers who are highly motivated by reputation more frequently express agreement and disagreement with questioners and reuse answers that they posted in Yahoo! Answers than answerers who are less motivated by reputation.

Table 5.137 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Reputation.

Table 5.137. Coefficients of Regression for Answer-Evaluation Strategies by Reputation

Measures	B	Std.Error	Sig.
EV1: Other Answers	.051	.060	.391
EV2: Questioners	.244	.060	.000**
EV3: Community	.283	.065	.000**

The relationships with Reputation as a motivation were significant for EV2, Questioners and EV3, Community. The regression equations are as follows.

Predicted Questioners = .244 Reputation + 2.998

Predicted Community = .283 Reputation + 2.666

Thus, answerers who are highly motivated by reputation evaluate answers based on feedback from questioners and the community of Yahoo! Answers more frequently than answerers who are less motivated by reputation.

5.5.10. Reciprocity and Strategies

Table 5.138 shows a summary of the coefficients of the regression model predicting strategies for selecting questions from the motivation factor, Reciprocity.

Table 5. 138. Coefficients of Regression for Question-Selection Strategies by Reciprocity

Measures	B	Std.Error	Sig.
SE1: Confidence/interests in topics	-.032	.037	.388
SE2: Easy	.031	.056	.585
SE3: Difficult	.278	.059	.000**
SE4: Positive attitudes	.177	.045	.000**
SE5: Negative attitudes	.108	.044	.015*
SE6: No one answered	.121	.062	.054
SE7: Recently posted	.098	.064	.129
SE8: Purposed benefit	.243	.044	.000**
SE9: Someone Else	.358	.057	.000**

The relationships with Reciprocity as a motivation were significant for SE3, Difficult Questions, SE4, Positive Attitudes, SE5, Negative Attitudes, SE8, Purposed Benefit and SE9, Someone Else. The regression equations are as follows.

Predicted Difficult = .278 Reciprocity + 2.446

Predicted Positive Attitudes = .177 Reciprocity + 2.850

Predicted Negative Attitudes = .108 Reciprocity + 2.616

Predicted Purposed Benefit = .243 Reciprocity + 1.173

Predicted Someone Else = .358 Reciprocity + 1.806

Thus, answerers who are highly motivated by reciprocity select difficult questions, questions where questioners expressed positive and negative attitudes, questions where questioners intend to obtain benefit from the answers and questions asking for information on behalf of someone else more frequently than answerers who are less motivated by reciprocity.

Table 5.139 shows a summary of the coefficients of the regression model predicting strategies for interpreting questions from the motivation factor, Reciprocity.

Table 5.139. Coefficients of Regression for Question-Interpretation Strategies by Reciprocity

Measures	B	Std.Error	Sig.
IN1: Flow of topic	.330	.067	.000**
IN2: Research	.263	.065	.000**
IN3: Understand all	-.060	.039	.126
IN4: Answer Anyway	.149	.056	.009**
IN5: Clarification	.072	.067	.282

The relationships with Reciprocity as a motivation were significant for IN1: Flow of Topic, IN2: Research, and IN4: Answer Anyway. The regression equations are as follows.

Predicted Flow of Topic = .330 Reciprocity + 1.964

Predicted Research = .263 Reciprocity + 2.300

Predicted Answer Anyway = .149 Reciprocity + 1.340

Thus, answerers who are highly motivated by reciprocity monitor the flow of topics in health and do research about the topics more frequently than answerers who are less motivated by reciprocity. When they do not understand the meaning of questions, answerers who are highly motivated by reciprocity answer questions anyway more frequently than answerers who are less motivated by reciprocity.

Table 5.140 shows a summary of the coefficients of the regression model predicting strategies for seeking information from the motivation factor, Reciprocity.

Table 5.140. Coefficients of Regression for Information-Seeking Strategies by Reciprocity

Measures	B	Std.Error	Sig.
SO1: Information	-.021	.044	.641
SO2: Experiences	.215	.066	.011*
SO3: Expertise	-.148	.118	.211
SO4: Information Searched	.204	.067	.003**
SO5: Someone Else	.353	.058	.000**
SO6: Yahoo! Answers	.330	.053	.000**

The relationships with Reciprocity as a motivation were significant for SO2: Experiences, SO4: Information Searched, SO5: Someone Else, and SO6: Yahoo! Answers. The regression equations are as follows.

Predicted Experiences = .215 Reciprocity + 3.172

Predicted Information Searched = .204 Reciprocity + 2.526

Predicted Someone Else = .353 Reciprocity + 1.528

Predicted Yahoo! Answers = .330 Reciprocity + .890

Answerers who are highly motivated by reciprocity use their experiences, information that they searched on the Internet, information heard from someone else and information from Yahoo! Answers more frequently than answerers who are less motivated by reciprocity.

Table 5.141 shows a summary of the coefficients of the regression model predicting strategies for creating answers from the motivation factor, Reciprocity.

Table 5.141, Coefficients of Regression for Answer-Creation Strategies by Reciprocity

Measures	B	Std.Error	Sig.
CR1: Accuracy	-.056	.038	.142
CR2: Accuracy Source	.165	.066	.013*
CR3: Completeness	-.001	.049	.980
CR4: Completeness Search	.247	.068	.000**
CR5: Neutral Attitudes	.124	.058	.034*
CR6: Express Agree/Disagree	.138	.054	.011*
CR7: Express Support	.140	.054	.011*
CR8: New Answers	-.054	.073	.461
CR9: Reuse Answers	.117	.065	.074

The relationships with Reciprocity as a motivation were significant for significant in CR4: Completeness Search, CR6: Express Agreement/Disagreement, and CR7: Express Supports. The regression equations are as follows.

Predicted Accuracy of Source = .165 Reciprocity + 3.154

Predicted Completeness of Search = .247 Reciprocity + 2.523

Predicted Neutral Attitudes = .124 Reciprocity + 3.471

Predicted Express Agreement/Disagreement = .138 Reciprocity + 2.724

Predicted Express Support = .140 Reciprocity + 3.342

Thus, answerers who are highly motivated by reciprocity search additional sources of information in order to verify the accuracy and completeness of answers more frequently than do those who are less motivated by reciprocity. They also more frequently maintain neutral attitudes in answers

than answerers who are less motivated by reciprocity. They express agreement/disagreement with and support for questioners more frequently than answerers who are less motivated by reciprocity.

Table 5.142 shows a summary of the coefficients of the regression model predicting strategies for evaluating answers from the motivation factor, Reciprocity.

Table 5.142. Coefficients of Regression for Answer-Evaluation Strategies by Reciprocity

Measures	B	Std.Error	Sig.
EV1: Other Answers	.242	.061	.000**
EV2: Questioners	.153	.064	.017*
EV3: Community	.279	.069	.000**

The relationships with Reciprocity as a motivation were significant for EV1, Other Answers, EV2, Questioners, and EV3, Community. The regression equations are as follows.

Predicted Other Answers = .242 Reciprocity + 3.233

Predicted Questioners = .153 Reciprocity + 3.319

Predicted Community = .279 Reciprocity + 2.711

Thus, answers who are highly motivated by reciprocity evaluate answers based on feedback from other answerers, questioners, and the community of Yahoo! Answers more frequently than answerers who are less motivated by reciprocity.

5.5.11. Summary

Table 5.143 shows a summary of the results of the regression analyses in evaluating relationships between motivations and strategies. It examines the strategies used by answerers who are influenced by different kinds of motivations. The average number of strategies used by answerers was 17.5. Answerers who are highly motivated by efficacy used the most different strategies (26), while answerers who are highly motivated by personal gain used the least strategies (4). The frequency with which a strategy was used was positively related to almost all the motivations in a number of cases, including five of the strategies for selecting questions, two of the strategies for interpreting questions, two of the strategies for seeking information, three of the strategies for

creating answers, and all three of the strategies for evaluating answers. By contrast, the frequency with which a strategy was used was positively related to very few motivations in some cases: two of the strategies for selecting questions, one of the strategies for interpreting questions, two of the strategies for researching answers, and three of the strategies for creating answers (none of the strategies for evaluating answers).

Table 5.143. A Summary of the Relationships between Motivations and Strategies

Category	Strategies	Enjoy	Efficacy	Leaning	Gain	Altruism	Comm	Social	Empathy	Reput	Recip
Selecting questions	SE1: Confidence/Interests	.045	.121*	.037	.052	.294**	.020	-.003	.040	-.001	-.032
	SE2: Easy questions	.181	.174*	.114	.091	.142	.128	.092	.107	.129*	.031
	SE3: Difficult questions	.471**	.557**	.444**	.225*	.106	.429**	.514**	.302**	.215**	.278**
	SE4: Positive attitudes	.190*	.300**	.230**	.126	.285**	.266**	.231**	.239**	.177**	.177**
	SE5: Negative attitudes	.007	.248**	.163**	.113	.117	.159**	.117*	.296**	.119 **	.108*
	SE6: No one answered	.396**	.372**	.299**	.234	.316*	.282**	.280**	.219 *	.185**	.121
	SE7: Recently posted	.401**	.281**	.188*	-.024	.262	.162*	.173*	.164	.106	.098
	SE8: Purposed benefit	.073	.050	.170**	.265**	-.170	.261**	.156**	.107	.251**	.243**
	SE9: Someone else	.223	.384**	.407**	.103	.275*	.448**	.335**	.371**	.198**	.358**
Interpreting Questions	IN1: Flow of topic	.427**	.226*	.348**	.113	.425**	.534**	.452**	.341**	.261**	.330**
	IN2: Research	.623**	.486**	.393**	-.002	.449**	.372**	.457**	.379**	.277**	.263**
	IN3: Understand all	-.005	-.041	-.032	-.110	.146	-.004	-.034	.024	-.069	-.060
	IN4: Answer anyway	.267*	.248**	.107	.116	.201	.102	.240**	.139	.154**	.149**
	IN5: Clarification	.372**	.258*	.068	.022	.489**	.150	.227**	.192	.103	.072
Seeking Information	SO1: Information	-.009	.081	-.015	-.023	.231*	.016	-.040	.068	-.047	-.021
	SO2: Experiences	.031	.177	.207**	-.045	.217	.296**	.136	.552**	.062	.215*
	SO3: Expertise	.234	.576**	.183	.427*	.411	.213	.101	-.094	.205	-.148
	SO4: Information Searched	.518**	.581**	.423**	-.019	.319*	.272**	.295**	.291**	.242**	.204**
	SO5: Info form Someone	.250*	.368**	.351**	-.049	.035	.326**	.298**	.298**	.273**	.353**
	SO6: Yahoo! Answers	.197	.399**	.248**	.029	.220	.345**	.271**	.282**	.242**	.330**
Creating Answers	CR1: Accuracy	.080	.138*	.018	-.054	.313**	-.007	-.008	.015	-.041	-.056
	CR2: Accuracy Source	.253*	.243*	.336**	.008	.418**	.157	.139	.263**	-.068	.165*
	CR3: Completeness	.192*	.188**	.074	.016	.442**	.092	.118*	.130*	-.047	-.001
	CR4: Completeness Search	.476**	.231*	.346**	-.010	.388*	.253**	.168*	.239*	.028	.247**
	CR5: Neutral attitudes	-.022	.121	.072	.012	-.057	.123	.106	.065	-.072	.124*
	CR6: Express agree/disagree	.453**	.308**	.154*	.091	.245	.234**	.193**	.330**	.130**	.138*
	CR7: Express supports	.243**	.260**	.209**	.169	.288	.202**	.180**	.285**	.004	.140*
	CR8: New answers	-.138	-.071	-.049	-.215	.028	-.229*	-.043	-.077	-.031	-.054
	CR9: Reuse answers	.265*	.270**	.056	.147	.161	.171*	.103	.271**	.153**	.117
Evaluating Answers	EV1: Other Answers	.307**	.229*	.145*	-.086	.297*	.235**	.331**	.174	.051	.242**
	EV2: Questioners	.268*	.428**	.194**	.043	.315*	.152	.281**	.096	.244**	.153*
	EV3: Others	.308*	.424**	.237**	.113	.235	.268**	.428 **	.163	.283**	.279**

- Key for motivations (row headings): Enjoy = Enjoyment; Efficacy= Efficacy, Learning = Learning, Gain = Personal Gain, Altruism = Altruism, Comm = Community Interest, Social = Social Engagement, Empathy = Empathy, Reput = Reputation, Recip = Reciprocity.

In order to make the strongest relationships more visible, the relationships with beta weights > 0.4 are marked and presented in Table 5.140. Guilford (1956, p.145) suggested a scale for interpreting correlation coefficient values: almost negligible relationship: less than .2 (slight correlation); definite but small relationship: .2-.4 (low correlation); substantial relationship: .4-.7 (moderate correlation); marked relationship: .7-.9 (high correlation); and very dependable relationship: .9-1.0 (very high correlation). Thus, the correlations over .4 in Table 5.140 indicate moderate correlations between two variables.

According to the earlier correlation analysis in Table 5.144, motivations that have similar relationships with particular strategies can be grouped together for interpretation. First, Enjoyment and Efficacy, both personal factors which were ranked at the top among motivations, can be grouped. Both are correlated with SE3, Difficult Questions, IN2, Research, and SO4, Information Searched on the Internet. Second, Community Interest and Social Engagement, both social factors, are grouped. They are both correlated with SE3, Difficult Questions, and IN1, Flow of Topic. Third, Reputation and Reciprocity are grouped. Neither has any strong correlation with strategies in this analysis.

Table 5.144. The Relationships between Motivations and Strategies (Beta weights > 0.4)

Category	Strategies	Enjoy	Efficacy	Leaning	Gain	Altruism	Comm	Social	Empathy	Reput	Recip
Selecting questions	SE1: Confidence/Interests	.045	.121*	.037	.052	.294**	.020	-.003	.040	-.001	-.032
	SE2: Easy questions	.181	.174*	.114	.091	.142	.128	.092	.107	.129*	.031
	SE3: Difficult questions	.471**	.557**	.444**	.225*	.106	.429**	.514**	.302**	.215**	.278**
	SE4: Positive attitudes	.190*	.300**	.230**	.126	.285**	.266**	.231**	.239**	.177**	.177**
	SE5: Negative attitudes	.007	.248**	.163**	.113	.117	.159**	.117*	.296**	.119 **	.108*
	SE6: No one answered	.396**	.372**	.299**	.234	.316*	.282**	.280**	.219 *	.185**	.121
	SE7: Recently posted	.401**	.281**	.188*	-.024	.262	.162*	.173*	.164	.106	.098
	SE8: Purposed benefit	.073	.050	.170**	.265**	-.170	.261**	.156**	.107	.251**	.243**
	SE9: Someone else	.223	.384**	.407**	.103	.275*	.448**	.335**	.371**	.198**	.358**
Interpreting Questions	IN1: Flow of topic	.427**	.226*	.348**	.113	.425**	.534**	.452**	.341**	.261**	.330**
	IN2: Research	.623**	.486**	.393**	-.002	.449**	.372**	.457**	.379**	.277**	.263**
	IN3: Understand all	-.005	-.041	-.032	-.110	.146	-.004	-.034	.024	-.069	-.060
	IN4: Answer anyway	.267*	.248**	.107	.116	.201	.102	.240**	.139	.154**	.149**
	IN5: Clarification	.372**	.258*	.068	.022	.489**	.150	.227**	.192	.103	.072
Seeking Information	SO1: Information	-.009	.081	-.015	-.023	.231*	.016	-.040	.068	-.047	-.021
	SO2: Experiences	.031	.177	.207**	-.045	.217	.296**	.136	.552**	.062	.215*
	SO3: Expertise	.234	.576**	.183	.427*	.411	.213	.101	-.094	.205	-.148
	SO4: Information Searched	.518**	.581**	.423**	-.019	.319*	.272**	.295**	.291**	.242**	.204**
	SO5: Info form Someone	.250*	.368**	.351**	-.049	.035	.326**	.298**	.298**	.273**	.353**
	SO6: Yahoo! Answers	.197	.399**	.248**	.029	.220	.345**	.271**	.282**	.242**	.330**
Creating Answers	CR1: Accuracy	.080	.138*	.018	-.054	.313**	-.007	-.008	.015	-.041	-.056
	CR2: Accuracy Source	.253*	.243*	.336**	.008	.418**	.157	.139	.263**	-.068	.165*
	CR3: Completeness	.192*	.188**	.074	.016	.442**	.092	.118*	.130*	-.047	-.001
	CR4: Completeness Search	.476**	.231*	.346**	-.010	.388*	.253**	.168*	.239*	.028	.247**
	CR5: Neutral attitudes	-.022	.121	.072	.012	-.057	.123	.106	.065	-.072	.124*
	CR6: Express agree/disagree	.453**	.308**	.154*	.091	.245	.234**	.193**	.330**	.130**	.138*
	CR7: Express supports	.243**	.260**	.209**	.169	.288	.202**	.180**	.285**	.004	.140*
	CR8: New answers	-.138	-.071	-.049	-.215	.028	-.229*	-.043	-.077	-.031	-.054
	CR9: Reuse answers	.265*	.270**	.056	.147	.161	.171*	.103	.271**	.153**	.117
Evaluating Answers	EV1: Other Answers	.307**	.229*	.145*	-.086	.297*	.235**	.331**	.174	.051	.242**
	EV2: Questioners	.268*	.428**	.194**	.043	.315*	.152	.281**	.096	.244**	.153*
	EV3: Others	.308*	.424**	.237**	.113	.235	.268**	.428 **	.163	.283**	.279**

- Key for motivations (row headings): Enjoy = Enjoyment; Efficacy= Efficacy, Learning = Learning, Gain = Personal Gain, Altruism = Altruism, Comm = Community Interest, Social = Social Engagement, Empathy = Empathy, Reput = Reputation, Recip = Reciprocity.

5.6. Content Analysis of Answers

Answers posted by the survey participants in health categories of Yahoo! Answers were collected and analyzed in relation to the types of messages embedded in the answers. In terms of the answer collection, it was originally intended to collect one randomly-selected answer posted within the last two months by each participant. However, seven of the top answerers intentionally hide their answers from the public display, so answers from these participants were not included in the content analysis. Thus 250 answers (32 from top answerers and 218 from non-top answerers) are the final set of answer data used for the analysis reported below.

5.6.1. Intercoder Reliability.

To ensure the reliability of the results, intercoder agreement between two coders was computed using Cohen's κ (Cohen, 1960). For the analysis of the types of messages in answers, each coder reviewed 10% of the random sample of answers (25 answers) from the eligible 250 answers, and the degree of agreement between the two coders on assigning one of the categories of message types was calculated. The κ value was .89, which indicated an almost-perfect level of agreement (.21-.40: Fair, .41-.60: Moderate, .61-.80: Substantial, .81-1.00: Almost perfect (Landis and Koch (1977)).

For the analysis of the sources cited in answers, the same process of the evaluation was conducted. Each coder reviewed 10% of the random sample of answers (25 answers) from the eligible 250 answers (The answers in this evaluation may or may not the same answers from the evaluation of the intercorder reliability of the types of messages.). The degree of agreement between two coders on identifying the source of answers was calculated. The κ value was .93, which indicated an almost-perfect level of agreement.

5.6.2. Types of Messages in Answers

5.6.2.1. Distribution of Message Types Across All Respondents

In Section 4.3.2.2. Klemm et al's four types of health messages were introduced and used as the basis for identifying the types of answers: information giving, personal opinions, personal experiences, and encouragement. After reviewing health answers, however, it was found that the two main categories of messages – information and opinion – are appropriate to define the types of answers, because personal experiences and encouragement were used for explaining and supporting answers with information or opinions. Thus, the collected data of answers were categorized into just two groups (The intercoder agreement between two coders was reported above.)

The first group, information, indicates answers that are useful for helping questioners to solve problems or make decisions. These include answers with statements of definitions, diagnosis, symptom analysis, treatment suggestions, medical procedures, drug/medicine use or other types of health related information on a particular disease or a health concern (It should be noted that these answers may or may not be factually correct; however, they are represented by the answerer as being accurate.) Examples of information oriented answers are as follows.

> Answer Example (AE) 1: "Sounds like constipation. We all get it every once in a while. Try eating lots of fiber, or better yet, take Metamucil. If it gets worse, you can try something stronger like X-Lax. If it doesn't go away after you've tried self-treatment, though, see a doctor. If constipation goes on too long, it can be unhealthy and needs medical treatment. Besides, you don't want to go on feeling like that forever."

AE1 is a typical information-oriented answer. The answerer diagnosed the symptom that the questioner explained and provided possible treatments.

> AE2: "Most of that answer depends on what's causing the pain. If it's from an irritation: removing the irritant... if it's from over-exercising: ice, heat, and rest... if it's from a physical impact: ice and time to heal (maybe more depending on how bad it is), plus Arnica helps bruises and some other muscle pain issues... if it's an adverse reaction to a prescription (there are a few that cause it): find an alternative prescription/remedy... you get the point. You could take an OTC anti-inflammatory to help with short-term pain issues, but that wouldn't address the cause of the pain. Feel free to E-mail me if you have more details and I'll try to find a more detailed answer for you. Good luck and I hope I helped!"

In AE2, the answerer assumed several situations related to the pain that the questioner mentioned and provided solutions for each situation.

> AE3: “Honestly drink more water, take some vitamins and the best advice I have is an all natural oil or scrub. Things with petroleum in them (creams and baby oil and vaseline) don't help. I use Vaseline cocoa butter gel (it has a small trace of mineral oil) but over all works well. Along with a lufa or buff puff (Lufa last longer) it helps smooth out the skin, lock in missing moisture. Also Nutregena makes a good oil (Pricey) and or a body scrub (Sea salt or sugar) Stick to creams with shea or cocoa butter. Apply at night.”

In AE3, the answerer provided information to solve the questioner’s problem, based on his/her personal experience.

The second group, opinions, indicates answers with statements of personal opinion about debatable issues or problems in the area of health. In most cases, answerers express their agreement or disagreement with the statements of questioners, provide judgmental comments on questioners’ actions or thoughts, and express their emotional feelings to questioners. Examples of opinion-based answers are as follows.

> AE4: “You're right, they do suck. You just have to get used to them and it can take a while.”

In AE4, the answerer expressed his/her agreement with the questioner’s comments.

> AE5: “You do care about others "[T]his may be depressing someones New Year, which is good, no reason for them to hate you. Go to the forest for a walk, not to hang yourself.”

Questioners may ask for advice about how to deal with relationships with others. These questions may be health-related or not. Thus, the answerer provided his/her opinion, helping the questioner to deal with the situation.

> AE6: “Your weight sounds good. You didn't mention your age though. I'm guessing you're a bit on the slender side, but it all depends on how it's all distributed.”

In AE6, the answerer provided his/her opinion on whether the questioner is overweight or not.

> AE7: “[H]e must stop smoking IMMEDIATELY! He is literally killing himself. He must also go to a respiratory specialist right away! he has something seriously wrong with him that could be fatal sooner than later. Lungs should NEVER collapse, 8 times in 18 months is 8 times too many.”

In AE7, the answerer expressed his/her opinion on the smoking behaviors of the subject in the question.

Therefore, for the message type analysis, answers were classified into these two types: information and opinion. Most of the answers were classified in only one of the two categories. There were a few answers which included both information and personal opinions of answers. In these cases, the answers were categorized as opinions, because information in these answers was included primarily to support the answerers' opinions.

Table 5.145 shows the distribution of information and opinions of answers.

Table 5.145. Distribution of Message Types

Message Types	N	%
Information	157	62.8
Opinion	68	27.2
Other	25	10.0
Total	250	100.0

The Other category indicates answers that were meaningless or too short to determine whether they were information or opinion, e.g., "yes," "It is nature at work," "keep trying", etc. Also, there were a couple of answers that included counter-questions to questioners instead of answers. There were also answers suggesting that the questioner visit a doctor, without additional information or opinion.

According to Klemm et al.'s framework, two more types of messages might have appeared: personal experiences and social support. However, it was found that personal experiences and social support were observed in both information and opinion types of answers and they were used as either sources of answers or additional comments on support. Thus, because they primarily augmented the information or opinions in the answers, these categories were not coded separately.

Additional features within the answers were observed while reviewing the collected answers. Among the 250 answers, 62 (24.8%) included personal experiences of suffering from a health problem. In these answers, the answerers shared their own experiences and some of them

(6 answerers, 2.4%) shared the experiences of someone close to them. Here are examples of these kinds of answers:

> AE8: "[M]y husband's mother had tuberculosis and the whole family had to be treated. We had healthy children and so did his siblings."
>
> AE9: "I believe that the eye is an organ that should be protected. If they (the contact lenses) are prescription, I believe you might need advisement, but I had a teacher once that had a contact lens roll up and she had the devil of a time trying to get that thing down. If you plan to do it, I hope nothing goes wrong."
>
> AE10: "… I am a physician and a diabetic. My father was and my eldest daughter is an insulin-dependent diabetic."

As you see in examples in AE8, AE9, and AE10, answerers shared experiences of their own or of family members and even a teacher that they had known.

A total of 41 answerers (16.4%) provided supportive comments in answers for questioners. Most of them added one or two short sentences of supportive comments, such as "Good luck" and "I hope you get better soon." There are also other ways to provide support.

> AE11: "Good on ya, at least you are considering quitting and this is a good step :) Set a date to stop smoking, before that date try to smoke less. I personally quit last week, it was my new year resolution and i'm still smoke free :) … Good luck"

In AE11, the answerer started responding to the question with a supportive comment to encourage the questioner for putting effort into quitting smoking, and then provided suggestions on how to do it based on his/her own quitting experiences.

> AE12: "I'm really sorry you are in such a tough situation. First, you will have to get a doctor to write you prescriptions. … I wish I could give you really specific advice, but I hope this letter will get you in the right direction. I wish you the best."

In AE12, the answerer expressed her understanding of the questioner's situation and provided a list of possible options for solving the problem. Also she closed the answer with her comments expressing support for the questioner.

Answerers not only provided information or opinions for questioners but also did not hesitate to give advice to go to see a doctor. Among the answers, 34 answerers (13.2%) made such recommendations in their answers.

AE13: “[T]alk to your doctor. Pain moves around sometimes. Most likely it is due to unusual stress on the leg due to the weight of the boot. Maybe the proper pillow support might help This CANNOT be answered on Y Q&A Hope you are better soon”

AE14: “Actually, no moisturizer will work, as you are confusing the scaling of seborrheic dermatitis for dry skin. A moisturizer will momentarily "grease" the scaling, making it less likely to reflect light and appear to have helped, but once the "grease" wears off, you're back to where you started. What u really need to do is to treat the underlying inflammatory dermatitis, so that the scaling isn't produced in the first place. You should see your dermatologist for help in that.”

AE15: “Your husband is hypertensive and needs to see a doctor right away. The top number (systolic) of the blood pressure reading is the force with which the heart is beating or pushing the blood after it's been restricted (by a blood pressure cuff, for example). … The nausea and vomiting are also a concern. Make an appointment to see his physician.”

In terms of the target subject of the questions, 222 (88.8%) questioners asked questions about their own problems, while 8 (3.5%) of them discussed the problems of someone close to them, e.g., family members, children, friends, teachers, colleagues, etc.

AE16: “There isn't any specific diet I can give you, but she should talk to her OB doctor to make sure she keeps her nutrition up, especially since she is breastfeeding. In addition, she should get out (weather permitting) and walk. … Tell her not to set an unrealistic goal. 2 pounds a week is considered safe weight loss, and make sure she drinks plenty of water.”

In AE16, it is hard to know who the one dieting in the answer is, but the answerer provided advice for someone about whom the questioner is concerned.

AE17: “ … It's time for you to be a parent and for your wife to be a parent and set some rules that are for a 16 year old instead of a 20 year old. You need to stop her from flying on private jets unless you see the contract in advance and know exactly who is paying for it where she is going and with whom she is flying. … Take control now or you will lost it forever.”

In AE17, the answerer provided a parenting guide for the questioner and her daughter.

Additionally, an attempt to reach questioners with personal contact was also observed. Three answerers noted their contact information, e.g., email addresses or Internet messenger IDs, for future communication with questioners.

AE18: “I'm currently suffering from depression and anxiety. My symptoms seem pretty similar to what you and other people who've answered have. I suffer from insomnia every night and extreme apathy… I don't think that my depression is something will ever be

cured, but I'm learning how to deal with it. As others have said, if you want to ask me anything more my email is 0000 AT ymail.com"

AE19: "I'd love to talk with you, my name's 0000 if the screen name isn't blatantly obvious. I might be going to bed soon tonight but maybe you can catch me, IM me if you want/need to talk about anything psychological. MSN: 0000@live.com Yahoo!: 0000@yahoo.com AIM: 0000"

The distributions of these additional features by message type are shown in Tables 5.146 – 5.148.

Table 5.146. Personal Experiences in Answers

	Personal Experiences Included		Personal Experiences Not Included		Total	
	N	%	N	%	N	%
Information	50	31.8	107	68.2	157	100
Opinion	11	16.2	57	83.8	68	100
Other	1	4.0	24	96.0	25	100
Total	62	24.8	188	75.2	250	100

Among the answers, 31.8% of information-oriented answers included the personal experiences of answerers, while personal experiences were included in only 16.2% of opinion-oriented answers. A chi-square test was conducted to evaluate this difference between Information and Opinion and it was statistically significant ($\chi^2 = 5.896$, p=.015). Thus, information-oriented answers include personal experiences more frequently than opinion-oriented answers.

Table 5.147. Supportive Comments in Answers

	Supportive Comments Included		Supportive Comments Not Included		Total	
	N	%	N	%	N	%
Information	33	21.0	124	79.0	157	100
Opinion	8	11.8	60	88.2	68	100
Other	0	0.0	25	100.0	25	100
Total	41	16.4	209	83.6	250	100

The analysis showed that 21.0% of information-oriented answers include supportive comments while 11.8 % of opinion-oriented answers included supportive comments. A chi-square test was conducted to evaluate the statistical significance of the difference and the difference was not significant.

Table 5.148. Referral to Doctor in Answers

	Referral to Doctor Included		Referral to Doctor Not Included		Total	
	N	%	N	%	N	%
Information	17	10.8	140	89.2	157	100
Opinion	12	17.6	56	82.4	68	100
Other	5	20.0	20	80.0	25	100
Total	34	13.6	216	86.4	250	100

Also, 10.8% of information-oriented answers included advice from answerers to go to see doctors, while 17.6% of opinion-oriented answers included such advice. Only 5 of the answers mentioned to go to see doctors without informational or opinion-based comments. A chi-square test was conducted to evaluate the statistical significance of the differences across message types, but the differences were not significant.

5.6.2.2. Distribution of Message Types of Top Answerers

The proportions of message types given by top answerers and non-top answerers were compared. Table 5.149 shows the summary.

Table 5.149. Message Types Used by Top answerers and Non-Top answerers

Message Types	Top Answerers		Non-Top Answerers	
	N	%	N	%
Information	30	93.8	127	58.3
Opinions	2	6.2	66	30.3
Other	0	0.0	25	11.4
Total	32	100.0	218	100.0

Almost all (93.8%) of the answers given by top answerers were information-oriented, while 58.3% of the answers from non-top answerers were information-oriented. Conversely, 6.2% of answers given by top answerers were opinion-oriented, while 30.3% were opinion-oriented for non-top answerers. None of answers given by top answerers were classified in the Other category; all 25 of them were from non-top answerers. A chi-square test was conducted to evaluate these differences, and they were found to be statistically ($\chi^2 = 15.189$, p=.001).

Additional features of answers were also compared between top answerers and non-top answerers. A chi-square test was conducted to evaluate the differences of additional features between top answerers and non-top answerers. The differences were not statistically significant for any of these features.

Table 5.150. Personal Experiences in Answers, by Top Answerer Status

	Personal Experiences Included		Personal Experiences Not Included		Total	
	N	%	N	%	N	%
Top Answerers	8	25.0	24	75.0	32	100.0
Non-top Answerers	54	24.8	164	75.2	218	100.0
Total	62	24.8	188	75.2	250	100.0

Table 5.151. Supportive Comments in Answers, by Top Answerer Status

	Supportive Comments Included		Supportive Comments Not Included		Total	
	N	%	N	%	N	%
Top Answerers	8	25.0	24	75.0	32	100.0
Non-top Answerers	33	14.1	185	85.9	218	100.0
Total	41	16.4	209	83.6	250	100.0

Table 5.152. Referral to Doctor in Answers, by Top Answerer Status

	Referral to Doctor Included		Referral to Doctor Not Included		Total	
	N	%	N	%	N	%
Top Answerers	2	6.3	30	93.8	32	100.0
Non-top Answerers	32	14.7	186	85.3	218	100.0
Total	34	13.6	216	86.4	250	100.0

5.6.2.3. Distribution of Message Types by Level of Health Expertise

The proportions of message types given by health experts and non-experts were compared. Table 5.153 shows the summary.

Table 5.153. Message Types Used by Health Experts and Non-Experts

Message Types	Health Experts		Non-Health Experts	
	N	%	N	%
Information	52	74.3	105	58.3
Opinions	14	20.0	54	30.0
Other	4	5.7	21	11.4
Total	70	100.0	180	100.0

About three-quarters (74.3%) of the answers given by health experts were information-oriented, while 58.3% were for non-health experts were information-oriented. Conversely, 20.0% of the answers given by health experts were opinion-oriented, while 30.0% were for non-health experts. A few (5.7%) of the answers given by health experts were classified in the Other category, while 11.4% of them from non-health experts were classified as Other types of messages. A chi-square test was conducted to evaluate these differences; they were not statistically significant.

Additional features of answers were also compared between health experts and non-health experts. The results of these analyses are shown in Tables 5.154 - 5.156.

Table 5.154. Personal Experiences in Answers, by Health Expert Status

	Personal Experiences Included		Personal Experiences Not Included		Total	
	N	%	N	%	N	%
Health experts	11	15.7	59	84.3	70	100.0
Non-health experts	51	28.3	129	71.7	180	100.0
Total	62	24.8	188	75.2	250	100.0

Table 5.155. Supportive Comments in Answers, by Health Expert Status

	Supportive Comments Included		Supportive Comments Not Included		Total	
	N	%	N	%	N	%
Health experts	12	17.1	58	82.9	70	100.0
Non-health experts	29	16.1	151	83.9	180	100.0
Total	41	16.4	209	83.6	250	100.0

Table 5.156. Referral to Doctor in Answers, by Health Expert Status

	Referral to Doctor Included		Referral to Doctor Not Included		Total	
	N	%	N	%	N	%
Health experts	7	10.5	63	90.0	70	100.0
Non-health experts	27	15.0	153	85.0	180	100.0
Total	34	13.6	216	86.4	250	100.0

Comparing the features in answers given by health experts and non-health experts, 15.7 % of experts' messages included personal experiences, 17.1% of them included supportive comments, and 10.5% of them included advice to see a doctor. A chi-square test was conducted to evaluate the statistical significance of these differences. The difference between health experts and non-experts in their use of personal experiences was statistically significant ($\chi^2 = 4.303$, p=.038). Thus,

we can conclude that health experts included personal experiences less frequently than non-health experts. The differences were not statistically significant for the other two features.

5.6.3. Sources of Answers

5.6.3.1. Distribution of Source Types Across All Respondents

For the analysis of answer sources, an information source framework was borrowed from a previous study (Oh, Oh, & Shah, 2008). The framework identifies sources in four categories: human sources, Internet sources, mass media and books. The 2008 study presented 13 different kinds of information sources under these categories and introduced a distribution of the sources with a relatively large set of answers (7,834 answers), in order to understand the overview of answerers' use of sources in social Q&A.

In the current study, sources of answers which are used by the survey participants for providing health answers were analyzed in depth. Answerers create answers with or without sources of information. Among 250 answers, 119 answers (47.6%) included explicit references to sources of information. There were answers which had more than one source. Thus a total of 127 sources were identified. Table 5.157 shows a summary of the source types.

Table 5.157. Distribution of Sources in Health Answers

Source Type	N	%
Personal/Situational Experience	60	47.2
Professional/Educational Expertise	27	21.3
Websites	39	30.7
Others (e.g., Television)	1	.8
Total	127	100.0

The most frequently used source of answers was personal/situational experiences (47.2%). Answerers shared their personal experiences of suffering from a disease (e.g. cancer, diabetes, depression, bipolar disorder, etc.), being over-weight, dental problems, smoking habits, allergies, stomach problems, or headaches, being a mother who raises sick children, having troubles with health insurance and so on. They were willing to share information about treatment, medicines, and living tips for relieving their symptoms. Answerers used not only their own experiences but

also those of someone who is close to them, e.g., family members, friends, etc. Examples of answers with personal experiences were introduced in 5.6.1.1.

The second most frequently used sources of answers were the Internet sources. Thirty-three unique URLs of Websites were observed, as displayed in Table 5.158.

Table 5.158. Internet Websites Used as Information Sources

Source Type	N	%
General Interest Websites	7	21.2
Health-specific Websites	26	78.8
Total	33	100.0

Among the 33 Websites, 24 of them were Health-specific Websites, such as a Website of a health organization or a Website specifically focused on a diseases or health issue. These include Websites related to diets, cancer, marrow donation, menstrual cycle, mental illness, dizziness, medicine/drug companies, and health research foundations and centers. General Interest Websites cited in answers include Wikipedia, Yahoo! Answers, New York Times, a general forum site (Buzzle.com), and another Q&A site (Ask & Discuss). Most of these websites were cited only once in the collected answers, except Wikipedia (3 times) and Mayoclinic.com (2 times). Since the number of answers collected in the current study is small, it is hard to draw any general conclusions about the use of these sources by health question answerers.

The third source of answers was professional/educational expertise. Such a source was counted only if answerers identified their health expertise in their answers. Answerers noted that they are MDs, health care providers, physicians, Red Cross first aiders, dentists, certified dental assistants, registered nurses, respiratory therapist, oncologist, and students in medical schools. Additionally, the distribution of the sources across answers was analyzed. Descriptive statistics of the inclusion of personal experiences as sources in different types of answers were shown in Table 5.142, above. We concluded that information-oriented answers include personal experiences more frequently than opinion-oriented answers.

Descriptive statistics of the inclusion of professional/educational expertise as sources in different types of answers are shown in Table 5.159. Among the answers, 13.4% of information-oriented answers included professional/educational expertise as a source, while professional/educational expertise was included in only 4.4% of opinion-oriented answers. A chi-square test was conducted to evaluate this difference and it was statistically significant (χ^2 = 7.343, p=.025). Thus, information-oriented answers include professional/educational expertise more frequently than do opinion-oriented answers.

Table 5.159. The Inclusion of Profession/Educational Expertise as a Source in Different Types of Answers

	Professional/Educational Expertise Included		Professional/Educational Expertise Not Included		Total	
	N	%	N	%	N	%
Information	21	13.4	136	86.6	157	100 %
Opinion	3	4.4	65	95.6	68	100 %
Other	0	0.0	25	100.0	25	100 %
Total	24	9.6	226	90.4	250	100 %

Descriptive statistics of the inclusion of Websites as sources in different types of answers were shown in Table 5.160. Among the answers, 18.5% of information-oriented answers included Websites as sources of answers, while Websites were included in only 4.4% of opinion-oriented answers. A chi-square test was conducted to evaluate this difference and it was statistically significant (χ^2 = 7.688, p=.006). Thus, information-oriented answers include Websites more frequently than opinion-oriented answers.

Table 5.160. The Inclusion of Websites as Sources in Different Types of Answers

	Websites Included		Websites Not Included		Total	
	N	%	N	%		
Information	29	18.5	128	81.5	157	100 %
Opinion	3	4.4	65	95.6	68	100 %
Other	0	0.0	25	100.0	25	100 %
Total	32	21.3	218	145.3	150	100 %

5.6.3.2. Sources Used by Top Answerers

Personal Experiences, Health Expertise and Websites are the main categories of sources. The use of each type of source by top answerers and non-top answerers was compared. A total of 250 answers were used for analysis. Among them 32 answers were given by top answerers, and 218 answers were given by non-top answerers. For each source of answers, whether a source was included or not included was investigated and a chi-square test was conducted to evaluate statistical differences of significance of using sources between the two groups of answerers. The data on which these analyses were based is shown in Table 5.161.

Table 5.161. Sources of Answers by Top Answerer Status

	Top answerers		Non-top answerers	
	N	%	N	%
Personal Experiences				
Included	8	25.0 %	54	24.7 %
Not included	24	75.0 %	164	75.3%
Total	32	100.0%	218	100.0 %
Professional/educational Expertise				
Included	10	31.2%	14	6.4%
Not included	22	68.8%	204	93.6%
Total	32	100.0%	218	100.0%
Websites				
Included	10	31.2%	22	10.1%
Not included	22	68.8%	196	89.9%
Total	32	100.0%	218	100.0%

About one-quarter of each group (top answerers and non-top answerers cited their personal experiences when answering a question. A chi-square test was conducted to evaluate this difference; it was not statistically significant.

Almost one-third of the top answerers cited their professional/educational expertise in their answers, while only 6.4% of the non-top answerers cited this source. A chi-square test was conducted to evaluate this difference; it was statistically significant ($\chi^2 = 19.820$, p=.000). Therefore, we can conclude that top answerers respond to questions using their professional/educational expertise more frequently than non-top answerers.

Almost one-third of the top answerers cited a website in their answers, while only 10.1% of the non-top answerers cited this type of source. A chi-square test was conducted to evaluate this difference; it was statistically significant ($\chi^2 = 11.192$, p=.001). Therefore, we can conclude that top answerers use Internet sources more frequently than non-top answerers.

5.6.3.3. Sources Used by Health Experts

Personal Experiences, Health Expertise and Websites are the main categories of sources. The use of each type of sources by health experts and non-health experts was compared. A total of 250 answers were used for analysis. Among them 70 answers were given by health experts, and 180 answers were given by non-health experts. For each source of answers, whether a source was included or not included was investigated and a chi-square test was conducted to evaluate the statistical significance of the differences in using sources between the two groups of answerers. The data on which these analyses were based is shown in Table 5.162.

Table 5.162. Sources of Answers by Health Expertise

	Health Experts		Non-Health Experts	
	N	%	N	%
Experiences				
Included	11	15.7	51	28.3
Not-Included	59	84.3	129	71.7
Total	70	100.0	180	100.0
Professional/educational Expertise				
Included	20	28.6	4	2.2
Not-Included	50	71.4	176	97.3
Total	70	100.0	180	100.0
Websites				
Included	7	10.0	25	13.9
Not-Included	63	90.0	155	86.1
Total	70	100.0	180	100.0

When answering questions, 15.7% of health experts and 28.3% of non-health experts cited their personal experiences in the answers. A chi-square test was conducted to evaluate this difference; it was statistically significant ($\chi^2 = 4.303$, p=.038). We can conclude that health experts used personal experiences less frequently than non-health experts.

Almost one quarter of the health experts cited their professional/educational expertise in their answers, while only 2.2% of the non-health experts cited their professional/educational expertise as a source. A chi-square test was conducted to evaluate this difference; it was statistically significant ($\chi^2 = 40.321$, p=.000). We can conclude that health experts responded to questions using their health expertise more frequently than non-health experts.

Almost one-tenth of each group cited a Website in their answers when answering questions. A chi-square test was conducted to evaluate this difference; it was not statistically significant.

5.6.4. Summary of Findings on Answers

The two main categories of messages in answers – information and opinion – were used to classify the types of answers. Information-oriented answers are statements of definitions, diagnosis, or symptom analysis related to a health issue. Opinion-oriented answers include personal opinions about debatable issues or problems, which were sometimes phrased with statements of strong agreement or disagreement. There were three times as many information-oriented answers as opinion-oriented answers. Additional features of answers were observed regarding whether answers include personal experiences, supportive comments, or referral to doctors. The distributions of these features by the types of answers were reported. Also, the characteristics of answers given by top answerer status and health experts were examined. It was found that top answerers produced more information-oriented answers than non-top answerers. Health experts also produced more information-oriented answers than non-experts. In addition, they included personal experiences less frequently than non-experts.

Three main types of sources were observed – personal/situational experiences, professional/educational expertise and Websites. Answerers cited not only their own personal experiences, but also their family members' and friends' experiences in answers. Almost 80% of Websites that were cited in answers were related to medical information, while the rest of them

were general interest Websites, such as Wikipedia, Yahoo! Answers, and the *New York Times* and so on. Top answerers used/cited their health expertise and Websites more frequently than non-top answerers. Not surprisingly, health experts used/cited their health expertise more frequently than non-health experts.

CHAPTER VI. DISCUSSION

The major focus of the current study is answerers who are willing to share information, experiences and expertise with anonymous others. Their roles as information providers can be considered an important source of information in online environments. The current study was an exploratory investigation into answerers' motivations and strategies for providing health information and support in the context of social Q&A. Based on the model of answering behaviors proposed in the current study, 10 motivations and 32 strategies were identified and evaluated in order to investigate the current status of answerers' expectations and contributions to information provision through the format of social Q&A. It was hoped that, with a better understanding of answerers' motivations and strategies, we might identify ways to encourage answerers to participate and to contribute more effectively, so that the quality of future human-oriented Q&A services could be improved.

Two particularly interesting groups of answerers in the current study are top answerers and health experts. In the model of answering behaviors as shown in Figure 3.1, it was assumed that there were two most influential factors affecting answerers – prior experience of providing answers in social Q&A, and prior knowledge in a subject area, which was specified as health in the current study. Top answerers and health experts are representative groups for each factor. Top answerers are those who have been recognized and complimented by the community of a social Q&A, due to their great contribution to providing good answers in terms of both quality and quantity. In the current study, top answerers were those defined as those who were assigned to that status by Yahoo! Answers because they earned the most points as they contributed in providing answers under the health category. Their experiences and knowledge of providing

answers in the community have accumulated as they provide more and more answers and this accumulation is likely to influence their motivations and strategies. Health experts are those who may have been answerers in their everyday lives as they consult with their patients or the people around them about health issues or problems. Their role as answerers was replicated and possibly expanded in online environments. They chose a social Q&A as a venue in order to extend the scope of communication to those they meet online. In the current study, health experts included those who described their past/current occupations as health care professionals. Their background knowledge in health has contributed to their ability to distribute health information widely to those who are accessible online. In this study, the motivations and strategies of these two groups of answerers were further analyzed, and compared with the motivations and strategies of those who are not named as top answerers or health experts.

This chapter is organized as follows. First, in Section 6.1, a summary and synthesis of the findings about motivations and strategies are provided. This is followed by an analysis of motivations and strategies of top answerers and health experts in Sections 6.2 and 6.3, respectively. Finally, in Section 6.4, limitations of the study were described.

6.1. Motivations and Strategies

One of the preliminary findings of the current study is the report of the demographic characteristics of answerers, which have not known in the previous research and practice of social Q&A. According the survey, the ratio of participation by male and female answerers was almost equal. Adult groups of various ages were observed, ranging widely from the youngest, 18, to the oldest, 77; the average was 40.7 years old. The level of education of answerers was relatively high; the majority of answerers (81.1%) had at least some college education. In terms of ethnicity, white was dominant (70.2%). A social Q&A service used as a test-bed in the current study was Yahoo! Answers, a USA-based English service. Due to its geographical definition, most of the answerers were from the U.S.A. (75.6%), but survey distribution was not limited to this country.

With information from 257 survey participants, 26 countries were identified as the locations from which people access Yahoo! Answers. Although the participation ratio of each country was relatively small, it is true that a social Q&A is an online platform that allows people around the world to collaborate in sharing information and social support.

The average time being active online per day was 4.2 hours, ranging widely from .5 (30 minutes) to 15 hours. The main interest of the current study was health information provision. Thus, the survey asked what percent of their active online time answerers use to provide health answers. The average was 24.3%, covering a wide scope from 3% to 96%. More interestingly, 41% of answerers indicated that they used less than 5% of their time online for providing health answers. This was followed by a question about how many times answerers provide health answers per week, and the average was 14.6. The range was also wide, from .3 to 300 times per week. The average duration time for providing a health answer per session was 10.4 minutes, ranging from 1 to 120 minutes.

The wide variations of time used for providing health answers represent a variety of answerers in their contributions and efforts to provide useful answers in a social Q&A. There seem to be answerers who spend a great deal of time providing answers because they put much value on it. On the contrary, there seem to be answerers who visit once in a while and provide their input when they think it is necessary. Or, there seem to be answerers who want to contribute more, but have less time. Many different kinds of intentions and situations can be involved in their answering behaviors. With this background knowledge of answerers' characteristics, a series of in-depth analyses about their motivations and strategies for answering questions was conducted.

6.1.1. Motivations

Ten possible motivations were examined in this study: Enjoyment, Efficacy, Learning, Personal Gain, Altruism, Community Interest, Social Engagement, Empathy, Reputation, and Reciprocity. Altruism was the most influential motivation chosen by answerers. The altruistic

reasons for answerers stem from their various backgrounds from personally enjoying helping others to the philosophy that helping others should be a norm for better living in society. Altruism was statistically significantly correlated with the rest of the motivations except Reputation and Personal Gain. A similar pattern of correlation was observed from Empathy. Thus, answerers who are strongly motivated by altruism or empathy are less likely to attempt to gain advantage in their answers as they sell products or promote their business or improve their reputations from providing health answers in social Q&A.

The second and third most influential motivations were Enjoyment and Efficacy, both of which belong to personal factors, and were strongly correlated with each other. Answerers may enjoy providing answers in social Q&A because they feel proud of their capability to distribute health information in this particular context. Both motivations were correlated with all other motivations except Personal Gain, although the correlation between Enjoyment and Reputation was low.

Personal Gain, the least influential motivation, had no correlation with the rest of the motivations, except Reputation. Reputation was correlated with most of the other motivations except Altruism and Empathy. This finding indicates that answerers who pursue reputations are unlikely to contribute to the community for altruistic or empathic reasons. Instead, they may be interested in promoting community interest and social engagement, because the growth of the community will make them more influential as they build their reputations. In fact, Community Interest was very strongly correlated with Learning, Social Engagement, and Reciprocity, as well as Reputation.

Reciprocity, the ninth motivation in terms of its importance, was statistically significantly correlated with the rest of the motivations except Personal Gain. It was interesting that Reciprocity was among the least important motivations. The concept of returning something to the community may relate to the concept of altruism, which ultimately has the umbrella purpose of helping others. However, it seems that answerers make a sharp distinction between helping

others with pure intentions and helping others as a payback for the community. Another possible explanation is that answerers with altruistic reasons may less frequently ask questions. They do not have to think about reciprocity because they would not need to receive information or social support from other answerers.

The answerers did report one motivation not included in the original model; they indicated that they are providing answers in order to prevent the distribution of misleading and incorrect information. The topic of health itself deals with many sensitive issues that seriously influence people's lives. Answerers who are aware of its importance may be involved in aggressively providing answers that they believe are correct and authoritative. This opens a discussion about the issue of quality of answers: What will be the criteria with which to evaluate the quality of answers? Whose answers would be considered correct or incorrect? With what kinds of background will answerers decide whether there is useful or misleading information in the answers already provided? In a previous study, Kim and Oh (2008) introduced users' relevance criteria for evaluating answers. Content-based criteria, such as accuracy and completeness, were relatively frequently used to consider the quality of answers, but it is still not known in what ways questioners evaluate the quality of answers and draw conclusions about the accuracy and completeness of the answers. Answerers' perceptions on the issue of the answer quality were not covered in the current study, but they need to be further investigated.

In addition to examining the importance of each motivation and the relationship among the motivations, the distribution of the 10 motivations was analyzed in relation to the demographic characteristics of the answerers. With Altruism, Enjoyment, Efficacy, and Personal Gain, statistical differences in different groups of answerers were barely observed when separated by demographic backgrounds. However, there were some variations with Learning, Community Interest, Social Engagement, Empathy, Reputation and Reciprocity. These motivations were more influential for the answerers with lower income, answerers with lower levels of education or answerers with lower Yahoo! Answers levels, as well as younger answerers. Reputation was

more strongly motivated male answerers. Reputation was also more strongly motivated by answerers with lower Yahoo! Answers levels.

When the relationships between motivations and characteristics related to answering behaviors were evaluated, it was found that Learning, Community Interest, Reputation and Reciprocity were more strongly influential for answerers who spend more time online per day. No statistically significant differences were found based on percent of time providing health answers online per day, the number of times providing health answers per week or duration time for providing a health answer per session.

One of the most consistent findings from the motivation analysis across the different groups of answerers is that answerers are more strongly influenced by self-oriented motivations than motivations of social contribution or interaction with others in social Q&A. In most cases of the analysis, the top-ranked motivations were Altruism, Enjoyment, and Efficacy, and they were followed by Empathy, Community Interest, and Social Engagement, although there are some variations in order within the groups. The second and third motivations – Enjoyment and Efficacy – originate from personal belief or the need to be entertained. Enjoyment and Efficacy are self-oriented motivations, which are related to how much the answerer is personally enjoying and satisfied with answering questions in social Q&A. These two motivations were coupled and showed similar patterns of correlations with other motivations and even with strategies (the correlations with strategies are further discussed in Section 6.3.). Altruism, the most influential motivation, may be a possible inclusion to this trend, since it can be considered a personal factor because answerers enjoy helping others and it makes them, as individuals, feel good, and happy, although it was originally considered as a social factor in that answerers contribute for the benefit of others in the current study. The emphasis on the self-oriented motivations indicates that social Q&A should be a place where answerers can have fun and enjoy their time being involved in various activities, in order to maximize the participation and contribution of answerers.

Of course, it is also important to promote answerers with motivations related to social interaction. Answerers with lower Yahoo! Answers levels were more influenced by Empathy, Community Interest, Reputation, and Reciprocity. The Yahoo! Answers levels are upgraded as answerers produce more answers. Answerers with lower levels may have relatively less experience in providing answers than answerers with higher levels. It seems that answerers are first motivated by the motivations of social interaction when they begin to participate in Yahoo! Answers and, so, are in the lower levels. As they obtain more experience, contribute more and their levels are upgraded, their motivations change. Thus, social Q&A should be a place for less experienced answerers to build their social relationships with others with motivations of empathy, community interest, reputation or reciprocity.

6.1.2. Strategies

A number of possible strategies for answering questions and the correlation among the strategies were evaluated in order to understand answerers' behaviors when providing information and support in the context of social Q&A. The strategies related to the five steps of answering giving – selecting questions, interpreting questions, seeking information, creating answers and evaluating answers – were analyzed, and it was found that most of strategies were used somehow during the process of answering questions. When selecting questions, confidence or interest in the topic was the most frequently used strategy, while the least used strategy was selecting those questions from which the questioner intends to gain personal benefit from the answer. When interpreting questions, answerers believe that they understand the question most of the time, and are reluctant to answer a question that they don't understand. When seeking information for answers, most of the sources of answers are from answerers' own information and experiences. Answers posted in Yahoo! Answers were also used as sources, but relatively fewer times than other sources. When creating answers, accuracy and completeness are the most frequently used criteria for evaluating information sources in various contexts. When evaluating

answers, answerers review responses to their answers from other groups of people – questioners, other answerers, and other members in Yahoo! Answers.

The distribution of the strategies was analyzed in relation to the demographic characteristics of the answerers. Younger answerers more frequently select questions in which the questioner expresses positive attitudes and questions for which no one else provides answers than do older answerers. The frequency with which they answer even though they do not understand the meaning was higher among younger answerers than among older answers. Also, younger answerers use their personal experiences, information searched on the internet, information from someone else, and answers from Yahoo! Answers to create their answers more frequently than do older answerers. Younger answerers more frequently search for additional sources in order to verify the accuracy of their answers and express agreement/disagreement or supportive comments to questioners. Interestingly, younger answerers more frequently evaluate their answers based on feedback from all of the three groups proposed in the study – other answerers, questioners and the community.

Answerers with higher educational attainment more frequently select questions when they are confident or interested in the topic of the question, while answerers with lower levels of education more frequently select questions through which questioners intend to obtain some advantage from the answers, and questions asking for information on behalf of someone else. Answerers with higher level of education more frequently use their health expertise as a source of answers, and consider accuracy of answers as an important factor when they create answers than do answerers with lower levels of education. On the other hand, answerers with lower levels of education more frequently use their personal experiences, information that they searched on the Internet, information obtained from someone else, and answers from Yahoo! Answers as sources of their answers. Answerers with higher levels of education more frequently consider accuracy as an important factor in creating answers while answerers with lower levels of education more frequently express their supportive comments in answers.

There were also statistically significant differences in strategies among answerers by Yahoo! Answers levels. Answerers at higher levels more frequently ask counter questions to questioners in order to clarify the meaning of the questions than do answerers at lower levels. Answerers at lower levels more frequently select questions in which questioners express negative attitudes or questions through which the questioners intend to obtain benefit from the answers than do answerers at higher levels. Answerers at lower levels more frequently use their personal experiences and information or experiences heard from someone else. When evaluating answers, answerers at lower levels consider feedback more frequently from all of the three groups of participants – other answerers, questioners, and the community.

The relationships between strategies and behavioral characteristics of being online and providing health answers indicate that the longer times answerers spend online or spend providing answers, the more they research about the topics that they are interested in and search for additional sources in order to verify the accuracy and completeness of answers. They more frequently use sources that they searched and found from the Internet as well as information that they heard from someone else, or refer to answers from Yahoo! Answers. Answerers who spend higher percentages of their online time for providing health answers also more frequently monitor the flow of the topics that they are interested in on social Q&A sites and ask counter questions when they do not understand the meaning of the questions than answerers who spend lower percentages of time. Answerers who provide health answers more often per week more frequently select difficult questions and questions that no one else answers, as well as monitor the flow of topics and ask counter questions for clarification. They also more frequently answer questions even when they do not fully understand the questions. The duration times for creating answers to health questions per session is also related to the strategies used. Answerers who spend longer tend to select more difficult questions or questions that express positive attitudes. They monitor the flow of the topics and do research about the topics more frequently than those who spend shorter times providing each answer.

Additionally, the correlation analysis of strategies resulted in the identification of several interesting groups of answerers, and their strategies are described here.

Answerers Who Select Questions Based on Their Confidence/Interests in Topics of Questions

The most frequently used strategy in selecting questions was the answerers' confidence or interest in the topic of the questions. This was correlated with the strategies for monitoring the flow of topics of interest and doing research about them. Thus, these answerers put continuous effort into studying their topics of interest. The major sources of answers for them were their own information and expertise in an area of health. These sources of answers were somewhat informational, but they often created personalized answers as they provided social support and expressed agreement/disagreement with questioners. They indicated that accuracy and completeness of answers are important factors with which to evaluate answers; these two strategies for creating answers are very highly correlated with each other. These answerers are also willing to search additional sources to verify the accuracy of their answers. These answerers also indicated that they believe that they interpret questions well most of the time.

Answerers Who Believe that They Understand the Meanings of Questions Well

In interpreting questions, the most frequently used strategy was that answerers believe that they understand the meaning of the questions well. Questions posted in a social Q&A site are written messages. Although there is no word limitation in writing questions in the case of Yahoo! Answers, there must be questioners who have trouble explaining their needs in writing. Yet these answerers believe that they can correctly interpret most questions.

As noted earlier, this strategy for interpreting questions was correlated with answerers' confidence/interests in topics when selecting questions. Interestingly, it was negatively correlated with the strategy that answerers provide answers even when they do not understand questions. This indicates that these answerers provide answers only when they believe that they understand the meaning of the questions. Additionally, answerers commented that they sometimes provide several possible answers for questioners when they are not sure of the meaning of a question.

The strategy of understanding the meaning of the questions well is also correlated with strategies that answerers maintain neutral attitudes in their answers, create new answers (rather than re-using answers), and evaluate answers based on the feedback from other answerers. Thus, these answerers have developed their own strategies to respond to ambiguous questions as they maintain neutral attitudes, create customized answers with multiple possible solutions for questioners' problems, and compare their answers to other answers.

Answerers Who Do Research about the Topics in Which They are Interested

The strategy of doing research about the topics of questions was highly correlated with other strategies, such as using information searched and found from the Internet as sources of information, and searching additional sources of answers in order to verify accuracy and completeness. Thus, these answerers have developed various strategies for seeking and searching for information to research the topics. If necessary, they ask counter questions to questioners in order to clarify the meaning of the questions.

Answerers Who Use Personal Experiences as Sources of Answers

The strategy of using personal experiences as sources of information was positively correlated with the strategy of using information that they have, but negatively correlated with health expertise. Thus, these answerers do not use health expertise but their own information as sources of answers, in addition to their experiences. In creating answers, there was no correlation between answering questions with personal experiences and considering accuracy and completeness as important factors of answers. However, these answerers did express their social and emotional support to questioners. These answerers evaluate answers based on the feedback from the community.

Answerers Who Use Their Health Expertise as Sources of Answers

Compared with answerers who use their personal experiences as sources of answers, some answerers use information that they have as additional sources of answers, but are not interested in using their personal experiences. These answerers consider both accuracy and

completeness important in creating answers. No correlation exists with strategies of using health expertise and strategies of expressing agreement/disagreement and social support. In evaluating answers, interestingly, the strategy of using health expertise was negatively correlated with the strategy of evaluating answers based on the feedback from other answerers. Thus, these answerers are less likely to care how other answerers review their answers.

Answerers Who Evaluate their Answers

All of the three strategies in evaluating answers – evaluating answers based on feedback from other answerers, questioners and the community – are highly correlated with one another. Thus, these answerers value feedback from all of the groups of participants and contributors in a social Q&A.

Relationships Between Answerer Characteristics and the Strategies Used

The distribution of the 32 strategies was analyzed in depth according to the demographic characteristics of the answerers. Between male and female answerers, it was found that female answerers more frequently ask counter questions to questioners in order to clarify the meaning of the questions, and they use their personal experiences as sources of information more frequently than do male answerers. Also, female answers more frequently search for additional sources to verify the accuracy of their answers, express supportive comments in their answers, and create new answers customized to each question, than do male answerers.

One of the most interesting findings from the strategy analysis was that a variety of patterns of answering behaviors was observed. Answerers have developed their own strategies based on their capabilities and the specific situations in which they are providing answers. The seven groups of answerers introduced in the current section have developed answering strategies distinct from one another. Answerers who consider accuracy and completeness important often carried out the follow-up actions to search for additional information. These answerers used sources of information that they searched while they provide answers, rather than sharing their personal experiences. The two groups of answerers who share their personal experiences and

provide information based on their health expertise have distinct patterns of answering strategies. Thanks to this diversity in answerers' backgrounds and strategies, social Q&A has been recognized as full of different kinds of information which may not be available from other human-mediated Q&A services.

6.1.3. Relationships between Motivations and Strategies

Table 5.139 shows a summary of the relationships between motivations and strategies. Interestingly, all of the relationships are positive, which indicates that answerers who are strongly influenced by each of motivations more frequently carry out each of the strategies which are noted in the table. Some strategies are commonly applied across motivations. For example, strategies of monitoring the flow of topics, doing research on the topic and searching sources of answers on the Internet are strategies used by answerers with all of motivations, except Personal Gain. Interestingly, the strategy of maintaining a neutral attitude had no relationship with any of the motivations. On the other hand, there are some variations in the use of strategies across motivations. For example, there were no relationships statistically significant between Empathy and any of the strategies of evaluating answers. Thus, answerers who are motivated by Empathy would not be interested in getting feedback from others. In terms of the number of strategies related to motivations, Efficacy was related to 23 strategies among 32, while Personal Gain was related to only four strategies. An in-depth analysis of the relationships between motivations and strategies follows.

Altruism was the most strongly motivating factor and its relationships with the other motivations were quite different from Reputation. The strategies used by answerers with these two different motivations are compared here. They have common strategies in that both kinds of answerers more frequently monitor the flow of topics in health and do research on those topics in order to be ready to answer questions. However, the two groups are generally different in their patterns of strategy use. For example, when they do not understand the meaning of the questions,

answerers with altruistic motivations more frequently ask counter questions to clarify the meaning of the questions, while answers with reputation motivations answer the questions anyway as much as they understand them. Answerers with altruistic motivations often use their own information or information they searched and found from the Internet as sources of answers while answerers with reputation motivations use information heard from someone else or reuse Yahoo! answers, as well as information searched and found from the Internet. More interestingly, answerers with altruistic motivations consider accuracy and completeness important and search additional sources to verify the accuracy and completeness of their answers. However, no relationships between reputation motivations and these strategies were statistically significant. When evaluating answers, answerers with altruistic motivations review comments from other answerers and questioners, while answerers with reputation motivations review comments from questioners and the community.

The differences between those answerers with Altruism and Reciprocity motivations were discussed earlier. Both motivations are related to helping others, but there was a fine line between helping others without reasons, and helping others with expected returns to the community. When comparing the strategies of answerers with motivations of reciprocity to answerers with altruistic motivations and answerers with reputation motivations, those motivated by Reciprocity were more similar to answerers with reputation motivations. Answerers with motivations of reciprocity also answer questions anyway when they do not fully understand them. No relationships were found between the motivation of reciprocity and such strategies as clarifying the meaning of answers and considering accuracy or completeness important. Instead, answerers with motivations of reciprocity often evaluate their answers based on the feedback from all of the groups of people – other answers, questioners, and the community. The most interesting pattern of the strategy distribution of answerers with motivations of reciprocity is that there was no statistically significant relationship with the strategy of selecting questions which no

one else answers. In particular, this strategy has significant relationships with all of the motivations except the motivation of Reciprocity.

The patterns of strategies of answerers with learning, answerers with community interest and answerers with social engagement are very similar to one another. These answerers select questions using all of the strategies listed in the study design except two – confidence or interest in topics and easy questions. They used three types of sources – information searched from the Internet, information heard from someone else, and answers from Yahoo! Answers – in seeking information for answers. They express agreement /disagreement and social/emotional comments in their answers. In evaluating answers, they consider feedback from other answerers and the community.

Personal Gain, the least influential motivation, shows a distinct pattern of relationships with the strategies – quite different from any other motivations. Three out of four strategies related to Personal Gain are question selection strategies. Answerers who intend to take advantage from answers by selling products or services often select difficult questions, questions that no one answers, or, interestingly, questions which intend to obtain the purposed benefit. Thus, answerers with personal gain would like to respond to questioners who want to get benefits from the answers. The one last strategy used by answerers motivated by personal gain was that they use their health expertise as a source of information. This relationship was further discussed in Section 6.3.

6.1.4. Content of Answers

Two major types of health answers – information and opinion – were observed from the collected data of answers. According to the analysis, it was found that three times more information-oriented answers than opinion-oriented answers were produced by answerers. Two additional features included in answers are consistent with the findings from the analysis of the answering strategies. The first is related to the representative statements of answerers for

emotional and social support. Answerers noted their contact information – email addresses, messenger IDs, etc. – in answers in order to further communicate with questioners for clarifying the uncertain meaning of questions or discussing health issues in which they are commonly interested. Additionally, it was observed that answerers often advised questioners to go to see doctors in addition to either information-oriented or opinion-oriented answers.

Answerers' use of different kinds of sources was analyzed as a strategy for seeking information. From the content analysis, it was found that almost half of the answerers (47.6%) cite the sources in their answers. In a previous study (Oh, Oh, & Shah, 2008), the source citation ratio was much lower (7.7%). Two reasons might explain this difference. First, the method for identifying sources in answers from the two studies was different. In the previous study, sources which were noted in a separate section, named "Sources" in Yahoo! Answers, were counted for the analysis. Thus, sources embedded within the text of answers were excluded. This limitation was overcome in the current study. A thorough review of the content of answers allowed me to identify sources hidden in answers, and it resulted in an increase in the source citation ratio. Second, the topic of interest may influence the high ratio of source citation. The current study covered only health answers and investigated the use of sources in health answers, while source citations across all of the topics were available in the previous study. Health answerers may more openly reveal the sources of their answers than answerers in other topic categories, though this cannot be confirmed. A future study of the source citations across topic categories with a thorough review of the answers would be necessary to confirm the difference.

Three kinds of sources were observed in health answers – personal experiences, professional/educational expertise and Websites. In general, the most frequently used source was personal experiences, and it was followed by Websites and professional/educational expertise. The use of all of the three sources was observed in both information-oriented answers and opinion-oriented answers. However, information-oriented answers more frequently included all of the three types of sources than opinion-oriented answers. It seems that many of the opinion-

oriented answers were given without source citation. Also, the patterns of source use were different across different groups of answerers. The use of sources in answers by top answerers and health experts were further investigated and are reported in the following sections.

6.2. Motivations and Strategies of Top Answerers

Top answerers are those who have been recognized by their great contribution to providing good answers in terms of both quality and quantity. One of the most interesting findings about the characteristics of the top answerers is that they more likely to have health expertise than those who are not top answerers. Social Q&A is an open site, in which anyone can be a candidate to be a top answerer, although he/she needs to satisfy conditions such as posting a number of useful answers for questioners as well as the community. It is of major concern to social Q&A users and researchers whether the quality of the answers created by top answerers in this open and anonymous environment is high enough to accept the answers as good sources of information during information seeking and sharing. In this respect, the fact that top answerers more likely have health expertise than non-top answerers provides a chance to re-evaluate the issue of the quality of answers. Of course, we cannot assume that all of the answers produced by top answers have high quality or top answerers with health expertise always produce accurate, complete, and authoritative answers.

The distribution of the 10 motivations across top answerers was similar to the distribution across all of the survey respondents. Altruism was the most influential motivation and it was followed by Enjoyment, Efficacy, Empathy, Community Interest, Social Engagement, Learning, Reputation, Reciprocity and Personal Gain. When the relationship between top answerer status and motivations was evaluated, it was found that top answerers were less motivated than non-top answerers by Empathy and Reciprocity.

Reciprocity may not be important for top answerers because they have not asked questions frequently in social Q&A. According to the descriptive statistics of the number of

answers provided and questions asked by top answerers (N = 36), on average, top answerers produce 12,757.14 answers (SD = 27804.50) as opposed to asking 66.03 questions (SD = 215.16)[23]. As one of the measurements of Reciprocity, it was asked whether answerers provide answers in return for their past experience of receiving answers. Most of the answerers may have had very few chances to ask questions, compared to answering questions. Thus, they may have lower expectations for reciprocity than non-top answerers who may ask more questions than they provide answers. Empathy is an emotional factor of motivation. Top answerers may be less motivated by emotions or feeling that they have toward questioners than non-top answerers because they make judgments based on their health expertise. This conclusion is supported in the data on the use of answering strategies by top answerers.

Among the strategies for seeking information for answering questions, it was found that top answerers use their own health expertise more frequently than those who are not top answerers. Top answerers consider accuracy more frequently than those who are not top answerers. Top answerers more frequently take action to clarify the meaning of questions than those who are not top answerers. As pointed out earlier, a number of answers are produced by a top answerer. Top answerers reuse previously posted answers more frequently than those who are not top answerers, in order to be able to produce that many answers. In evaluating answers, top answerers review other answers to the questions that they have answered less frequently than those who are not top answerers. Also, top answerers review responses from other community members on their answers less frequently than those who are not top answerers. It seems top answerers are not interested in getting feedback on their answers from other answerers or the community. One of the unexpected results of the strategy analysis is that top answerers are more likely to select easy questions than those who are not top answerers. Again, this may be a strategy used to increase the number of answers that can be provided.

[23] The number of total answers given by each top answerer in the sample was investigated and the mean value and standard deviation were reported here. The statistics of 36 top answerers were obtained on July 01, 2010.

The content analysis of answers compared the types of messages and sources of answers used by top answerers and non-top answerers. It was found that top answerers produce more information-oriented answers than non-top answerers, while non-top answerers produce more opinion-oriented answers. As noted earlier, top answerers were more likely to have health expertise than non-top answerers. Thus, it was not surprising that top answerers responded to questions using their professional/educational expertise (in other words, their health expertise) more frequently than non-top answerers. Also, top answerers use Internet sources, which are mostly health-related Websites, more frequently than non-top answerers.

Top answerers have developed various strategies to produce a large number of good quality answers. For some, their health expertise may allow them to produce more information-oriented and authoritative answers than answerers who do not have health background. According to the statistics of source use of top answerers, 31.2% of top answerers exposed their health expertise in answers. Such disclosure may also help them to be recognized as health experts. Top answerers also have developed strategies for producing many answers in a limited time. They select easy questions to answer and reuse answers that they posted before. There is a possibility that the questions are the ones that they already answered several times before, or the questions are about a popular topic that has been repeatedly asked by questioners. The combination of the strategies for producing good quality answers and multiplying the number of answers enables them to be successful as top answerers.

On the contrary, it seems that top answerers have less interest in developing strategies for interacting with other answerers or the community. It may be caused by their intention to have no further interaction with others or by the limitations of the current interfaces of social Q&A, which do not allow answerers to easily come back to all the questions for which they provided answers in order to review the feedback from others. Answerers may revisit every page of the questions manually, but it may not be possible, especially for top answerers who post tens or hundreds of answers per day.

6.3. Motivations and Strategies of Health Experts

Health experts are those who have a career as healthcare professionals in the past or current. The distribution of motivations among health experts was similar to their distribution across the entire sample. Altruism was the most influential motivation and it was followed by Enjoyment, Efficacy, Empathy, Learning, Social Engagement, Community Interest, Reputation, Reciprocity and Personal Gain. Surprisingly, health experts were more motivated by Personal Gain than non-health experts. This result indicates that health experts were more interested in selling their products or services than non-health experts, but it is not known what specific kinds of personal gains these health experts were pursuing.

When selecting questions, health experts consider their confidence and interest in the topic of the question more frequently than those who are not experts. Also, health experts select both easy and difficult/challenging questions more frequently than those who are not experts. It was obvious that health experts use their own health expertise more frequently than non-experts. On the other hand, health experts use their personal experiences with health problems less frequently than those who are not experts. They also use information/experiences heard from someone else and answers posted in Yahoo! Answers less frequently than those who are not experts. Health experts consider the accuracy of the answer more frequently than those who are not experts. However, no relationship between being a health expert and strategies for searching additional sources of information to verify accuracy of answers was statistically significant. Similar to top answerers, health experts less frequently consider reviewing feedback from other answerers on their answers than non-health experts.

The content analysis of answers compared the types of messages and sources of answers used by health experts and non-health experts. There were no statistically significant differences between the two groups in the types of messages produced. Health experts may respond with both information-oriented and opinion-oriented messages without considering them separately.

However, there were statistically significant differences in the use of sources. Health experts used their personal experiences less frequently than non-health experts, while they responded to questions with their health expertise more frequently than non-health experts.

The strategies of health experts were quite similar to top answerers, in that both groups of answerers put effort into producing good quality of answers. Health experts mainly used their health expertise for creating answers. Accuracy was important for them, but they didn't feel a need to search for additional sources to verify accuracy, possibly because they believe that they have enough knowledge to produce accurate answers. Health experts were also less interested in communicating with other answerers. The same interface problem mentioned above may also influence the (lack of) interactions of health experts. One way in which health experts differ from top answerers is that they do not seem interested in developing strategies for producing large numbers of answers. Health experts produce answers without selecting questions based on the difficulty of questions.

6.4. Limitations of the current study

As an exploratory study about answerers, the current study provides a broad understanding of the characteristics of answerers based on motivations and strategies. However, limitations exist.

First, the current study evaluated answerers' motivations and strategies based on the population of Yahoo! Answers users. Yahoo! Answers was chosen because of its popularity as a social Q&A service, but it may be a biased representation of the general population of answerers, because this social Q&A site has particular incentives and mechanisms in place that may attract only a particular subset of all answerers.

Second, due to the limitations of the interface of Yahoo! Answers, the survey was distributed only to those who are available via email communication. Those who have intentionally hidden their email addresses to prevent communication with others were excluded

from the study because there was no alternative way to contact these answerers. The answerers who participated in the current study are more open to further interaction with questioners or anyone else who is accessible via email. Thus, there is a possibility that the characteristics of answerers who were invited to participate in the survey may be more interactive and participatory than other answerers.

Third, the usage of a number of strategies was evaluated and a number of individual significance tests were conducted. The evaluation was effective for investigating the overview of answering behaviors, but there is a possible weakness in this approach, namely, that running many individual significance tests may increase the likelihood of finding a relationship that doesn't really exist.

Fourth, the model of answering behaviors suggested in the current study was incomplete. There were additional motivations and strategies which were mentioned by the survey participants and these were not explicitly reflected in the survey questions when the study was designed. Thus, a gap between the current model and the real motivations and strategies was observed, and there may be additional motivations and strategies which have yet to be discovered.

Fifth, the survey design investigated "what" the motivations and strategies of answerers are, but did not address the questions of "why" answerers have developed such motivations and strategies and "how" these motivations and strategies have evolved while they have been actively involved in answering questions. These remaining questions can be further investigated in future research.

CHAPTER VII. CONCLUSION

Answerers have taken an important role as information providers in online environments as people desire to obtain information and social support from those who have expertise or similar experiences related to the situations they encounter. Little is known, however, of answerers' motivations and behaviors carried out during information seeking and sharing. Therefore, an exploratory study of answerers' motivations and strategies for providing information and social support was conducted to provide insights into and comprehension of the current status of answerers and to shed light on ways to promote effective answering behaviors in the future.

Social Q&A was the most appropriate context to investigate answerers, because it was intentionally designed to support question asking and answering behaviors, and the roles of questioners and answerers and their interactions are easily recognizable. The focus of the current study was answerers in social Q&A, with a special interest in the topic of health. The results of the study revealed that answerers have been influenced by several different kinds of motivations and their motivations have evolved as they accrue more answering experience and their "levels" are upgraded. Answerers have developed their own strategies for providing effective answers, and a variety of answerer groups were identified based on an analysis of these strategies and the relationships among them. According to the evaluation of the relationships between motivations and strategies, it was found that all of the relationships are positive, which indicates that answerers who are strongly influenced by each of motivations more frequently perform each of the strategies. The content analysis of answers identified two major types of health answers –

information and opinion – and the sources cited in these answers. The use of sources of the different groups of answerers was investigated and reported.

This concluding chapter is organized as follows. First, Section 7.1discusses the practical and research implications of the findings from the current study. And then, possible future work is discussed in Section 7.2.

7.1. Implications

7.1.1. Practical Implications

The results of this study have practical implications for promoting the use of social Q&A. Designs and mechanisms that encourage answerers with the motivations and strategies observed from the current study can be developed in several ways. For example, the current social Q&A services have adapted point systems, which enable answerers to build their reputations as higher level answerers or top answerers. The findings, however, indicated that reputation is one of the least influential motivations for answerers. It was also found that answerers motivated by their desire to build a reputation have little interest in the accuracy or completeness of their answers and produce answers from information heard from others, or reuse answers posted in Yahoo! Answers more frequently than other answerers. Thus, encouragement of reputation building may cause the production of many answers with lower quality. Furthermore, answerers in higher levels are less motivated by reputation than answerers in lower levels. All these findings suggest that the current point systems in social Q&A won't be able to contribute much to encouraging further high-quality contributions of answerers and may lead to overall lower quality in the information provided on the site. Therefore, design solutions to encourage answerers with other motivations should be developed.

In the current study, it was found that Altruism, Enjoyment and Efficacy were the top ranked motivations. How can a current social Q&A service be improved to encourage answerers motivated by Altruism, Enjoyment or Efficacy to contribute more in answering questions? First, a

more natural way for answerers to communicate with questioners should be provided. Answerers who are motivated by Altruism would like to be more engaged with questioners and know questioners' situations and experiences related to health problems in detail, in order to provide the most appropriate answers to questioners. It was observed from answerers' strategies that they often posted counter questions to clarify the meanings of questions. Currently, answerers and questioners can personally communicate via email or messenger access, but it is limited to those who make the access enabled. As a solution, an intuitive interface design that supports negotiation between questioners and answerers would assist answerers in more effectively interacting with the questioners. A discussion board can be opened for conversation between questioners and answerers for evaluation of information needs. The process of negotiation can be open to the public, so anyone who has information or social support to share can join the discussion. This re-design will also encourage answerers motivated by Enjoyment or Efficacy. These answerers would like to join discussions of problems or issues that are popular or difficult to solve. The discussion board would let them argue about the topics and issues in which they are interested more freely than if they are expected to provide only a customized answer to a particular question. Another interesting finding from the current study is that all of the answerers, except the ones motivated by personal gain and empathy, have evaluated and reviewed their answers based on feedback from other answerers, questioners or the community. According to the open comments by answerers regarding answer evaluation, they mentioned that they had a hard time tracing their answers and reviewing responses from others in the current interface. A reminder of updates to questions and answers or feedback from others may help answerers to access the responses from others and would be likely to promote social interaction in the community.

Additionally, an observation of the use of sources of answers indicated that the groups of answerers who use personal experiences and health expertise have distinct patterns of answering strategies. Mechanisms to support each group of answerers should be different. The current

profile pages of answerers include numeric indicators of answerers' points or levels and icons only for top answerers. The backgrounds of answerers with health expertise may be easily recognized as they have special icons in their profile pages. Also, a systematic way to display a medical history of answerers in their profile pages may be able to help answerers to refer to their personal and situational experiences in answers. With this exposure of medical history, the privacy of answerers can be an issue. However, some answerers have already explained their background in their profile pages voluntarily, with a subjective description. An optional section which is specially designed for the description of medical history may encourage answerers to provide useful information for answering questions in their profile pages.

The results from the current study can be applied to the promotion of similar types of online services, such as digital reference services and expert Q&A services. In digital reference services, the motivations and strategies of answerers can be compared to those of digital reference librarians. Digital reference librarians can learn from the diverse interests of answerers and apply them in providing answers in their services. Compared to digital reference librarians, social Q&A answerers have developed strategies to emotionally and socially support questioners more promptly in their answers. Answerers with all of the motivations except Reputation and Personal Gain have often expressed their agreement or disagreement with answerers and provide supportive comments. They also have referred answers from other answerers, responses from questioners or comments from community members, and evaluated their answers based on their feedback. These approaches of answerers can be applied to digital reference services, as digital reference librarians create an open and communicative environment in their online services.

The open and interactive environment of social Q&A can be used as a model to improve digital reference services provided by libraries. All of the processes of question asking and answering can be open to the public as it is in social Q&A. This open environment may enable people to easily access questions posted by others. Digital reference librarians may be able to facilitate the participation of other answerers and allow the participants to share information and

support from various groups of answerers. Each question may have one answer from a digital reference librarian and can have a series of other answers from third parties. It also allows answerers to review other answers, respond to questioners' comments, and evaluate their answers based on feedback from the community. Digital reference librarians have participated in providing answers in social Q&A. *Slam the Boards*[24] is one of the online activities in which reference librarians participate in answering questions in popular social Q&A services and encourage discussions among librarians about their experiences of communicating with questioners and other answerers. Digital reference librarians can expose their profession as librarians and URL links to their digital reference services when they provide answers in social Q&A, and inform people that they can obtain information and support from digital reference services. It may allow people to be aware of digital reference services available to them and let them use both social Q&A and digital reference services for seeking information and social support on their everyday problems.

7.1.2. Research Implications

One of the most important implications of the current study is that the results contribute to the body of knowledge about information providing behaviors through investigating the characteristics of answerers. As discussed earlier, the traditional approach of information behavior research has mainly focused on information seeking behaviors. The model of answering behaviors proposed in the current study made a deliberate attempt to turn the attention of researchers to information providing behaviors, and evaluated answerers' motivations and strategies as information providers in online environments. The findings of the current study revealed the dynamic characteristics of answerers with a variety of motivations and strategies, and can be a good foundation for building a theoretical model of information providing behaviors.

[24] Slam the Baords: http://answerboards.wetpaint.com/

Additionally, the research design and methods in the current study can be applied to examine answerers in similar types of settings of online communities and services. The diverse motivations and strategies of answerers in different settings can be compared. The generalized findings from these studies can be used to develop the model of information providing behaviors further. The topic of interest covered in the current study was health, but future studies can and should investigate additional content domains.

The results of the current study revealed not only that answerers have been motivated in a variety of ways to take a substantial part in information distribution, but also that they have developed a variety of strategies for providing answers in online environments. Motivations and strategies of top answerers were different from non-top answerers. Differences were also observed between health experts and non-health experts. Additionally, a wide variety of groups of answerers were identified based on the analysis of their motivations and strategies. Given the fact that a diverse group of answerers is involved in distributing information and offering social support in online environments, future research about answerers should take into account the characteristics of answerers and develop various approaches to investigate the behaviors of answerers.

7.2. Future Research

The findings from the current study can be a foundation on which to build a research agenda for future studies examining social Q&A, as a representative online application which enables people to seek and share information, opinions and support, and collaborate for solving the problems of everyday life. The current study provided some preliminary data about answerers, who are the most essential group of members to produce information and support that is shared in social Q&A. With the basic understanding of answerers that was gained, an in-depth analysis of information providing and sharing behaviors of answerers should be continued to investigate two remaining questions: “why” and “how”. Why do answerers develop their strategies in particular

ways? In what situations do answerers provide information and support in social Q&A? How do answerers evaluate the quality of answers? These, and many other questions about answerers, remain to be answered.

In addition, future research should include an investigation of questioners, another important group of members, who share their problems with the public and seek answers from anonymous others who have expertise or experiences related to their problems. Important research questions related to this group include: What are questioners' information needs that can be addressed with answers from social Q&A? How do questioners evaluate the quality of answers? How do questioners use social Q&A as a source of information? What kinds of strategies do questioners develop to obtain good answers from social Q&A? Furthermore, the relationships between questioners and answerers, which focus on their interactions and collaboration while seeking information and solutions to problems, should be examined.

An immediate follow-up qualitative study of the motivations and strategies of health answerers could be conducted to incorporate the essential findings from the quantitative analysis from the current study. The scope of the subjects can be extended to questioners as well as answerers, but the scope of the subjects can be simultaneously narrowed to a specific issue in health in order to focus on a homogeneous set of situations of information seeking and sharing. A variety of aspects pertaining to questioners and answerers, such as information needs, motivations, attitudes, and strategies of asking and answering questions, as well as their social interaction and collaboration in the context of social Q&A, should be thoroughly examined.

In addition, the current study design and methods can be applied to investigating the motivations and strategies of questioners and answerers in other subtopics in health as well as other topic areas. The scope of research can also be expanded to other contexts for human-oriented Q&A services, such as digital reference services or expert Q&A. The motivations and strategies of digital reference librarians or health experts can be investigated and compared to those of answerers in social Q&A.

APPENDIX A. INVITATION EMAIL TO SURVEY PARTICIPANTS[25]

Dear [Answerer's user ID],

As a top [recent] answerer in one or more of the health categories in Yahoo! Answers, you have been selected to participate in an important study on motivations and strategies for providing health answers online.

Note that this has no relation to Yahoo! Answers. This is an academic research, being conducted as part of my doctoral research at the School of Information and Library Science at the University of North Carolina at Chapel Hill.

It is a 15-minute survey. Upon completing it, you will be eligible to receive one of 4 Amazon gift cards ($50 each) via a random drawing.

Please do the following to participate:

1. Click on the following link or type it into your Web browser: [The survey URL here]

2. On the first page of the survey:
   Enter the following study participant ID: [subject ID]
   Enter your Yahoo! Answers user ID: [user ID]

3. Continue with the rest of the survey.

The proposed study has been approved by the Institutional Review Board at the University of North Carolina at Chapel Hill. Responding to the survey indicates your consent to participate in the study (Click here[26] for more information about the study). Your individual responses will be strictly confidential.

If you have any questions, please contact me via email, shoh@email.unc.edu, or you may contact my faculty advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu.

Thank you for your participation.

Sincerely,
Sanghee Oh
http://www.unc.edu/~shoh

[25] This email will be sent to both top and recent answerers via their open email submission form linked to their profile pages in Yahoo! Answers.

[26] The information sheet will be linked here.

APPENDIX B. REMINDER EMAIL TO SURVEY PARTICIPANTS

Dear [Answerer's user ID],

Recently, I contacted you to request your participation in an important study of answerers in Yahoo! Answers. I am writing to encourage you to respond as soon as possible. Please note that your participation is critical to the success of the study.

If you are willing to participate, please do the following:

1. Click on the following link or type it into the address or location field at the top of the Web browser: [The survey URL here]

2. On the first page of the survey:
   Enter the following study participant ID: [subjected]
   Enter your Yahoo! Answers user ID: [user ID]

3. Continue with the rest of the survey.

It will take you about 15 minutes to complete the survey. In appreciation for your participation, you will be eligible to receive one of 4 Amazon gift cards ($50 each). The four recipients will be selected via a random drawing.

The proposed study has been approved by the Institutional Review Board at the University of North Carolina at Chapel Hill. Responding to the survey indicates your consent to participate in the study (Click here[27] for the Information Sheet). Your individual responses will be strictly confidential.

If you have any questions, please contact me via email, shoh@email.unc.edu, or you may contact my faculty advisor, Dr. Barbara Wildemuth, wildem@ils.unc.edu.

Thank you for your participation.

Sincerely,
Sanghee Oh
http://www.unc.edu/~shoh

[27] The information sheet will be linked here.

APPENDIX C. AN INFORMATION SHEET FOR THE ONLINE SURVEY

IRB Study 10-0071 **Consent Form Version Date:** 2009-01-19

Title of Study: Answerers' Motivations and Strategies for Providing Information and Support in Social Q&A: An Investigation of Health Question Answering

Principal Investigator: Sanghee Oh, MLIS

Faculty Advisor: Barbara Wildemuth, PhD

UNC-Chapel Hill Department: School of Information & Library Science

Study Contact email: shoh@email.unc.edu (Principal Investigator), or wildem@ils.unc.edu (Faculty Advisor)

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

You should print a copy of this information sheet for your records. You should ask the researchers named above, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of the proposed research is to understand the motivations and strategies of people who have provided health answers in a social Q&A service like Yahoo! Answers. The relationship between answerers' characteristics - level of knowledge and experience in health, and level of experience with answering questions - and their motivations and strategies will be examined.

How many people will take part in this study?

The survey questionnaire will be distributed to answerers in the health category of Yahoo! Answers. Approximately 1,000 people will receive this request for survey participation.

What will happen if you take part in the study?

The survey consists of 4 sections: your experiences, motivations, and strategies for answering questions, and demographics. You will be asked to indicate your level of agreement or disagreement with statements about motivations and strategies for answering health questions. There are also open-ended questions to ask your personal opinions.

How long will your part in this study last?

The questionnaire will take about 15-20 minutes to complete.

What are the possible benefits from being in this study?

You may not receive any direct benefit from being in the proposed study. Society (in particular, those who provide social Q&A services or similar services) will benefit through the findings from the study by being able to improve the quality of their services and interfaces. The proposed study of answerers will be a significant endeavor in promoting the use of social Q&A. This study will be beneficial to Internet users in investigating the intentions and attitudes of answerers who distribute knowledge and information in the domain of health and in evaluating the current status of social Q&A services

What are the possible risks or discomforts involved from being in this study?

We do not think you will experience any discomfort or risk from completing the questionnaire.

How will your privacy be protected?

The individual responses with the collected questions and answers will be used only for the purpose of the current research and analyzed confidentially. There is a possibility that user names in Yahoo! Answers may be revealed when their answers are quoted in the publications of the current research. Someone may use the exact quote found in the publications to search information on Yahoo! Answers. Therefore, a section granting permission to quote their answers in the publications is included at the end of the survey. If you do not grant this permission, you will not be excluded from the study, but your answers will not be quoted in publications of the study results.

Will you receive anything for being in this study?

At the end of the survey, you will be asked to provide your email address for participating in a drawing to receive one of four $50 Amazon.com gift cards. Your email address will be stored separately from your survey responses, so your responses will remain confidential.

Will it cost you anything to be in this study?

There are no costs for being in the study, other than your time.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have a question, please do not hesitate to contact me (Sanghee Oh, shoh@email.unc.edu) or my faculty advisor (Barbara Wildemuth, wildem@ils.unc.edu).

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the UNC-CH Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Thank you for helping us with this study. If you are willing to participate, please do the following:[28]

1. Click on the following link or type it into the address or location field at the top of the Web browser: [The survey URL here]

2. On the first page of the survey:
   Enter the study participant ID in your invitation email.
   Enter your Yahoo! Answers user ID in your invitation email.

[28] When the survey participants read this information sheet, they can go directly to the survey from here.

3. Continue with the rest of the survey.

If you have any questions about the study, please do not hesitate to contact me via email, shoh@email.unc.edu, or you may contact my advisor, Barbara Wildemuth, wildem@ils.unc.edu. Thank you for your participation.

APPENDIX D. SURVEY QUESTIONNAIRE[29]

Welcome!

Thank you for being willing to participate in the survey! This is a survey about the motivations and strategies used by people who have answered questions in the Health category of Yahoo! Answers.

The survey consists of 4 sections: your experiences, motivations, and strategies for answering questions, and demographics. At the end of the survey, you will be asked to provide your email address for participating in the lottery to receive one of four $50 Amazon.com gift cards. Your email address will be stored separately from your survey responses, so your responses will remain confidential. If you have a question, please do not hesitate to contact me (Sanghee Oh, shoh@email.unc.edu) or my faculty advisor (Barbara Wildemuth, wildem@ils.unc.edu).

Before you start the survey, please click appropriate box below.[30]

I'm 18 years old or older I'm under 18 years old

Your Identification Information

Your subject ID and Yahoo! Answers ID in the survey invitation email need to be entered in this section. They will only be used to connect your survey responses with your health answers that are publicly available in Yahoo! Answers. The data analysis will proceed anonymously.

Copy your subject ID from the survey invitation email and paste it here.

( )

Copy your Yahoo! Answers ID from the survey invitation email and paste it here.

( )

Thank you for the identification information. Please click NEXT to start the survey.

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[29] The current version of the survey questionnaire is pre-tested by eight social Q&A answerers during December, 2009.

[30] When a participant says 'yes', the survey system will be forwarded to the next question. If he/she says 'no', the survey will be stopped and ask the participant to close the survey questionnaire.

Your Background Knowledge and Experience
in Answering Health Questions in Yahoo! Answers

What is your primary occupation?

- Student
- Educator
- Homemaker
- Health Care/Medical Professional
- Technical Professional
- Clerical/Administrative
- Sales
- Self-employed
- Retired/Not working
- Other. Please specify.

If your occupation is health-related, please specify.

- Clinical laboratory technologists and technicians
- Chiropractors
- Dentists
- Dietitians and nutritionists
- Occupational therapists
- Optometrists
- Pharmacists
- Physical therapists
- Physician and surgeons
- Radiation therapists
- Registered nurses
- Other. Please specify.
- My occupation is not health-related.

On average, how much time do you spend actively online per day? (in hours)

Of the time per day that you noted in the previous question, how much is spent answering questions in Yahoo! Answers? (percentage)

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

How many times did you answer health questions in Yahoo! Answers, per week? (number of times)

How long did you typically spend answering a health question on Yahoo! Answers, per session? (in minutes)

What kinds of health-related background did you mostly use when you answered health questions in Yahoo! Answers during the past 2 months? Please select all that apply and then explain them briefly in the text boxes.

- ☐ My expertise as a health care professional
- ☐ My knowledge about health issues
- ☐ My personal experiences of having health problems
- ☐ My personal experiences of knowing someone who is an expert in health
- ☐ My personal experiences of knowing someone who has health problems
- ☐ Information that I heard from someone else
- ☐ Information that I found from the Internet
- ☐ Other. Please specify.

In the past 2 months, did you ever search for additional information online to help you answer a health question on Yahoo! Answers?

- Yes[31]

  How long did you typically spend searching for additional information online to help you answer a health question on Yahoo! Answers? (in minutes)

- No

On which other services, in addition to Yahoo! Answers, did you answer questions in the past 2 months? Please select all that apply.

- None
- AnswerBag
- Askville
- Nave Knowledge-iN
- WikiAnswers
- Others. Please specify.

Please click NEXT to move to the motivation section.

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[31] When a participant says 'yes', the survey system will bring the sub question. If he/she says 'no', the survey will move to the next question.

Your Motivations for Answering Health Questions[32]

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer questions below.

Think about **why you answered health questions**. And then, please indicate how much you agree with the statements below.

"**I answered questions because...**".

* Personal factor: Enjoyment[33]
** Personal factor: Self-efficacy

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
It is fun.[34]*	○	○	○	○	○	○
I enjoy sharing my knowledge with others.[35]*	○	○	○	○	○	○
I enjoy sharing my experience with others.[36]*	○	○	○	○	○	○
I enjoy sharing my thoughts with others.[37]*	○	○	○	○	○	○
It is my hobby.[38]*	○	○	○	○	○	○
It gives me a feeling of accomplishment.[39]**	○	○	○	○	○	○
It gives me a feeling of competence.[40] **	○	○	○	○	○	○
It gives me a feeling of	○	○	○	○	○	○

[32] The scales measuring the motivations and strategies of each factor were adapted from a number of previous studies, but they were modified to be tested in the context of health question answering in social Q&A. The footnote in each statement of the measure indicates the previous studies which have been used to develop the survey questionnaire. When the survey is administered, the footnote information won't be provided.

[33] The * sign indicates related motivational and strategic factors which will be tested in the proposed study. The information of * signs is available at the top of each table. When the survey is administered, the * sign information won't be provided.

[34] Hars & Ou (2002); Lakhani & von Hippel (2003)
[35] Hars & Ou (2002); Kankanhalli et al. (2005)
[36] Hars & Ou (2002); Kankanhalli et al. (2005)
[37] Hars & Ou (2002); Kankanhalli et al. (2005)
[38] Lakhani & von Hippel (2003)
[39] Hars & Ou (2002)
[40] Hars & Ou (2002)

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
effectiveness.[41] **						
I'm confident in my ability to provide information that others consider valuable. **	○	○	○	○	○	○

Please click NEXT to move to the next section.

Continue to think about **why you answered health questions during the past 2 months**. And then, please indicate how much you agree with the statements below.

I answered questions because...

* Personal factor: Learning
** Personal factor: Personal Gain

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
I want to learn about the health issues in which I'm interested.*	○	○	○	○	○	○
I want to know about new health issues.*	○	○	○	○	○	○
I want to learn about what kinds of health problems people have. *	○	○	○	○	○	○
I want to learn about my health issues.*	○	○	○	○	○	○
I want to learn about the health issues of my acquaintances.*	○	○	○	○	○	○
I want to learn about health issues in my field of expertise.*	○	○	○	○	○	○
I want to advertise a certain business. **	○	○	○	○	○	○
I want to advertise a certain online community. **	○	○	○	○	○	○
I want to sell products.[42] **	○	○	○	○	○	○
I want to sell services.**	○	○	○	○	○	○

[41] Hars & Ou (2002)
[42] Hars & Ou (2002)

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
It is a part of my job. **	○	○	○	○	○	○

Please click NEXT to move to the next section.

Continue to think about **why you answered health questions during the past 2 months**. And then, please indicate how much you agree with the statements below.

I answered questions because...

* Social factor: Altruism
** Social factor: Community Interest

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
I enjoy helping others.[43]*	○	○	○	○	○	○
I want to help others by sharing my experience.*	○	○	○	○	○	○
I want to help others by sharing my knowledge. *	○	○	○	○	○	○
People should help each other.[44]*	○	○	○	○	○	○
It promotes discussion about the health topic in which I'm interested.[45] **	○	○	○	○	○	○
It promotes discussion about the health problems that I have. **	○	○	○	○	○	○
It promotes discussion about the health problems that my acquaintances have. **	○	○	○	○	○	○
It promotes discussion about the health area in which I have expertise. **	○	○	○	○	○	○
It promotes Yahoo! Answers**.	○	○	○	○	○	○
It promotes discussion in the health community of Yahoo!	○	○	○	○	○	○

[43] Hars & Ou (2002); Wang & Fesenmaier (2003); Lakhani & von Hippel (2003); Kankanhalli et al.(2005); Wasko and Faraj (2000)
[44] Hars & Ou (2002)
[45] Lakhani & von Hippel (2003)

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable

Answers.

Please click NEXT to move to the next section.

Continue to think about **why you answered health questions during the past 2 months**. And then, please indicate how much you agree with the statements below.

I answered questions because...

* Social factor: Empathy

	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree	Not Applicable
It helps me feel engaged in a community.	○	○	○	○	○	○
I want to be a part of the health community of Yahoo! Answers.	○	○	○	○	○	●
I want to communicate with someone.	○	○	○	○	○	○
I want to communicate with the questioner in particular.	○	○	○	○	○	○
I empathize with those who have health problems.*	○	○	○	○	○	○
I empathize with those who have similar health problems as mine.*	○	○	○	○	○	○
I empathize with those who have similar health problems as my acquaintances.*	○	○	○	○	○	○
I empathize with those who are emotionally depressed. *	○	○	○	○	○	○
I empathize with those who are desperate.*	○	○	○	○	○	○
Questioners may not receive a good answer if I do not offer it.[46]*	○	○	○	○	○	○

Please click NEXT below to move to the next section.

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[46] Lakhani & von Hippel (2003)

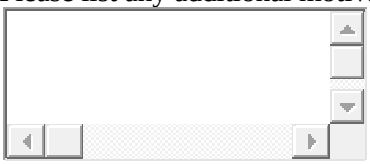
Continue to think about **why you answered health questions during the past 2 months**. And then, please indicate how much you agree with the statements below.

I answered questions because...

* Social factor: Reputation
** Social factor: Generalized Reciprocity

	Not Applicable	Strongly Disagree	Somewhat Disagree	Neither Disagree Nor Agree	Somewhat Agree	Strongly Agree
I receive points from Yahoo! Answers.*	○	○	○	○	○	○
It raises my level in Yahoo! Answers. *	○	○	○	○	○	○
I want to be a top answerer. *	○	○	○	○	○	○
It enhances my reputation in Yahoo! Answers.*[47]	○	○	○	○	○	○
It enhances my reputation in the health community of Yahoo! Answers. *	○	○	○	○	○	○
The particular questioner will help me when I ask questions. **	○	○	○	○	○	○
Other people will help me when I ask questions in Yahoo! Answers.**[48]	○	○	○	○	○	○
Other people answered my questions in the past and I want to return the favor by answering questions. **	○	○	○	○	○	○
It will encourage the questioner to "pay it forward" as he/she answers other questions.[49] **	○	○	○	○	○	○

Please list any additional motivations you have and explain them.



[47] Hars & Ou (2002); Kankanhalli et al. (2005); Lakhani & von Hippel (2003); Wasko and Faraj (2005)
[48] Kankanhalli et al. (2005); Lakhani & von Hippel (2003); Wang & Fesenmaier (2003); Wasko and Faraj (2005)
[49] Lakhani & von Hippel (2003); Wasko and Faraj (2005)

Thank you for your input in the motivation section.

Please click NEXT to move to the section on the strategies you use to answer questions.

Your Strategies for Answering Health Questions

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Think about what you did **when you SELECTED health questions to answer**. And then, indicate how frequently you did each of the things listed below.

I selected health questions to answer when...

	Never	Rarely	Sometimes	Often	Always	Not Applicable
The topic matched my interests.	○	○	○	○	○	○
I was confident in my knowledge.	○	○	○	○	○	○
I was confident due to my experiences.	○	○	○	○	○	○
The questions challenged me.	○	○	○	○	○	○
The questions were easy.	○	○	○	○	○	○
The questioners asked for information on behalf of someone else.	○	○	○	○	○	○
The questions were recently posted.	○	○	○	○	○	○
No one had answered yet.	○	○	○	○	○	○

Please click NEXT to move to the next section.

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Continue to think about what you did **when you SELECTED health questions to answer**. And then, indicate how frequently you do each of the things listed below.

I selected health questions to answer when....

	Never	Rarely	Sometimes	Often	Always	Not Applicable
I agreed with the questioners.	○	○	○	○	○	○
I disagreed with the questioners.	○	○	○	○	○	◉
The questioners were polite.	○	○	○	○	○	○
The questioners were impolite.	○	○	○	○	○	○
The questioners were nice.	○	○	○	○	○	○
The questioners were humorous.	○	○	○	○	○	○
The questioners were depressed.	○	○	○	○	○	○
The questioners were desperate.	○	○	○	○	○	○
The questioners were aggressive.	○	○	○	○	○	○
The questioners were selling products.	○	○	○	○	○	○
The questioners were advertising their businesses.	○	○	○	○	○	○
The questioners asked homework question.	○	○	○	○	○	○

Please share your strategies for selecting health questions to answer, if they were not covered in the the statements above.

Please click NEXT to move to the next section.

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Think about what you did **when you READ the health questions posted in Yahoo! Answers**. And then, please indicate how frequently you did each of the things listed below.

When I read health questions...

	Never	Rarely	Sometimes	Often	Always	Not Applicable
I observed the flow of topics in the health categories.	○	○	○	○	○	○
I researched health topics in order to provide useful answers to	○	○	○	○	○	○

	Never	Rarely	Sometimes	Often	Always	Not Applicable
questioners.						
If I did not understand the question, I answered the question anyway.	○	○	○	○	○	○
If I did not understand the question, I posted questions in the answer section and asked the questioner to clarify the meaning of the question.	○	○	○	○	○	○
If I did not understand the question, I asked for clarification from the questioner, and then I came back to that question later to answer it.	○	○	○	○	○	○

Please share your strategies for interpreting questions to answer, if they were not covered in the statements above.

Please click NEXT to move to the next section.

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Think about what you did **when you SOUGHT INFORMATION to answer health questions**. And then, please indicate how frequently you did each of the things listed below.

I answered questions based on...

	Never	Rarely	Sometimes	Often	Always	Not Applicable
Information I know.[50]	○	○	○	○	○	○
My personal experience of having health problems.	○	○	○	○	○	○
My expertise as a health care professional.	○	○	○	○	○	○

[50] Lakhani & von Hippel (2003)

	Never	Rarely	Sometimes	Often	Always	Not Applicable
Information that I heard from someone else.	○	○	○	○	○	○
Experiences that I heard about from someone else.	○	○	○	○	○	○
Information that I researched from the Internet.[51]	○	○	○	○	○	○
Answers that I found from Yahoo! Answers.	○	○	○	○	○	○

Please share your strategies for seeking information to answer questions, if they were not covered in the statements above.

Please click NEXT below to move to the next section.

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Think about what you did **when you CREATED your health answers**. And then, please indicate how frequently you did each of the things listed below.

When I created my answers to health questions...

	Never	Rarely	Sometimes	Often	Always	Not Applicable
I considered the accuracy of my answers to be important.	○	○	○	○	○	○
I verified the accuracy of my answers by consulting additional sources.	○	○	○	○	○	○
I considered the completeness of my answers to be important.	○	○	○	○	○	○
I searched for better answers, even after finding one or more possible	○	○	○	○	○	○

[51] Lakhani & von Hippel (2003)

	Never	Rarely	Sometimes	Often	Always	Not Applicable
solutions for questions.						
I maintained a neutral attitude in my answers.	○	○	○	○	○	○
I provided personal comments to support the questioner emotionally.	○	○	○	○	○	○
I provided personal comments to encourage the questioner.	○	○	○	○	○	○
I expressed my agreement with the questioners.	○	○	○	○	○	○
I expressed my disagreement with the questioners.	○	○	○	○	○	○
I used answers that I had created before.	○	○	○	○	○	○
I copied and pasted the answers that I had created before.	○	○	○	○	○	○
I created new answers, without referring to answers I created in the past.	○	○	○	○	○	○

Please share your strategies for creating your answers, if they were not covered in the statements above.

Please click NEXT below.

To answer the following questions, think about your experiences in answering health questions in Yahoo! Answers during the past 2 months, and then answer the questions below.

Think about what you did **AFTER you answered health questions.**

After you answered a health question, did you come back to that particular question later?

- ○ Yes[52]

[52] When a participant says 'yes', the survey system will bring the next two questions. If he/she says 'no', the survey will skip the next two questions.

- ○ No

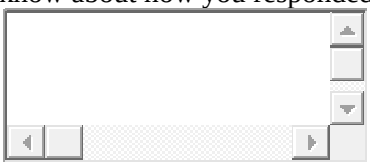
Please indicate how frequently you did each thing listed below.

After I answered a health question, I came back to the question later because...

	Never	Rarely	Sometimes	Often	Always	Not Applicable
I wanted to see other answers.	○	○	○	○	○	○
I wanted to ask the questioner whether he/she was satisfied with my answer.	○	○	○	○	○	○
I wanted to see the questioner's comment on my answer.	○	○	○	○	○	○
I wanted to see other comments on my answer.	○	○	○	○	○	○
I wanted to see whether others agreed with my answer.	○	○	○	○	○	○
I wanted to see whether others disagreed with my answer.	○	○	○	○	○	○
I wanted to see whether my answer was selected as best answer.	○	○	○	○	○	○
I wanted to see whether my answer was "Thumbs-up" or "Thumbs down".	○	○	○	○	○	○

Please describe additional reasons that you came back to the question.

Before proceeding to the background questions, please tell us anything else you would like us to know about how you responded to health questions in Yahoo! Answers.



Thank you for completing the questions about your strategies. Please click NEXT to move to the demographic information section.

Your Background Information

What is your sex?

- Male
- Female

How old are you (in years)?

What is your highest level of education?

- 12th grade or less (no diploma)
- High school diploma
- Some college, no degree
- Vocational/technical school (2 year)
- Bachelor's degree
- Master's degree
- Doctoral degree
- Professional degree (MD, JD, etc.)
- Other. Please specify.
- Would rather not say.

In which group would you classify yourself? (Select all that apply)

- ☐ Asian/Pacific Islander
- ☐ Black/African American
- ☐ Hispanic/Latino
- ☐ White/Caucasian
- ☐ Other. Please specify. _____
- ☐ Would rather not say.

What is your current household income in U.S. dollars?

- ○ Less than $24,999
- ○ $25,000 - $49,999
- ○ $50,000 - $74,999
- ○ $75,000 - $99,999
- ○ $100,000 or more
- ○ Would rather not say.

Please click NEXT to move to the final section.

Additional Information

As you are already aware, all of the questions and answers posted in Yahoo! Answers are open to the public. Anyone may come to visit Yahoo! Answers and search for answers. Therefore, we would like to collect questions and answers posted by you, connect them to your survey responses and conduct further analysis of motivation and strategies.

Your individual responses with the collected questions and answers will be strictly used for the purpose of the current research and analyzed confidentially. However, there is a possibility that your user name in Yahoo! Answers may be revealed when your answers are quoted in the publications of the current research. Someone may use the exact quote found in the publications to search information on Yahoo! Answers. Therefore, please indicate your permission to quote your answers in the publications related to the current research.

- ○ Yes. I allow the researcher to quote my answers in her publications.
- ○ No. I do not allow the researcher to quote my answers in her publications.

As appreciation for your participation, you will be eligible to receive one of four American gift cards ($50 each). The four recipients will be selected via a random drawing. If you want to participate in the drawing, please indicate your email address here. Your email address here will be used only for the drawing; it will not be included in the study data.

_____

If you are interested in the results of the study, please indicate your email address below. A link of the Website with the study results will be sent to you within 6 months. Your email address here will be used only for the distribution of the study results; it will not be included in the study data.

Please click NEXT to complete the survey.

Thank you for your time and effort filling out the survey.

Your responses will contribute to understanding the characteristics of answerers in the domain of health in online Q&A communities. If you have a question, please do not hesitate to contact me (Sanghee Oh, shoh@email.unc.edu) or my faculty advisor (Barbara Wildemuth, wildem@ils.unc.edu).

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